

~~FOR OFFICIAL USE ONLY~~

MC02 FINAL REPORT



This is an internal document that is deliberative in nature and contains subjective evaluations, opinions and recommendations. Distribution is authorized to US government agencies only. Requests for public release or disclosure to foreign governments shall be referred to CDR, US Joint Forces Command, Norfolk, VA 23551-2488.

(This Page Blank)



USJFCOM

United States Joint Forces Command

a message from ADM Giambastiani...

Millennium Challenge 2002, the largest-ever joint experiment conducted by the United States, was a major milestone in a concept development process that began in 1999 and continues today. The scale and scope of the experiment was aggressive. But it had to be aggressive, to allow us to assess warfighting concepts using real operational headquarters.

This remarkable effort, more than two years in the making, included over 13,500 soldiers, sailors, airmen and marines, operating from 25 locations across the United States. They were placed in an operational environment that integrated live and computer-simulated forces operating in a complex scenario that gave us the most extensive and realistic assessment of our concepts to date.

MC02 took place at the end of the summer in 2002. The conclusions that were drawn from the experiment were current as of August 2002. Since then, a lot has changed. We have had time to incorporate lessons learned into our experiments and operations. We have recognized the potential of the concepts that were experimented with, and have enough confidence to field prototypes today that are fundamentally changing the way joint forces communicate and plan vertically and horizontally, how they view the battlespace, how joint task forces are formed, and how they train.

As this report is being published, U.S. Joint Forces Command is helping combatant commanders implement Collaborative Information Environments, providing training on Effects-Based Operations and helping implement real-world Operational Net Assessments. It is organizing and training Standing Joint Force Headquarters elements to improve pre-crisis planning and to speed the formation of joint task forces.

The challenge now is for the military to find ways to institutionalize the changes required to implement the successful concepts while we continue our work refining the others and developing new concepts. We must march ahead through a continuing experimental campaign, building on the lessons from MC02, to ensure the continued superiority of the United States Armed Forces to meet any threat when our nation calls.

Edmund P. Giambastiani, Admiral, USN
Commander, U.S. Joint Forces Command

PROTOTYPE	PROTOTYPE PARTNERS	WORKING
Standing Joint Force HQ	PACOM, CENTCOM	SOUTHCOM, EUCCOM, NORTHCOM, STRATCOM, TRANSCOM, SOCCOM
Operational Net Assessment	PACOM, CENTCOM, USFK, DARPA	SOUTHCOM, NORTHCOM, SOCCOM
Joint Interagency Coordination Group	PACOM, CENTCOM, USFK, IDA-OED	SOUTHCOM, STRATCOM, TRANSCOM, SOCCOM
Joint Logistics (Common Relevant Operating Picture)	USFK	NORTHCOM
Effects-based Operations	CENTCOM, USFK	
Collaborative Information Environment	PACOM, CENTCOM, USFK	SOUTHCOM, SOCCOM
Joint Fires Initiative	CENTCOM, USFK	PACOM

(This Page Blank)

Executive Summary

Introduction

Millennium Challenge 2002 was a congressionally mandated, operational-level, joint experiment that combined live forces with virtual and constructive simulation. MC02 was conducted by the U.S. Joint Forces Command (USJFCOM) in July and August 2002, and was the culmination of a series of joint experiments. Spanning more than two years, it was designed to assess the ability of a Joint Task Force (JTF) to execute the Rapid Decisive Operations (RDO) war-fighting concept in this decade given a set of enabling and supporting concepts. The hypothesis for the experiment is shown in the box at right. MC02 assessed the RDO enabling concepts of Standing Joint Force Headquarters (SJFHQ), Effects-Based Operations (EBO), and Operational Net Assessment (ONA). The RDO supporting concepts Collaborative Information Environment (CIE), Joint Interagency Coordination Group (JIACG), Joint Theater Logistics Management (JTLM), and Joint Intelligence, Surveillance and Reconnaissance (JISR), were also assessed. In addition, the experiment included assessment of 20 joint initiatives, such as the joint fires initiative (JFI) and Joint Enroute Mission Planning System (Near-term) (JEMPRS-NT) that were not directly in support of RDO, but were focused on improving specific JTF processes.

Hypothesis:

If an enhanced joint force headquarters is informed by an Operational Net Assessment and employs Effects Based Operations which use the full range of our national capabilities; then the 2007 joint force will be able to conduct Rapid Decisive Operations against a determined 2007 adversary.

MC02 capitalized on over two years of detailed conceptual work, as well as a number of wargames, and meticulous post-event analysis. MC02's successful concepts were shared with senior level defense decision makers, and are now in the process of being fielded to support today's forces. This executive summary provides an overview of the findings and recommendations resulting from MC02 experimentation, as well as the assessment methodology, the scenario, and organization of the final report.

General Findings

The warfighting ability of the joint force was greatly enhanced by the application of the experimental concepts. The CIE contributed significantly to the JTF's ability to understand the situation, accelerated and improved the planning process, and made the exhibited benefits of all other concepts possible. The experimental SJFHQ allowed the JTF to form faster and increased its situational awareness. EBO and JIACG increased the options available to the joint force and ensured they were harmonized with actions from other government agencies. The ONA process helped the JTF evaluate enemy, friendly, and neutral forces as a single inter-related system. This allowed the force to plan actions designed to achieve intended effects while identifying potential unintended effects. However, the experimental tools provided to support the ONA process were not sufficient to support RDO.

Targeting and sustainment were improved by the increased ability of the force to collaborate and share information using the CIE. The JISR concept increased the JTF's ability to synchronize intelligence, surveillance, and reconnaissance operations, but the tools provided require more development before fielding.

The JTF, however, was not able to achieve the full power expected of the RDO concept.

General Findings

- CIE improved communications and situational understanding in the JTF...
- CIE enabled the other concepts...
- SJFHQ allowed JTF to form quickly and improved planning ...
- JIACG informed commander of interagency concerns and harmonized actions...
- EBO increased the options available to the JTF...
- ONA enabled JTF to view the enemy, friendly and neutral players as a single system...
- Although JTF performance increased, RDO was not achieved ...

RDO requires the complete integration of several supporting operational concept elements including dominant maneuver, precision engagement, information operations, rapid force deployment and agile sustainment. These five operational concept elements were not complementary due to immature effects assessment tools, assessment procedures, and the fragmented nature of information operations doctrine, training and the inflexibility of the deployment and sustainment systems.

Specific Findings by Assessment Area

Collaborative Information Environment

The CIE, consisting of the InfoWorkSpace (IWS), SharePoint Portal Server (SPPS), and the Automated Deep Operations Coordination System (ADOCS), gave the joint force unprecedented ability to share information. The JTF was required to use these common systems provided by USJFCOM. System commonality was as important as system capability in enabling information sharing and the building of situational awareness and understanding. As a result, information was disseminated across the force more quickly than in previous operations or exercises.

Consequently, overall situational awareness/understanding was greater than that seen in previous exercises or operations. In addition, targeting was greatly improved because all tactical headquarters could see the same targets, allowing the commanders to “nominate” the use of their assets to attack. This kind of bidding process was unexpected prior to the experiment. Lastly, an informal information-checking process emerged that quickly filtered bad information from the system.

The increased quantity of information-exposed requirements demands much greater bandwidth or the application of commensurate bandwidth reduction techniques than has previously been available to JTFs. In addition, improved information visualization tools are needed for effective presentations to decision-makers, if the concept is to reach its full potential. The success of the CIE indicates that investment in common collaborative and communications systems for JTF's is warranted. Part of the success of the CIE was because it was developed by a single agency to be interoperable. This indicates that future communication systems should follow the same model and joint communications systems be built by a single command.

CIE Findings —

- Required common systems ...
- Enabled SJFHQ and JIACG collaboration ...
- Enabled integrated Effects Based Planning at JTF level and the components ...
- Improved targeting and JISR operations ...
- Increased integration of logistics with ops planning...

SJFHQ

The SJFHQ element improved the formation of a JTF by bringing specific regional knowledge, experience with the collaborative tools, and joint experience to a single-service headquarters. The organization and manning of the SJFHQ will require minor adjustment, but the concept allowed an Army corps headquarters to transition to a JTF headquarters more quickly than has been the experience in previous operations and exercises, without the cost of maintaining a permanently formed joint headquarters.

Effects-Based Operations

EBO showed immense potential by greatly broadening the number and type of operational tools available to JTF commanders, including non-military elements of national power and by empowering subordinate commanders to plan and achieve desired effects. Although non-military effects in “Diplomatic, Informational, and Economic” domains were planned and executed

by the JTF, assessment of those effects was difficult, handicapping the execution of the RDO concept. Assessment tools for these “soft” effects, such as determining the will or the economic capability of an adversary, are required to enable EBO to be practiced by a joint force. Those tools must also help the commander, and his staff, identify unintended consequences of achieving desired effects, so they can be mitigated. The experience of this JTF also indicated that EBO planning processes must be included in military training courses from the earliest stage to foster its use at the operational level. A headquarters cannot begin thinking in this way when it forms a JTF headquarters. This has to be a habitual thought process honed through training, experience, and education in Service and joint professional military education (PME) programs.

Joint Interagency Coordination Group

The JIACG exhibited its usefulness in assisting the combatant commander to integrate non-military elements of national power with the interagency community. Elements not under the JTF commander’s control, such as diplomatic initiatives, were coordinated with military actions to achieve desired effects. When the elements could not be coordinated, interagency experts quickly made the combatant and JTF commander aware of potential unintended consequences. The JIACG, as it was designed for the MC02 warfighting scenario, was most properly positioned as an adjunct to the combatant commander’s staff, since most of the non-military effects are at that level of responsibility. However, the collaboration tools allow for effective and persistent dialogue between the JTF staff, the combatant command, the JIACG, and their counterparts in the United States.



The Pacific Ocean, Aug. 2, 2002 — An MH-60S Knighthawk multi-mission helicopter makes an approach to the experimental high-speed vessel off southern California during MC02.

Operational Net Assessment

The ONA concept provided a useful process with which to view enemy, friendly, and neutral forces as a seamless system of systems. It helped the JTF identify desired effects and determine the required actions needed to bring about those effects. It also helped the JTF consider possible unintended actions. Its value was somewhat mitigated by lack of clear concept definition and understanding. In fact, the concept embodied both a process and a product. It also was a valuable resource for those involved in JTF planning, even though it required tools to access its information. Finally, there was an ONA organization aspect for MC02; a system of systems analysis (SOSA) cell was developed to design, build, and update the experiment's ONA knowledge base. Depending on context, the ONA acronym alone could cause confusion. The tools provided to access and use ONA were insufficient and required extensive work before fielding. While refinement of the process used to generate and maintain data is essential to ONA's future, a top priority of this challenge should be to develop a tool that allows the JTF to visualize the interrelationship of the systems. ONA, like EBO, requires education at all levels to effectively integrate it into operations. This thought-process should be incorporated in all Service and joint schools.

Joint Fires Initiative

Targeting was greatly improved by the use of the CIE. Tactical-level targets were presented in a common picture that allowed all functional component commands to see them and nominate kill mechanisms. For instance, a special operations team might detect a high value target such as a mobile SCUD. At the same time, the land component may have an attack helicopter armed and available to attack the target, and the air component may have an appropriate aircraft similarly available. Additionally, if necessary, the common picture enabled the functional components to quickly coordinate and task the most appropriate shooter to attack emerging, time critical targets. The JTF targeting cell could direct the most available and most appropriate shooter to destroy the target without a cumbersome process of manually passing the target information across components. The experiment's communications systems functioned seamlessly, automatically sharing the targets with all components.

Joint Theater Logistics Management

Joint Theater Logistics Management (JTLM) was similarly improved through use of the CIE. The logisticians used an SPPS display that contained a watchboard, which displayed continuously updated logistics information for operators and logisticians to use as a decision-aid. Logisticians were integrated into the operations and plans groups. This improved situational awareness and increased the responsiveness of deployment and sustainment planning to the operation, but it made some senior leaders uneasy that there was no single logistics point of contact equivalent to the director of plans and director of operations.

ONA Findings —
➤ **ONA provided a useful process with which to view enemy, friendly, and neutral forces as a seamless system ...**

JFI Findings —
➤ **Targeting was greatly improved by the use of the CIE...**

JTLM Findings —
➤ **JTLM was similarly improved through use of the CIE...**

JISR Findings —
➤ **JISR improved synchronization of ISR operations and increased support to operations ...**

Joint Intelligence Surveillance and Reconnaissance

The JISR concept, combined with the ability of ISR planners and operators to collaborate through the CIE, improved synchronization of ISR operations and increased ISR support to operations. However, the emulated tools provided were too immature to support the concept.

Rapid Decisive Operations

Despite the improvement in synchronization and collaboration outlined above, the full power of RDO was not realized due to an inability to incorporate information operations (IO). IO were hindered by the JTF's inability to assess non-military effects, inadequate IO doctrine, organization and training, and authority for IO being retained at too high a level. RDO was also hampered by a deployment and sustainment system unsuited to support a fast-changing operational environment.

For RDO to be both rapid and decisive, it requires that dominant maneuver, precision engagement, and IO be complementary to achieve synergy. Precision fires must enhance maneuver and maneuver must exploit the effects of precision fires to be truly dominant. Likewise, IO helps identify targets that will result in a reduction of an adversary's cohesion. Elements of IO such as deception and psychological operations mask the pattern of maneuver and fires to increase the problem set for an adversary and to increase the shock effect of those operations. IO was not integrated into the overall operation, despite the best efforts of the Blue players. This allowed the adversary to mass forces near targets it perceived as critical to Blue, attempting to use them as bait to draw Blue into unfavorable engagements.

The inadequate effects assessment process and tools discussed in the EBO section above was key to the problems encountered in IO. Without adequate processes and tools to determine the value of an information campaign or to identify the unintended consequences of that campaign, IO cannot be integrated into the more straightforward operational concepts of precision engagement or dominant maneuver.

IO doctrine, organization, and training are not coherent for effective use at the joint force commander level. There is no organization at the JTF responsible to integrate the elements of IO. Throughout the experiment, as the JTF increasingly understood RDO's reliance on IO, it increased the responsibility on the IO planner until he briefed alongside the functional component commanders. However, no organization existed to enable the IO planner to coordinate IO. A Joint Psychological Operations Task Force coordinated psychological operations, but responsibility for the other elements of IO was fragmented across the JTF. No coherent training program exists to develop IO leaders.

RDO Findings —

- **The full power of RDO was not realized due to an inability to incorporate Info Ops...**
- **RDO hampered by legacy deployment and sustainment systems...**
- **The Deployment, Employment, and Sustainment system, although improved by collaboration and information sharing, was not responsive enough for RDO...**
- **The inadequate effects assessment process and tools were key to the IO problems...**
- **IO doctrine, organization, and training are not coherent...**
- **Authority for IO was held at too high a level, which prevented IO from being agile and adaptive...**

Authority for IO was held at too high a level, which prevented IO from being agile and adaptive. Psychological operations themes, for instance, had to be approved at the Department of State. This was facilitated by the JIACG, but in the two weeks of play in the experiment, only one leaflet drop was authorized, although many more were requested. This prevented integration of IO into JTF operations that were typically planned in a 72-96 hour timeframe.

The deployment, employment, and sustainment system, although improved by collaboration and information sharing, still was not responsive enough to support RDO. Forces were not tailored in CONUS for immediate operations upon arrival. The sustainment process must be able to adjust to interruptions in the flow caused by enemy action or by unanticipated deployments. RDO requires development of an integrated deployment, employment, and sustainment process, which will be a significant undertaking.

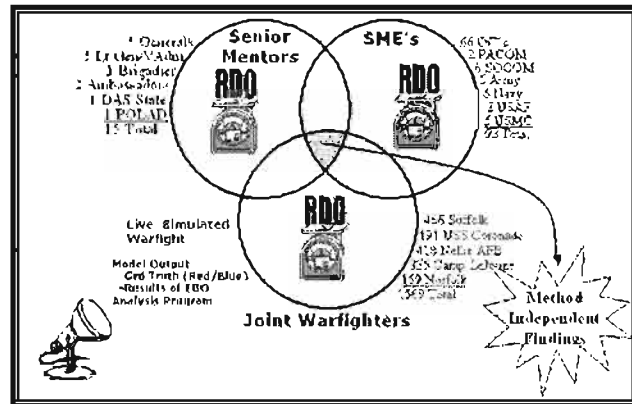
Experiment Methodology

MC02 was designed to assess the ability of a JTF to conduct RDO given a set of advanced concepts. In addition, the experiment confirmed or refuted conclusions drawn throughout the two-year experimental campaign in order to shape recommendations for the Commander, JFCOM, and the Department of Defense.

MC02 used players from operational commands as the experimental audience. Commanders and staffs from III Corps, 12th Air Force, Third Fleet, and II Marine Expeditionary Force formed the JTF and component commands. Their headquarters were distributed in Suffolk, VA and out to various locations across the United States to include aboard ship in the Pacific Ocean. Subordinate forces were a mix of live and simulated forces. The live forces operated in training areas across the western United States and in the Pacific Ocean. The simulated forces were emulated by integrating over 40 service-specific models and simulations to provide a seamless picture of the forces.

A tough, adaptive opposing force (OPFOR) was used to provide the Blue forces with a determined 2007 enemy. The Blue force and the OPFOR operated under similar rules of engagement where each could perceive and attack only what their sensors could detect. This “firewall” built between the players caused each side to perceive different views of the action and different perceptions of the outcome.

Each side operated freely inside the constraints of the scenario and the appropriate tactics given the situation and their respective goals. Appropriate actions were allowed in every case except when they prevented the continuation of the experiment and jeopardized the ability to achieve experimental objectives. In those few cases, the JFCOM’s Joint Experimental Control Group took one of two actions. Either the action was allowed and the results carefully documented before resetting the situation to continue the experiment, or the action was prevented after off-line analysis of the predicted results. In the latter case, the off-line analysis was documented to gain vital lessons learned on the experimental concepts.

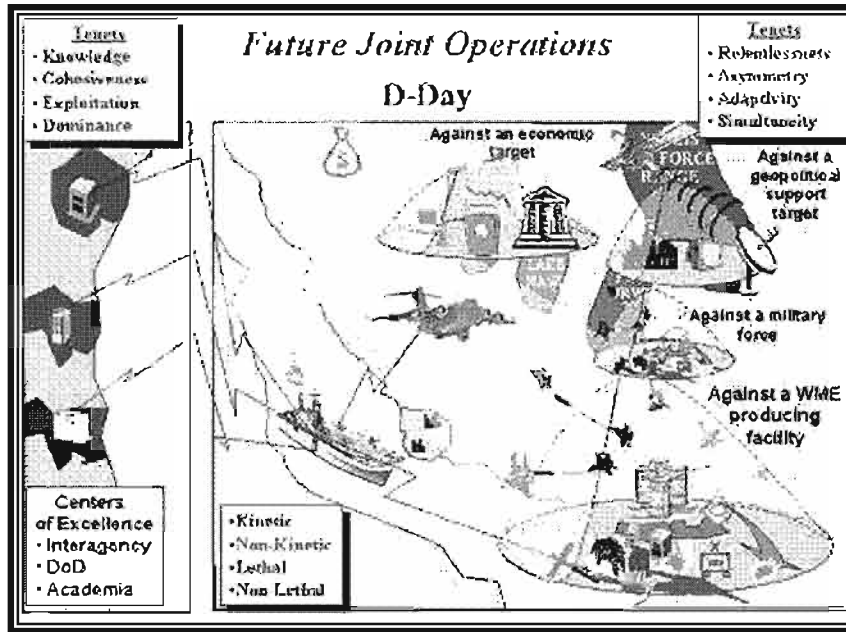


MC02 Assessment Methodology

A Joint Analysis Team consisting of analysts from JFCOM, the Services, and SOCOM assessed MC02. The team analyzed data from many complementary and overlapping data sources. Specific emphasis was placed on reducing and analyzing the data quickly in order to identify discrepancies between data sources for clarification and to allow inclusion of unanticipated areas of interest that emerged during the experiment. Subjective data was collected along with objective data from the models and simulations. The Joint Analysis Team captured all of the data in an experiment database.

Subjective data was collected through over 12,500 player and observer surveys

distributed throughout the experiment and at senior concept developer roundtables conducted twice daily. To make the subjective data as objective as possible, the subjects were divided into three independent panels: players (including both Blue and OPFOR), expert observers, and senior concept developers. These panels provided structured observations on the concepts during the experiment and participated in post-experiment moderated discussions. Where the three independent groups agreed on the strength or



Conceptual Operations within a Joint Operations Area upon the commencement of a Rapid Decisive Operation.

weaknesses of a concept, a conclusion could be drawn with great confidence. Disagreements were identified within 24 hours after the responses were collected, and more data was collected to resolve the matter, or to understand why the disagreement occurred.

Objective data was collected from the models and simulation, the live ranges and the CIE systems. The models and simulation provided "ground truth" positions and status of forces, which could then be compared to the information the JTF received from the CIE. The CIE also allowed the Joint Analysis Team to capture communications data such as numbers and types of messages, participation in collaborative sessions and bandwidth usage.

Experiment Scenario

The MC02 Scenario was developed to provide a context that was both plausible and conducive to testing the experiment hypothesis. The scenario consisted of a high-end, small-scale contingency that had the potential to escalate to a major theater war. Real world data were used to populate a database, enabling the availability of source material to support the process of realistic Blue and Red force planning.

The experiment scenario was set in a 2007 timeframe. The country of interest (Red) possessed a set of capabilities that U.S. forces could reasonably expect to face at that time. Red

was located in a geographically strategic area, and possessed natural resources critical to the world community.

The scenario began when Red suffered a natural disaster (earthquake) and the subsequent chain of events resulted in the separation of a rogue military commander. Identified as Commander, Joint Task Force South (CJTF-S), he, and his subordinate military commanders spun away from national (Government of Red) control. A renegade element within the Red leadership, CJTF-S conducted broad actions, including conventional military, asymmetric, diplomatic, information, economic, and terrorist applications, with the goal of establishing regional power and control. A dispute over national ownership of local islands led to CJTF-S's seizure of the disputed islands, the launch of a CJTF-S sponsored military escort service to ensure safe passage, and a related toll for use of that service. These aggressive actions led to destabilization of regional security, and represented a direct threat to the region and world economies.

Blue's goals were to secure the shipping lanes for international commerce; neutralize CJTF-S's weapons of mass effect (WME) capability; and establish sovereign control of the disputed islands in accordance with the World Court decision.

All of these elements contributed to a realistic set of circumstances that helped to fully examine the MC02 objectives. Although this scenario was developed prior to the hostilities in Afghanistan and Iraq, it provided an analogous complex situation. It contained a hostile military force operating in an environment that contained players whose sympathies ranged from full support of Blue actions to outright hostility—with considerable ambiguity as to which players were which. Although this was chosen as a plausible scenario of future conflict, current events have shown it to be more than just plausible.

Report Organization

The report is divided into eight chapters, and fourteen annexes. The first six chapters provide the scope, purpose, scenario of MC02, and the live forces that participated, while also introducing the concepts and objectives. Analyses of the MC02 concepts and objectives are reflected in Chapter 7, which lists the findings and recommendations. Chapter 8 provides a summary and conclusions of the experiment. The annexes contain detailed information on specific aspects of MC02.



Way Ahead

In MC02, USJFCOM experimented with new concepts and tools for the warfighters of the 21st century. As the men and women in the military continue to fight the global war on terror, we are learning how to do a better job of thinking about the threat to allow us to substitute information for brawn. MC02 has introduced a pathway for future experimentation efforts.

As transformation continues to evolve, we are carving the shape of future warfighting bit by bit, one experiment at a time. We must march ahead with the knowledge gained from MC02 and learn to "think differently," and ensure the superiority of the United States military will succeed against any adversary, at any time.



~~~~~

## The Findings

### **ASSESSMENT AREA 1 — ESTABLISH AND MAINTAIN INFORMATION SUPERIORITY (IS).....52**

- Finding 1: As a result of operating in a CIE the CJTF was able to attain a high state of situational awareness.....55
- Finding 2: While operating in a CIE, the JTFHQ and component staffs were able to attain a high state of accurate and timely situational awareness..... 57
- Finding 3: The increased visibility of information within the JTF produced an informal, but active information error detection and correction capability. : ..... 58
- Finding 4: While operating in the collaborative environment the JTF was able to minimize, but not prevent, surprise attacks by opposing forces..... 59
- Finding 5: The JTF was able to use shared awareness and collaboration to gain and maintain high operational tempo. .... 60
- Finding 6: The JTF was able to use shared awareness and collaboration to synchronize its forces..... 61
- Finding 7: Information requirements will grow with the adoption of EBO..... 62

### **ASSESSMENT AREA 2 — RAPIDLY SET CONDITIONS FOR DECISIVE OPERATIONS..... 74**

- Finding 1: The CIE streamlined deployment-planning coordination, but the MC02 joint force deployment planning procedures did not improve joint force planning or help develop the JTF TPFDD..... 78
- Finding 2: Intermediate staging and support bases (ISBs) were suited to rapidly moving forces and equipment and, with host nation support, instrumental in reducing the logistics footprint in the JOA. .... 79
- Finding 3: The CIE was effective in synchronizing deployment flow. .... 79
- Finding 4: The Log CROP, an element of the CIE, was a useful information source for tracking deployment flow, but not for synchronizing it. .... 80
- Finding 5: The Log CROP provided sufficient information to allow the CJTF to divert PREPO materiel or inbound supplies to satisfy needs elsewhere in the JOA. .... 80
- Finding 6: Blue Forces were able to conduct operational maneuver in support of Effects-Based Operations..... 80

- Finding 7: Blue reduced joint force vulnerability to disruption; however, it was not able to prevent OPFOR observation of its forces, due to sympathizers, terrorist cells, and during the initial days of the operation, commercial satellite imagery. .... 82
- Finding 8: The roles, responsibilities, and functions for deployment planning remained somewhat unchanged with the MC02 JTF organization. .... 84
- Finding 9: An assessment of the JRSOI process could not be made during MC02 because the JRSOI process was not visible in the experiment. .... 84
- Finding 10: The CONUS, with its posts, camps, stations, bases, lines of communication, sea ports of embarkation, and aerial ports of embarkation are part of the battlespace and vulnerable to asymmetric attack. .... 84

**ASSESSMENT AREA 3 — ASSURE ACCESS INTO AND THROUGH THE BATTLESPACE..... 89**

- Finding 1: Blue forces could not isolate or suppress enemy anti-access capabilities consistently during the experiment..... 93
- Finding 2: Blue did not successfully create operational sanctuaries in time and space necessary for conducting RDO..... 95
- Finding 3: Despite persistent targeting and rapid engagement, Blue could not deny the enemy sanctuary. .... 98
- Finding 4: Blue provided sufficient forces, capabilities, and positioning of sensors necessary to conduct EBO and to accomplish the assured access mission..... 98
- Finding 5: At the operational level, Blue was able to provide protection for operational forces, means, and noncombatants in the JOA..... 101
- Finding 6: Blue was moderately successful in providing operational air, space, and missile defense. .... 102

**ASSESSMENT AREA 4 — CONDUCT DECISIVE EFFECTS-BASED OPERATIONS (EBO)..... 108**

- Finding 1: Joint force targeting was greatly enhanced in a CIE, with an ONA, reach-back capabilities, and effective combat assessment. However, the ability to conduct effective operational combat assessment was not demonstrated. .... 113
- Finding 2: The JTF was able to effectively attack operational targets to achieve desired military effects using EBO concepts, collaboration and CIE tools, (SPPS, ONA, IWS and ADOCS). .... 123

- Finding 3:** The JTF exhibited increased ability to coordinate and integrate joint and interagency assets for EBO. However, the use of DIE elements of national power to produce JTF desired effects was not effective. .... 135
- Finding 4:** The JTF improved its ability to synchronize and employ joint forces against key tactical objectives, despite not strictly adhering to the concepts of EBO..... 136
- Finding 5:** The JTF failed to execute and integrate information operations, including PSYOP and military deception. .... 142

**ASSESSMENT AREA 5 — SUSTAIN THE FORCE ..... 153**

- Finding 1:** The Log CROP became the key tool for displaying logistics information and providing logistics situational awareness. .... 155
- Finding 2:** Sustainment packages were not tailored for deploying units. ISBs shaped the logistics footprint. The JTF made good use of multiple delivery platforms for sustainment distribution. .... 156
- Finding 3:** Immature development and insufficient integration of the Theater Medical Information Program (TMIP) had a negative impact on the ability of the JTF staff to gain and maintain knowledge of force health status. .... 157

**ASSESSMENT AREA 6 — STANDING JOINT FORCE HEADQUARTERS (SJFHQ) ..... 162**

- Finding 1:** The SJFHQ provided value added to JTF staff for C2 of the joint force. It reduced the ad hoc nature of activating a JTF, helped surmount the JTF standup learning curve, and provided continuity in planning and operations from pre-crisis through execution to transition. .... 165
- Finding 2:** Although the SJFHQ provided value added to the JTF, continued refinement of its organization and composition is warranted..... 189
- Finding 3:** The SJFHQ concept’s boards, centers, cells, and working groups provided a suitable structure from which the JTF staff could control the joint force..... 207
- Finding 4:** The SJFHQ presence and effectiveness altered the role of component command LNOs at the JTF. .... 227

**ASSESSMENT AREA 7 — OPERATIONAL NET ASSESSMENT (ONA) ..... 239**

- Finding 1:** There is not a common understanding of the capability and use of the ONA. 245
- Finding 2:** ONA was useful during the experiment and shows great potential for military operations. .... 248



Finding 3: Visualization of information is key to use of the ONA concept and its components..... 250

Finding 4: Better tools are needed to develop, manage, and convey ONA data and information..... 252

Finding 5: Requirements for the ONA are different at each command level..... 254

Finding 6: Lack of understanding of the philosophical intent, relationship to traditional staff actions, and application of the ONA concept impacted its use..... 256

**ASSESSMENT AREA 8 — EFFECTS-BASED OPERATIONS (EBO):  
PLANNING AND ASSESSMENT ..... 329**

Finding 1: Operating in a CIE, JTF planners were better able to understand the operational situation and develop better-reasoned courses of action..... 330

Finding 2: The JTF required extensive experience with EBO before it was able to adequately analyze intended and unintended effects..... 336

Finding 3: The ETO process can be effective at both the JTF and the functional component commander level..... 343

Finding 4: The organization that owns the effect must be able to accomplish and assess it. .... 345

Finding 5: Assessment and prediction are separate and distinct functions, and may require separate cells within the JTF to properly address both of these process functions. .... 347

**ASSESSMENT AREA 9 — COLLABORATIVE INFORMATION  
ENVIRONMENT (CIE)..... 354**

Finding 1: The Joint Task Force was able to establish a persistent collaborative environment across all echelons of command..... 359

Finding 2: The COP provided an adequate picture for situational awareness at the operational level..... 363

Finding 3: The JTF was able to maintain command and control of on-going operations using the collaborative tools. .... 369

Finding 4: To enable operational and tactical-level situational awareness, COP unit icons must be linked to status information such as posture, activity, and readiness... 369

Finding 5: The collective bandwidth requirement for a JTF using C4I tools similar to the XC4I tools used in the MC02 experiment is approximately 15 Mb/s with a

sustained surge capacity to 25 Mb/s. This order of bandwidth usage is much greater than that which has been available to JTFs to date. .... 370

Finding 6: Interoperability problems prevented effective COP database management.. 374

Finding 7: Systems maintenance and the operational battle rhythm have to be closely integrated to maximize system performance at critical points in the battle. .... 376

Finding 8: The Joint Enroute Mission Planning and Rehearsal System- Near Term (JEMPRS-NT) was effective in enabling the JTF commander and his staff to collaborate while traveling between command posts. .... 377

**ASSESSMENT AREA 10 — ENHANCE INTERAGENCY PERSPECTIVE WITHIN THE JOINT FORCE HEADQUARTERS ..... 399**

Finding 1: The JIACG enabled the combatant commander to harmonize operational plans with national policy decisions and guidance. .... 400

Finding 2: The JIACG concept, as it was implemented for the MC02 warfighting scenario, was most properly positioned to operate at the combatant command level, since most of the non-military effects are at that level of responsibility. .... 401

Finding 3: A compatible CIE linkage to engaged agencies is essential for the effective harmonization of IA actions. .... 402

Finding 4: The JIACG composition should be based on the combatant commander's regional requirements. .... 404

Finding 5: The combatant commander's ability to plan and execute RDO requires a rapid and decisive national policy determination process. .... 404

Finding 6: The JIACG's principal function is to focus on providing IA advisory support to the combatant commander and staff, not on producing combatant commander plans. .... 408

**ASSESSMENT AREA 11 — JOINT THEATER LOGISTICS MANAGEMENT (JTLM)..... 414**

Finding 1: The Log CROP was successful in achieving situational awareness. .... 416

Finding 2: The Effects-Based Planning and the deployment and sustainment processes were not effectively integrated. .... 420

Finding 3: The JTLM concept reduced the logistics footprint in the JOA. .... 422

Finding 4: Embedding logistics personnel in the operations and plans groups improved situational awareness across the JTF. .... 422

**Finding 5: The organization of the SJFHQ and control of the JTF logistics activities needs refinement to provide more functional specialty expertise..... 424**

**Finding 6: The collaborative logistics board, center, cells, and working groups enhanced the performance and situational awareness of all planners and operators across the joint force..... 425**

**Finding 7: Logistics decision support tools provided to the JLMC, JTF, and components enhanced planning and decision-making. .... 430**

**ASSESSMENT AREA 12 — JOINT INITIATIVES ..... 439**

**ASSESSMENT AREA 13 — JOINT INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (JISR)..... 441**

**Finding 1: JISR improved integration of ISR with operations..... 442**

**Finding 2: JISR improved ISR support to operations..... 442**

**Finding 3: Collaboration was the key to JISR’s successes and performance..... 442**

**Finding 4: A lack of collection management experience detracted from JISR integration. .... 443**

**Finding 5: Tool functionality as emulated did not support the JISR concept..... 444**

**Finding 6: No clear defining system to establish priorities was available to Collection Management..... 444**

## Table of Recommendations

### **ASSESSMENT AREA 1 — ESTABLISH AND MAINTAIN INFORMATION SUPERIORITY (IS) ----- 52**

1. DoD, immediately select a common collaborative capability (including JEMPRS-NT) for use as an interim joint command and control tool. Concurrently, USJFCOM, supported by unified commanders, Services and other agencies, develop a joint C4I architecture for the purposes of merging the two efforts for the fielding of a DoD-wide collaborative information environment by 2005. ----- 71
2. USJFCOM, in conjunction with the Services and other combatant commanders, work to redefine and document the meaning, relationships and importance of Information Superiority, information operations, decision superiority, knowledge superiority, knowledge readiness and commander centric operations so a commonly understood Lexicon is developed. -- ----- 71
3. USJFCOM, conduct a manpower study on a JTF supported by a SJFHQ and operating in a collaborative information environment to determine its' manpower requirements. ----- 72

### **ASSESSMENT AREA 2 — RAPIDLY SET CONDITIONS FOR DECISIVE OPERATIONS ----- 74**

1. The JFCOM Joint Logistics Transformation Center (JLTC) with the JFCOM Joint Deployment Process Office (JDPO) should, in the near term, host seminars, work shops or limited objective experiments (LOEs) to explore what changes have to take place to the effects-based planning and execution process. They should also examine the means to fully integrate force deployment, employment, and sustainment. Additionally, the group should review what decision support tools are needed by the SJFHQ to allow them to rapidly assess the feasibility, availability of transportation resources, of force deployment and employment scenarios in the same timeline that effects-based planning takes place. ----- 87
2. JFCR development should continue. JFCOM, JLTC and the Services should continue to populate the JFCR with warfighting capabilities and application usage that supports units aligned with their capabilities. ----- 87
3. JFCOM JDPO should develop decision support tools to support deployment planning. ----- 87
4. All Services should identify personnel to be trained and function solely as JOPES operators. ----- 87

5. All Services should review use of PREPO in support of RDO, and ensure PREPO assets are kept current with force modernization. ----- 87
6. For ISB planning, Service components should collaborate as much as possible to reduce duplication of logistics capability in order to minimize the ISB footprint. ----- 87
7. DoD, develop or modify doctrine to jointly coordinate the movement of forces into the JOA to facilitate initiation of effects operations upon entry. Include the IA to ensure DIE aspects are integrated into these efforts. ----- 87
8. DoD, develop doctrine establishing APODs and SPODs, which are protected against asymmetric attacks. ----- 87
9. DoD, incorporate asymmetric attacks on posts, camps, stations and bases plus APOEs and SPOEs into all deployment exercises. ----- 87

**ASSESSMENT AREA 3 — ASSURE ACCESS INTO AND THROUGH THE BATTLESPACE ----- 89**

1. JFCOM, develop an Assured Access concept to support EBO and RDO. ----- 105
2. JFCOM, conduct an LOE to explore integration of D, I, and E with JTF operations. 105
3. JFCOM, investigate the establishment of an IO group or task force to integrate IO into JTF operations. ----- 105
4. JFCOM, conduct further concept development, experimentation and analysis on JRSOI to focus on effects capabilities in support of EBO/RDO. ----- 105
5. JFCOM, conduct further experimentation on the tailoring of forces from the components for integration into the JTF. ----- 105
6. JFCOM, improve the effectiveness of decision support tools for the deployment and redeployment of JTF resources. ----- 106
7. JFCOM, revise concept documents to specify a closer working relationship between the logistics personnel and the operational planners for RDO logistical integration. ----- 106
8. JFCOM, research new metrics for assessment of non-kinetic attacks on non-traditional targets. ----- 106
9. JFCOM, explore assigning ISR platforms at lower echelons to meet the tactical ISR demands placed on tactical units by the asymmetrical nature of EBO/RDO. - 106
10. JFCOM, develop a dedicated, joint, rear-area command concept refined for EBO/RDO. ----- 106

11. JFCOM, provide guidance on pre-hostility ROE change implementation to support RDO actions, and to ensure the safety of friendly forces and capabilities in the JOA. ----- 106

12. JFCOM, refine joint air and space missile defense doctrine to support effects-based operations. ----- 106

**ASSESSMENT AREA 4 — CONDUCT DECISIVE EFFECTS-BASED OPERATIONS (EBO)-----108**

1. JFCOM, develop a PME template to the Service schools and NDU for inclusion in their curriculum. ----- 149

2. NDU and Services, incorporate the JFCOM EBO template in the curricula of joint and Service warfare colleges. ----- 149

3. JFCOM, refine EBO concept and procedures in future experiments to develop EBO tools and TTPs. ----- 149

4. JFCOM, exercise the collaborative process and CIE tools in an LOE to refine the business rules and processes required to maximize the usefulness of these tools. ----- 149

5. JFCOM, in conjunction with a combatant command, develop a robust ONA tool incorporating better search engines and data visualization tools to help users more quickly and efficiently access and understand the data contained in the ONA. ----- 149

6. JFCOM, further define the reach-back concept as part of future experiments. ----- 149

7. JFCOM, lead an effort to develop a joint integrated tasking order to complement the ETO and integrate the actions of all components including JFLCC and JSOTF necessary to create joint effects. ----- 149

8. JFCOM, continue the development and refinement of the CONOPS and TTPs necessary to build an ETO defining linkages between the ETO, PEL and ONA. ----- 150

9. JFCOM, foster development of ISR systems and M&S tools to replicate ISR systems to better assess results of EBO effects. ----- 150

10. JFCOM, in the SJFHQ concept, move the effect assessment cell from the Information Superiority group to the plans group. ----- 150

11. JFCOM, reorganize the EAC to include IS personnel, to process BDA data, and operations personnel to conduct predictive analysis to turn the data into information that can be used to predict an adversary's capabilities and intentions. ----- 150

12. JFCOM, organize the EAC into three (3) functional groups: intelligence and BDA data collection and analysis (IS personnel)- effects assessment (IS/OPS personnel)- predictive/deficiency analysis (OPS personnel). ----- 150
13. JFCOM, examine effects assessment in future experiments with an emphasis on organization, manning, tools, and doctrine (TTP). ----- 150
14. JFCOM, in conjunction with Service and joint schools, incorporate nodal and deficiency analysis into curriculum to reinforce the EBO concept. ----- 150
15. JFCOM, develop a coherent definition of TST, highlighting the differences between a target that needs to be prosecuted immediately (TBM, CDCM, etc.) and one that can wait until an asset is available to prosecute it. ----- 150
16. DoD, field ADOCS as an interim targeting toolset. ----- 150
17. DoD, field TST process and JFI concept, incorporating lessons learned and the revised procedures developed during MC02 as a joint procedure immediately. ----- 150
18. DoD, develop M&S tools to better replicate non-kinetic weapon capabilities and effects in exercise, wargame and experiment events. ----- 150
19. JFCOM, modify the JIACG concept to include the Pol/Mil planner as the forward element liaison between the JIACG and the JTF staff. ----- 150
20. DoD, develop M&S tools to assist with the assessment of DIE actions. ----- 151
21. JFCOM, continue development of the effects-based planning process and training for members of the JTF staffs. ----- 151
22. JFCOM, develop an acceptable mechanism for coordinating SAP/STO actions and integrating SAP/STO program information into the JTF IO campaign. ----- 151
23. JFCOM, take the lead in evaluating inclusion of STO in the JTF CIE, and in determining if more STO billets are required throughout the JTF. ----- 151

**ASSESSMENT AREA 5 — SUSTAIN THE FORCE-----153**

1. JFCOM JLTC, through future experimentation events using the CIE, develop joint sustainment structure(s) that support RDO scenarios such as those used in MC02 ----- 160
2. MEDCOM, field-test theater medical information program (TMIP) to validate Service data integration prior to acceptance.----- 160
3. JFCOM JLTC, examine networked distribution structure as part of an LOE on satisfying joint force sustainment requirements for RDO.----- 160

4. JFCOM JLTC, Joint Staff J4, DISA, and Services, continue to refine the Log CROP and its functionality based on user comments and the availability of new or advanced technologies----- 160

5. JFCOM JLTC, pursue examination and definition of ‘predictive logistics tools’ ----- 160

**ASSESSMENT AREA 6 — STANDING JOINT FORCE HEADQUARTERS (SJFHQ)-----162**

1. DoD, field prototype SJFHQ to each combatant commander using MC02 model as base. ----- 233

2. JFCOM/SJFHQ, update SJFHQ concept of employment (CONEMP) to include KIMP and integrated Pol/Mil plan as pre-crisis products to be provided by SJFHQ prior to activation of the JTF. ----- 233

3. JFCOM/SJFHQ, update JSOP to clearly define the qualifications, duties, and responsibilities for each position. ----- 233

4. JFCOM, investigate the continuing role of the SJFHQ with the JTF as the crisis matures, to include duration of SJFHQ involvement, role of the SJFHQ in transition to post-conflict, and provisions for the SJFHQ should a second crisis erupt. ---- 233

5. JFCOM, change the name of SJFHQ from “Standing Joint Force Headquarters” to “Standing Joint Force Command and Control Element” to clarify its role. --- 233

6. JFCOM, maintain the current SJFHQ organization—command group, plans group, operations group, information superiority group, and knowledge management group. ----- 233

7. JFCOM/SJFHQ, investigate dissolving the IS group and KM group into the plans and operations groups to provide better support to planning and operations functions. ----- 233

8. JFCOM/SJFHQ, investigate the establishment of a logistics/support group to coordinate, synchronize, and integrate logistics and other support functions in pre-crisis activities, planning, and operations, but keep logistics personnel in the plans group and operations group. ----- 233

9. JFCOM, investigate the establishment of an IO group or task force—JIOTF. Clearly, define IO and educate DoD and external agencies. ----- 233

10. JFCOM/SJFHQ, add fires person to operations group—person also provides fires expertise during planning. ----- 233

11. JFCOM/SJFHQ, add STRATLIFT, personnel, and engineer expertise to plans group. ----- 233



- 12. DoS, DoD, and JFCOM, ensure Pol/Mil planner in plans group is a civilian with regional expertise and IAC experience, and is directly linked to JIACG at important. ----- 233
- 13. JFCOM/SJFHQ, assign responsibilities to several SJFHQ members in plans group and operations group to coordinate and synchronize the plans group hand-off to operations group. ----- 233
- 14. DoD and JFCOM/SJFHQ, add a flag or general officer, to command SJFHQ (command group). Upon integration of the SJFHQ into the JTF, the GO/FO can fulfill Deputy CJTF or JTF CoS duties. ----- 234
- 15. JFCOM/SJFHQ, maintain SJFHQ BCCWG structure, but let JTF add and delete BCCWGs as required. ----- 234
- 16. JFCOM/SJFHQ, rework the JISC to improve effectiveness. ----- 234

**ASSESSMENT AREA 7 — OPERATIONAL NET ASSESSMENT (ONA) -----239**

- 1. JFCOM, define the intended use of ONA. ----- 265
- 2. JFCOM, establish a section within joint experimentation that designs visualization models for its concepts. ----- 265
- 3. JFCOM, focus ONA development on the command level for which it was designed. - 265
- 4. JFCOM, develop a PME template that guides development of joint and service ONA concept education and training. ----- 265
- 5. JFCOM, design ONA knowledge base tools that are intuitive to use and dynamically support developers and users. ----- 266
- 6. JFCOM, in conjunction with a combatant commander, develop a prototype ONA. -- 266

**ASSESSMENT AREA 8 — EFFECTS-BASED OPERATIONS (EBO):  
PLANNING AND ASSESSMENT-----329**

- 1. JFCOM, explore reach-back in future experiments and exercises as a feature of virtual collaborative planning and assessment to define potential reach-back agencies that enhance future operations. ----- 352
- 2. JFCOM, develop decision support tools for effects visualization and modeling. ----- 352
- 3. JFCOM, modify the EBO concept to include effects timing in the PEL in addition to describing desired effects in terms of changes to the adversary's actions or behavior, the desired level of changes, and the scope and distribution of the effect. ----- 352

4. Joint Staff J7, establish, through the Military Education Coordination Council (MECC), the requirement for joint and Service professional military education institutions to incorporate the effects-based concept into their curricula. ----- 352

**ASSESSMENT AREA 9 — COLLABORATIVE INFORMATION ENVIRONMENT (CIE)-----354**

1. JFCOM and the Joint Staff, use the MC02 XC4I system as a baseline for immediate development of a prototype C4I system to support future joint operations. --- 394
2. JFCOM, develop decision support tools to support EBO. ----- 394
3. JFCOM, and the Joint Staff, use the MC02 XC4I network as a model to connect the JTF with its components and combatant commander. ----- 394
4. JFCOM, consolidate and streamline common CIE tools. ----- 394

**ASSESSMENT AREA 10 — ENHANCE INTERAGENCY PERSPECTIVE WITHIN THE JOINT FORCE HEADQUARTERS -----399**

1. JFCOM, in conjunction with a combatant command, stand-up a JIACG prototype, in conjunction with the SJFHQ, to refine doctrine, TTP, and manpower requirements. ----- 412
2. JFCOM, refine roles and responsibilities, relationships, functions, vertical and horizontal communication, and authority of a JIACG during peacetime, theater engagement, crisis preparations, crisis response, transition, and recovery. --- 412
3. JFCOM, explore interagency contributions to the SJFHQ and it's enabling concepts (CIE, ONA, EBO, and JISR). ----- 412
4. JFCOM, explore coordination of civilian multinational entities, regional and international organizations, and non-governmental organizations into the concept. ----- 412
5. JFCOM and OSD, expand interagency play in joint exercises. ----- 412
6. OSD, develop and field an interagency CIE to implement a secure CIE capability for use by all departments and agencies with national security responsibilities. ----- 413
7. JFCOM in conjunction with OSD, develop business rules such as TTP's, for collaborative engagement internal and external to DoD. ----- 413

**ASSESSMENT AREA 11 — JOINT THEATER LOGISTICS MANAGEMENT (JTLM)-----414**

1. JLTC, continue to refine the roles and responsibilities of the JLTC positions in the deployment and sustainment TTP and JSOP in future LOEs. ----- 435
2. JLTC, in future LOEs and work shops, investigate the roles and responsibilities for a JTF support operations group that integrates all logistics and support functions under a single director equivalent to the plans and operations group directors. ----- 435
3. JFCOM/SJFHQ, consider a logistics battle rhythm change that establishes a lower level (action officer) collaborative working group to develop options and recommendations for senior officers prior to the LARB. ----- 436
4. JFCOM/JLTC, improve logistics decision support tools and logistics tools to meet the agility demands of RDO. ----- 436
5. JFCOM, develop an assured access concept to encompass force protection, employment, deployment and sustainment from the continental United States to the joint operations area. ----- 437
6. JFCOM, review joint doctrine regarding the essential elements and roles and responsibilities of joint rear area operations. ----- 437
7. JFCOM, experiment with a CONOPS specifically targeting joint rear area operations. ----- 437

**ASSESSMENT AREA 12 — JOINT INITIATIVES -----439**

**ASSESSMENT AREA 13 — JOINT INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (JSR) -----441**

1. JFCOM, make the emulated tools user-friendlier with increased functionality. ----- 446
2. JFCOM, conduct a limited objective experiment in an ISR asset constrained environment with modeling and simulations that adequately supports a continuing series of ISR experiments. ----- 446
3. JFCOM/SJFHQ, move all ISR personnel to the IS group. ----- 446

## Table of Contents

|                                                             |               |
|-------------------------------------------------------------|---------------|
| <b>A MESSAGE FROM ADMIRAL GIAMBASTIANI</b>                  | <b>iii</b>    |
| <b>EXECUTIVE SUMMARY</b>                                    | <b>v</b>      |
| <b>THE FINDINGS</b>                                         | <b>xiv</b>    |
| <b>TABLE OF RECOMMENDATIONS</b>                             | <b>xx</b>     |
| <b>TABLE OF CONTENTS</b>                                    | <b>xxviii</b> |
| <b>TABLE OF FIGURES</b>                                     | <b>xxxvii</b> |
| <b>TABLE OF TABLES</b>                                      | <b>xliv</b>   |
| <b>CHAPTER 1 — BACKGROUND</b>                               | <b>1</b>      |
| Purpose                                                     | 1             |
| Scope                                                       | 1             |
| MC02 Live Force Participants                                | 1             |
| Locations                                                   | 8             |
| <b>CHAPTER 2 — OBJECTIVES</b>                               | <b>9</b>      |
| Establish and Maintain Information Superiority              | 9             |
| Set Conditions for Decisive Operations                      | 9             |
| Assured Access                                              | 10            |
| Conduct Decisive Effects-Based Operations                   | 10            |
| Sustain the Force                                           | 11            |
| <b>CHAPTER 3 — CONCEPTS</b>                                 | <b>13</b>     |
| Standing Joint Forces headquarters (SJFHQ)                  | 13            |
| Collaborative Information Environment (CIE)                 | 14            |
| Operational Net Assessment (ONA)                            | 15            |
| Effects-Based Operations (EBO): Planning and Assessments    | 16            |
| Interagency                                                 | 18            |
| Joint Theater Logistics Management                          | 19            |
| Joint Initiatives                                           | 21            |
| Joint Intelligence, Surveillance, and Reconnaissance (JISR) | 22            |
| <b>CHAPTER 4 — EXPERIMENT SCENARIO</b>                      | <b>23</b>     |
| Blue Forces                                                 | 23            |

|                                                                                                                                                                                             |           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Adaptive Adversary -----                                                                                                                                                                    | 26        |
| Scenario -----                                                                                                                                                                              | 26        |
| Threat forces organization and systems -----                                                                                                                                                | 28        |
| <b>CHAPTER 5 — EXPERIMENT EXECUTION - THE SPIRALS -----</b>                                                                                                                                 | <b>31</b> |
| MC02 Test Campaign Plan -----                                                                                                                                                               | 31        |
| Spiral 0 (December 3-14, 2001) -----                                                                                                                                                        | 33        |
| Spiral 1 (January 28 – February 8, 2002) -----                                                                                                                                              | 35        |
| Spiral 2 (March 4-29, 2002) -----                                                                                                                                                           | 36        |
| Spiral 3 (May 20 - June 14, 2002) -----                                                                                                                                                     | 38        |
| End-to-End Test -----                                                                                                                                                                       | 39        |
| Experiment Execution - Simulation Federation -----                                                                                                                                          | 44        |
| Experiment Execution – Hybrid Terrain -----                                                                                                                                                 | 45        |
| Experiment Execution — Data Collection and Assessment -----                                                                                                                                 | 46        |
| <b>CHAPTER 6 — ASSUMPTIONS AND LIMITATIONS -----</b>                                                                                                                                        | <b>47</b> |
| MC02 Assumptions -----                                                                                                                                                                      | 48        |
| MC02 Limitations -----                                                                                                                                                                      | 49        |
| <b>CHAPTER 7 — THE FINDINGS -----</b>                                                                                                                                                       | <b>51</b> |
| <b>ASSESSMENT AREA 1 — ESTABLISH AND MAINTAIN INFORMATION<br/>SUPERIORITY (IS) -----</b>                                                                                                    | <b>52</b> |
| Overall Assessment Results -----                                                                                                                                                            | 52        |
| Methodology -----                                                                                                                                                                           | 53        |
| Warfighting Challenge: Ability to provide situational awareness throughout the JTF55<br>Warfighting Challenge: Ability to use the CROP and collaboration to enhance JTF<br>operations ----- | 55        |
| Other Observations -----                                                                                                                                                                    | 62        |
| Relationship to Other Objectives -----                                                                                                                                                      | 67        |
| Relationship to Baseline Analysis -----                                                                                                                                                     | 69        |
| DOTMLPF Linkage -----                                                                                                                                                                       | 70        |
| Recommendations -----                                                                                                                                                                       | 71        |
| <b>ASSESSMENT AREA 2 — RAPIDLY SET CONDITIONS FOR DECISIVE<br/>OPERATIONS -----</b>                                                                                                         | <b>74</b> |
| Overall Assessment Results -----                                                                                                                                                            | 74        |
| Methodology -----                                                                                                                                                                           | 75        |
| Warfighting Challenges: Ability to establish advantageous positions for decisive<br>operations; and ability to decrease joint force vulnerability to disruption. -----                      | 76        |
| Other Observations -----                                                                                                                                                                    | 84        |
| Relationship to Other Objectives -----                                                                                                                                                      | 85        |
| Relationship to Baseline Analysis -----                                                                                                                                                     | 86        |
| DOTMLPF Linkage -----                                                                                                                                                                       | 86        |

Recommendations ----- 87

**ASSESSMENT AREA 3 — ASSURE ACCESS INTO AND THROUGH THE BATTLESPACE----- 89**

Overall Assessment Results----- 89  
Methodology----- 89  
Warfighting Challenge: Ability to provide selective dimensional superiority----- 90  
Warfighting Challenge: Ability to provide sufficient operational reach----- 91  
Warfighting Challenge: Ability to enhance force protection----- 92  
Other Observations ----- 104  
Relationship to Other Objectives ----- 105  
Relationship to Baseline Analysis ----- 105  
DOTMLPF Linkage----- 105  
Recommendations ----- 105

**ASSESSMENT AREA 4 — CONDUCT DECISIVE EFFECTS-BASED OPERATIONS (EBO)-----108**

Overall Assessment Results----- 108  
Methodology----- 109  
Warfighting Challenge: Ability to synchronize the application of the full range of joint capabilities in order to engage decisive points in time and space ----- 110  
Warfighting Challenge: Ability to integrate full joint capabilities against tactical level objectives ----- 111  
Warfighting Challenge: Ability to integrate execution of information operations into EBO ----- 112  
Other Observations ----- 146  
Relationship to Other Objectives ----- 147  
Relationship to Baseline Analysis ----- 148  
DOTMLPF Linkage----- 148  
Recommendations ----- 149

**ASSESSMENT AREA 5 — SUSTAIN THE FORCE-----153**

Overall Assessment Results----- 153  
Methodology----- 153  
Warfighting Challenge: Ability to Provide Agile Sustainment ----- 154  
Other Observations ----- 158  
Relationship to Other Objectives ----- 158  
Relationship to Baseline Analysis ----- 159  
DOTMLPF Linkage----- 159  
Recommendations ----- 160

**ASSESSMENT AREA 6 — STANDING JOINT FORCE HEADQUARTERS (SJFHQ)-----162**

Overall Assessment Results----- 162  
Methodology----- 163

|                                                                                     |     |
|-------------------------------------------------------------------------------------|-----|
| Warfighting Challenge: Ability to quickly achieve cohesive C2 of a joint force ---- | 164 |
| Other Observations -----                                                            | 229 |
| Relationship to Other Objectives -----                                              | 229 |
| Relationship to Baseline Analysis -----                                             | 231 |
| DOTMLPF Linkage-----                                                                | 231 |
| Recommendations -----                                                               | 233 |
| Appendix A — SJFHQ Manning-----                                                     | 237 |

**ASSESSMENT AREA 7 — OPERATIONAL NET ASSESSMENT (ONA) -----239**

|                                                         |     |
|---------------------------------------------------------|-----|
| Overall Assessment Results-----                         | 239 |
| Methodology-----                                        | 240 |
| Other Observations -----                                | 261 |
| Relationship to Other Objectives -----                  | 264 |
| Relationship to Baseline Analysis -----                 | 264 |
| DOTMLPF Linkage-----                                    | 264 |
| Recommendations -----                                   | 265 |
| Appendix A — ONA Data Collection Matrix Analysis -----  | 267 |
| Appendix B — ONA Training-----                          | 294 |
| Appendix C — Additional Observations and Comments ----- | 296 |
| Appendix D — ONA Database Development for MC02-----     | 301 |
| Appendix E — ONA Knowledge Base Information -----       | 302 |
| Appendix F — ONA Knowledge Base Access and Use -----    | 304 |
| Appendix G — ONA Data Collection Matrix -----           | 312 |

**ASSESSMENT AREA 8 — EFFECTS-BASED OPERATIONS (EBO):**

**PLANNING AND ASSESSMENT-----329**

|                                                                                                                      |     |
|----------------------------------------------------------------------------------------------------------------------|-----|
| Overall Assessment Results-----                                                                                      | 329 |
| Methodology-----                                                                                                     | 329 |
| Warfighting Challenges: Ability to conduct Effects-Based Planning; and ability to<br>conduct Effects Assessment----- | 329 |
| Other Observations -----                                                                                             | 350 |
| Relationship to Other Objectives -----                                                                               | 351 |
| Relationship to Baseline Analysis -----                                                                              | 352 |
| DOTMLPF Linkage-----                                                                                                 | 352 |
| Recommendations -----                                                                                                | 352 |

**ASSESSMENT AREA 9 — COLLABORATIVE INFORMATION**

**ENVIRONMENT (CIE) -----354**

|                                                                                                       |     |
|-------------------------------------------------------------------------------------------------------|-----|
| Overall Assessment Results-----                                                                       | 354 |
| Methodology-----                                                                                      | 354 |
| Warfighting Challenge: Ability to establish a valid COP and build the CROP in a CIE<br>-----          | 359 |
| Warfighting Challenge: Ability to plan collaboratively in a distributed joint C2<br>environment ----- | 359 |
| Other Observations -----                                                                              | 378 |

|                                              |     |
|----------------------------------------------|-----|
| Relationship to Other Objectives -----       | 388 |
| Relationship to Baseline Analysis -----      | 389 |
| DOTMLPF Linkage-----                         | 393 |
| Recommendations -----                        | 394 |
| Appendix A — Top Comments Group -----        | 395 |
| Appendix B — SME CROP Survey Questions ----- | 397 |

**ASSESSMENT AREA 10 — ENHANCE INTERAGENCY PERSPECTIVE  
WITHIN THE JOINT FORCE HEADQUARTERS -----399**

|                                                                                                              |     |
|--------------------------------------------------------------------------------------------------------------|-----|
| Overall Assessment Results-----                                                                              | 399 |
| Methodology-----                                                                                             | 399 |
| Warfighting Challenge: Ability to quickly achieve and maintain cohesive relationships<br>with the IAC. ----- | 400 |
| Warfighting Challenge: Ability to improve interagency campaign planning and<br>execution. -----              | 400 |
| Other Observations -----                                                                                     | 409 |
| Relationship to Other Objectives -----                                                                       | 411 |
| Relationship to Baseline Analysis -----                                                                      | 411 |
| DOTMLPF Linkages-----                                                                                        | 411 |
| Recommendations -----                                                                                        | 412 |

**ASSESSMENT AREA 11 — JOINT THEATER LOGISTICS MANAGEMENT  
(JTLM) -----414**

|                                                                   |     |
|-------------------------------------------------------------------|-----|
| Overall Assessment Results-----                                   | 414 |
| Methodology-----                                                  | 415 |
| Warfighting Challenge: Ability to Plan for Agile Sustainment----- | 415 |
| Other Observations -----                                          | 433 |
| Relationship to Other Objectives -----                            | 434 |
| Relationship to Baseline Analysis -----                           | 435 |
| DOTMLPF Linkage-----                                              | 435 |
| Recommendations -----                                             | 435 |

**ASSESSMENT AREA 12 — JOINT INITIATIVES -----439**

|                                        |     |
|----------------------------------------|-----|
| Near Term Fieldable Technologies ----- | 440 |
|----------------------------------------|-----|

**ASSESSMENT AREA 13 — JOINT INTELLIGENCE, SURVEILLANCE, AND  
RECONNAISSANCE (JISR) -----441**

|                                                                                       |     |
|---------------------------------------------------------------------------------------|-----|
| Overall Assessment Results-----                                                       | 441 |
| Methodology-----                                                                      | 441 |
| Warfighting Challenge: Ability to provide relevant intelligence to the commander----- | 441 |
| Other Observations -----                                                              | 445 |
| Relationship to Other Objectives -----                                                | 446 |
| Relationship to Baseline Analysis -----                                               | 446 |
| DOTMLPF Linkage-----                                                                  | 446 |
| Recommendations -----                                                                 | 446 |



|                                                                              |            |
|------------------------------------------------------------------------------|------------|
| <b>CHAPTER 8 — SUMMARY AND CONCLUSIONS</b>                                   | <b>447</b> |
| <b>ANNEX A — GLOSSARY/ACRONYMS</b>                                           | <b>A1</b>  |
| Acronyms                                                                     | A17        |
| <b>ANNEX B — BASELINE REPORT</b>                                             | <b>B1</b>  |
| <b>ANNEX C — ASSESSMENT PLAN</b>                                             | <b>C1</b>  |
| Objective #1: Establish And Maintain Information Superiority                 | C14        |
| Objective #2: Rapidly Set Conditions For Decisive Operations                 | C15        |
| Objective #3: Assure Access Into And Through The Battlespace                 | C16        |
| Objective #4: Conduct Decisive Effects-Based Operations                      | C18        |
| Objective #5: Sustain The Force                                              | C21        |
| <b>ANNEX D — NEAR TERM FIELDABLE TECHNOLOGIES</b>                            | <b>D1</b>  |
| <b>ANNEX E — EXERCISE CONTROL DESCRIPTION</b>                                | <b>E1</b>  |
| Purpose                                                                      | E1         |
| Experiment Overview                                                          | E1         |
| Control Overview                                                             | E1         |
| Joint Experiment Control Group (JECG)                                        | E3         |
| Role Players                                                                 | E4         |
| Control Communications                                                       | E5         |
| <b>ANNEX F — ADAPTIVE ADVERSARY</b>                                          | <b>F1</b>  |
| OPFOR Organization                                                           | F2         |
| OPFOR Campaign Objectives                                                    | F2         |
| OPFOR Credibility                                                            | F9         |
| RDO Vulnerabilities Addressed                                                | F12        |
| Conclusion                                                                   | F17        |
| <b>ANNEX G — RANGE INTEGRATION RESULTS</b>                                   | <b>G1</b>  |
| Background and Concept of Operations                                         | G3         |
| Requirements Development and Integration CONOPS                              | G3         |
| Execution CONOPS                                                             | G4         |
| Post execution and Analysis CONOPS                                           | G4         |
| Range Integration CONOPS Findings and Recommendations                        | G5         |
| <b>ANNEX H — MODEL AND SIMULATION FEDERATION</b>                             | <b>H1</b>  |
| Preface                                                                      | H1         |
| Air Force Synthetic Environment for Reconnaissance and Surveillance (AFSERS) | H1         |
| Air Warfare Simulation, AWSIM                                                | H2         |
| C2 Analysis and Targeting Tool (CATT)                                        | H3         |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                                                                 |     |
|---------------------------------------------------------------------------------|-----|
| Civil Environment Model (CEM)-----                                              | H3  |
| Clutter/JSAF -----                                                              | H3  |
| Digital Battle staff Sustainment Trainer (DBST) -----                           | H3  |
| Distributed IW Constructive Environment (DICE)-----                             | H3  |
| Extended Air Defense Simulation (EADSIM) -----                                  | H4  |
| Fire Simulation (FIRESIM)-----                                                  | H4  |
| JQUAD (JCAS and JOISIM)-----                                                    | H4  |
| Joint Conflict and Tactical Simulation (JCATS) (A = Army / M = Marines/SOF)---- | H4  |
| Joint Semi-Automated Forces (JSAF)-----                                         | H4  |
| Missile Defense Space Warning Tool (MDST) -----                                 | H4  |
| Multiple Unified Simulation Environment (MUSE)-----                             | H5  |
| National War Gaming System (NWARs) -----                                        | H5  |
| Simulation of the Location and Attack of Mobile Enemy Missiles (SLAMEM) -----   | H5  |
| Tactical Exploitation of National Capabilities (TENCAP) -----                   | H6  |
| Virtual Surveillance Target and Attack Radar System JSTARS (VSTARS)-----        | H7  |
| Airborne Laser Simulation (ABL) -----                                           | H7  |
| Automated Scriptor Simulator Exercise Trainer (ASSET) -----                     | H7  |
| ATLOS -----                                                                     | H7  |
| Airborne Warning and Control System (AWACS)-----                                | H7  |
| Battle Force Tactical Trainer (BFTT) -----                                      | H7  |
| Cobra Ball-----                                                                 | H8  |
| CV-22-----                                                                      | H8  |
| Dynamic Communications Environment (DCE)-----                                   | H9  |
| Information Warfare Effects Generator (IWEG)-----                               | H9  |
| Flight Deck Operations (FDO) [WARCON] -----                                     | H9  |
| Integrated Modeling Platform for Advanced Computational Technologies-----       | H10 |
| LOCAAS Engagement Analysis Program Simulation (LEAPS) -----                     | H10 |
| Logistics Simulation (LOGSIM)-----                                              | H10 |
| Multi-LINK System Test and Training Tool (MLST3) -----                          | H11 |
| Ocean Atmosphere Space Environmental Services (OASES)-----                      | H11 |
| Environmental Data Ingestor (EDI)-----                                          | H11 |
| Environmental Data Transformer (EDT)-----                                       | H11 |
| Environmental Tailoring System (ETS)-----                                       | H12 |
| Personal Computer - Shallow Water Acoustic Toolkit (PC-SWAT)-----               | H12 |
| Portable Space Model Enhanced/Navigation (PSM+/NAV) -----                       | H12 |
| Rivet Joint Mission Trainer (RJMT)-----                                         | H12 |
| Simulation C4I Interchange Module for Plans, Logistics, & Exercises (SIMPLE) -  | H12 |
| Unattended MASINT Sensor (UMS)-----                                             | H12 |
| Virtual Submarine (VSSGN) -----                                                 | H13 |
| Weapons Analysis Lethality Toolset (WALTS) -----                                | H13 |
| Tools & Stand-Alone Models:-----                                                | H14 |
| C4I Gateway (C4IGW)-----                                                        | H14 |
| Chicken Little-Global Positioning System (CL-GPS)-----                          | H14 |
| Compact Terrain Database (CTDB) -----                                           | H14 |
| Digital Collection, Analysis, and Review System (DCARS)-----                    | H15 |
| High Level Architecture / Distributed Interactive Simulation Gateway -----      | H15 |

|                                                                     |     |
|---------------------------------------------------------------------|-----|
| High Level Architecture Results -----                               | H15 |
| Joint Medical Semi Automated Forces (JMEDSAF) -----                 | H15 |
| Multi-Host Automation Remote Control & Instrumentation (MARCI)----- | H16 |
| Run Time Infrastructure (RTI) -----                                 | H16 |

**ANNEX I — SPONSORED JOINT INITIATIVES ----- I1**

|                                                                                 |     |
|---------------------------------------------------------------------------------|-----|
| C2 of Space, IO Forces -----                                                    | I2  |
| Global C2 System Integrated Imagery and Intelligence (GCCS-I3)-----             | I7  |
| Global Strike Task Force (GSTF)-----                                            | I10 |
| Collaboration Tool (InfoWorkSpace (IWS) 2.5)-----                               | I15 |
| Joint Automated Target Folders (JATF) -----                                     | I22 |
| Joint Enroute Mission Planning and Rehearsal System – Near Term (JEMPRS-NT) I26 |     |
| Joint Fires Initiative – Automated Deep Operations Coordination System-----     | I29 |
| Joint Intelligence, Surveillance and Reconnaissance/ Collection Management----- | I35 |
| Joint Public Affairs Operations Group (JPAOG) -----                             | I39 |
| JSOTF Reach-back Special Operations Mission Planning Environment (SOMPE) - I49  |     |
| Logistics Tool Suite (LTS)-----                                                 | I53 |
| Maneuver Control System – Tactical Combat Operations (MCS-TCO) Interface ---    | I56 |
| National Imagery and Mapping Agency (NIMA) Initiative -----                     | I60 |
| Network Security Management Correlation and Display Systems (NSM C&D)-----      | I62 |
| Theater Medical Information Program — Joint (TMIP-J)-----                       | I67 |
| Unmanned Sensor (US) -----                                                      | I70 |
| Operational Network Assessment (ONA) Tool Suite -----                           | I76 |
| Automated Information Network Flow (ANIF)-----                                  | I81 |
| Special Technology Operations (STO) Initiative -----                            | I83 |

**ANNEX J — PARTICIPATING ORGANIZATIONS ----- J1**

**ANNEX K — EXPERIMENT LESSONS LEARNED ----- K1**

|                                                                       |    |
|-----------------------------------------------------------------------|----|
| Title: OPFOR Rules of Engagement (ROE)-----                           | K1 |
| Title: OPFOR Reaction Time-----                                       | K1 |
| Title: Video Media Objectivity-----                                   | K2 |
| Title: Experiment Play Classification Level -----                     | K2 |
| Title: Third Party Grey Cell-----                                     | K2 |
| Title: Simulation-Live Event Tie-in -----                             | K3 |
| Title: Red and Blue Daily MSEL Processes -----                        | K4 |
| Title: Boil Down Conducted in the Form of Work Shops Process -----    | K4 |
| Title: Analyst Use of the Collaborative Information Environment ----- | K4 |
| Title: Post Experiment After Action Review -----                      | K5 |
| Title: Surveys - Participant Overload-----                            | K5 |

**ANNEX L — SENIOR CONCEPT DEVELOPER/MENTOR OBSERVATIONS-L1**

|                                                           |    |
|-----------------------------------------------------------|----|
| MC02 Execution Senior Concept Developer Observations----- | L1 |
| Millennium Challenge 2002 OPFOR After Action Report ----- | L1 |

|                                                                   |           |
|-------------------------------------------------------------------|-----------|
| <b>ANNEX M — SERVICE INPUT</b> -----                              | <b>M1</b> |
| USMC — United States Marine Corps Combat Development Command----- | M1        |
| USA — Training and Doctrine Command-----                          | M2        |
| USN — Navy Warfare Development Command -----                      | M7        |
| USAF — Air Force Experimentation Office -----                     | M8        |
| <br>                                                              |           |
| <b>ANNEX N — INDEX</b> -----                                      | <b>N1</b> |
| <br>                                                              |           |
| <b>ANNEX O — DISTRIBUTION LIST</b> -----                          | <b>O1</b> |

## Table of Figures

|                                                                                                                                                                                                                                                                                                                     |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| FIGURE 1: RESPONSE CELL AND LIVE FORCES LOCATIONS-----                                                                                                                                                                                                                                                              | 8  |
| FIGURE 2: EBO CYCLE-----                                                                                                                                                                                                                                                                                            | 11 |
| FIGURE 3: MC02 JOINT FORCE HQ-----                                                                                                                                                                                                                                                                                  | 13 |
| FIGURE 4: EXPERIMENTAL COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE<br>(XC4L) APPARATUS, ALLOWED A COHERENTLY JOINT, REACH-BACK,<br>COLLABORATIVE INFORMATION ENVIRONMENT.-----                                                                                                                               | 14 |
| FIGURE 5: NAVAL STATION SAN DIEGO, CALIF., JUL. 24, 2002 — A HARBOR TUG PULLS THE<br>GUIDED MISSILE DESTROYER USS FITZGERALD (DDG 62) AWAY FROM PIER 3 AT<br>THE NAVAL STATION, SAN DIEGO. FITZGERALD WAS PARTICIPATING IN<br>MILLENNIUM CHALLENGE 2002.-----                                                       | 15 |
| FIGURE 6: JTF ORGANIZATION CHART-----                                                                                                                                                                                                                                                                               | 16 |
| FIGURE 7: JIACG RELATIONSHIPS-----                                                                                                                                                                                                                                                                                  | 18 |
| FIGURE 8: NELLIS AIR FORCE BASE, NEV. (AFIE) -- TECH. SGT. TOMMY MAZZONE, A<br>LOADMASTER FROM THE 8TH SPECIAL OPERATIONS SQUADRON AT HURLBURT<br>FIELD, FLA. LOADS A PALETTE ABOARD A MC-130E COMBAT TALON ON JULY 29<br>FOR AN AIR DROP DURING MILLENNIUM CHALLENGE.-----                                         | 20 |
| FIGURE 9: MC02 SCENARIO HIGHLIGHTS-----                                                                                                                                                                                                                                                                             | 28 |
| FIGURE 10: CHINA LAKE, CALIF. JULY 30 (AFIE) -- INSIDE THE INTEGRATED BATTLESPACE<br>ARENA AT MICHELSON LABORATORY, WARFIGHTERS KEEP A CLOSE EYE ON<br>SCREENS SHOWING A REAL-TIME PICTURE OF THEATER AIR ASSETS AND A LIVE<br>FEED FROM A PREDATOR SURVEILLANCE AIRCRAFT DURING MILLENNIUM<br>CHALLENGE 2002.----- | 29 |
| FIGURE 11: SUFFOLK, VA., JULY 29, 2002 — "WHAT I'VE SEEN IS THE FUTURE," SAID ADM. VERN<br>CLARK AFTER HIS TOUR OF THE JOINT TRAINING, ANALYSIS, AND SIMULATION<br>CENTER (JTASC). THE CHIEF OF NAVAL OPERATIONS TOURED THE U.S. JOINT<br>FORCES COMMAND DURING MC02.-----                                          | 31 |
| FIGURE 12: SAN DIEGO, CALIF., JUL. 26, 2002 — THE CHAIRMAN OF THE JOINT CHIEFS OF<br>STAFF, AIR FORCE GEN. RICHARD MYERS (CENTER) AND AIDE NAVY CAPT.<br>RICHARD W. HUNT ARE BRIEFED BY CAPT. KEN GINADER, A DIRECTOR OF<br>OPERATIONS IN THE JOINT AIR OPERATIONS CENTER ABOARD USS CORONADO<br>(AGF 11).-----     | 34 |
| FIGURE 13: RAPTOR 4002 PASSED ITS 300TH FLIGHT-HOUR MARK, THE FIRST F-22 TO DO SO<br>AT THE AIR FORCE'S FLIGHT TEST CENTER, RECENTLY. WHILE THIS RAPTOR IS<br>REAL, THE F-22'S IN MC02 WERE ALL SIMULATED BLUE FORCE ASSETS AS THE<br>EXERCISE PORTION OF THE EXPERIMENT FEATURED FORCES FROM FY 2007.--            | 36 |
| FIGURE 14: MC02 ASSESSMENT METHODOLOGY-----                                                                                                                                                                                                                                                                         | 45 |
| FIGURE 15: THE ARMY'S NEWEST FIGHTING VEHICLE, THE STRYKER GOT A WORKOUT DURING<br>MC02-----                                                                                                                                                                                                                        | 51 |
| FIGURE 16: RELATIVE INFORMATION POSITION-----                                                                                                                                                                                                                                                                       | 53 |
| FIGURE 17: PARTICIPANT VIEW ON CONCEPT CONTRIBUTION-----                                                                                                                                                                                                                                                            | 53 |
| FIGURE 18: EXPERIMENTATION INFORMATION FLOW INTO THE JOINT TASK FORCE-----                                                                                                                                                                                                                                          | 54 |
| FIGURE 19: INFORMATION SUPERIORITY ASSESSMENT PROCESS-----                                                                                                                                                                                                                                                          | 54 |
| FIGURE 20: IWS CONFERENCE ROOM USE DESCRIBED-----                                                                                                                                                                                                                                                                   | 56 |
| FIGURE 21: THE INFORMATION AVAILABLE IN THE CIE WAS SUFFICIENT TO MAINTAIN A HIGH<br>LEVEL OF AWARENESS REGARDING BOTH THE FRIENDLY AND ENEMY<br>SITUATIONS AT ALL TIMES.-----                                                                                                                                      | 56 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

FIGURE 22: HQS EFFECTIVENESS ASSESSMENT TOOL RESULTS ----- 57

FIGURE 23: JISC ROOM CHAT TEXT ----- 58

FIGURE 24: INTEL ROOM CHAT TEXT ----- 59

FIGURE 25: JTF FRAGO DESCRIBED IN DATA REDUCTION----- 61

FIGURE 26: SYNCHRONIZATION LEVELS----- 61

FIGURE 27: RICHNESS OF INFORMATION IN THE COP, ON BOTH FRIEND AND FOE, WAS  
CONSIDERED ACCEPTABLE BY A MAJORITY OF JTF STAFF MEMBERS. ----- 62

FIGURE 28: RICHNESS OF INFORMATION IN THE CROP ----- 63

FIGURE 29: MOST THOUGHT THE QUALITY OF THE CROP IMPROVED WITH TIME----- 63

FIGURE 30: UTILITY OF INFORMATION IN THE CROP----- 64

FIGURE 31 A & B: PARTICIPANTS' USE OF IWS PEEKED DURING THE ISLAND OPERATIONS  
CAMPAIGN (LEFT), WHICH CORRESPONDED WITH HIGH LEVELS OF E-MAIL USE,  
SHOWN AT RIGHT----- 64

FIGURE 32: TOOLS, WHICH PROVIDED THE MOST USEFUL INFORMATION----- 65

FIGURE 33: AN F-16 ENGAGES A TARGET OVER THE NEVADA FIRING RANGES IN RESPONSE TO  
AN MC02 TASKING ORDER ----- 73

FIGURE 34: SMES THOUGHT THE JTF STAFF WAS ABLE TO RESPOND MORE QUICKLY TO  
DEPLOYMENT CHANGES IN THE CIE ----- 78

FIGURE 35: MOST AGREED THAT ISBS WERE WELL SUITED TO MOVING FORCES----- 79

FIGURE 36: CIE EFFECTIVELY SYNCHRONIZED DEPLOYMENT FORCE FLOW----- 80

FIGURE 37: MAJORITY THOUGHT LOG CROP PROVIDED SUFFICIENT INFORMATION TO DIVERT  
PREPO MATERIAL----- 81

FIGURE 38: ABILITY TO DECREASE JTF VULNERABILITY ----- 83

FIGURE 39: SERVICES THOUGHT PREPO REDUCED TIMELINES ----- 84

FIGURE 40: A SOLDIER PREPARES A PSC-5 COMMUNICATIONS SET AS BLUE FORCES ASSAULT  
AN OPFOR AIRFIELD DURING MC02----- 88

FIGURE 41: INSTANCES OF FRIENDLY OPERATIONS DELAYED, DISRUPTED, AND CANCELED  
BECAUSE OF THE ACTIONS OF AN ENEMY FORCE ----- 92

FIGURE 42: RATING OF ADEQUACY OF FRIENDLY STRATEGY TO COUNTER ENEMY ANTI-  
ACCESS STRATEGY----- 94

FIGURE 43: INSTANCES OF LESS THAN OPTIMUM WEAPON SELECTION ----- 101

FIGURE 44: INSTANCES OF FRIENDLY OPERATIONS DELAYED BY ENEMY ACTIONS, BY DAYS  
OF DELAY ----- 104

FIGURE 45: INSTANCES OF COMPROMISED INTENTIONS----- 105

FIGURE 46: SEAL TEAM TRANSPORTATION STANDING BY TO EMBARK RIDERS TO AN  
OBJECTIVE AREA ----- 107

FIGURE 47: INSTANCES OF ISSUES CONCERNING RELATIONSHIP OF PEL TO JIPTL----- 114

FIGURE 48: REACH-BACK CAPABILITY HAD A POSITIVE IMPACT ON THE TARGETING PROCESS  
----- 116

FIGURE 49: COLLABORATION CAPABILITY IS ADEQUATE ----- 117

FIGURE 50: PERCENT OF ONA NODES IDENTIFIED FOR ATTACK ----- 119

FIGURE 51: FORTY-THREE PERCENT OF JFACC ASSETS WERE ALLOCATED TO THE TBM/WME  
THREAT----- 126

FIGURE 52: THE JFMCC AND JFACC WERE RESPONSIBLE FOR ACTING AGAINST TIME  
SENSITIVE TARGETS ----- 130

FIGURE 53: PARTICIPANTS THOUGHT COLLABORATION IMPROVED TST COORDINATION----- 132

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

FIGURE 54: MOST THOUGHT MC02 TST PROCEDURES SHOULD BE ADOPTED AS A JOINT STANDARD ----- 133

FIGURE 55: ADOCS VIEWED AS 'BETTER THAN ADEQUATE' FOR USE AS A TARGETING TOOL 134

FIGURE 56: TIME REQUIRED FOR BLUE TO DETERMINE A NEW PLAN IS REQUIRED LESS THEN 1 HOUR ----- 139

FIGURE 57: EIGHTY-FIVE PERCENT OF RESPONDENTS INDICATED THAT BLUE FORCES WERE REPOSITIONED IN LESS THAN SIX HOURS ----- 140

FIGURE 58: DEGREE OF SUCCESS ACHIEVED AGAINST IO OBJECTIVES ----- 145

FIGURE 59: US NAVY MEDICAL TEAMS WORK ON THE WOUNDED DURING MC02 FIELD EXERCISES ----- 152

FIGURE 60: LOG CROP ENHANCES AWARENESS (N=59) ----- 156

FIGURE 61: LOG CROP PROVIDES VISIBILITY-TAILORING SUSTAINMENT OF DEPLOYED FORCES (N=55)----- 157

FIGURE 62: GETTING READY FOR THE GLOBAL STRIKE TASK FORCE MISSION DURING MC02 EXERCISES----- 161

FIGURE 63: JSOP CORRECTLY DESCRIBES/DEFINES RESPONSIBILITIES AND FUNCTIONS --- 167

FIGURE 64: SJFHQ PRE-CRISIS PLANNING ENHANCED THE FUNCTION OF THE JTF HEADQUARTERS----- 168

FIGURE 65: SJFHQ PROVIDED EXPECTED PRODUCTS FROM PRE-CRISIS PLANNING ----- 169

FIGURE 66: SJFHQ SHOULD BRING ADDITIONAL SKILLS, KNOWLEDGE, OR PRODUCTS TO JTF ACTIVATION----- 170

FIGURE 67: JSOP CONSIDERED A 'SOMEWHAT USEFUL' DOCUMENT----- 171

FIGURE 68: JSOP NEEDED MODIFICATION----- 171

FIGURE 69: JTF SUCCESSFUL IN PERFORMING EBO AND UJTL TASK----- 172

FIGURE 70: JTF FUNCTIONS NOT AFFECTED BY BATTLE RHYTHM RIGOR OR STRUCTURE ---- 173

FIGURE 71: SJFHQ WAS VALUABLE TO STANDUP OF JTF HQ----- 175

FIGURE 72: ATTRIBUTES OF SJFHQ QUICKENED THE JTF HQ LEARNING CURVE ----- 176

FIGURE 73: SJFHQ CONSIDERED CRITICAL TO JTF HQ ----- 176

FIGURE 74: VALUE OF SJFHQ ATTRIBUTES IN QUICKENING JTF LEARNING CURVE ----- 177

FIGURE 75: SJFHQ ENHANCED TASK PERFORMANCE ----- 178

FIGURE 76: JTF RELIED ON SJFHQ FOR TASK PERFORMANCE ----- 179

FIGURE 77: SME OBSERVED CONTINUITY IN JTF PLANNING AND OPERATIONS ----- 180

FIGURE 78: SJFHQ EXPERTISE WAS VALUABLE TO JTF ESTABLISHING AND MAINTAINING INFORMATION SUPERIORITY----- 180

FIGURE 79: SJFHQ WAS A FORCE MULTIPLIER FOR THE JTF AND A VALUABLE TOOL IN ESTABLISHING AND MAINTAINING IS ----- 181

FIGURE 80: SJFHQ EXPERTISE WAS VALUABLE TO JTF SETTING CONDITIONS FOR DECISIVE OPERATIONS. ----- 181

FIGURE 81: SJFHQ WAS AN ENHANCEMENT TO THE JTF FOR SETTING CONDITIONS FOR DECISIVE OPERATIONS----- 182

FIGURE 82: SJFHQ EXPERTISE WAS VALUABLE TO THE JTF IN ITS REQUIREMENT TO EXECUTE "ASSURED ACCESS" ----- 182

FIGURE 83: SJFHQ EXPERTISE WAS VALUABLE TO THE JTF, WHILE CONDUCTING EBO ----- 182

FIGURE 84: VALUE OF SJFHQ IN ENABLING JTF TO SUSTAIN THE FORCE----- 183

FIGURE 85: SJFHQ ENABLED THE "SUSTAIN THE FORCE" MISSION----- 183

FIGURE 86: FORMING THE JTF TODAY ----- 184

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

FIGURE 87: FORMING THE MC02'S JTF -----185

FIGURE 88: EFFECTS-BASED PLANNING DIDN'T FALTER DUE TO ORGANIZATIONAL PROBLEMS  
-----185

FIGURE 89: BCCWG STRUCTURE ENHANCED JTF HQ OPERATIONS-----186

FIGURE 90: SJFHQ ENHANCED THE FUNCTION OF THE FORWARD HQ-----187

FIGURE 91: SJFHQ PRESENCE REDUCED FORWARD HQ SET-UP TIME-----188

FIGURE 92:CHANGES AND IMPROVEMENTS NEEDED FOR SJFHQ -----189

FIGURE 93: PARTICIPANTS WERE UNSURE OF THE CORRECT NUMBER AND DISTRIBUTION OF  
IO PLANNERS WITH THE SFJHQ-----194

FIGURE 94: CHANGE IN IO RESPONSES -----195

FIGURE 95: MOST AGREED THAT LOGISTICIANS IN PLANS ENHANCED JTF -----195

FIGURE 96: LOGISTICIANS IN OPERATIONS ENHANCED JTF-----196

FIGURE 97: GROUP STRUCTURE EFFECT ON JTF OPERATIONS -----197

FIGURE 98: GROUP STRUCTURE EFFECT ON COMPONENT INTERACTION -----197

FIGURE 99: MOST THOUGHT STRUCTURE WAS AN ENHANCEMENT TO JTFHQ-COMPONENT  
INTERACTION. JFACC/JPOTF MIXED.-----198

FIGURE 100: MOST THOUGHT INTERACTION BETWEEN JTF HQ AND THE COMPONENT STAFFS  
WAS EFFECTIVE-----198

FIGURE 101: JTF AND COMPONENTS THOUGHT STRUCTURE ENHANCED INTERACTION  
BETWEEN THE COMBATANT COMMANDER'S STAFF AND THE JTF STAFF.  
COMBATANT COMMANDER'S STAFF DISAGREED. -----199

FIGURE 102: ADDITIONAL SKILLS, KNOWLEDGE, AND PRODUCTS NEEDED FROM SJFHQ -----200

FIGURE 103: BCCWG HAD A POSITIVE EFFECT ON JTF OPERATIONS-----207

FIGURE 104: BCCWG EFFECT ON COMPONENT INTERACTION -----208

FIGURE 105: BCCWG EFFECT ON COMBATANT COMMANDER STAFF INTERACTION -----208

FIGURE 106: BLUE/RED CELL INTERVAL, MIX AND NUMBERS WERE CONSIDERED ADEQUATE  
-----209

FIGURE 107: BLUE/RED CELL FULFILLMENT OF JTF NEEDS-----210

FIGURE 108: EFFECTS ASSESSMENT CELL ATTRIBUTES -----210

FIGURE 109: EFFECTS ASSESSMENT CELL FULFILLED JTF'S NEEDS -----211

FIGURE 110: INFORMATION OPERATIONS CELL CONSIDERED ADEQUATE BY MOST -----212

FIGURE 111: INFORMATION OPERATIONS CELL FULFILLED OF JTF NEEDS-----213

FIGURE 112: JOINT COORDINATION BOARD MET EVERYONE'S EXPECTATIONS-----214

FIGURE 113: JOINT COORDINATION BOARD'S PERFORMANCE IMPROVED BETWEEN SPIRAL 3  
AND MC02 EXECUTION-----214

FIGURE 114: THE JCB WORKING GROUP RECEIVED WIDE ACCLAIM -----215

FIGURE 115: JOINT COORDINATION BOARD WORKING GROUP SAW EFFECTIVENESS RATINGS  
RISE BETWEEN SPIRAL 3 AND MC02 EXECUTION -----215

FIGURE 116: JOINT COLLECTION MANAGEMENT CELL ATTRIBUTES -----216

FIGURE 117: RESPONDENTS CONSIDERED SOME CELL SHORTCOMINGS-----216

FIGURE 118: JOINT FIRES ELEMENT WORKING GROUP ATTRIBUTES -----217

FIGURE 119: JOINT FIRES ELEMENT WG MET JTF NEEDS-----217

FIGURE 120: JOINT INFO SUPERIORITY CENTER ATTRIBUTES ADEQUATE-----218

FIGURE 121: JOINT INFO SUPERIORITY CENTER MET JTF NEEDS-----219

FIGURE 122: JOINT OPERATIONS CENTER PERSONNEL MIX AND NUMBER CONSIDERED  
ADEQUATE -----219



U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

FIGURE 123: JOINT OPERATIONS CENTER MET THE JTF NEEDS----- 220

FIGURE 124: JOINT PLANNING CENTER ATTRIBUTES----- 221

FIGURE 125: JOINT PLANNING CENTER MET JTF NEEDS----- 221

FIGURE 126: ROE WORKING GROUP ATTRIBUTES----- 222

FIGURE 127: ROE GROUP JUDGED A BIG SUCCESS ----- 223

FIGURE 128: ALL WERE SATISFIED WITH THE MIX AND NUMBER OF PERSONNEL WORKING IN  
THE TIME SENSITIVE TARGETING CELL ----- 223

FIGURE 129: TIME SENSITIVE TARGET CELL MET JTF NEEDS ----- 224

FIGURE 130: LOGISTICS ACTION RESPONSE BOARD MET JTF NEEDS----- 225

FIGURE 131: PARTICIPANTS WERE SATISFIED WITH THE MIX OF BOARDS, CENTERS, CELLS, OR  
WORKING GROUPS AND WOULDN'T DELETE ANY ----- 225

FIGURE 132: COMMAND AND CONTROL IS THE EMPHASIS IN MC02 ----- 238

FIGURE 133: MAJORITY FEELS ONA SHOULD BE DESIGNED TO SUPPORT A BROAD RANGE OF  
SPECIALTIES.----- 246

FIGURE 134: DESIRED ONA CHARACTERISTICS ----- 247

FIGURE 135: ONA BENEFICIAL FOR BLUE ----- 248

FIGURE 136: ONA EFFECTIVENESS----- 249

FIGURE 137: EASE OF INFORMATION UPDATE AND MAINTENANCE----- 251

FIGURE 138: EASE OF ONA INFORMATION RETRIEVAL----- 252

FIGURE 139: EASE OF ONA INFORMATION FILTER AND SORT----- 253

FIGURE 140: SHOULD ONA BE A SOURCE FOR CURRENT BDA?----- 254

FIGURE 141: SHOULD ONA BE DESIGNED AS A SOURCE FOR CURRENT INTELLIGENCE  
INFORMATION----- 255

FIGURE 142: LESS THAN HALF OF MC02 PARTICIPANTS THOUGHT THEY WERE ADEQUATELY  
TRAINED ON ONA ----- 257

FIGURE 143: INFORMATION RETRIEVAL RECEIVED MIXED GRADES----- 259

FIGURE 144: EASE OF INFORMATION UPDATE AND MAINTENANCE IN ONA KNOWLEDGE BASE  
----- 260

FIGURE 145: IMPORTANT TO BE NOTIFIED OF ONA ANALYSIS UPDATES ----- 261

FIGURE 146: CAN TELL WHEN ONA HAS BEEN UPDATED ----- 261

FIGURE 147: ONA DATABASE CHANGES ----- 262

FIGURE 148: TOTAL EXECUTION ONA DATABASE CHANGES ----- 263

FIGURE 149: ONA DESKTOP SNAPSHOT ----- 267

FIGURE 150: PRE SPIRAL 3 ONA DATABASE CHANGES ----- 268

FIGURE 151: PRE SPIRAL 3 ONA DATABASE CHANGES ----- 269

FIGURE 152: ONA DATABASE VIEWING----- 270

FIGURE 153: EXECUTION ONA DATABASE VIEWING BY GROUP ----- 270

FIGURE 154: ONA ANALYSIS IS GENERALLY UNDERSTOOD----- 271

FIGURE 155: ONA ANALYSIS IS THOROUGH AND USEFUL ACCORDING TO MAJORITY----- 271

FIGURE 156: ONA ANALYSIS OF BLUE IS USEFUL ----- 272

FIGURE 157: EIGHTY-TWO PERCENT OF RESPONDENTS SAID THEY UNDERSTOOD ONA  
ANALYSIS OF RED PMESII ----- 273

FIGURE 158: ONA ANALYSIS OF OPFOR GOALS, INTENTIONS, STRENGTHS, AND WEAKNESSES  
----- 274

FIGURE 159: ONA ANALYSIS OF RED IS USEFUL----- 274

FIGURE 160: ONA ANALYSIS OF OPFOR GOALS, INTENTIONS, STRENGTHS, AND WEAKNESSES -----275

FIGURE 161: ONA PROVIDES AWARENESS OF BATTLESPACE -----275

FIGURE 162: THE NUMBER OF ONA CHANGES DEPICTED DURING THE JUNE 3-14 PERIOD REPRESENTS ALL OF THE SPIRAL 3 DATA CHANGE ACTIVITIES BY PARTICIPANTS AND SOSA ANALYSTS. THE FIGURE INDICATES A GRADUAL INCREASE IN THE ONA DATABASE CUMULATIVE DATA CHANGES AS SPIRAL 3 APPROACHED AND A GRADUAL DECREASE IN THE CUMULATIVE DATA CHANGES IN THE ONA DATABASE AS SPIRAL 3 PROGRESSED. ONE CONTRIBUTING FACTOR TO THE "APPARENT DECLINE" IN ACTIVITY WAS THAT THE SOSA ANALYSTS WERE HEAVILY ENGAGED IN CREATING THOUSANDS OF LINKS BETWEEN THE VARIOUS EFFECTS, NODES AND ACTIONS AND, UNFORTUNATELY, THIS LINKING ACTIVITY HAD NOT BEEN PROGRAMMED FOR CAPTURE BY THE AUDIT LOG DURING SPIRAL 3 OR EXECUTION.-----276

FIGURE 163: THE FIGURE DISPLAYS THE PRE-EXECUTION (JULY 8-24) DATA CHANGE ACTIVITY IN THE ONA DATABASE. NODES AND SELECTED N-A-E LINKS (INDICATIVE OF PLAN CHANGE) CATEGORIES SAW MODERATE LEVELS OF DATA BEING CHANGED. EFFECT AND ACTION ITEMS WERE DESCRIBED IN VERY BROAD TERMS WITHIN THE DATABASE. AS A RESULT, THEY GENERALLY DID NOT NEED TO BE CHANGED. CHANGES TO EFFECTS AND ACTIONS DATA WERE MINIMAL DURING THIS PERIOD SPIRAL 3 ONA DATABASE CHANGES. -----276

FIGURE 164 ABOVE: DEPICTS THE PRE-EXECUTION DATABASE AND FIGURE 165 BELOW DEPICTS THE EXECUTION DATABASE CHANGES. THE EXECUTION DATA CHANGE ACTIVITY IN THE ONA DATABASE FROM JULY 22 TO AUGUST 10 IS SHOWN IN FIGURE 164. AGAIN, NODES AND SELECTED N-A-E LINKS (PLANS ACTIVITY) SAW A MODERATE LEVEL OF DATA BEING CHANGED. CHANGES TO EFFECTS AND ACTIONS DATA WERE ALSO MINIMAL DURING THIS PERIOD; THEY WERE WRITTEN IN BROAD LANGUAGE THAT NEEDED LITTLE MODIFICATION AS EXECUTION PROGRESSED. THE PLANS ACTIVITY CHANGE SPIKE ON AUG 6 MAY BE EXPLAINED BY THE JOINT OPERATION STRIKE PLANNING THAT WAS OCCURRING AT THE TIME. AVERAGE PLANNING (SELECTED N-A-E LINKS) CHANGES INCREASED FROM 27 CHANGES PER DAY DURING SPIRAL 3 TO 103 CHANGES PER DAY DURING EXECUTION. AVERAGE NODE CHANGES INCREASED FROM 41 CHANGES PER DAY DURING SPIRAL 3 TO 62 CHANGES PER DAY DURING EXECUTION. THIS CHANGE ACTIVITY, MODEST AS IT IS, SUPPORTS THE TASK TO CONTINUALLY UPDATE THE ONA. -----277

FIGURE 165: DEPICTS THE EXECUTION DATABASE CHANGES. -----277

FIGURE 166: ALL EFFECTS IN THE ONA DATABASE WERE ALSO TAGGED WITH "PHASE OF ENGAGEMENT" META-INFORMATION (INFLUENCE, COERCE, DETER, COMPEL, DEFEAT AND TRANSITION). THE FIGURE BREAKS OUT THE AMOUNT OF PHASE-RELATED DATA CHANGE ACTIVITY FOR EFFECTS DURING EXECUTION. -----278

FIGURE 167: EXECUTION ONA ACTION DIME CHANGES. ALL ACTIONS IN THE ONA DATABASE ARE ALSO TAGGED WITH DIME META-INFORMATION. THIS GRAPH BREAKS OUT THE AMOUNT OF ACTIONS DIME-RELATED DATA CHANGE ACTIVITY DURING EXECUTION. CHANGES TO ACTIONS WERE MINIMAL, SPORADIC AND NO TRENDS WERE NOTED.-----278

FIGURE 168: EXECUTION ONA ACTION PHASE CHANGES. ALL ACTIONS IN THE ONA DATABASE ARE ALSO TAGGED WITH PHASE META-INFORMATION. THE GRAPHS BREAKS OUT THE AMOUNT OF ACTIONS PHASE-RELATED DATA CHANGE ACTIVITY DURING EXECUTION. CHANGES TO ACTIONS WERE MINIMAL, SPORADIC AND NO TRENDS WERE NOTED.-----279

FIGURE 169: EXECUTION ONA NODE PMESII CHANGES. ALL NODES IN THE ONA DATABASE WERE ALSO TAGGED WITH "PMESII" META-INFORMATION. THIS GRAPH BREAKS

OUT THE AMOUNT OF NODES PMESII-RELATED DATA CHANGE ACTIVITY DURING EXECUTION. IT WAS ANTICIPATED THAT THE NATURE OF DATA CHANGED IN THE DATABASE MIGHT REFLECT THE PHASES OF ENGAGEMENT WITH OPFOR. CHANGES TO THE NODES WERE EXTENSIVE, BUT PREDOMINANTLY MILITARY AND INFORMATION IN NATURE. A MINOR CHANGE INCREASE TREND NOTED ACROSS ALL THE PMESII META-INFORMATION, ESPECIALLY POLITICAL, ECONOMIC, SOCIAL AND INFRASTRUCTURE, AROUND 7 AUGUST COULD HAVE BEEN CAUSED BY THE TRANSITION TO PEACE PLANNING. ----- 279

FIGURE 170: MAJORITY THOUGHT NOTIFICATION OF ONA ANALYSIS UPDATES IMPORTANT -280

FIGURE 171: MOST PARTICIPANTS COULD NOT TELL WHEN ONA WAS UPDATED ----- 280

FIGURE 172: ONA TRAINING VS. RECOGNIZING ONA UPDATES-----281

FIGURE 173: EASE OF INFORMATION RETRIEVAL FROM ONA KNOWLEDGE BASE -----282

FIGURE 174: PARTICIPANTS SPLIT ON THE EASE OF RETRIEVING ONA INFORMATION VIA FILTER AND SORT FUNCTIONS -----283

FIGURE 175: TRAINING VS. ONA INFORMATION RETRIEVAL-----284

FIGURE 176: TRAINING VS. ONA INFORMATION FILTER & SORT -----285

FIGURE 177: ONA WAS USEFUL IN PEL DEVELOPMENT-----286

FIGURE 178: ONA WAS VALUABLE TO ETO DEVELOPMENT -----287

FIGURE 179: ONA USEFULNESS FOR BOARD/CENTER/CELL PREPARATION.-----287

FIGURE 180: ONA SUPPORTS ENHANCED DECISION-MAKING-----288

FIGURE 181: ONA ANALYSIS FOR ETO-----289

FIGURE 182: ONA ANALYSIS USEFUL IN IDENTIFYING RED INTENTIONS-----290

FIGURE 183: ONA 2ND & 3RD ORDER EFFECTS USED IN DECISION PROCESS -----290

FIGURE 184: ONA IMPACT ON COA SELECTION-----291

FIGURE 185: ONA USEFULNESS IN PEL DEVELOPMENT-----291

FIGURE 186: HOW ONA WAS USED -----292

FIGURE 187: ELEMENTS OF JTF ON OFFENSIVE DUE TO SPECIFIC SUPPORT FROM ONA -----292

FIGURE 188: ONA PROVIDED SUPPORT TO ELEMENTS OF JTF ENABLING -----293

FIGURE 189: ONA PORTAL PAGE ON SPPS. FIGURE IS A SCREEN CAPTURE OF THE ONA PORTAL (ENTRYWAY) PAGE ON THE MC02 SPPS. THE ONA PORTAL WAS ALSO USED AS THE ONA TODAY EXECUTIVE SUMMARY PAGE. AS SUCH, THIS EXECUTIVE SUMMARY AND PORTAL PAGE RECORDED MORE VISITS THAN THE OTHER ONA PAGES BECAUSE USERS PREDOMINANTLY USED IT TO TRANSIT TO THEIR DESTINATION PAGE(S). THE ONA PORTAL LOGGED 2,051 VISITS DURING THE THREE-WEEK EXECUTION PERIOD. ----- 304

FIGURE 190: A SCREEN CAPTURE OF THE ONA MATRIX PAGE ON THE MC02 SPPS. THE PAGE WAS VISITED BY 256 USERS DURING THE THREE-WEEK EXECUTION PERIOD ---304

FIGURE 191: SCREEN CAPTURE OF AN ONA DATABASE LOGIN PAGE, 1,539 USERS VISITED THE LOGIN PAGE DURING THE THREE-WEEK EXECUTION PERIOD ----- 305

FIGURE 192: SCREEN CAPTURE OF ONA REFERENCE PAGES. ONE HUNDRED THIRTY USERS VISITED THE REFERENCES PAGE DURING THE THREE-WEEK EXECUTION PERIOD ----- 305

FIGURE 193: A SCREEN CAPTURE OF THE ONA RELATED PRODUCTS PAGE ON THE MC02 SPPS. SIXTY-NINE USERS VISITED THE PRODUCTS PAGE DURING THE THREE-WEEK EXECUTION PERIOD.----- 306

FIGURE 194: THE CUMULATIVE NUMBER OF VISITORS TO ALL THE ONA PAGES ON SPPS PER DAY. THERE APPEARS TO BE A CORRELATION BETWEEN THE MAJOR PLANNING ACTIVITIES SHOWN IN THE TEXT BOXES AT THE TOP OF THE CHART WITH THE CUMULATIVE NUMBER OF VISITORS TO THE ONA PAGES. ----- 306

- FIGURE 195: VISITORS ON SPECIFIC ONA PAGES. THIS GRAPHIC BREAKS OUT THE VARIOUS ONA PAGES TO SHOW THAT THE ONA TODAY (EXECUTIVE SUMMARY AND PORTAL) AND THE DATABASE LOGIN PAGES WERE THE PAGES MOST OFTEN VISITED. THERE APPEARS TO BE A CORRELATION BETWEEN THE MAJOR PLANNING ACTIVITIES SHOWN IN THE TEXT BOXES AT THE TOP OF THE CHART WITH THE NUMBER OF VISITORS. -----307
- FIGURE 196: THIS CHART SHOWS THE AVERAGE NUMBER OF MINUTES SPENT ON ALL THE ONA PAGES ON SPPS PER DAY. THIS IS THE TOTAL NUMBER OF VISITORS DIVIDED BY THE TOTAL NUMBER OF MINUTES PER DAY. THERE STILL APPEARS TO BE A CORRELATION BETWEEN THE MAJOR PLANNING ACTIVITIES SHOWN IN THE TEXT BOXES AT THE TOP OF THE CHART WITH THE AVERAGE NUMBER OF MINUTES ON THE ONA PAGES-----307
- FIGURE 197: TOTAL MINUTES ON ONA PAGES SHOWS THE CUMULATIVE NUMBER OF MINUTES SPENT ON ALL THE ONA PAGES ON SPPS PER DAY. THERE APPEARS TO BE A CORRELATION BETWEEN THE MAJOR PLANNING ACTIVITIES SHOWN IN THE TEXT BOXES AT THE TOP OF THE CHART WITH THE CUMULATIVE NUMBER OF MINUTES ON THE ONA PAGES BUT IT IS LESS CLEAR THAN THE PREVIOUS FIGURES. IT SHOULD BE NOTED THAT THE DATA DOES NOT DIFFERENTIATE PRODUCTIVE FROM NON-PRODUCTIVE ACTIVITY WHILE SPENDING TIME ON THE PAGE(S). ---308
- FIGURE 198: TOTAL MINUTES ON SPECIFIC ONA PAGES BREAKS OUT THE VARIOUS MINUTES SPENT ON THE VARIOUS ONA PAGES TO SHOW THAT THE ONA TODAY AND THE DATABASE LOGIN PAGES WERE AGAIN THE FAVORITES. THERE STILL APPEARS TO BE A CORRELATION BETWEEN THE MAJOR PLANNING ACTIVITIES SHOWN IN THE TEXT BOXES AT THE TOP OF THE CHART WITH THE NUMBER OF MINUTES ON EACH OF THE ONA PAGES BUT THE CORRELATION IS LESS CLEAR THAN THE PREVIOUS FIGURES. MORE CUMULATIVE TIME WAS SPENT ON THE ONA TODAY PAGE THAN ON THE DATABASE LOGIN PAGE. WHAT WAS UNEXPECTED WAS THE LACK OF USE OF THE MATRIX PAGE THAT HAD THE BLUE ON RED AND RED ON BLUE PERSPECTIVES AS WELL AS INFORMATION ON THE VARIOUS COUNTRIES OF THE REGION. -----308
- FIGURE 199: FIGURE SHOWS THE AVERAGE NUMBER OF MINUTES SPENT ON EACH ONA PAGE ON SPPS PER DAY. THIS IS THE TOTAL NUMBER OF VISITORS DIVIDED BY THE TOTAL NUMBER OF MINUTES PER DAY. THERE STILL APPEARS TO BE A CORRELATION BETWEEN THE MAJOR PLANNING ACTIVITIES SHOWN IN THE TEXT BOXES AT THE TOP OF THE CHART WITH THE AVERAGE NUMBER OF MINUTES ON THE ONA PAGES. -----309
- FIGURE 200: THE NUMBER OF VISITS CATEGORIZED BY THE VISIT DURATION IN ONE-MINUTE INTERVALS FOR EACH ONA PAGE ON SPPS-----309
- FIGURE 201: FIGURE BREAKS OUT THE VARIOUS ONA PAGE VISITS BY GROUP TO SHOW THAT THE ONA TODAY (EXECUTIVE SUMMARY AND PORTAL) AND THE DATABASE LOGIN PAGES WERE THE PREDOMINANT PAGES VISITED CONSISTENTLY. THE JTF, SJFHQ JFLCC, AND JFMCC GROUPS CONSISTENTLY MADE THE GREATEST NUMBER OF VISITS TO THE VARIOUS PAGES. AGAIN, THE LACK OF USE OF THE MATRIX PAGE THAT HAD THE BLUE ON RED AND RED ON BLUE PERSPECTIVES AS WELL AS INFORMATION ON THE VARIOUS COUNTRIES OF THE REGION WAS UNEXPECTED.-----310
- FIGURE 202: THIS GRAPHIC BREAKS OUT THE PERCENTAGES OF THE VARIOUS GROUPS VISITING THE ONA PAGES TO SHOW THAT THE JTF, SJFHQ JFLCC AND JFMCC GROUPS CONSISTENTLY HAD THE GREATEST PERCENTAGE OF VISITS TO THE VARIOUS PAGES. -----311
- FIGURE 203: SECRETARY OF DEFENSE DONALD RUMSFELD IS BRIEFED BY COMMANDER USJFCOM, GEN WILLIAM F. KERNAN DURING THE SECRETARY'S VISIT TO JFCOM'S

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                                                                                                                                                                                                                  |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| JOINT TRAINING, ANALYSIS, AND SIMULATION CENTER, SUFFOLK, VA DURING MILLENNIUM CHALLENGE 2002                                                                                                                                    | 328 |
| FIGURE 204: ACCESS TO THE CROP ENHANCED THE EBP PROCESS                                                                                                                                                                          | 331 |
| FIGURE 205: THE CIE HELPED TO DEVELOP BETTER COA'S                                                                                                                                                                               | 332 |
| FIGURE 206: THE CIE HELPS DEVELOP COA'S MORE QUICKLY                                                                                                                                                                             | 333 |
| FIGURE 207: DEMANDS ON PLANNERS' TIME WAS SIGNIFICANT                                                                                                                                                                            | 334 |
| FIGURE 208: PARTICIPANTS DISAGREED WITH THE STATEMENT, 'DEMANDS ON PLANNERS' TIME OUTWEIGH COLLABORATION BENEFITS'                                                                                                               | 335 |
| FIGURE 209: EFFECT NUMBER DESIGNATED IN THE ONA DATABASE VS. THE NUMBER OF MEASURES OF EFFECTIVENESS                                                                                                                             | 345 |
| FIGURE 210: MOST THOUGHT THE CROP WAS USEFUL IN TRACKING PROGRESS                                                                                                                                                                | 349 |
| FIGURE 211: LINE HANDLING EVOLUTIONS ONBOARD USS CORONADO (AFG11) FLAGSHIP FOR COMMANDER JOINT MARITIME FORCES COMPONENT COMMANDER AND DEPLOYED HEADQUARTERS FOR THE COMMANDER JOINT TASK FORCE DURING MILLENNIUM CHALLENGE 2002 | 353 |
| FIGURE 212: CIE ARCHITECTURE AT THE TIME OF MC02 EXECUTION                                                                                                                                                                       | 355 |
| FIGURE 213: COP ARCHITECTURE AT THE TIME OF MC02 EXECUTION                                                                                                                                                                       | 356 |
| FIGURE 214: A DEPICTION OF HOW DATA FLOWED FROM THE COMPONENTS' RESPONSE CELLS TO THE LOG CROP                                                                                                                                   | 357 |
| FIGURE 215: XC4I WIDE AREA NETWORK RUNNING THE CROP                                                                                                                                                                              | 358 |
| FIGURE 216: THE NUMBER OF PARTICIPANTS THAT WERE LOGGED ONTO IWS WAS FAIRLY CONSTANT UNTIL THE LAST DAYS OF THE EXPERIMENT                                                                                                       | 360 |
| FIGURE 217: AVG. DURATION (IN HRS) PARTICIPANTS WERE ACTIVE ON IWS. THE GRAPH IS IN ONE-HOUR INCREMENTS FROM ZERO THROUGH SEVEN HOURS.                                                                                           | 361 |
| FIGURE 218: IWS CONSIDERED EFFECTIVE BY MOST                                                                                                                                                                                     | 361 |
| FIGURE 219: A DEPICTION OF THE JTF BATTLE RHYTHM USED IN MC02                                                                                                                                                                    | 362 |
| FIGURE 220: SNAPSHOT OF MC02 CJTF STANDING SCHEDULE OF EVENTS                                                                                                                                                                    | 362 |
| FIGURE 221: SNAPSHOT OF ADOCS MAPPING DURING THE EXPERIMENT                                                                                                                                                                      | 363 |
| FIGURE 222: ENEMY LOCATION/STATUS TIMELINESS IN ADOCS                                                                                                                                                                            | 364 |
| FIGURE 223: ENEMY LOCATION/STATUS DETAIL IN ADOCS                                                                                                                                                                                | 364 |
| FIGURE 224: OPFOR SUBMARINE TRACKS IN GCCS                                                                                                                                                                                       | 365 |
| FIGURE 225: ADOCS INFORMATION WAS ONLY 'SOMEWHAT ACCEPTABLE' WITH REGARD TO LEVEL OF DETAIL                                                                                                                                      | 365 |
| FIGURE 226: ADOCS INFORMATION WAS ONLY 'SOMEWHAT ACCEPTABLE' WITH REGARDS TO ITS TIMELINESS                                                                                                                                      | 366 |
| FIGURE 227: ADOCS DISPLAYED INFORMATION WAS ONLY 'SOMEWHAT ACCEPTABLE' WITH REGARDS TO ACCURACY                                                                                                                                  | 366 |
| FIGURE 228: NAVAL FORCES CHART DISPLAYED IN ADOCS                                                                                                                                                                                | 367 |
| FIGURE 229: GROUND TRUTH AND SIMULATION LOCATIONS WERE RELATIVELY ACCURATE AS DISPLAYED HERE.                                                                                                                                    | 368 |
| FIGURE 230: JFLCC ATTACK ON OBJECTIVE TWO SHOWING BOTH GROUND TRUTH AND THE GCCS DISPLAY                                                                                                                                         | 368 |
| FIGURE 231: MC02 PERMANENT VIRTUAL PATHWAYS (PVPS) WITH SOFT PERMANENT VIRTUAL CONNECTIONS (SPVCS) SUPPORTING COMMAND AND CONTROL APPLICATIONS                                                                                   | 372 |
| FIGURE 232: AVERAGE BANDWIDTH USAGE (TRANSMIT & RECEIVE) FOR EACH HOUR OVER THE ENTIRE EXPERIMENT (14 DAYS)                                                                                                                      | 373 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

FIGURE 233: AVERAGE BANDWIDTH USAGE (TRANSMIT & RECEIVE) FOR EACH DAY (14 DAYS) -----374

FIGURE 234: AVERAGE BANDWIDTH USAGE (TRANSMIT & RECEIVE) FOR EACH HOUR FOR DAY D+7 -----374

FIGURE 235: AVERAGE BANDWIDTH USAGE (TRANSMIT & RECEIVE) FOR EACH HOUR FOR DAY D+8 -----375

FIGURE 236: E-MAIL WAS THE TOOL OF CHOICE FOR MC02 PARTICIPANTS, BUT EXPERIMENTAL NETWORKING TOOLS SUCH AS THE INFOWORKSPACE AND THE SHARED POINT PORTAL SERVER WERE AFFORDED A TRYOUT. -----379

FIGURE 237: WEB PORTAL PAGE – LOGISTICS -----380

FIGURE 238: SURVEYS/COMMENTS ON SPPS ELICITED 103 POSITIVE AND 108 NEGATIVE RESPONSES. EIGHTY-THREE OF THE POSITIVE RESPONSES CONTAINED NEGATIVE COMMENTS IN THE RESPONSE NARRATIVE -----381

FIGURE 239: EIGHTY-SEVEN VOLUNTARY COMMENTS ON SPPS WERE 2:1 CRITICAL OF THE TOOL. ONLY THE LOGISTICS PAGE GOT STRONG REVIEWS -----382

FIGURE 240: VERTICAL AND HORIZONTAL COLLABORATION AS DONE DURING MC02 ----- 383

FIGURE 241: USAF AC130 PILOT PREPARES HIS AIRCRAFT FOR OPERATIONS IN SUPPORT OF MC02 -----398

FIGURE 242: JIACG WAS POSITIVELY VIEWED AT JTF HQ -----402

FIGURE 243: DOES JIACG PROVIDE RELEVANT IA POLICY-OPERATIONAL LEVEL INSIGHTS AND UNDERSTANDING? -----403

FIGURE 244: PHYSICAL DETAILING OF JIACG IA LNO'S IS STILL NECESSARY, EVEN WITH IWS (CIE). -----403

FIGURE 245: IMPROVED INSIGHT INTO THE JTF AND COMBATANT COMMANDER DECISION PROCESS WAS LISTED AS THE BIGGEST BENEFIT FROM THE IA POINT OF VIEW, WHILE ACCESS TO THE POL-MIL DEBATE BY THE MILITARY STAFF WAS THE GREATEST BENEFIT SEEN BY EXPERIMENT PARTICIPANTS. -----405

FIGURE 246: JTF STAFFERS CONSIDERED COMBATANT COMMANDER ACCESS TO THE INTERAGENCY TO BE A SIGNIFICANT CAPABILITY, WHILE THE WASHINGTON, DC AGENCY SOUGHT ACCESS TO THE COMMANDER'S PLANNING AND OPERATIONS PROCESS. -----406

FIGURE 247: IWS WAS DEEMED AN IMPORTANT COLLABORATION TOOL, ESPECIALLY FOR THE DC/IAC -----407

FIGURE 248: PARTICIPANTS AGREED THAT IA ADVISORY AND GUIDANCE ROLE WAS SUCCESSFUL AND SHOULD BE CONTINUED, MELDING WITH DIME -----408

FIGURE 249: DOES JIACG PROVIDE RELEVANT IA POLICY-OPERATIONAL LEVEL INSIGHTS AND UNDERSTANDING -----408

FIGURE 250: KEY SKILLS AND ABILITIES OF THE JIACG DIRECTOR ARE DEFINED BY THE MC02 PARTICIPANTS -----409

FIGURE 251: NIGHT OPERATIONS AT CHINA LAKE DURING MC02 FIELD EXERCISES -----413

FIGURE 252: PARTICIPANTS AGREED THAT THE COLLECTION OF INFORMATION TOOLS AND LINKS WAS USEFUL IN EXECUTING THEIR MISSION -----417

FIGURE 253: MOST HAD CONFIDENCE IN INFORMATION OBTAINED FROM THE LOG CROP ----417

FIGURE 254: MOST AGREED THAT THE GCCS PORTAL, JL TOOLS, JFCR AND GTN WERE KEY DATA SOURCES -----418

FIGURE 255: MOST AGREED THAT THE WATCHBOARD ENHANCED AWARENESS OF LOGISTICS MATERIAL AND EQUIPMENT READINESS -----419

FIGURE 256: SUPPORT OPTIONS THAT BEST SUPPORTED RDO -----421

FIGURE 257: MOST AGREED THAT OPERATORS PROVIDED BETTER RECOMMENDATIONS ----423

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

FIGURE 258: LOGISTICS PERSONNEL WORKING IN PLANS CELLS WAS A POSITIVE-----424

FIGURE 259: OVER 75 PERCENT OF THE JTF PLAYERS CLEARLY UNDERSTOOD THEIR ROLE IN  
ATTENDING THE APPROPRIATE COLLABORATIVE SESSION -----430

FIGURE 260: SPECIAL FORCES OPERATIONS AT SEA IN SUPPORT OF MILLENNIUM CHALLENGE  
2002 -----438

FIGURE 261: ISR AND OPERATIONS WERE SYNCHRONIZED -----442

FIGURE 262: JISR ENHANCED OPERATIONS -----442

FIGURE 263: JISR COLLABORATION WAS EFFECTIVE -----443

FIGURE 264: JISR COLLABORATION EFFICIENCY IMPROVED OVER THE COURSE OF THE  
EXPERIMENT -----443

FIGURE 265: MOST AGREED THAT ADDITIONAL TOOL FUNCTIONALITY WAS REQUIRED -----444

FIGURE 266: COLLECTION PRIORITIES WEREN'T CLEAR -----445

FIGURE 267: NELLIS AIR FORCE BASE, NEV. (AFIE) -- AN F-117 STEALTH FIGHTER FLIES OVER  
THE NEVADA DESERT AUG. 6 DURING MILLENNIUM CHALLENGE 2002. -----448

FIGURE 268: NELLIS AIR FORCE BASE, NEV. (AFIE) -- AN HH-60G PAVE HAWK FROM 86TH  
RESCUE SQUADRON HERE REFUELS FROM AN MC-130E COMBAT TALON FROM  
THE 711TH SPECIAL OPERATIONS SQUADRON AT DUKE FIELD, FLA., ON AUG. 5  
DURING MILLENNIUM CHALLENGE 2002.----- E2

FIGURE 269: EXPERIMENT CONTROL ORGANIZATION ----- E3

FIGURE 270: EXPERIMENT CONTROL ARCHITECTURE----- E4

FIGURE 271: JTF-S EFFECTIVENESS CHART SHOWED THAT OVER TIME THE ADVERSARIES  
BECAME LESS AND LESS EFFECTIVE. ----- F4

FIGURE 272: GOR CAMPAIGN OBJECTIVES----- F6

FIGURE 273: TERRORIST/PIRATE CAMPAIGN OBJECTIVES----- F8

FIGURE 274: EACH RDO VULNERABILITY WAS ADDRESSED BY MULTIPLE OPFOR ACTIONS --F13

FIGURE 275: NETWORK CONNECTIVITY OF THE RANGE INTEGRATION DEMONSTRATION  
DURING MC02 REHEARSALS AND THE FINAL EXECUTION. THERE WERE ACTUALLY  
TWO PARALLEL NETWORKS. THE FIRST WAS PROVIDED BY DISA –  
COMMERCIALY ACQUIRED CIRCUITS, AND THE SECOND WAS A NETWORK ASSET  
-----G2

FIGURE 276: MC02 FEDERATION CORE MODELS----- H2

FIGURE 277: SAILORS UNHOOK A BATTLESPACE PLANNING AUTONOMOUS UNDERWATER  
VEHICLE (BPAUV) DURING MINE HUNTING AND OCEAN MAPPING EXERCISES  
CONDUCTED DURING THE NAVY'S PORTION OF MILLENNIUM CHALLENGE 2002. H5

FIGURE 278: THE FIRST PRODUCTION A-10A WAS DELIVERED TO DAVIS-MONTHAN AIR FORCE  
BASE, AZ., IN OCTOBER 1975. IT WAS DESIGNED SPECIALLY FOR THE CLOSE AIR  
SUPPORT MISSION AND HAD THE ABILITY TO COMBINE LARGE MILITARY LOADS,  
LONG LOITER AND WIDE COMBAT RADIUS, WHICH PROVED TO BE VITAL ASSETS  
TO AMERICA AND ITS ALLIES DURING OPERATION DESERT STORM. IN THE GULF  
WAR, A-10S, WITH A MISSION CAPABLE RATE OF 95.7 PERCENT, FLEW 8,100  
SORTIES AND LAUNCHED 90 PERCENT OF THE AGM-65 MAVERICK MISSILES. --- H8

FIGURE 279: MC02 SIMULATION SITES ----- H17

FIGURE 280: INTEGRATION OF COMPONENT PLANNERS ----- I4

FIGURE 281: SPACE & IO PERSONNEL INCREASED THE CONSIDERATION OF SPACE ASSETS AT  
THE JTF LEVEL & BELOW ----- I5

FIGURE 282: MC02 MIDB REPLICATION ARCHITECTURE----- I8

FIGURE 283: IWS SCREEN CAPTURE-----I15

FIGURE 284: COLLABORATIVE SESSIONS OPENED -----I17

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

FIGURE 285: RATING OF THE QUALITY OF VISUAL AND ORAL INFORMATION USERS CONFIDENT IN QUALITY OF INFORMATION PRESENTED. QUICK LEARNING CURVE RESULTED IN EXTENSIVE USE. -----118

FIGURE 286 A & B: EFFECTIVENESS OF IWS AND ITS ABILITY TO HELP MAINTAIN CROP-----119

FIGURE 287: JASGS ARCHITECTURE-----120

FIGURE 288: SCREEN CAPTURE OF JATF -----123

FIGURE 289: IMPACT ON JTF PERFORMANCE -----125

FIGURE 290: JEMPRS-NT-----126

FIGURE 291: THE JFI COMMUNICATIONS GRID ENSURES CRITICAL INFORMATION IS SHARED WITH THE PEOPLE WHO NEED TO KNOW, WHEN THEY NEED TO KNOW IT. -----131

FIGURE 292: EFFECTIVENESS OF JFI CONCEPT OF OPERATIONS AND TTPS -----132

FIGURE 293: IMPORTANCE OF ACCEPTANCE AND VISUALIZATION -----134

FIGURE 294: JISR TOOL -----135

FIGURE 295: EFFECTIVENESS OF JISR TOOLS -----137

FIGURE 296: VISUALIZATION OF ISR MISSIONS AND SENSORS-----137

FIGURE 297: ENHANCEMENT OF JISR PLANNING -----138

FIGURE 298: JPAOG REACH-BACK CAPABILITIES -----141

FIGURE 299: JSOTF REACH-BACK/SOMPE -----149

FIGURE 300: TOOLS WERE USEFUL TO THE WARFIGHTER-----154

FIGURE 301: LOGISTICS TOOLS WERE USEFUL-----154

FIGURE 302: TOOLS WERE USEFUL TO THE WARFIGHTER-----155

FIGURE 303: UCAX MCS TCO ARCHITECTURE-----158

FIGURE 304: SCREEN CAPTURE OF NSM C&D-----163

FIGURE 305: LOGICAL FLOW FOR THE CONOPS DECISION MAKING FOR CND-----164

FIGURE 306: EFFECTIVENESS OF TMIP -----169

FIGURE 307: UNATTENDED GROUND SENSOR -----170

FIGURE 308: UGS ARCHITECTURE -----171

FIGURE 309: UAV'S USED IN MC02 -----171

FIGURE 310: UAV EMPLOYMENT ARCHITECTURE-----172

FIGURE 311: CJTF'S SITUATIONAL AWARENESS-----178

FIGURE 312: EASE OF USE AND FUNCTIONALITY FOR UNDERSTANDING AND SITUATIONAL AWARENESS-----179

FIGURE 313: ONA DATABASE EFFECTIVENESS AS A COLLABORATIVE, UPDATED INFORMATION TOOL WAS CONSIDERED VERY GOOD TO AVERAGE BY PARTICIPANTS -----179

FIGURE 314: ANALYST NOTEBOOK EFFECTIVENESS PROVIDING VISUALIZATION FOR ANALYSIS OF THE ADVERSARY'S POLITICAL INFRASTRUCTURE-----180

FIGURE 315: ARCVIEW/IMS FUNCTIONALITY IN PROVIDING GEOSPATIAL INFORMATION FOR PLANNING AND SITUATIONAL AWARENESS -----180

FIGURE 316: ANIF SCREEN CAPTURE-----182



## Table of Tables

|                                                                                           |     |
|-------------------------------------------------------------------------------------------|-----|
| TABLE 1: MC02 ASSIGNMENTS -----                                                           | 2   |
| TABLE 2: UNITS INVOLVED IN MC02 -----                                                     | 3   |
| TABLE 3: POTENTIAL PROBLEMS -----                                                         | 42  |
| TABLE 4: SAMPLE LAND FUNCTIONAL TASK-----                                                 | 42  |
| TABLE 5: SAMPLE TASKINGS-----                                                             | 43  |
| TABLE 6: SELECTED BASELINE FINDINGS AND CORRESPONDING OBSERVATIONS-----                   | 69  |
| TABLE 7: AIRCRAFT LOSSES BY TYPE AND COMPONENT-----                                       | 96  |
| TABLE 8: SHIP LOSSES BY TYPE AND COMPONENT -----                                          | 96  |
| TABLE 9: PERSONNEL KILLED, WOUNDED, AND MISSING-----                                      | 97  |
| TABLE 10: FRIENDLY GROUND SYSTEM LOSSES-----                                              | 97  |
| TABLE 11: FORCES OPCON TO THE JRAC BY PHASE -----                                         | 102 |
| TABLE 12: OPFOR TBM FORCES NEUTRALIZED OR DESTROYED -----                                 | 126 |
| TABLE 13: MAJOR GROUND EQUIPMENT NEUTRALIZED OR DESTROYED -----                           | 127 |
| TABLE 14: OPFOR GROUND UNIT COMBAT EFFECTIVENESS AS OF THE END OF THE<br>EXPERIMENT.----- | 127 |
| TABLE 15: ENEMY NAVAL VESSELS NEUTRALIZED OR DESTROYED -----                              | 129 |
| TABLE 16: ENEMY AIRCRAFT/SAMS/RADARS NEUTRALIZED OR DESTROYED -----                       | 129 |
| TABLE 17: TSTS ATTACKED BY THE FUNCTIONAL COMPONENT -----                                 | 130 |
| TABLE 18: SJFHQ VALUE ADDED CONSIDERABLE IN ALL AREAS BY MOST ACCOUNTS-----               | 184 |
| TABLE 19: SUMMARY OF BOARDS, CENTERS, CELLS, AND WORKING GROUPS-----                      | 227 |
| TABLE 20: SJFHQ MANNING. THE TABLE BELOW PROVIDES A SUMMARY OF SJFHQ MANNING.<br>-----    | 235 |
| TABLE 21: ONA SURVEY QUESTIONS AND RESPONSES -----                                        | 336 |
| TABLE 22: SME SURVEY QUESTIONS AND RESPONSES -----                                        | 338 |
| TABLE 23: SME SURVEY QUESTIONS AND RESPONSES -----                                        | 339 |
| TABLE 24: SME SURVEY QUESTIONS AND RESPONSES -----                                        | 339 |
| TABLE 25: SME SURVEY QUESTIONS AND RESPONSES -----                                        | 340 |
| TABLE 26: SME SURVEY QUESTIONS AND RESPONSES -----                                        | 340 |
| TABLE 27: SME SURVEY QUESTIONS AND RESPONSES -----                                        | 342 |
| TABLE 28: SME SURVEY QUESTIONS AND RESPONSES -----                                        | 343 |
| TABLE 29: SME SURVEY QUESTIONS AND RESPONSES -----                                        | 344 |
| TABLE 30: SME SURVEY QUESTIONS AND RESPONSES -----                                        | 344 |
| TABLE 31: SME SURVEY QUESTIONS AND RESPONSES -----                                        | 347 |
| TABLE 32: SME SURVEY QUESTIONS AND RESPONSES -----                                        | 348 |
| TABLE 33: COMPARING DATA BETWEEN THE SIM AND COP DATABASES-----                           | 369 |
| TABLE 34: COMMAND LEVEL PARTICIPANTS-----                                                 | 371 |
| TABLE 35: SPVC IDENTIFIERS AND ASSOCIATED BANDWIDTH-----                                  | 371 |
| TABLE 36: FOUR SECONDARY PVC LINKED MAINLY TO THE JFLCC -----                             | 371 |
| TABLE 37: THE REMAINING SPVCs WERE AS FOLLOWS:-----                                       | 372 |
| TABLE 38: MAINTENANCE ACTIVITIES IMPACTING ON SPPS AVAILABILITY AND PERFORMANCE<br>-----  | 376 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                                                                                 |     |
|-------------------------------------------------------------------------------------------------|-----|
| TABLE 39: WARFIGHTERS CHOICE FOR MOST USEFUL INFORMATION TOOL -----                             | 378 |
| TABLE 40: THE AVERAGE DAILY NUMBER OF USERS 26 JULY THROUGH 8 AUGUST 2002-----                  | 379 |
| TABLE 41: COMPARISON OF BASELINE FINDINGS AND EXPERIMENT OBSERVATIONS -----                     | 389 |
| TABLE 42: PLAYERS VIEW OF THE LOGISTICS ACTION RESPONSE BOARD-----                              | 426 |
| TABLE 43: RECOMMENDED DEPLOYMENT/REDEPLOYMENT CELL MEMBERSHIP: -----                            | 429 |
| TABLE 44: OPERATIONS AND PLANS GROUPS LOGISTICS POSITIONS -----                                 | 436 |
| TABLE 45: SUMMARY OF JOINT INITIATIVES BY GROUP -----                                           | C10 |
| TABLE 46: GCCSI3 IMPACTS MEASURED -----                                                         | 19  |
| TABLE 47: GSTF PROVIDED SUPPORT TO THE SJFHQ -----                                              | 113 |
| TABLE 48: IWS EVALUATION -----                                                                  | 116 |
| TABLE 49: JATF SURVEY RESULTS ARE MEASURED -----                                                | 124 |
| TABLE 50: JEMPRS-NT SUPPORT FOR MC02 OBJECTIVES MEASURED -----                                  | 128 |
| TABLE 51: JFI SUPPORT FOR MC02 OBJECTIVES MEASURED -----                                        | 132 |
| TABLE 52: JISR MODULE RELATIONSHIPS TO MC02 OBJECTIVES AND SJFHQ-----                           | 136 |
| TABLE 53: JPAOG BATTLE TASKS FOR MC02-----                                                      | 147 |
| TABLE 54: THE JSOTF REACH-BACK/SOMPE EVALUATION IN RELATION TO THE RDO KEY<br>ENABLERS-----     | 152 |
| TABLE 55: UCAX MCS-TCO INTERFACE MEASURED AS AN ENABLER OF MC02 OBJECTIVES ---                  | 160 |
| TABLE 56: NIMA INITIATIVE MEASURED AGAINST MC02 OBJECTIVES -----                                | 161 |
| TABLE 57: COMPUTER NETWORK DEFENSE MEASURED AGAINST MC02 OBJECTIVES-----                        | 165 |
| TABLE 58: THEATER MEDICAL INFORMATION PROGRAM - JOINT MEASURED AGAINST MC02<br>OBJECTIVES ----- | 168 |
| TABLE 59: EVALUATION OF US SUPPORT TO SPECIAL RECONNAISSANCE -----                              | 175 |
| TABLE 60: STO FACTORS MEASURED AGAINST SJFHQ OBJECTIVES -----                                   | 186 |

## Chapter 1 — Background

### **Purpose**

Can a U.S. Joint Task Force (JTF) execute a Rapid Decisive Operation (RDO) in this decade? That's the question U.S. Joint Forces Command's (USJFCOM) Millennium Challenge 2002 experiment tested. The resulting transformational change package recommendations, based on the findings derived from multiple events during the past three years and culminating with the MC02 findings and lessons learned, target the expectations of our forces, civilian leaders, and the public for military transformation and Joint Vision 2020 (JV2020) goals.

### **Scope**

MC02 did not have a traditional training audience, since neither the audience nor specific training objectives were the experiment's focus. This distinction was an important factor in the control of the experiment. MC02 was designed to create the environment that would allow the experiment to proceed toward some reasonable conclusion—the outcome was not preordained—within which concepts for transformation of forces into the JV 2010 and JV 2020 precepts could be observed. Congressional language in the FY01 Defense Authorization Act (HR 5408) directed USJFCOM, the Services, and the U.S. Special Operations Command (USSOCOM) to demonstrate in FY02, the armed forces' ability to conduct RDO using capabilities and technologies available in this decade.

While MC02 assessed U.S. joint capability to carry out RDO in this decade, a number of related and supporting technical and conceptual experiments were included in the experiment design, along with the integration of concurrently conducted Service-live experiments. The combination of live force maneuvers and training built around and supporting a virtual scenario was unique in both its size and proportion. Integration of information regarding live and simulated forces into a single common operational picture (COP) was a goal of the experiment as was support of a longer-range project for instrumenting and integrating the Services' western test-and-training ranges to support joint training.

### **MC02 Live Force Participants**

The XVIII Airborne Corps was to have provided the core of the JTF headquarters, supplemented by a Standing Joint Force Headquarters (SJFHQ) element from USJFCOM. However, real-world operations required Commanding General, III Corps and his staff, from Fort Hood, TX, to stand-in on short notice. The new JTF commander, taking the reins just prior to Spiral 3, operated from JFCOM's Joint Training, Analysis, and Simulation Center (JTASC), before deploying forward to the USS *Coronado* (AGF 11) in San Diego, CA, mid-way through the experiment. The Commanding General, II Marine Expeditionary Force (MEF) established a Joint Force Land Component Command (JFLCC) headquarters at Camp LeJeune, NC. The JFLCC's force included elements of the 82<sup>nd</sup> Airborne Division from Fort Bragg, NC, and of the 1<sup>st</sup> Marine Regiment from Marine Corps Base Camp Pendleton, CA. The San Diego, CA, based Third Fleet staff, aboard the THIRDFLT flagship USS *Coronado* (AGF 11), formed the Joint Force Maritime Component Command (JFMCC) with Commander, Second Fleet acting as the JFMCC commander. Various Navy and Marine Corps elements of the U.S. Pacific Fleet supported the JFMCC commander. Commander, Twelfth Air Force operated as Commander,

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

Joint Force Air Component Command (JFACC), operating out of the Combined Air Operations Center at Nellis Air Force Base, NV, with support from Air Force activities throughout the United States. USSOCOM provided the Joint Special Operations Task Force (JSOTF), with elements of a Special operations group in direct support. USJFCOM established a Joint Psychological Operations Task Force (JPOTF) in Suffolk, VA.

An interagency group made up of individuals from departments and agencies of the U.S. government participated at various times before and during the exercise, primarily in development and sustainment of the Operational Net Assessment (ONA), and during the transition phase of the operation. See table 1 for specific assignments.

Table 1: MC02 Assignments

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Specific MC02 assignments included:                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Exercise Director – Deputy Commander, USJFCOM                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Deputy Director Exercise Control/Officer Conducting the Exercise – USJFCOM, J7                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Deputy Director Experiment Control – USJFCOM, J9                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Deputy Exercise Director – USJFCOM, JW01                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Director, Joint Exercise Planning Group (JEPG) - USJFCOM, JW01                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Director, Joint Exercise Control Group (JECG) - USJFCOM, JW01                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Commander, Joint Task Force – CDR, III Corps                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Commander, Army Forces – CDR, 82nd Airborne Division                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Commander, Air Force Forces – CDR, 12th AF                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Commander, Naval Forces – COMSECONDFLT                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Commander, U.S. Marine Corps Forces – CDR II MEF                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Joint Force Air Component Commander – CDR, 12th AF                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Joint Force Land Component Commander – CDR II MEF                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Joint Force Maritime Component Commander – COMSECONDFLT                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Commander, Joint Special Operations Task Force                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Commander, Joint Psychological Operations Task Force                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| The supporting Commands and Agencies were comprised of US Space Command, US Special Operations Command, US Strategic Command, US Transportation Command, Central Intelligence Agency, Defense Information Support Agency, Joint Communications Support Element, Joint Information Operations Center, Joint National Test Facility, Joint Warfare Analysis Center, Marine Standards and Training Program, National Assessment Group, National Reconnaissance Office, and the National Security Agency. |

By congressional direction, MC02 was to be an assimilation of live and simulated events. This combination was the first attempt to require that the real-world training exercise support the simulated training exercise. In general, combinations of this sort are built around the live event with simulations plugged in to support it.

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

This effort required an extraordinary amount of coordination and multi-service cooperation to ensure that the events occurred in a timely manner. Not all events were successful, but the effort was noteworthy. Approximately 13,500 personnel from all of the Services participated in the MC02 experiment and the accompanying Service experiments including the units listed in table 2.

Table 2: Units Involved in MC02

| <u>UNIT</u>                        | <u>OPERATING LOC</u> | <u>HOME BASE/REMARKS</u>    |
|------------------------------------|----------------------|-----------------------------|
| 162 <sup>ND</sup> FIGHTER WING     | NELLIS AFB, NV       | AATC, DAVIS MONTHAN AFB, AZ |
| 20 <sup>TH</sup> FIGHTER WING      | NELLIS AFB, NV       | SHAW AFB, SC                |
| 2 <sup>ND</sup> BOMBER WING        | NELLIS AFB, NV       | BARKSDALE AFB, LA           |
| 4 <sup>TH</sup> WING               | NELLIS AFB, NV       | SEYMOUR JOHNSON AFB, SC     |
| 53 <sup>RD</sup> WING              | NELLIS AFB, NV       | EGLIN AFB, FLA              |
| 55 <sup>TH</sup> RECON WING        | NELLIS AFB, NV       | OFFUTT AFB, NE              |
| 57 <sup>TH</sup> WING              | NELLIS AFB, NV       | INDIAN SPRINGS AFB, NV      |
| 509 <sup>TH</sup> BOMBER WING      | NELLIS AFB, NV       | WHITEMAN AFB, MO            |
| 552 <sup>ND</sup> AIR CONTROL WING | NELLIS AFB, NV       | TINKER AFB, OK              |
| 9 <sup>TH</sup> RECON WING         | BEALE AFB, CA        | BEALE AFB, CA               |
| 917 <sup>TH</sup> WING             | NELLIS AFB, NV       | AATC, BARKSDALE AFB, LA     |
| 93 <sup>RD</sup> AIR CONTROL WING  | NELLIS AFB, NV       | ROBINS AFB, GA              |
| 939 <sup>TH</sup> RESCUE WING      | NELLIS AFB, NV       | ANG, PORTLAND, OR           |
| VMA 214                            | NELLIS AFB, NV       | USMC                        |
| VMGR 352                           | NELLIS AFB, NV       | USMC                        |
| 645 <sup>TH</sup> MATS             | NELLIS AFB, NV       | AFMC, PALMDALE AFB, CA      |
| 16 <sup>TH</sup> SOW               | NELLIS AFB, NV       | AFSOC, HURLBURT FIELD, FLA  |
| 160 <sup>TH</sup> SOAR             | NELLIS AFB, NV       | FT CAMPBELL, KY             |
| 193 <sup>RD</sup> SOW              | NELLIS AFB, NV       | ANG, MIDDLETOWN, PA         |
| VP40                               | SOCAL                | NAS WHIDBEY ISLAND, WA      |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| <u>UNIT</u>                      | <u>OPERATING LOC</u>                       | <u>HOME BASE/REMARKS</u>                                       |
|----------------------------------|--------------------------------------------|----------------------------------------------------------------|
| 92 <sup>ND</sup> AIR REFUEL WING | NELLIS AFB, NV                             | FAIRCHILD AFB, WA                                              |
| COMSECONDFLT                     | SOUTHERN CALIFORNIA OPERATING AREA (SOCAL) | USS CORONADO, SAN DIEGO, CA                                    |
| COMTHIRDFLT STAFF                | SOCAL                                      | USS CORONADO, AFLOAT PLANS STAFF, SAN DIEGO, CA                |
| COMCARGRU EIGHT                  | NELLIS AFB, NV                             | SAN DIEGO, CA, W/JFACC                                         |
| COMCARGRU THREE                  | USS CORONADO                               | USS CORONADO, AFLOAT OPS STAFF, SAN DIEGO, CA                  |
| USS CORONADO (AGF 11)            | AFLOAT SOCAL                               | JFMCC, IWC EMBARKED, SAN DIEGO, CA                             |
| USS FITZGERALD (DDG 62)          | AFLOAT SOCAL                               | SAN DIEGO, CA                                                  |
| USS BENFOLD (DDG 65)             | AFLOAT SOCAL                               | SAN DIEGO, CA                                                  |
| USS SALT LAKE CITY (SSN 716)     | AFLOAT SOCAL                               | SAN DIEGO, CA, VIRTUAL SSGN                                    |
| USS BOXER (LHD 4)                | AFLOAT SOCAL                               | SUPPORT STOM JSHIP, CPR 1 EMBARKED, SAN DIEGO, CA              |
| JOINT VENTURE (HSVX-1)           | AFLOAT SOCAL                               | NSWTG EMBARKED                                                 |
| SEA SLICE                        | AFLOAT SOCAL                               | MIW, ASUW SOF                                                  |
| COM AIR WING 11                  | CHINA LAKE, CA                             | STRIKE WARFARE CDR, NAS LEMOORE, CA                            |
| COMDESRON NINE                   | FCTCPAC SD, CA                             | SEA COMBAT COMMANDER, SAN DIEGO, CA                            |
| COMPHIBRON ONE                   | FCTCPAC SD, CA                             | CATF AMWC STAFF AFLOAT CPR 1 EMBARKED USS BOXER, SAN DIEGO, CA |
| FIWC                             | NAB LITTLE CREEK, VA                       | IO REAR AREA, NAB LITTLE CREEK, VA                             |
| COMCMRON THREE                   | SOCAL/FCTCPACSD                            | MIWC EMBARKED ON HSV, CORPUS CHRISTI, TX                       |
| CTF 12                           | PEARL HARBOR                               | THEATER ASWC                                                   |
| CO, USS ANTIETAM                 | GREENSBORO                                 | AADC MODULE (FACTORY PRODUCTION UNIT), SAN DIEGO, CA           |
| VIRTUAL SSGN                     | NUWC NEWPORT                               | NEWPORT, RI                                                    |
| VIRTUAL DDX                      | FCTCPAC SD, CA                             | SAN DIEGO, CA                                                  |
| NAWC                             | SEA TEST RANGE                             | PT MUGU, CA,                                                   |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| <u>UNIT</u>                        | <u>OPERATING LOC</u>                                                                    | <u>HOME BASE/REMARKS</u>                                                                    |
|------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| VC-6                               | VARIOUS                                                                                 | NORFOLK, VA                                                                                 |
| PT MUGU NRL                        | SOCAL                                                                                   | PT MUGU, CA                                                                                 |
| VAW 116                            | SOCAL                                                                                   | PT MUGU, CA                                                                                 |
| VMFA 242                           | SOCAL                                                                                   | MCAS<br>MIRAMAR, SAN DIEGO, CA                                                              |
| VP 9                               | SOCAL                                                                                   | NASNI, SAN DIEGO, CA, ASW<br>MISSIONS                                                       |
| VP 46                              | CHINA LAKE, CA                                                                          | NAS WHIDBEY ISLAND, WA,                                                                     |
| VX 9                               | CHINA LAKE, CA                                                                          | PT MUGU, CA                                                                                 |
| VAQ 135                            | CHINA LAKE, CA                                                                          | NAS WHIDBEY ISLAND, WA                                                                      |
| VAQ 132                            | NELLIS AFB, NV                                                                          | NAS WHIDBEY ISLAND, WA GSTF<br>SUPPORT                                                      |
| HSL 43, 45, 47, 49                 | SOCAL                                                                                   | NAS NORTH ISLAND, SAN DIEGO<br>CA                                                           |
| VS 33                              | SOCAL                                                                                   | NAS LEMORE, CA                                                                              |
| HS-2                               | SOCAL                                                                                   | NASNI, CA                                                                                   |
| HS-6                               | SOCAL                                                                                   | NASNI, CA                                                                                   |
| II MEF                             | CAMP LEJEUNE                                                                            | PROVIDED JFLCC STAFF<br>ELEMENT FOR JOINT TASK<br>FORCE LAND COMPONENT,<br>CAMP LEJUENE, NC |
| 1 <sup>ST</sup> MARINE REGIMENT    | EMBARKED USS BOXER                                                                      | CAMP PENDLETON, CA                                                                          |
| 1/1 BLT                            | EMBARKED USS<br>BOXER/HSVX-1                                                            | CAMP PENDLETON, CA                                                                          |
| HMM 268                            | EMBARKED USS BOXER                                                                      | MCAS, CAMP PENDLETON ALSO<br>SUPPORTED MC SERVICE<br>EXPERIMENT AT SCLA,<br>VICTORVILLE, CA |
| 3/7 BLT                            | SOUTHERN CALIF<br>LOGISTICS AIRPORT,<br>SUPPORTED<br>VICTORVILLE SERVICE<br>EXP AT SCLA | MCB 29 PALMS                                                                                |
| SOCJFCOM                           | SUFFOLK, VA                                                                             | SUFFOLK, VA                                                                                 |
| NAVAL SPECIAL WARFARE<br>GROUP ONE | VARIOUS                                                                                 | NAB CORONADO, CA                                                                            |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| <u>UNIT</u>                                        | <u>OPERATING LOC</u>          | <u>HOME BASE/REMARKS</u> |
|----------------------------------------------------|-------------------------------|--------------------------|
| III CORPS HQ (AS JTF)                              | SUFFOLK, VA                   | FT HOOD, TX              |
| 32AAMDC                                            | NELLIS AFB, NV                | FT BLISS, TX W/JFACC     |
| 1 <sup>ST</sup> BCD                                | NELLIS AFB, NV<br>SUFFOLK, VA | FT BRAGG, NC W/JFACC     |
| JICC-D                                             | NELLIS AFB, NV<br>SUFFOLK, VA | FT MCPHERSON, GA         |
| 82 <sup>ND</sup> AIRBORNE DIV                      | FT BRAGG, NC                  | FT BRAGG, NC             |
| 82 <sup>ND</sup> AIRBORNE DIV<br>TACTICAL CMD POST | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| C/82D SIG BN (-)                                   | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| 2 <sup>ND</sup> BRIGADE COMBAT<br>TEAM             | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| 1 <sup>ST</sup> BATTALION, 325TH<br>REGIMENT       | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| 1-325 TACTICAL<br>COMMAND POST                     | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| 1/B/3-4 ADA                                        | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| HSB/2-319 FA                                       | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| A/2-319 FA                                         | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| 2 <sup>ND</sup> BATTALION, 325TH<br>REGIMENT       | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| 2-325 TACTICAL<br>COMMAND POST                     | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| 3 <sup>RD</sup> BATTALION, 325TH<br>REGIMENT       | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| 3-325 TACTICAL<br>COMMAND POST                     | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| B/313 MI BN                                        | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| 82 <sup>ND</sup> MP CO                             | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| 21 <sup>ST</sup> CHEM CO                           | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| A/3-27 FA BN (HIMARS)                              | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| 234 FAD                                            | FT IRWIN (NTC), CA            | FT BRAGG, NC             |
| HHC DISCOM-82 <sup>ND</sup> ABN<br>DIV             | FT IRWIN (NTC), CA            | FT BRAGG, NC             |



U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| <u>UNIT</u>                                           | <u>OPERATING LOC</u> | <u>HOME BASE/REMARKS</u> |
|-------------------------------------------------------|----------------------|--------------------------|
| 782 <sup>ND</sup> MSB                                 | FT IRWIN (NTC), CA   | FT BRAGG, NC             |
| 407 <sup>TH</sup> FWD SPT BN                          | FT IRWIN (NTC), CA   | FT BRAGG, NC             |
| HHC 1 <sup>ST</sup> COSCOM (-) SPT                    | FT IRWIN (NTC), CA   | FT BRAGG, NC             |
| HHC 311 <sup>TH</sup> COSCOM (-) SPT                  | FT IRWIN (NTC), CA   | FT LEWIS, WA             |
| B/82D SIG BN (-)                                      | FT IRWIN (NTC), CA   | FT BRAGG, NC             |
| B/1-58 ATS                                            | FT IRWIN (NTC), CA   | FT BRAGG, NC             |
| 313 <sup>TH</sup> MI BN, 82ND ABN DIV                 | FT IRWIN (NTC), CA   | FT BRAGG, NC             |
| 82 <sup>ND</sup> SIG BN, 82ND ABN DIV                 | FT IRWIN (NTC), CA   | FT BRAGG, NC             |
| 11 <sup>TH</sup> HHC TRANS BN                         | FT IRWIN (NTC), CA   | FT EUSTIS, VA            |
| 372 TRANS CGO TRANS CO                                | FT IRWIN (NTC), CA   | FT EUSTIS, VA            |
| 1066 MVT CTL TM (CGO DOC)                             | FT IRWIN (NTC), CA   | FT EUSTIS, VA            |
| STRYKER BRIGADE COMBAT TEAM                           | FT IRWIN (NTC), CA   | FT LEWIS, WA             |
| 3 <sup>RD</sup> BDE, 2ND INF DIV (SBCT) (-) (TOC)     | FT IRWIN (NTC), CA   | FT LEWIS, WA             |
| 5-20 INF BN (-) (TOC)                                 | FT IRWIN (NTC), CA   | FT LEWIS, WA             |
| 5-20 TACTICAL COMMAND POST                            | FT IRWIN (NTC), CA   | FT LEWIS, WA             |
| A/5-20 INF (CO)                                       | FT IRWIN (NTC), CA   | FT LEWIS, WA             |
| 1-14 CAV SQDN (RSTA) (-) (TOC)                        | FT IRWIN (NTC), CA   | FT LEWIS, WA             |
| 1-23 INF BN (-) (TOC)                                 | FT IRWIN (NTC), CA   | FT LEWIS, WA             |
| 3-2 INF BN (-) (TOC)                                  | FT IRWIN (NTC), CA   | FT LEWIS, WA             |
| 296 <sup>TH</sup> BRIGADE SUPPORT BATTLION (-)        | FT IRWIN (NTC), CA   | FT LEWIS, WA             |
| HHC 101 <sup>ST</sup> AVN BDE HQ (-)                  | FT IRWIN (NTC), CA   | FT CAMPBELL, KY          |
| 2 <sup>ND</sup> BATTALION, 101 <sup>ST</sup> AVIATION | FT IRWIN (NTC), CA   | FT CAMPBELL, KY          |
| 2-101 TACTICAL OPERATIONS CENTER                      | FT IRWIN (NTC), CA   | FT CAMPBELL, KY          |

| <u>UNIT</u>         | <u>OPERATING LOC</u> | <u>HOME BASE/REMARKS</u> |
|---------------------|----------------------|--------------------------|
| HHC 82D AVN BDE (-) | FT IRWIN (NTC), CA   | FT BRAGG, NC             |

**Locations**

The overall joint experiment force structure was an integrated organization including live (Service experiment) and simulated forces (See Figure 1). Central control of Service experiment live forces, to include opposing forces (OPFOR), was restricted to agreed upon joint events. Outside of those events, Services had full control of live forces. Control of all simulated forces included in the joint experiment remained with JFCOM's Joint Experiment Control Group (JECG).

Live forces were located primarily on ranges in the western United States (Fort Irwin, CA; Camp Pendleton, CA; China Lake, CA; Nellis AFB, NV) and the San Nicholas Island sea ranges off the coast of Southern California. In addition, component response cells with their simulations were located at Fort Irwin, CA; Camp LeJeune, NC; Hurlburt Field, FL, and Fleet Combat Training Center Pacific in San Diego, CA. The component commands were located at Camp LeJeune, NC – JFLCC; at Nellis AFB, NV – JFACC; and on board the USS *Coronado* – JFMCC.

The JTF, along with the JIACG, the JSOTF, and the Joint Psychological Operations Task Force (JPOTF), was located in the JFCOM, JTASC in Suffolk, VA. Mid-way through the operation, the JTF commander and elements of his staff forward deployed to the USS *Coronado* (AGF-11), joining the JFMCC and operating in the Pacific Ocean waters off San Diego, CA.

Senior simulation controllers and simulation tech controllers managed forces at the JTASC. JTASC controllers managed all simulated OPFOR in the joint experiment, as well as live forces participating in certain key joint events supporting specific experiment objectives. Live force participants were under direct central control during joint events, but were controlled locally during Service specific experiments.

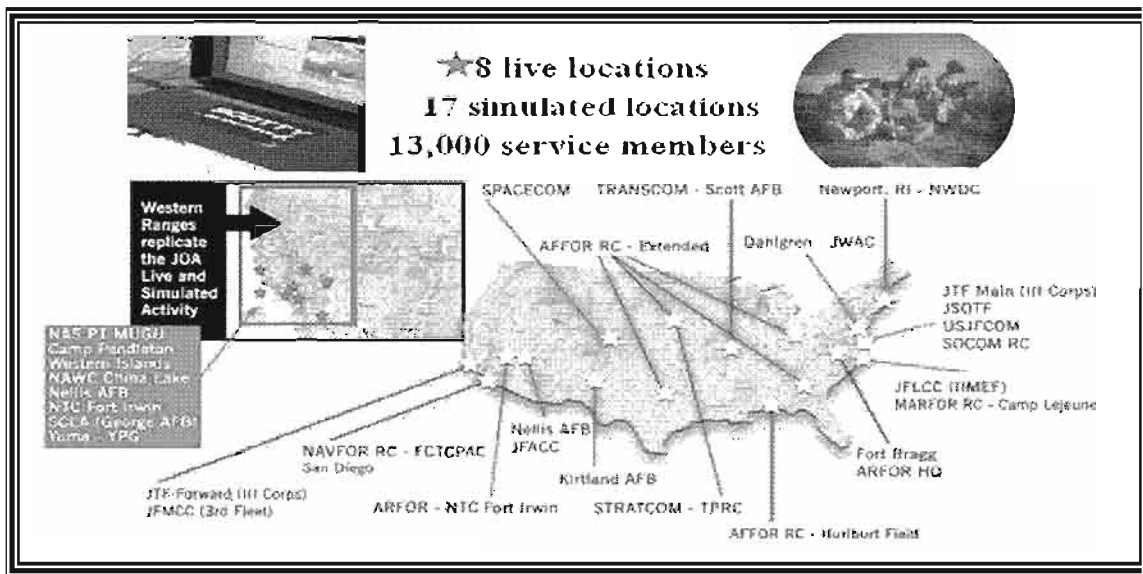


Figure 1: Response cell and live forces locations

## **Chapter 2 — Objectives**

MC02 experiment designers identified five objectives integral to the RDO concept. Unequivocal attainment of the objectives through employment of the concepts and tools at the center of RDO would provide the basis for support of the RDO process. Equally, failure to attain those objectives could indicate a need to rework the concept or to reconsider support for the entire proposal. The actual findings are provided in detail in Chapter 7. The five objectives are summarized below.

### **Establish and Maintain Information Superiority**

Information Superiority (IS), according to Joint Publication 1-02, occurs when the degree of dominance in the information domain permits the conduct of operations without effective opposition. There are multiple tasks and challenges within this objective.

The initial task or challenge was to demonstrate the ability to provide situational awareness to everyone. The first step was to keep the Blue-force picture clear. The JTF disseminated the composite picture by maintaining and distributing a timely, accurate, relevant, and integrated picture of friendly units' locations, and operational status. This step was successful if the information provided by the Blue force Common Relevant Operational Picture (CROP) was of sufficient richness to meet the operational needs of the Blue force commander. The second step involved the adversary's force. The JTF had to issue timely and accurate reports on the adversary's relevant operational capabilities, location, courses of action, and intentions. Like the first step, this step was successful if the information provided by the CROP met the needs of the Blue force commander.

The next task was demonstrating the ability to use the CROP and collaborating within the force to enhance JTF operational timelines. Success revolved around the degree of shared awareness within the force, the decision-making timeline, synchronization of efforts, economical employment of forces, maintenance of operational tempo, and logistical support.

The last task was to use information to prevent surprises by the adversary. The effectiveness of having superior information available at the JTF decision-making level to predict adversarial actions was measured by documenting instances in which Blue forces were surprised or confused by actions taken by the adversary.

### **Set Conditions for Decisive Operations**

The JTF needed to establish early in the conflict the right conditions from which to launch RDO. The right conditions meant a shortened deployment period, and very rapid joint reception, staging, onward movement, and integration (JRSOI) times or a condition where JRSOI lead-time was not a factor at all.

During Effects-Based Operations (EBO), the staffs used a revised joint deployment process. In collaboration with the components, they synchronized the force flow, and equipment arrival times and established a distributed deployment and sustainment intermediate staging and support base (ISB) infrastructure. The ISB reduced insertion and sustainment times for "ready off the ramp" forces. A new tool, the Joint Force Capabilities Register (JFCR), aided planners during mission analysis and course of action development.

### **Assured Access**

In order to conduct RDO against a capable adversary, the component commander must provide his on-scene commander access to the battlefield in sufficient volume to ensure the task force has room to maneuver and an unbroken logistic train. Assured Access is defined as the ability to set and sustain the battlespace conditions necessary to provide the joint force commander (JFC) sufficient freedom of action to achieve the desired effects in conducting a rapid decisive operation. The component commanders and the JFC continually addressed this objective as the adversaries pressed constantly to reduce the Blue footprint in the theater. Future JFC's should expect to encounter foes that have any or all of the following:

- Robust intelligence, surveillance, and reconnaissance (ISR) architectures, or open access to commercially available space-based ISR products
- Cruise and ballistic missiles with improved range and lethality as well as capabilities that include salvo fire against in-theater bases, staging areas, and maritime forces
- Integrated air defense systems to protect their offensive capability and infrastructure, while inflicting attrition losses on the joint force
- Long range strike aircraft
- Weapons of mass effect
- Maritime capabilities, mine warfare, coastal-defense cruise missiles, cruise missile equipped patrol boats, and submarines, all designed and deployed to deny access to the region
- Full spectrum information capabilities, including military deception, electronic warfare, psychological operations, operational security, physical destruction, and information attacks used to counter the U.S.'s heavy reliance on integrated information systems

The MC02 foes had area denial capabilities with the potential to deny an opponent rapid access to the region.

### **Conduct Decisive Effects-Based Operations**

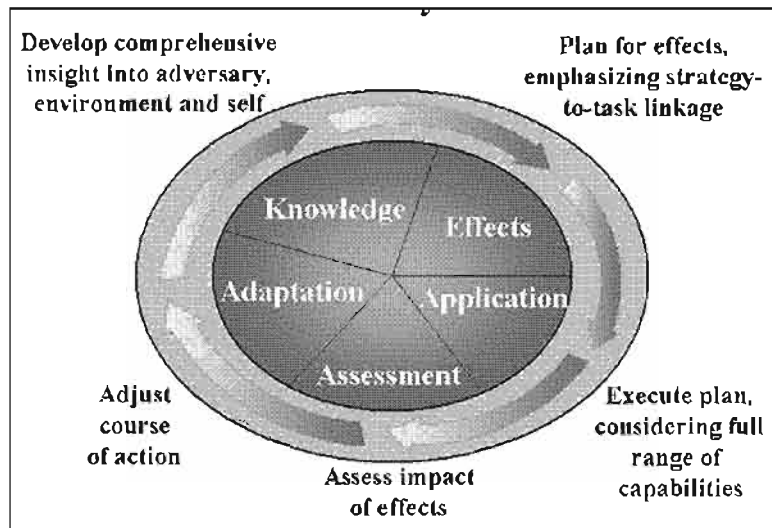
The joint force commander, his staff, and the component headquarters were expected to conduct decisive, Effects-Based Operations in the execution of an RDO.

EBO, which is discussed in detail in the next chapter, is a process for obtaining a desired strategic outcome or "effect" through the synergistic and cumulative application of the full range of military and nonmilitary capabilities at all levels of conflict. An "effect" is the physical, functional, or psychological outcome, event, or consequence that results from specific military or non-military actions.

The EBO process can be depicted as a continuous and iterative planning and execution cycle. The cycle begins with the development of a comprehensive insight or knowledge of the nature of the adversary, the environment, and our own capabilities (See Figure 2). EBO envisions the development of broader and deeper knowledge of the adversary than is currently achieved. The comprehensive insight developed through systems analysis will enable planning staffs to determine more accurately the strength or cohesion that holds the adversary together and motivates him to action. In consonance with other national actions, the joint force commander's intent will then stress the desired effects necessary to break that cohesion and convince or compel the adversary to change his behavior. Guidance given in terms of desired effects is an essential piece of the strategy-to-task linkage. Application is then a function of determining and applying those elements of national power that will be most effective in achieving the desired

effects in a coordinated and synergistic manner. An aggressive, fully integrated, and continuous assessment process measures the impact of the effects created. This assessment must determine if the desired effects were achieved, what unintended effects were produced, their overall impact on the joint effort, and why effects either did or did not contribute to campaign objectives. The assessment process facilitates decisions the commander must make to adapt and adjust his current course of action to reach his desired end-state more effectively and rapidly.

EBO takes the objectives-based approach with commander's intent one step further;



commanders examine the causal linkages and effects through which actions lead to objectives. Causal linkages help planners understand why a proposed action could be expected to produce a desired effect given the circumstances. What separates effects from objectives is the type of results that are called effects, vice the type of results that are called objectives. Effects include all of the results of actions, including the undesired and unexpected. Objectives only include the results to be achieved — the desired results. It is, therefore, the consideration of the full range of potential results of

Figure 2: EBO Cycle

actions that is the key to, and the challenge of, EBO.

### Sustain the Force

Demonstrating the ability to provide agile sustainment was an MC02 goal. To attain this goal, participants had to successfully satisfy the JFC deployment, employment, and sustainment requirements for RDO. They also had to gain and maintain knowledge of force health status and provide medical care.

Concurrent collaboration and a logistics CROP providing access to emerging technologies such as Joint Total Asset Visibility (JTAV), Global Combat Support System (GCSS), a logistics CROP, and Joint Logistics Decision Support Tools (DSTs) allowed the staff to rapidly process data and manage the logistics environment.

Employing a distribution structure to satisfy the JFC deployment, employment, and sustainment requirements included the use of ISBs, sea based logistics, forward rearming and refueling points, tailored support packages, and alternate delivery methods such as using the high speed vessel (HSV).

The JTF staff employed an experimental product, Theater Management Information System (TMIP) in an effort to satisfy the requirement to track patients throughout the theater of operations and back to Level 4 treatment centers.

(This Page Blank)

## Chapter 3 — Concepts

“Joint Concept Development and Experimentation,” USJFCOM’s charge, takes a promising, emerging idea like RDO, from concept development to implementation. MC02 was the experimentation phase of RDO development. Here, seven concepts at the core of RDO were tested in whole or in part and a short overview follows. These concepts are enablers for the five objectives described in Chapter 2.

### Standing Joint Forces headquarters (SJFHQ)

RDO requires a greater coherence of operational level advanced planning and command and control than current ad hoc or augmented Service core-headquarters can generate (See Figure 3). Successful, rapid response in future operations requires a headquarters that has a detailed understanding of the designated region and is immediately responsive to the regional combatant commander for crisis response planning and execution. The SJFHQ meets these requirements. The SJFHQ, as part of the commander’s staff, develops continually updated procedures for joint force operations within the designated region, as well as pre-crisis planning for areas of focus as assigned by the combatant commander. Pre-crisis planning includes managing the development of the ONA, the development of contingency plans for the focus areas, and relationship building with other potential participants across the government interagency community (IAC). These relationships, established through a network of collaboration, become the basis for expanding the SJFHQ’s core capabilities as a crisis develops. As a crisis develops, the SJFHQ rapidly and seamlessly shifts from planning to execution. It employs its developed knowledge of all aspects of the crisis area to advise the combatant commander on the use of flexible deterrent options and to facilitate the ramp-up of a subordinate staff designated to handle the crisis. The SJFHQ may be incorporated into the Joint Task Force (JTF) commander’s staff. In all cases, the JTF would be supported by extensive reach-back to the combatant commander’s staff and other supporting agencies.

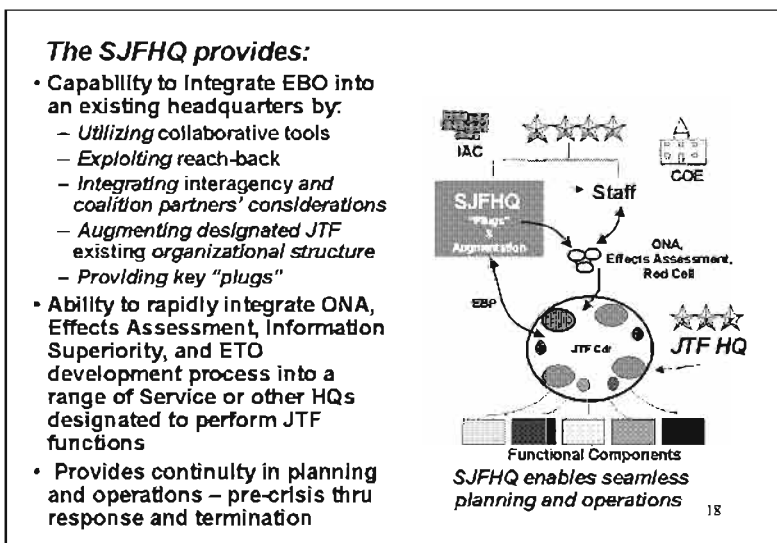


Figure 3: MC02 Joint Force HQ

The MC02 SJFHQ was functionally organized to facilitate effects-based operations and to conduct rapid planning and execution. As part of the combatant commander’s staff, it conducted pre-crisis planning activity, including the development of a contingency plan and an initial effects tasking order (ETO). As the crisis developed, the SJFHQ was reassigned to augment the staff of the designated JTF commander to help resolve the crisis presented by the

experiment scenario. The SJFHQ participants included former, retired, and current military members from all Services with an average of 23 years of military experience and over three years of joint experience. These participants included a former operations chief and a former plans chief on a combatant commander's staff.

The primary elements of the SJFHQ organization are the command group, the operations group, the plans group, the information superiority group, and the knowledge management group. The III Corps JTF commander used this architecture as the organizational structure for the JTF HQ.

### Collaborative Information Environment (CIE)

Access to the right information, at the right place, at the right time, in the right presentation format to accelerate the commander's decision-to-action time is fundamental to information-age warfare. The CIE provides the JTF the ability to share information, facilitates reduced planning timelines, and enhances organizational effectiveness. This environment, enabled by high-speed communications links, fed through large bandwidth pipelines, and using electronic collaborative tools, improves the exchange of information among members of the joint

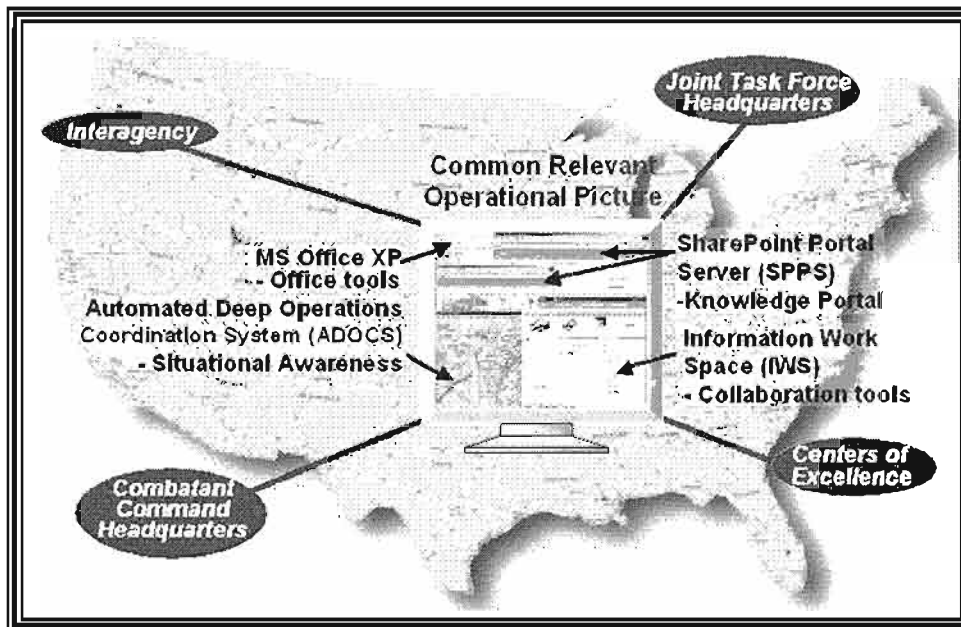


Figure 4: Experimental Command, Control, Communications, and Intelligence (XC4I) apparatus, allowed a coherently joint, reach-back, collaborative information environment.

force and those organizations supporting or being supported by the joint force (See Figure 4). The CIE contains three major components: the COP, the CROP, and an on-line collaborative tool suite.

Military commanders must be able to understand, decide, and act.

The design goal for CIE is to increase shared information, use shared information

to improve shared awareness, and, with shared awareness, extend and enrich collaboration both vertically and horizontally throughout the force. The CIE should enrich collaboration to improve the synchronization of tactical, operational, and strategic actions by the joint force. The CROP is the primary repository and means of access for most information products necessary for the joint force. The CROP presents timely, fused, accurate, assured, and relevant information that may be tailored to meet the requirements of the joint force. The information will be available to every properly equipped organization and individual involved in a joint operation. The CROP enables the joint force to achieve the high level of knowledge necessary to support RDO. The CROP is a



virtual warehouse of information – friendly, neutral and enemy force dispositions (aerospace, land, and sea); intelligence; maps and imagery; logistics data; planning data; weather; socio-economic data; and cultural information. Users access this virtual warehouse to extract the information they need to accomplish their mission. Access to the information residing in the CROP, combined with the ability to collaborate quickly with domain experts in the CIE, should enable commanders and their staffs to achieve an exceptionally high degree of shared battlespace awareness.

Information Superiority is a byproduct of effective CIE. Within the information domain, superiority is a state of imbalance in one's favor (relative advantage). Advantage is achieved by being able to give the right information to the right people, at the right time, in the right form, while denying an adversary the ability to do the same. This way of thinking about Information Superiority combines a specific outcome associated with Information Superiority and the method that is used to achieve it. Information Superiority derives from the ability to create a relative information advantage over an adversary. Information advantage is not a new concept.

Commanders have always sought a decisive information advantage over their adversaries. Surprise, one of the immutable principles of war, can be viewed as a type of information advantage that one force is able to establish over another.

Information advantage is not exclusively about collection, visualization, analysis, and dissemination, but it is also about a force's ability to meet its information needs with available resources and to do it more effectively than its

adversary does. In fact, the degree to which the force can meet its information needs, compared to its counterpart, determines in large part the degree of success of the particular operation. The key to gaining the information advantage is to match information-related capabilities with the right concept of operations, organization, and approach to command and control, and the capabilities of the people and the weapons systems involved.

### **Operational Net Assessment (ONA)**

ONA provides the foundation of knowledge and understanding about an adversary needed for RDO. It provides information in sufficient detail to critically focus the application of



Figure 5: Naval Station San Diego, Calif., Jul. 24, 2002 — A harbor tug pulls the guided missile destroyer *USS Fitzgerald* (DDG 62) away from Pier 3 at the Naval Station, San Diego. *Fitzgerald* was participating in Millennium Challenge 2002.

integrated diplomatic, information, military, and economic (DIME) friendly actions decisively against an adversary's political, military, economic, social, infrastructure, and information (PMESII) systems. This knowledge base includes systems analyses that identify critical adversary vulnerabilities and potential friendly DIME actions with the goal of causing desired effects. It is a product of collaboration among a wide variety of organizations, providing data to decision makers from strategic to tactical levels. ONA is one of the supporting concepts enabling RDO and it provides the foundation for a coherent knowledge base that enables EBO as well.

ONA requires an understanding of both adversary and friendly forces as a set of interdependent systems, PMESII, and is a product of collaboration between strategic, operational, and tactical levels. It provides a common knowledge base available to customers from the national strategic level to the tactical. These potential customers also participate in and contribute to the development of the ONA by their interaction. They contribute to each element of the ONA they touch.

Under the concept, a virtual, distributive National Knowledge Advantage Center supports the system-of-systems analysis. The IAC, through the JIACG, which represents the IAC on the theater combatant commander's staff, articulates effects on adversary PMESII. The IAC and components contribute to identification of DIME actions to create a desired effect. All participants formulate the resource and support requirements associated with each action. While this concept of operations addresses the ONA from the perspective of the SJFHQ, the production of a credible ONA requires sustained involvement from the JIACG and Service components. It is not done and cannot be done by the combatant commander's staff alone.

The ONA approaches a potential adversary as an inter-dependent system-of-systems. All of the systems contribute toward the adversary's public unity, will, and capability to pursue a course of action unfavorable to U.S. interests. The ONA supports EBO, which requires that all levels—strategic to tactical—collaborate to plan and execute synchronized operations producing desired effects upon the adversary's capability to conduct operations. The ONA goes far beyond traditional intelligence assessments. It is an action-oriented process, which provides a continuous stream of knowledge, from desired effects to adversary vulnerabilities to tasks. As such, ONA represents a philosophy that continuously drives a process to develop an actionable product. The process builds situational awareness and understanding, supports plans and execution of operations, and the ONA product changes and expands over time. The ONA is a medium that provides the analytic knowledge and questions that drive the collection process.

### Effects-Based Operations (EBO): Planning and Assessments

The Effects-Based Planning (EBP) process is a modification of the current joint planning process. The EBP leverages knowledge systems and the benefits of collaboration. Furthermore, it forces the JFC to explore and consider the complex strategic and operational-level interrelationships coincident with application of all elements of national power. The modifications to the current process better leverage knowledge systems, improve collaboration,

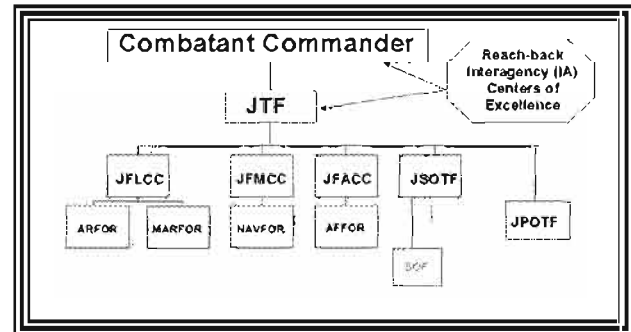


Figure 6: JTF organization chart

and address the complex strategic and operational-level interrelationships caused by the globalization of economies and mass media. The modified military planning process is designed to leverage the attributes of the joint force as described in JV 2020 (dominant maneuver, precision engagement, focused logistics, and full-dimensional protection) in synchronization with activities applying other elements of national power. Furthermore, the process requires an iterative feedback mechanism that collects, processes, analyzes, and disseminates information and knowledge in a sufficiently timely manner to enable commanders at all levels to make better decisions. It should allow commanders to make better decisions more rapidly than the opposing commander. The improved functionality of the EBP combined with the effects-based strategy-to-task linkage supports the rapid adaptation element desired to promote decisiveness, unpredictability, and increased decision-to-action tempo.

The CROP and the continually updated ONA provide the force planners with Information Superiority. This insight shapes the planning process by focusing it on both effects and tasks vice just the tasks. Planners are also able to expand their analysis of adversary centers of gravity (COG) by study of adversarial PMESII.

During the EBP process, operational-level planners and commanders focus not only on the desired outcomes of planned actions including second and third order effects, but also other potential consequences such as undesired effects. Examination of the hierarchy and relationships between anticipated effects maximizes the impact of actions and develops the most effective course of action (COA) options. Additionally, military planners benefit from interagency participation in planning. Those interagency contributors, including scientists, educators, and engineers, working in the collaborative environment with access to the ONA and analysis tools, provide multiple alternatives for action. EBP provides commanders an increased ability to have a far-reaching impact in areas not traditionally within the military scope of operations.

The effects assessment (EA) process starts during the COA development step and runs throughout the EBP cycle. Since the goal is to achieve effects on a complex adaptive adversary, the process must include the ability to adapt the plan to deal with: 1) the adversary's actions that are based on his own initiative; 2) action taken in response to previous friendly efforts; and 3) undesired or inefficient effects, and defeated actions. Assessment planning identifies measures for desired and supporting effects. The evaluation and comparison of measures of performance (MOP) and measures of effectiveness (MOE) provides effects assessment. MOP is the objective metric of the "outcome" of a "tactical action." Normally the component level of command provides the MOP. It is the result of the tactical actions performed to achieve a desired effect, such as was the target hit and what level of damage was achieved. More than one MOP can be associated with each MOE, as many tactical actions may be required to bring about a desired effect. MOE are most often "subjective indicators" that allow identification of the resulting effects of actions or applied capabilities. MOE articulate where to look and what to measure in order to determine if the desired effect has been achieved. In short, MOE must be able to show incremental progress in achieving desired effects.

Measures used in assessment become meaningful when they are tied to theater objectives, reliable when they can be validated by collection disciplines, and observable when allocated traditional and non-traditional means of observing, and reporting data can be tasked before, during, and after the application of capabilities. Developing MOE start with the clear articulation of the desired effect and should encompass parameters describing such things as the levels of change (disruption, denial, neutralization), the distribution (geographic, organizational, political, cultural), and duration of the effect.

Robust collection is integral to comprehensive EA. Collection planning must incorporate all-source collection requirements in support of the overall EA process and at the same time be responsive to the dynamic environment inherent in RDO. A Joint Intelligence, Surveillance, and Reconnaissance (JISR) process is required to ensure collection assets are effectively tasked. To this end, the JTF or the combatant commander should state collection requirements early.

During MC02 execution, all employers of DIME elements of national power performed EA. A JTF EA cell was responsible for coordinating all levels of military EA. The EA cell and component staff elements continually assessed the impact that tactical actions achieved and provided that information to the Joint Planning Center and the Joint Operations Center. In roughly the same way, the effects analysts worked in the collaborative environment with the IAC to ensure that the effects achieved by other agencies' actions were available to joint planners and operators. The effort was a dynamic process that drove planners and operators to closely consider specific aspects of the plan to determine what, if any, modification had to be made to improve the pace of achieving the JTF commander's desired effects.

### Interagency

MC02 explored methodologies to facilitate U.S. Government interagency planning and execution in support of EBO in RDO. Two significant components to the experiment relate to interagency activity.

First, the combatant commander's staff was augmented with an experimental staff element—the JIACG. The JIACG represented the IAC at the operational-level (See Figure 7). Their mission was to facilitate information sharing across the IAC to include the embassy/country team. Second, a common, secure collaborative network linked selected members of the U.S. Interagency to facilitate planning and coordination. The desired result was an effective political-military plan and a combatant commander's operational plan, developed to effectively and efficiently employ all elements of national power in support of national and regional policy aims, as well as the combatant commander's theater engagement plan.

With shared equities in the management of national security and its transformation, interagency representatives collaborated during a series of discreet events to produce the strategic documentation required to support MC02 experiment objectives. IAC participation varied as issues changed. The intent was to include as many IAC representatives as appropriate. However, real-world commitments prevented some IAC representatives from participating throughout the entire experiment. The requisite knowledge and expertise remained constant as substitutes came in to pick up the load when necessary.

The goal of interagency experimentation in MC02 was to develop organizational relationships, tools, and processes to optimize civilian and military interoperability within the

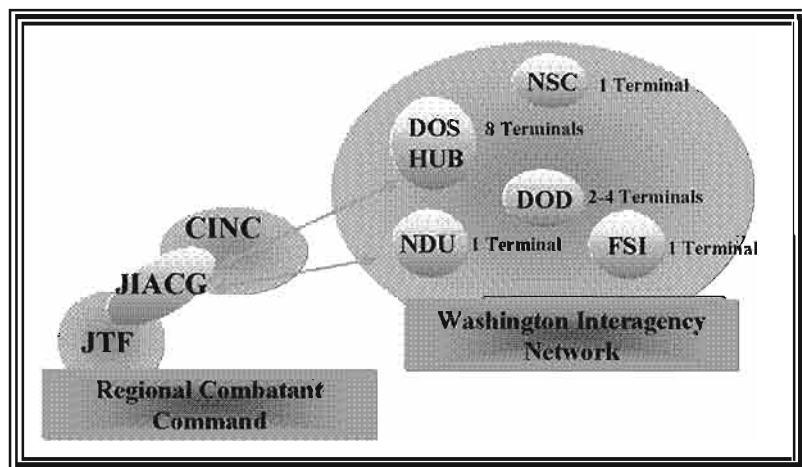


Figure 7: JIACG Relationships

IAC and to accomplish operational-level coordination. This enhanced coordination was employed to support: deliberate crisis, and transition planning; national-level net assessment synchronization of actions to achieve desired effects and strategic objectives; and conducting Effects-Based Operations.

The interagency concept of operations for MC02 included four significant engagements with the wider interagency, beginning in January 2002 and concluding with the execution of MC02 in July and August 2002. The three events scheduled prior to MC02 established the national strategic and regional approach for the experiment, resulted in a Political-Military Plan, and allowed personnel training on the use of the collaborative tools employed during MC02.

The JIACG intentions were to:

- Establish regular, timely, collaborative working relationships among military and civilian operational planners
- Form, train, and exercise a new staff element JIACG composed largely of U.S. civilian personnel with strong agency expertise and connections
- Create opportunities for realistic and accelerated operational planning upon approval of a political-military plan
- Build on initial efforts to integrate military and civilian planning issues using a deliberate planning process

### **Joint Theater Logistics Management**

Joint Theater Logistics Management (JTLM) is a process that provides the combatant commander the ability to synchronize, prioritize, direct, integrate, and coordinate common-user and cross-Service logistics functions, optimizing support to the joint force. The process allows centralized management of the most critical supply areas such as in-theater logistics, inter- and intra-theater transportation, in-theater contracting, host nation support, and critical supply items such as precision guided munitions, and common ground munitions and fuel. Key elements of JTLM provide for efficient common-user logistics support, ensuring a smaller logistics footprint by reducing redundancy, and most important integrating component logistics forces.

JTLM relies heavily on an improved, robust communications system. Today's advanced information systems, and the CIE allows JTLM to provide a centralized location to track the Services' support to any one facet of a mission. JTLM ensures that the corresponding Service logistics demands have the right priority and emphasis. Using the CIE, the theater staff has the capability to reach back and harness a vast array of technical expertise, and resolve complex issues in a timely manner.

The MC02 JTLM organization was two-tiered. At the upper level was the Joint Logistics Management Center (JLMC), which comprises the theater commander's J4 staff, and staff from US Transportation Command (TRANSCOM), Defense Logistics Agency (DLA), and the Services. The JLMC planned, coordinated, and deconflicted logistics support for the theater. The second level of logistics planning concentration was at the JTF level. Logisticians were embedded within each of the JTF groups, providing those planning staffs with organic logistics expertise. The Logistic Action Response Board (LARB) tied the two halves of the logistics planning effort together, using the communications tools inherent in the CIE. The LARB, a concurrent virtual, collaborative board made up of members of the JLMC, the JTF, and component/Service logistics staffs, met to synchronize plans and operations in support of Effects-Based Operations.

## U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

The functions, roles and responsibilities of each of the JTF logistics positions, after the SJFHQ was absorbed into the JTF, are described in the SJFHQ Concept of Employment, the Deployment and Sustainment CONOPS and TTP, and the Joint Standard Operating Procedure (JSOP) manual.

The LARB was the principal forum for overall collaboration of logistics support to the operation. It augmented, but did not replace normal staff procedures and was intended to resolve complex, sophisticated issues. The LARB convened daily, after Joint Planning Center (JPC) collaborative sessions in support of ETO development and as required to resolve specific logistics issues.

It facilitated the coordination of logistics and transportation support for Effects-Based Planning and current operations by:

- Bringing the strategic, operational, and tactical levels together
- Enabling rapid response to short-fused logistics problems
- Helping to ensure the ETOs were resourced

The logistics CROP, which included access to Global Combat Support System (GCSS), combatant commander/JTF, Joint Total Asset Visibility (JTAV), Global Transportation Network (GTN), and the joint logistics tools facilitated the functions. The Log CROP was built in the SharePoint Portal Server (SPPS). The log watchboard provided a commander and his staff a stoplight chart on the status of JTF component commanders' critical warfighting resources. For example, if the JFMCC reported ammunition stores as critically low, at a predetermined point below the wartime requirement, he colored the appropriate block Red. At a glance, other commanders and logisticians could see the problem, find the cause, and correct it.

Logistics functional areas, which act as a library for various reports and plans, are shown on the left of the Log CROP. The ADOCS COP was also displayed on the Log CROP and provided situational awareness. However, the ADOCS presentation was not real-time and had to be periodically refreshed.

On the right of the Log CROP display, the user had access to additional information. Tools and logistics systems were also available here, including data marts containing large amounts of reference information, such as the Defense Management Data Center (DMDC), the Automated Air Facilities Information File (AAFIF), the Worldwide Port System (WPS), and the Joint Electronic Battlebook (JEB).



Figure 8: NELLIS AIR FORCE BASE, Nev. (AFIE) -- Tech. Sgt. Tommy Mazzone, a loadmaster from the 8th Special Operations Squadron at Hurlburt Field, Fla., loads a pallet aboard a MC-130E Combat Talon on July 29 for an air drop during Millennium Challenge.

## U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

During MC02 EBP, the logistics plans officer, the logistics coordinator, and most of the JTF's log plans section personnel participated in the joint planning center (JPC) planning sessions. The log operations sustainment officer and other selected log operations personnel monitored the JPC. The relationship between COA development and deployment planning starts with the assignment of effects-based missions from a prioritized effects list (PEL) being given to the components. The components conducted their COA development by selecting capabilities to accomplish the assigned tasks. The JTF then synchronized and sequenced the force flow based on the PEL leading to development of the time-phased force and deployment data (TPFDD). The JTF then had to deconflict competing demands for limited air and sealift. Such conflicts could have been attenuated by the JTF with the support of the components selecting the desired capabilities and considering the net lift cost of each selection.

As EBP continued, the normal logistics planning functions required in support of COA development, such as the construction of a logistics staff estimate, and the assessment of COAs for logistics and transportation feasibility were accomplished based on the desired effects. The products were provided to the plans Director and included in the logistics portion of the ETO. After the first ETO was published and execution began, the ETO process became iterative. The process repeated itself in a somewhat abbreviated manner, based on the assessment of the success of the planned effects, and in response to new missions and/or requirements. The logistics operations director with the logistics coordinator convened the LARB to ensure a smooth and complete exchange of sustainment information, achieve synchronization of sustainment, employment, and transportation and other resources, and to address issues that exceeded the ability of routine staff work to resolve. A deployment-planning cell was convened as necessary to ensure the smooth and complete exchange of deployment information, achieve synchronization of deployment, employment, and transportation and other resources. Approximately 176 logisticians were involved in MC02.

### **Joint Initiatives**

The MC02 joint initiatives process provided a systematic, objective review of proposed joint initiatives. The process featured a multi-level review of initiatives with command-wide involvement supplemented by interagency and service representation. The initiative approval process objectively compared each proposed initiative to the overall experiment objectives as well as applicability to the joint environment. Additionally, the process provided continual tracking and addressing of associated issues throughout event preparation. The joint initiatives process provided two-way communications between the individual initiative sponsors and the MC02 experiment planning and integration teams. The review process provided for three examination sessions. Each session was progressively more detailed and required higher-levels of endorsement than its predecessor did. Phase 1 was the initial review by subject matter experts from the functional and experimentation community that screened submissions against RDO objectives and MC02 joint experiment objectives. As part of Phase 2, a "Council of Colonels" was formed to review the recommendation of the operational/technical panels and forward its findings to the third phase, a general officer/flag officer panel. Many Service proposed initiatives were not approved for joint integration because the initiatives lacked a joint application or perspective. The Services evaluated some of these initiatives on their own. This process is planned for use in future major experiments to ensure a standard and formal procedure exists for vetting new ideas and technologies into the joint experimentation process.

One of the new initiatives reviewed in MC02 through this process was the joint fires initiative (JFI). The JFI concept enables time sensitive target (TST) coordination across components and the Joint Task Force. It provides a common tool set, architecture, and automated processes for the joint force commander, component commanders, and supporting tactical commanders to operational and tactical fires across the engagement spectrum from planning to execution for time-sensitive targeting. The JFI mission is enhanced by CROP toolsets providing users with the same information, the same results, and ensuring consistent horizontal integration of information across components.

### **Joint Intelligence, Surveillance, and Reconnaissance (JISR)**

JISR is a network-centric approach to the management of ISR platforms and sensors to better support the quick-paced demands of EBO. JISR, as employed in MC02, emphasized collaboration between producers and users to provide rapid and responsive mission focused ISR, essential to future joint operations. Planners and operators shared information rather than working through and around cumbersome, single-intelligence “stovepipe” tactics, techniques, and procedures. In the context of the MC02 experiment, the JISR concept and supporting tools were relatively immature. They had not undergone preceding experimentation. Consequently, the focus of the JISR assessment was limited to collection management and ISR operations.

JISR thrives in a rapid-fire, information exchange environment characterized formed by the integration of sensors at the national, theater, and tactical levels. This concept streamlines ISR management using new integrated, OPS/INTEL capabilities, allowing dynamic re-tasking of sensors to ensure ISR optimization. In addition, multiple sensor cross-cueing becomes routine, and the synchronization of ISR assets with operations, the norm.

As our understanding of the key tenets of EBO and the EBP processes matures, JISR will assume an ever more critical role. The ability to effectively manage multiple collection sensors, spanning several levels of operational control, within the compressed decision timelines associated with RDO will be key. JISR will enable the JFC to smartly couple ISR assets to specific effects, thereby optimizing the employment of high demand/low density assets.



## **Chapter 4 — Experiment Scenario**

### **Blue Forces**

Commander, Blue Forces/Commander, Joint Task Force (CJTF) led a U.S. land, sea, air and special operations expeditionary force in support of a theater commander. The task force consisted of units from the four Services, supporting commanders, and a Special Operations Command task force. An Army corps headquarters unit composed the JTF staff and an Army lieutenant general led the Joint Task Force, reporting directly to the combatant commander. Members of a Standing Joint Forces Headquarters (SJFHQ) augmented the JTF. The SJFHQ, itself a new warfare concept under review, was a detachment of the theater combatant commander assigned to speed the JTF's learning/acclimation process. The JTF commander's functional component support was provided as follows:

A JFLCC, a Marine Corps major general and the staff of a marine expeditionary force; a JFACC, an Air Force lieutenant general from a numbered Air Force element and his staff; and a JFMCC— a vice admiral from a numbered fleet command. The Service components were joined by a JSOTF led by an Army colonel and a JPOTF led by an Army lieutenant colonel. The commander was provided assistance through various means by elements of the interagency (civilian departments and agencies of the U.S. Government).

### **Navy Order of Battle**

The Joint Force Maritime Component Commander had two Carrier Battle Groups. Each battle group included an aircraft carrier and its embarked air wing, AEGIS cruisers, AEGIS guided missile destroyers, non-AEGIS destroyers and frigates, a close support submarine, and supporting replenishment vessels. In addition, two amphibious ready groups made up of three amphibious ships each (LHD, LHA, LSD), were carrying the Marine Expeditionary Units (MEU). Mine countermeasure forces included both MCM and MHC class ships and H-53 helicopter support. The naval force commander, who broke his flag in a Navy command ship, also had at his disposal the ships of a standing naval theater force (already in the theater when the conflict began), in this case consisting of a cruiser and two guided missile destroyers. Various supply, cargo, military prepositioning ships, and auxiliary craft of the service fleet were also assigned. Four special boat units were available to support Navy SEAL teams. The SEALs and their support craft were under the tactical control of the special operations force (SOF) commander. For MC02, the fleet also had at its disposal the experimental high-speed vessels, providing rapid logistics and insertion capabilities for Marine and SOF forces. The carrier air wings each consisted of F/A 18's (C and F models), EA6B's, E2C's; S-3B's; SH-60R's, MH-60's and C2A's.

### **Marine Corps Order of Battle**

The Marine Corps was selected to stand up the JFLCC. The JFLCC was assigned both Army Forces (ARFOR) and Marine Forces (MARFOR). The Army order of battle is described below. MARFOR consisted of a Marine Expeditionary Brigade (MEB) and two MEUs. The MEB brought with it a command element, including a headquarters group with a radio battalion, a communications battalion and an intelligence battalion; a force reconnaissance detachment; a civil affairs detachment; a Marine liaison element company, and a Marine air-ground task force

command and control detachment. The MEB's ground combat element (MEB GCE) consisted of a regimental headquarters; infantry battalions; infantry battalion headquarters with divisional headquarters detachment support; a reconnaissance company; and a reinforced artillery battalion that had a chemical, biological and radiological (CBR) detachment and a high mobility artillery rocket system (HIMARS) battery. Additionally, the MEB GCE had an advanced amphibious assault vehicle battalion (AAAV); a light armored reconnaissance battalion, made up of light armored vehicles (LAV-25's); one tank battalion, consisting of M1A1 tanks, and a construction engineer battalion (CEB) assigned. The MEB air combat element (MEB ACE) included a Marine wing headquarters squadron and a Marine air control group with its various support squadrons, a reinforced low altitude air defense (LAAD) battalion with a detachment of Avengers and Claws and a detachment of vehicle-mounted UAV's (VMUAV) and vertically launched UAV (VTUAV) (Dragon Eye and Dragon Warrior).

The Marine air group was reinforced and included two squadrons of F/A-18C's, a squadron of F/A-18D's, a squadron of AV-8B's, a squadron of C-130's, and as previously mentioned an EA-6B squadron under JFACC control. Rotary wing assets included V-22 squadrons, a squadron of CH-53E's, and a squadron of light attack helicopters AH-1Z's and UH-1Y's. A Marine wing support group and a Marine air logistics squadron supported the group. MEB service support group included a headquarters and support battalion and supply, maintenance, engineering, transportation support, and medical battalions. The JFLCC was also able to draw upon two Marine Expeditionary Units (MEU). Each MEU consisted of a battalion landing team (BLT), V-22's, CH-53E's, AH-1Z's, UH-1Y's, AV-8B's, and necessary support group detachments. Unlike the MEB, the MEU is a component of a Navy's aircraft carrier battle group (CVBG) or an amphibious ready group (ARG). The MEU embarks in a three-ship ARG and may deploy with the battle group or deploy independently with escorts.

### **Air Force Order of Battle**

The Air Force, acting as the functional air-warfare commander, was set up as the Joint Force Air Component Commander and operated out of the Combined Air Operations Center (CAOC) at Nellis AFB, NV. The staff of a numbered Air Force commander manned the JFACC. Those forces were augmented by other agencies and organizations to include U.S. Space Command, U.S. Transportation Command, and U.S. Strategic Command. The JFACC was responsible for a deployable global strike task force (GSTF), an ISR/JAOC FDO, in-theater air defense units, and various support elements. The GSTF consisted of B-2s, B-52s, B-1s, F-22s, and two squadrons of KC-135 and KC-10 air refueling aircraft. Also available to the JFACC were E-8 JSTARS, E-3A AWACS, RC-135J's, Global Hawks, ABL's, U-2's, EC-130H (Compass Call), C-130's, C-130H's, and EA-6B's (USMC assets TACON to the JFACC).

The JFACC also controlled in-theater forces consisting of F-15C and F-15E aircraft, RQ1 Predators, Joint Strike Fighters, F-16CJ's, F-16CL's, F-117's, A-10's, EC-130H's (Compass Call), HH-60's, KC-135 and KC-10 tankers, and necessary C-130, C-17 and C-5 lift support aircraft. Also on scene were combat service support units (tanker airlift control, mission support teams, air mobility elements).

### **Special Operations Force Order of Battle (SOF)**

The SOF provided a significant piece to the puzzle. Headquartered with the JTF commander and functioning as a JTF component – JSOTF - was a theater special operations command, consisting of two support battalions and a special operations task force. The task force

was made up of Special Forces battalions, ranger battalions, and a ranger regimental headquarters staff. In addition, there was a special operations aviation regiment, providing MH-47E's, MHJ-60L's, and AH-6/MELB aircraft. The Navy added a naval special warfare task group to include a headquarters unit, SEAL teams, special boat units, and an explosive ordnance detachment. An Air Force special operations wing was also attached to the JSOTF. The wing was made up of a special tactics squadron and a special operations squadron - Air Force foreign internal defense unit. Additionally, there were AC-130's, MC-130 H/P's, CV-22's, and EC-130J aircraft assigned in support. Operating with the JSOTF was the JPOTF, consisting of one Army PYSOP group. The group was made up of a regimental support battalion, dissemination battalion, tactical battalions, and one enemy prisoner of war (EPW) battalion.

### **Army Order of Battle**

The ARFOR was task-organized under an airborne division headquarters, comprised of a Stryker brigade combat team (SBCT), an airborne division ready brigade, a deep strike/mobile strike aviation task force package, and associated division and corps units that were necessary for force protection, sustainment, and C4ISR functions. The brigade included a headquarters element, airborne infantry battalions, a 105mm field artillery battalion (towed), a forward support battalion, a reconnaissance battalion, an air defense artillery battalion, a military intelligence company, a communications and signal platoon, a military police platoon, and a nuclear, biological and chemical platoon. The Stryker brigade combat team included a brigade headquarters element, Stryker-equipped infantry battalions, a Stryker-equipped reconnaissance, surveillance, and target acquisition (RSTA) squadron. It also included a 155mm (towed) field artillery battalion, a brigade support battalion, a Stryker-equipped anti-tank company, an engineer company, a military intelligence company, a signal company, an attached combat service support company, and (for MC02) an attached air defense artillery battery (Avenger).

Mechanized infantry battalions, a mechanized reconnaissance surveillance and target acquisition squadron, an anti-tank company, a 155mm field artillery battalion (towed), a combat engineer company (wheeled), a military intelligence battalion, a communications and signals battalion, a brigade support battalion and an air defense artillery battery (Avenger). The ARFOR aviation brigade included a medium attack helicopter squadron of AH-64's and RAH-66's, a Multiple-Launch Rocket System (MLRS) battalion with a target acquisition company, support battalions, military intelligence battalion, a communications and signals battalion, a civil affairs unit, and a psychological operations unit.

Army forces were equipped with the Army Battle Command Systems (ABCS), which includes the Army Tactical Command and Control System (ATCCS) suite of systems at brigade through corps levels. The Maneuver Control System (MCS), Maneuver Control System - Light (MCS-L), All-Source Analysis System (ASAS), All-Source Analysis System - Light, (ASAS-L), Advanced Field Artillery Tactical Data System (AFATDS), Air and Missile Defense Workstation (AMDW/S), and the Combat Service Support Control System (CSSCS) make up the ABCS. The Global Command and Control System-Army (GCCS-A) was positioned at the ARFOR, U.S. Army Special Operations Command (USASOC), and the JFLCC to allow joint connectivity during the planning and execution of MC02. The Integrated Meteorological Systems (IMETS), the Digital Topographical Support System (DTSS), and the Tactical Airspace Integration System (TAIS) were also employed.

### **Adaptive Adversary**

The MC02 opposing forces' (OPFOR) mission was to be a credible adversary for the Blue force. This required an OPFOR that was aggressive and adaptive, capable of achieving its own objectives through diplomatic, information, military, and economic influences. The overall objective of the MC02 OPFOR was to provide a 2007-based, realistic, adaptive opponent that would test the vulnerabilities of the RDO concept. In concert with the MC02 scenario, the multi-faceted adversary portrayed to the Blue JTF provided a realistic test opponent. The confrontation that developed created an excellent environment in which the RDO concept could be explored. It allowed examination of the ONA, EBO, interagency, SJFHQ, and other supporting concepts and objectives. The JFCOM Joint Warfighting Center Support Team (JST), in coordination with the JFCOM World Class Adversary (WCA) Team, provided the OPFOR.

JFCOM analysts and subject matter experts (SMEs) assessed the OPFOR organization and campaign during MC02. This allowed for an in-depth understanding of the success and failure of Blue Effects-Based Operations. The assessment team met with OPFOR senior leaders daily to review their operations, how they planned to respond to BLUE efforts, and to collect DIME/PMESII self-assessment data.

The senior OPFOR leadership team included a retired lieutenant general (USMC), who was the JTF-South commander and a former U.S. ambassador, the GOR Supreme Leader.

The MC02 scenario called for an upper level, small-scale contingency (SSC). As such, the OPFOR organized into a multi-faceted group that included government, military, terrorist, pirate, subversive, militant, and criminal elements. These elements each had their own objectives and did not always work cooperatively. As such, they posed a considerable challenge for the Blue JTF.

### **Scenario**

The MC02 scenario postulated a year 2007 regional power, Red, situated within an area of critical world strategic and economic importance (See Figure 9). Red suffered a natural disaster (earthquake) and the subsequent chain of events resulted in the separation of a rogue military commander. Identified as CJTF-South, he and his subordinate military commanders spun away from national (Government of Red) control. A renegade element within the Red leadership, CJTF-S conducted broad actions, including conventional military, asymmetric, diplomatic, information, economic, and terrorist applications, with the goal of establishing regional power and control. A dispute over national ownership of local islands led to CJTF-S's seizure of the disputed islands, and the subsequent launch of a CJTF-S sponsored military escort service to ensure safe passage, and a related toll for use of that service. Blue ordered the execution of decisive operations that led to the initiation of hostilities.

Blue goals were to secure the shipping lanes for international commerce; neutralize Red's WME capability; establish sovereign control of the disputed islands in accordance with a World Court decision, and compel JTF-S to abandon its political agenda in pursuit of regional hegemony.

Adversary goals were as varied as the factions that challenged the Blue forces. The OPFOR consisted of three primary elements: JTF-S military forces, the Government of Red (GOR) national leadership, and a terrorist organization that included pirates, a private company, and criminal elements. The JTF-South objectives were to preserve the regime, deter Blue military deployment, limit Blue war aims, and restore internal cohesion. In addition, JTF-S aimed to reduce Blue presence in the region, develop regional influence, and speed economic

**Experiment Force Activity**

The diagrams here provide a visual depiction of the buildup of events that eventually led to hostilities and Blue conflict with CJTF-S.

The diagrams also describe component activity in support of the MC02 experiment scenario and its schedule of events.

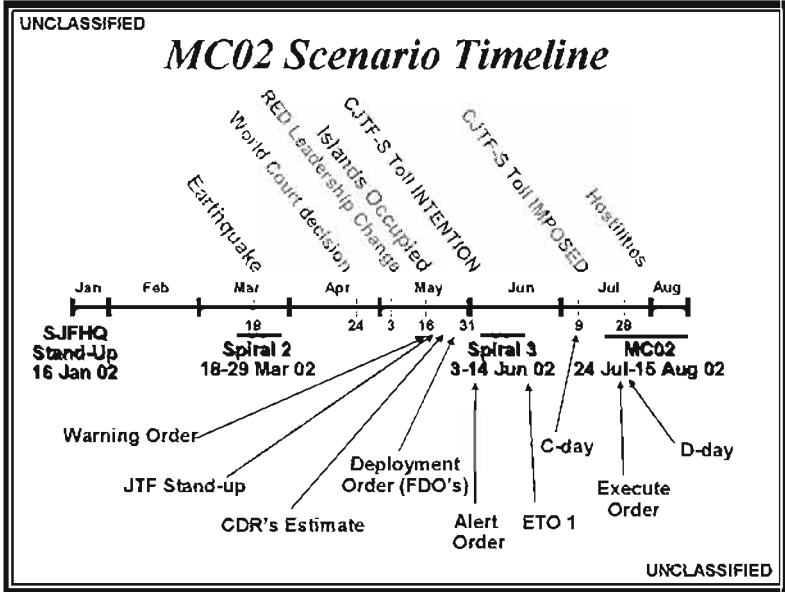


Diagram 1: MC02 scenario timeline from the stand up of the SJFHQ through the initiation of hostilities

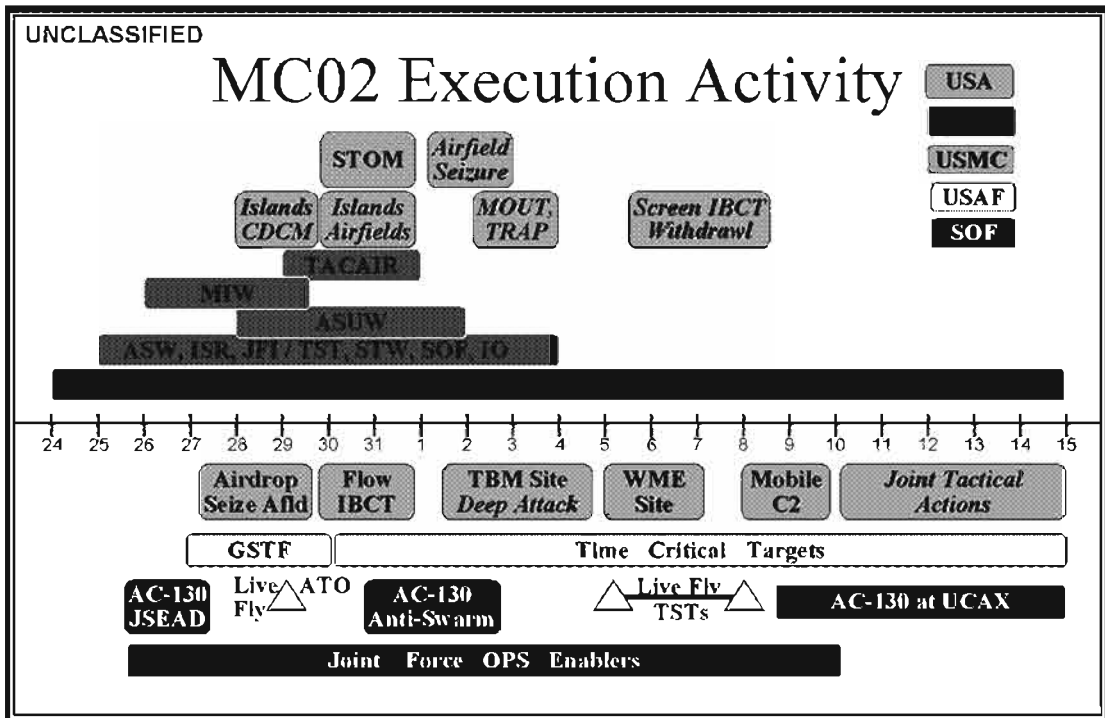


Diagram 2: Overlay of component exercise play and the MC02 experiment scenario.

recovery (earthquake aftermath), champion ideals in Red, control western access to natural resources, and gain Red stature. GOR objectives were to preserve the regime, reduce Blue presence in the region, develop regional influence, and speed economic recovery. The terrorists' objectives were to deny Blue access to the region, attack opposing political and religious organizations, and disrupt Blue operations.

### Threat forces organization and systems

The adversary ground forces consisted of an army of approximately 55,000: four divisions, (one armor, two infantry, and one mechanized); two airborne brigades; two independent armored brigades; a marine brigade; an independent artillery brigade; and various special operations forces. SOF/militia numbered 5,000 personnel for unconventional warfare. Theater ballistic missiles (TBM) forces included 200 launchers and 1,800 missiles with chemical/biological capable cruise missiles.

Air forces numbered 158 aircraft, including 14 MIG-29's, 4 SU-27's, 20 F5E's, and various other fighter, bomber, auxiliary, and support aircraft.

Naval forces included five diesel and four midget submarines; six guided missile frigates; 32 patrol gun boats - most with surface-to-surface missile capability; 13 amphibious class ships; 10 auxiliaries; 105 small craft armed with recoilless rifles or rocket launchers, and shore based anti-ship fixed and truck mounted missile launchers.

Scenario data points include:

- Though disavowed by the Government of Red, country Red was a major state sponsor of terrorism and provided sanctuary to

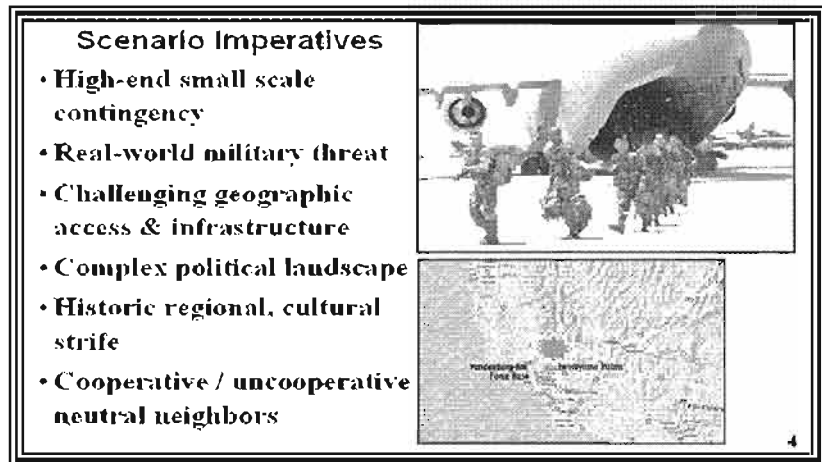


Figure 9: MC02 Scenario Highlights

- large terrorist groups within its sovereign borders and conventional force umbrella
- The Red leader employed these global-reach groups to create incidents and threats throughout the region and world, while maintaining official deniability
- Regional access was politically constrained and logistically challenging
- JTF-S's campaign plan was characterized by asymmetric attacks, ambiguity, anti-access, threat of WME, economic leverage and upheaval prepared for a large conventional set-piece battle, local and exported terrorism against adversary forces, and timing of their choosing
- A single-dimensional response (military) would not easily neutralize Red's coordinated political, military, economic, social, and informational campaign
- Threats to friendly forces and assets were worldwide
- Friendly conventional forces had to create selective periods of multidimensional supremacy and decisively apply military power to achieve desired effects, not necessarily conquer the country, or escalate the conflict
- Knowledge—not mass—was the decisive force enabler for friendly forces



Figure 10: CHINA LAKE, Calif. July 30 (AFIE) -- Inside the integrated battlespace arena at Michelson Laboratory, warfighters keep a close eye on screens showing a real-time picture of theater air assets and a live feed from a Predator surveillance aircraft during Millennium Challenge 2002.

(This Page Blank)



## Chapter 5 — Experiment Execution - The Spirals

### MC02 Test Campaign Plan

Focused technical and training events, or “Spirals,” preceded MC02. The Spirals tested and rehearsed the technical infrastructure that carried the experiment from coast to coast and intra-Service. The Spirals also provided the participants an opportunity to become acquainted with the new concept tools and the philosophy and technology of their applications.

The Spirals, which began in early December 2001 with Spiral 0, had a dedicated test plan and concept of operations embedded in the overall MC02 Campaign Plan. This section describes the concept, scope, activities, schedules, manning, and format used to develop the specific MC02 tests. It provides the guidance for the development of the individual test plans that USJFCOM and the Service participants used for pre-execution technical tests. The goal of the test program was to provide sufficient information on the MC02 technical architecture to recommend USJFCOM accreditation for its use in MC02.

There were three scheduled Integration Milestones (IMs) and four additional integration events that were added to address specific issues encountered in the IMs. The IMs were to integrate the Service simulations into a federation that would support MC02. Particular focus was placed on simulation interoperability, federation scalability, and federation reliability.

IM-1 was held June 4-8, 2001. The event brought together the MC02 core simulations for the first time. The objectives included:

- Federate simulations via the Run Time Infrastructure (RTI) or Gateways
- Verify that simulations reflect each other’s entities
- Verify that entities in different sims detect and shoot each other
- Examine terrain correlation
- Run a limited scale federation scenario

IM-1 proved that the MC02 federation was viable. It also showed that the degree of terrain correlation was unacceptable and would have to be improved. It also provided the community’s first experience with using multicast addressing over the wide area network (WAN), which required special router settings.

IM-1A was held June 18-22, 2001. This limited event investigated the use of Data Distribution Management (DDM) as a scaling tool and examined RTI scalability, using only JSAF and clutter. The objective was to gain experience with DDM and the RTI prior to using them in the full federation. The results showed that DDM did support scaling but that getting a display to monitor all the entities would require further optimization.

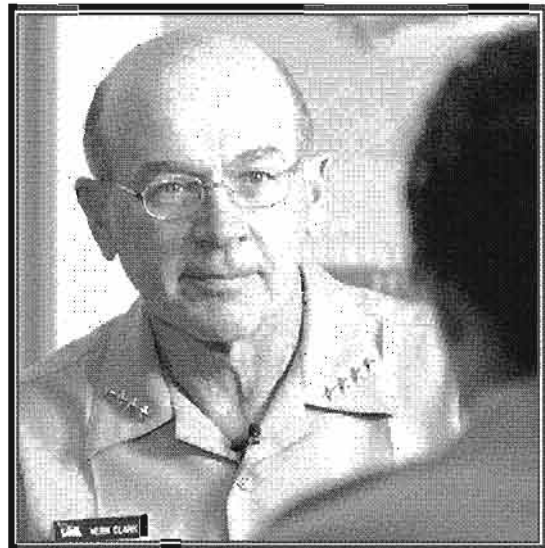


Figure 11: Suffolk, Va., July 29, 2002 — “What I’ve seen is the future,” said Adm. Vern Clark after his tour of the Joint Training, Analysis, and Simulation Center (JTASC). The Chief of Naval Operations toured the U.S. Joint Forces Command during MC02.

IM-2 was held July 30 – August 3, 2001. This event started to look at that ability of the MC02 federation to scale. The objectives of the event were:

- Start the process of standardizing enumerations
- Start the process of standardizing munitions
- Investigate issues associated in simulating large numbers of entities

Several automated and manual techniques for enumeration and munitions standardization were successfully tested across the WAN. A number of potential problems that were preventing the federation from scaling to 30,000 entities were also identified.

IM-2A was held from August 20-24, 2001 to improve the federation's ability to scale. Many scaling tests were held with both RTIs and many problems were debugged. The federation scaled to 35,000 entities, but issues with delayed discovery of new entities remained. Clamping was eliminated as a solution for terrain correlation and work on true correlation was initiated.

IM-3, held from September 17-27, 2001, objectives included:

- Continue to debug and implement DDM and scalability issues
- Continue verification of enumerations and munitions detonation interactions.
- Continue the integration of aggregates
- Begin the investigation of fault tolerance and recovery
- Begin the investigation of minefield interactions
- Begin integration of additional federates
- Begin integration of C4I interfaces and equipment
- Begin investigation of WAN issues
- Begin investigation of IFF
- Investigate electronic warfare issues

All issues showed progress except electronic warfare. It was determined electronic warfare would be handled by the Distributed Information Warfare Constructive Environment and the Command and Control Warfare Analysis and Targeting Tool. IM-3 demonstrated that the federation could handle the required number of entities and that slow discovery was improved although not eliminated. Additionally, many new simulations were integrated into the federation.

IM-3A was held from October 22-25, 2001 primarily to examine the performance of a new RTI version. This version was modified to support MC02 scalability requirements, primarily by turning off perfect filtering. Additional goals included:

- Verify a single Distributed Interactive Simulation/High Level Architecture (DIS/HLA) gateway can support over 30,000 entities
- Investigate settings and performance of multicast in the Cisco network switch
- Integrate new federates into the federations

IM-3A verified that the gateway could handle an adequate number of entities. RTI performance was improved, but still required optimization for multicast handling and four new federates were added

IM-3B was held from November 26-30, 2001 to test RTI modifications to support fault tolerance. These modifications were very successful and solved most fault tolerance issues.

## U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

IM3-B concluded the IM process and set the stage for the Spiral series test events that followed. The Spiral series tests technically verified the networks and the C4I infrastructure and provided the experiment “a running start” into execution.

Primary objectives of the spiral testing included:

- Ensure the successful accomplishment of MC02 from a technical standpoint
- Ensure that the modeling and simulation (M&S) architecture supported the accomplishment of the MC02 objectives
- Ensure that the C<sup>4</sup>I architecture supported the accomplishment of the MC02 objectives
- Perform event specific validation of the models and demonstrate that the federation could provide an accurate representation of the real world (circa 2007) within the context of MC02
- Validate control procedures
- Validate operational requirements and the supporting technical architecture
- Ensure users understood the capabilities and limitations of the technical architecture to support their objectives
- Ensure that the network architecture supported the accomplishment of the MC02 objectives

Scope of the spiral testing process

JFCOM networked Blue C<sup>4</sup>I architecture, a simulation federation, and a White C<sup>4</sup>I architecture to support MC02. The MC02 testing program used a requirements-based approach to ensure the thoroughness of testing and the validity of the event architecture. Preparation involved two phases: Phase 1 was developmental, with three integration milestone events; Phase 2 was an accreditation phase involving four Spiral events, an end-to-end test, and an experiment synchronization drill.

The tests provided sufficient data on the technical and functional characteristics of the MC02 Federation to allow its accreditation by JFCOM and its use during MC02 execution. The test plan was broken into stages to allow problems to be resolved in parallel with the plan schedule. Progressively complex technical and organizational systems were interconnected and brought on line in events so that faults could be identified and fixed, and personnel trained. The JFCOM Test Director determined the focus and tempo of technical events; the JFCOM Exercise Director determined the focus and tempo of operationally focused events.

Spiral tests included:

- Spiral 0 (December 3-14, 2001) (Technical Focus)
- Spiral 1 (January 28 – February 8, 2002) (Technical Focus)
- Spiral 2 Testing (March 11-22, 2002) (Technical Focus)
- Spiral 2 Training Support (March 25-29, 2002) (Operational Focus)
- Spiral 3 Testing (May 27 – June 7, 2002) (Technical Focus)
- Spiral 3 End-to-End Testing and Training Support (June 10-14, 2002) (Operational Focus)
- End-to-End Test (July 10-20, 2002) (Ensure that the network architecture supported the accomplishment of the MC02 objectives) (Technical Focus, transition to Operational Focus)
- Experiment Synchronization Drill (July 21-23, 2002) (Operational Focus)

### **Spiral 0 (December 3-14, 2001)**

Test setup, November 26-30, 2001, was followed by data review and technical integration December 3-14, 2001 and functional testing of simulation interactions and C<sup>4</sup>I linkages, December 10-14, 2001. Spiral 0 was a transitional event between Phase 1

(Development) and Phase 2 (Accreditation). A successful Spiral 0 permitted transition from a development-focused event to a functional-focused event.

Transition from Phase 1 occurred as expected during Spiral 0. M&S C<sup>4</sup>I interface testing, database verification, terrain verification, and functional testing in air, land, sea, logistics, and intelligence was accomplished. Based on the functional testing, USJFCOM identified and categorized non-existent or inadequate simulation functionality that needed to be fixed. Additionally, this test allowed JECG personnel, involved with data analysis, logistics, intelligence, and targeting, to familiarize themselves with federation capabilities and review control/collection procedures.

Specific objectives for Spiral 0 included:

- Establish federation
- Perform federation diagnostics
- Verify federates generate and receive interactions
- Perform object ownership tasks - add/delete/modify
- Verify object ghosting across federates
- Verify terrain
- Verify hybrid geography representations in C<sup>4</sup>I systems
- Perform functional testing of ISR, air, sea and ground entities
- Assess federation scalability through load test
- Conduct latency testing
- Determine operational intervention (save, restore, "recock") requirements
- Perform network performance monitoring
- Verify simulation data flow to available C<sup>4</sup>I systems
- Verify targeting requirements
- Verify data collection and analysis requirements
- Verify intel sensors/collectors
- Verify logistics level of play/requirements

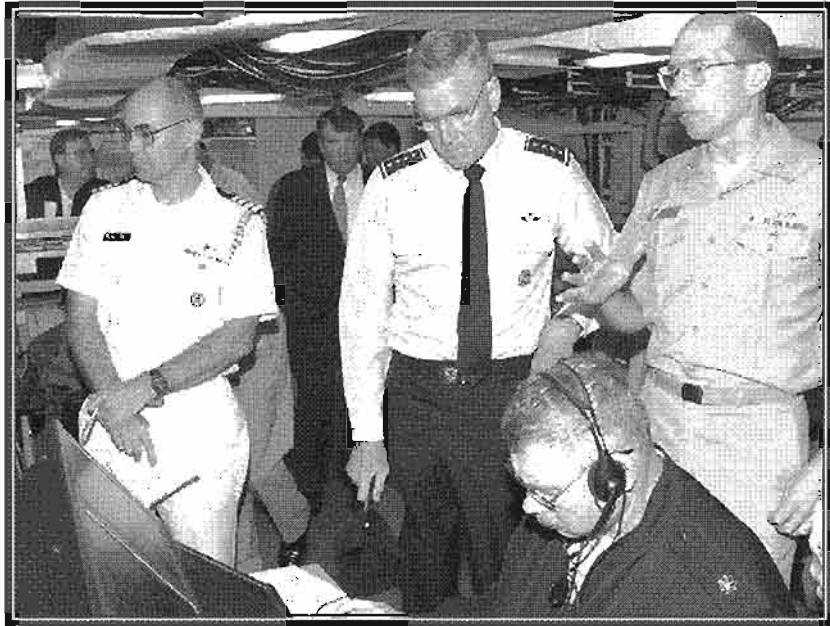


Figure 12: San Diego, Calif., Jul. 26, 2002 — The Chairman of the Joint Chiefs of Staff, Air Force Gen. Richard Myers (center) and aide Navy Capt. Richard W. Hunt are briefed by Capt. Ken Ginader, a director of operations in the Joint Air Operations Center aboard USS Coronado (AGF 11).

Participants in Spiral 0 included simulation owners and technical controllers, network analysts, database builders, JECG POC, USJFCOM C<sup>4</sup>I operators, remote site model operators, USJFCOM OPFOR model operators, USJFCOM intelligence integrators, and USJFCOM

logistics integrators. The database to support the test was ready on 26 November 2001 and was projected at the following levels: terrain, 100 percent; Blue order of battle 75 percent; Red order of battle 50 percent; and targets limited.

### **Spiral 1 (January 28 – February 8, 2002)**

Test setup occurred January 22-25, 2002, followed by data review, technical integration, and functionality testing January 28 – February 8, 2002. Spiral 1 was the first test to fully focus on the functional capabilities of the federation. This “technical” test expanded the distributed nature of the federation, included more C<sup>4</sup>I and experimental C<sup>4</sup>I (XC<sup>4</sup>I) systems, and allowed more end-user participation. The first week of testing focused on mapping and enumerations, database quality control, and systems tests, ensuring full C<sup>4</sup>I/XC<sup>4</sup>I network connectivity was reached; full connectivity was necessary to conduct the functional testing planned for the second week. Following functional testing, the test plan expanded into thread testing and a build up to larger scenarios, which would reflect expected activities during MC02. USJFCOM also conducted a load test, which stressed the systems above expected exercise loads. As in Spiral 0, the results of the testing caused USJFCOM to identify and categorize non-existent or inadequate system functionalities that were then fixed by coding changes to simulations/federation/C<sup>4</sup>I systems, redesigned, or relegated to scripting. Additionally, this test allowed JECG and Service personnel to assess federation capabilities so that detailed operational and technical control and collection procedures could be developed.

Specific objectives for Spiral 1 were:

- Establish Federation
- Perform Federation diagnostics
- Verify enumerations
- Verify federation save and restore procedures
- Verify federates generate and receive interactions
- Perform object ownership tasks - add/delete/modify
- Verify object ghosting across federates
- Verify database
- Verify C<sup>4</sup>I links and e-mail procedures
- Verify cell workstation/layout requirements
- Verify simulation data flow to available C<sup>4</sup>I systems
- Assess Battle Damage Assessment (BDA) requirements/capabilities
- Develop Event Tech Control (ETC) procedures
- Develop System Control (SYSCON) procedures
- Define intel level of play, reports, formats, and C<sup>4</sup>I compatibility
- Determine simulation rules and workarounds
- Verify unit terrain movement capabilities
- Functionality testing (air, land, sea, log, intel)
- Test ATO procedures
- Establish XC<sup>4</sup>I
- Verify communications connectivity
- Verify C<sup>4</sup>I connectivity
- Verify target database

- Master Scenario Events List (MSEL) scrub
- Load testing
- Latency testing
- Perform network performance monitoring
- Define deployment procedures
- Install/test Spiral event control communications (VTC, chat rooms, web page, shutdown, STU)
- Verify "clutter" patterns and capabilities
- Verify weather/night time capabilities
- Verify hybrid geography representations in C<sup>4</sup>I systems
- Determine Rules and Workarounds (Simulation, C<sup>4</sup>I, XC<sup>4</sup>I, Initiatives)
- Exercise distributed Help Desk procedures
- Test change over from Federation to Advanced Joint Combined Operations Model (AJCOM) based experiment driver
- Test data analysis functions

Key participants included Service representatives and technical support personnel, simulation owners and technical controllers, network analysts, database builders, JECG WG personnel, USJFCOM and Service C<sup>4</sup>I operators, Service remote site model operators, USJFCOM OPFOR and supporting Service model operators, USJFCOM intelligence integrators, USJFCOM logistics integrators, and data collectors/analysts.

The database to support this test was ready on 24 January 2002 at the following levels: Terrain 100 percent; Blue order of battle 100 percent; Red order of battle 100 percent, and

targets 100 percent. The Federation operated continuously for the duration of the test to simulate extended use.

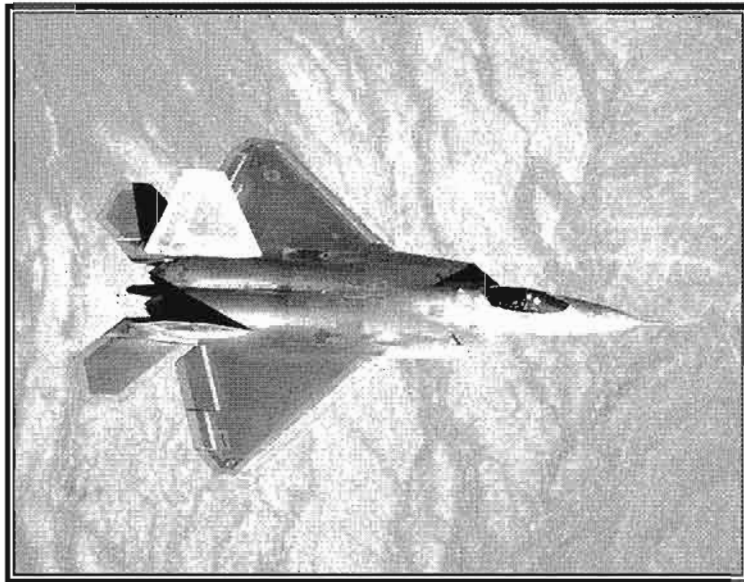


Figure 13: Raptor 4002 passed its 300th flight-hour mark, the first F-22 to do so at the Air Force's Flight Test Center, recently. While this Raptor is real, the F-22's in MC02 were all simulated Blue Force assets as the exercise portion of the experiment featured forces from FY 2007.

#### **Spiral 2 (March 4-29, 2002)**

Test setup occurred March 4-8, 2002, followed by data review, technical integration, and functionality testing March 11-22, 2002. Training was conducted from March 25-29, 2002.

Spiral 2 testing examined the functions and requirements of the entire MC02 architecture, including response cells, communications networks, C<sup>4</sup>I systems, and initiatives. The overarching concept was to operate the federation from distributed sites with additional models and C<sup>2</sup> systems to establish "near-exercise"

conditions, to evaluate the infrastructure's ability to support MC02 and to validate control procedures. As in Spiral 1, the test started with data review and technical integration to ensure week-two functional objectives could be supported.

The second week of Spiral 2 focused on tactical and operational vignettes after any remaining Spiral 1 functional tests were completed. The vignettes focused on expected MC02 activities and, when time and resources permitted, incorporated known rules and redesigns. Spiral 2 required extensive interaction with C<sup>4</sup>I systems and an assessment of the data flows through those systems. Completed tests included any remaining M&S C<sup>4</sup>I interface testing and functional testing in air, land, sea, logistics, and intelligence. After functional testing, the focus shifted to thread testing and larger scenarios, reflecting expected MC02 activities. As in the previous test, load tests were conducted which were less concerned with operational or tactical accuracy, but with stressing the systems above expected exercise loads.

As in Spirals 0 and 1, the results of the testing helped USJFCOM to identify and categorize non-existent or inadequate system functionalities. Additionally, this test allowed JECG and Service personnel to test their operational and technical control and collection procedures.

Specific objectives for Spiral 2 included:

- Establish Federation
- Perform Federation diagnostics
- Verify database
- Verify C<sup>4</sup>I links and e-mail procedures
- Verify cell workstation/layout requirements
- Verify model message output types/formats for C<sup>4</sup>I feeds
- Verify BDA procedures (manual/automatic)
- Verify Control procedures
- Thread Test Intel sensors/collectors data flow
- Validate attrition/usage rates
- Validate scenario events list
- Load testing
- Functionality testing (air, land, sea, log, intel)
- Verify simulation data flow to C<sup>4</sup>I systems
- Test ATO procedures
- Test XC<sup>4</sup>I
- Verify communications connectivity
- Verify C<sup>4</sup>I connectivity
- Perform network performance monitoring
- Install/test Spiral event control communications (i.e., VTC, chat rooms, web page, shutdown, STU) (administrative)
- Verify readiness to support Service Spiral objectives
- Verify weather/night time capabilities
- Verify hybrid geography representations in C<sup>4</sup>I systems
- Determine Rules and Workarounds (Simulation, C<sup>4</sup>I, XC<sup>4</sup>I, Initiatives)
- Exercise distributed Help Desk procedures
- Test change over from Federation to AJCOM based experiment driver

- Test severability of non-essential systems (Degradation Plan)
- Test data analysis functions
- Live-Sim procedures (TBD)

Key participants included Service representatives and technical support personnel, simulation owners and technical controllers, network analysts, database builders, JECG working group personnel, USJFCOM and Service C<sup>4</sup>I operators, Service remote site model operators, USJFCOM OPFOR and supporting Service model operators, USJFCOM intelligence integrators, USJFCOM logistics integrators, and data collectors/analysts.

The database to support this test was ready on March 14, 2002 at the following levels: terrain 100 percent; Blue order of battle 100 percent; Red order of battle 100 percent, and targets 100 percent.

### **Spiral 3 (May 20 - June 14, 2002)**

Spiral 3 featured the complete execution architecture. Test setup occurred May 20-24, 2002, followed by data review, technical integration, and functionality testing May 27 – June 7, 2002 with end-to-end test and support training, running from June 10-14, 2002.

Spiral 3 tested and validated the entire simulation architecture, including alternate response cells, communication nodes, headquarters, and C<sup>4</sup>I systems. The overarching objective was to operate the federation from distributed sites with all known simulation and C<sup>4</sup>I systems fully engaged. Spiral 3 was to replicate the actual exercise load in terms of data, operational requirements, and networks, while test activities essentially mirrored Spiral 2.

Specific objectives for Spiral 3 included:

- Establish Federation
- Perform Federation diagnostics
- Validate database
- Validate C<sup>4</sup>I links and e-mail procedures
- Verify critical C<sup>4</sup>I interfaces and output displays
- Validate cell workstation/layout requirements
- Validate model message output types/formats for C<sup>4</sup>I feeds
- Validate BDA procedures (manual/automatic)
- Validate ETC procedures
- Refine simulation rules and workarounds
- Verify attrition/usage rates
- Validate scenario event list
- Load testing
- Functionality testing (air, land, sea, log, intel)
- Verify simulation data flow to available C<sup>4</sup>I systems
- Test ATO procedures (administrative)
- Verify functional interfaces between models (air, land, sea, log, intel)
- Verify intel reporting procedures and report content
- Test XC<sup>4</sup>I (technical)
- Verify communications connectivity
- Verify C<sup>4</sup>I connectivity



- Verify intelligence collection matrix/results
- Deconfliction of live and simulation feeds
- Response cell training
- Perform network performance monitoring
- Verify supportability of and readiness to support Service Spiral objectives
- Verify hybrid geography representations in C<sup>4</sup>I systems
- Determine Rules and Workarounds (Simulation, C<sup>4</sup>I, XC<sup>4</sup>I, Initiatives)
- Exercise distributed Help Desk procedures
- Test change over from Federation to AJCOM based experiment driver
- Test severability of non-essential systems (Degradation Plan)
- Test data analysis functions
- Live-Sim procedures

Participants and processes were the same as those in Spiral 2 with more robust manning to replicate the exercise load.

#### **End-to-End Test**

The end-to-end test validated the "as built" architecture with the system in the final experiment configuration. The objective was to operate the federation from distributed sites with all known simulation and C<sup>4</sup>I systems online to replicate the exercise load in terms of data and operational requirements. Emphasis was on simulation to C<sup>4</sup>I interfaces and messages. Time was allocated during this period to support final training requirements. Specific objectives of the end-to-end test included:

- Verify simulation data flow to available C<sup>4</sup>I systems
- Test ATO procedures
- Perform network performance monitoring (technical)
- Load test entire event architecture
- Live-Sim procedures testing

#### Test Activities

To varying degrees, all five tests (Spirals 0-3 and the End-to-End Test) incorporated the areas described below and the appropriate test concepts. If remote sites were manned and communications were available, the lines and equipment that supported them were tested. Specific test activities are described in the following paragraphs.

#### Federation Infrastructure Testing

Comparable to Joint Training Center technical testing, federation infrastructure testing examined the functional interfaces of the federation and provided sufficient data to determine the technical, functional, and operational ability of the federation to support the experiment's training objectives. The federation technical, functional and operational testing executed during this phase established a functional baseline and verified that the federation models demonstrated sufficient interoperability to support MC02.

### Data Review Testing

Data review and technical integration testing were conducted at the start of each Spiral event to ensure the data and technical interfaces were operating properly to support functional and operational testing. Data reviews included simulation database evaluation, enumerations checks, terrain and targeting database assessments, and verification of forces and locations. Database testing validated current databases against requirements and the current model version, and, where applicable, verified corrections to previously reported deficiencies. Using the database list provided by the database manager (DBM), the functional test cell leads and site hosts verified the current database. The trouble report (TR) form was used to report database discrepancies.

### Technical Integration Testing

Technical integration testing followed federation infrastructure testing and ensured that the federation was operating sufficiently well to meet event-testing objectives. Technical integration testing included technical control procedures, network testing, and initial COP testing.

### Functional and Operational Testing

The functional and operational testing performed during the MC02 test program validated specific databases, current model versions, and operations unique to MC02 objectives. Operational activities were tested based on their criticality to the execution of MC02. Each individual test specified a task, conditions of concern, data to be gathered, and a test format. Functional model managers developed those tasks based on knowledge of model functionality and event requirements. A MSEL scrub was conducted concurrently with individual functional tests so that any redesign work could be retested.

### Experiment Control

Experiment control was concerned with the procedures and means that the JECG used to control the joint experiment. From this testing, control procedures were developed, refined, and tested to prepare for joint experiment execution.

### Data Collection and Analysis

Data collection and analysis testing dealt with the procedures and means by which data was collected and analyzed during the experiment. From this testing, the collection management plan was developed, tested, and refined to prepare for joint experiment execution.

### Scenario and MSEL

Scenario and MSEL testing determined which events the simulations could adequately replicate. Functional test cell leads extracted items from the MSEL that related to their respective functional area and performed the associated tasks. Redesign work was tested for those events that could not be replicated satisfactorily in the simulations.

### Load Test

To develop the load test parameters, the primary factors influencing the load were identified for each simulation. The maximum value of each factor, as constrained by the database, was used to define a target load condition. This approach created an entirely artificial

## U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

target load condition, producing a federation state under which each simulation was simultaneously in a condition of maximum load within the constraints of the event database. The artificial condition placed a computational burden on the infrastructure software that exceeded the anticipated load of MC02 and therefore, could support the federation in the actual event, even during peak periods.

### M&S and C<sup>4</sup>I Interface Testing

In most instances, C<sup>4</sup>I and peripheral equipment installation was staggered requiring that additional C<sup>4</sup>I interfaces be tested and data throughput verified throughout the MC02 preparation period. If available, critical C<sup>4</sup>I interfaces were tested during all Spiral events to identify problems early in the process. Selected C<sup>4</sup>I interfaces were tested and data throughput was verified primarily during Spirals 2, Spiral 3, as well as the end-to-end test. The latter fully examined the connectivity and readiness of the C<sup>4</sup>I systems participating in MC02. Connectivity testing involved testing the communications networks for the M&S and C<sup>4</sup>I architecture and included remote sites. The MC02 architecture included operational C<sup>4</sup>I systems, authentic intelligence systems, and related simulation feeds that provided the operational headquarters with a realistic view of the battlefield.

### Trouble Reporting

The test manager (TM) collected and tracked trouble reports (TR) for each test phase. Data was collected via the trouble report form and any discrepancy or deviation in the execution of the test was noted. Model and/or database discrepancies found were discussed at a daily "hot wash up" and TRs were generated as necessary. Discrepancies not directly related to the execution of a documented task were reported to the test manager, who cataloged and prioritized them with input provided by the Service and functional area representatives. The test director then approved or re-prioritized the TRs and directed action. Priorities were assigned using MIL-STD-498 as shown in Table 3. The TM held the daily hotwash via VTC during Spiral 2 and Spiral 3 and the end-to-end test. The site or assistant site managers represented the remote sites.

### Test Execution

A test readiness review was conducted 7-10 days prior to the start of each test to review the progress of test preparations and to make adjustments as necessary. Each test started with a kickoff meeting the morning of the first day to get participants oriented to the test schedule and objectives, and to identify issues. At the conclusion of each test day, a hotwash was conducted to review accomplishments and to coordinate each functional area's plan for the next day.

Federation technical control, simulation technical control suites, and network/systems personnel were located at Tech Control where TRs were received and maintained. Database personnel maintained a trouble report log, while Tech Control personnel maintained a separate Tech Control Daily Log.

At the conclusion of each Spiral event, JFCOM published a test report, summarizing major accomplishments, issues, decisions, and milestones as well as a plan of action that addressed test issues and items not tested.

### Test Plan Development

The test plan for each of the Spiral events followed a standardized format, depicted below. Where particular tests cut across functional or organizational areas, the designated

responsible individual or organization coordinated and integrated efforts and requirements before submitting the test plan.

Test Plan Input

A specific test step governed any test of the simulations and C<sup>4</sup>I system. The test step described the task, the conditions under which that task was to be performed, and the standards for test success. Table 4 provides a sample land functional task.

Table 3: Potential Problems

|          |                                                                                                                                                                                                                                                                                         |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Priority | Applies if the problem could:                                                                                                                                                                                                                                                           |
| 1        | (a) Prevent the accomplishment of an operational or mission essential capability.<br>(b) Jeopardize safety, security, or other requirement designated "critical."                                                                                                                       |
| 2        | (a) Adversely affect the accomplishment of an operational or mission essential capability and no work around solution was known.<br>(b) Adversely affect technical, cost, or schedule risks to the project or to life cycle support of the system, and no work around exists.           |
| 3        | (a) Adversely affect the accomplishment of an operational or mission essential capability but a work around solution was known.<br>(b) Adversely affect technical, cost, or schedule risks to the project or to life cycle support of the system, but a work around solution was known. |
| 4        | (a) Result in user/operator inconvenience or annoyance but does not affect a required operational or mission essential capability.<br>(b) Result in inconvenience or annoyance for development or support personnel but does not prevent the accomplishment of those responsibilities.  |
| 5        | Any other effect.                                                                                                                                                                                                                                                                       |

C<sup>4</sup>I System Testing

For C<sup>4</sup>I system testing, which often involved multiple simulations and C<sup>4</sup>I systems in a single task, testers needed to consider an accompanying test description, as well as available diagrams in order to provide the necessary information and understanding of the relevance of the task and how it supported the exercise.

Table 4: Sample Land Functional Task

| Task                                       | Test Purpose/Steps (Conditions)                                                                                                           | Test Verification (Standards)                                                                                                                                                                      | Results/Remarks (Optional) |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Event 10<br>Conduct indirect fire missions | a. Execute indirect fire missions in MTWS against brigade-sized ground units. Use HE, DPICM, and CPHD (PGM) munitions for these missions. | Verify that different type ground units suffer realistic attrition and damage reports are generated. Check spot reports for damage and verify supply levels are decremented in the attacked units. |                            |

Table 5 contains sample descriptions. These are examples only and do not reflect the actual MC02 architecture.

Air Warfare Simulation (AWSIM) to Joint Warfighting Center (JWFC) ADSI Simulation Data Flow Test (Red, White, and Blue Fixed-Wing and Rotary-Wing Air)

OPFOR, neutral, and Blue USAF, USA, and SOF fixed-wing and USAF rotary-wing aircraft tracks were created in the AWSIM and passed via the Aggregate Level Simulation Protocol (ALSP) to the Joint Operations Information Simulation (JOISIM). JOISIM converted all simulation air tracks into a Tactical Digital Interface Link-J (TADIL-J) message format and

**Table 5: Sample taskings**

| TASK #   | REQUIREMENT                                                                                                                                        | SYSTEM                              | PROCEDURE                                                                                                                                                                                                                                                                                           | RESULTS                                                                                             |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| D1.3.1.1 | Provide AWSIM-generated air tracks in TADIL-J format to the JWFC ADSI. This includes all AWSIM generated fixed-wing aircraft and Blue helicopters. | AWSIM<br>RTI<br>JOISIM<br>JWFC ADSI | Send AWSIM red, white, and Blue air tracks via RTI to JOISIM. JOISIM converts data to TADIL-J message format. Verify the correct receipt and parsing of each different track type by comparing model ground truth on the MAUI workstation with JWFC ADSI displayed track data.                      | RED FW _____<br>WHITE<br>FW _____<br>USAF FW _____<br>USA FW _____<br>SOF FW _____<br>USAF RW _____ |
| D1.3.1.2 | Provide RESA-generated Blue maritime air tracks in TADIL-J format to the JWFC ADSI. This includes embarked Marine and Allied Forces helicopters.   | RESA<br>RTI<br>JOISIM<br>JWFC ADSI  | Send RESA red and Blue maritime air tracks via RTI and JOISIM to the JWFC ADSI. JOISIM converts data to TADIL-J message format. Verify the correct receipt and parsing of each different track type by comparing model ground truth on the MAUI workstation with JWFC ADSI displayed track data.    | USN FW _____<br>USMC FW _____<br>USN RW _____                                                       |
| D1.3.1.3 | Provide MTWS-generated Blue and red helicopter tracks in TADIL-J format to the JWFC ADSI.                                                          | MTWS<br>RTI<br>JOISIM<br>JWFC ADSI  | Send red and Blue helicopter tracks from MTWS via RTI and JOISIM to the JWFC ADSI. JOISIM converts data to TADIL-J message format. Verify the correct receipt and parsing of each different track type by comparing model ground truth on the MAUI workstation with JWFC ADSI displayed track data. | RED RW _____<br>USMC<br>RW _____<br>USA RW _____<br>SOF RW _____                                    |

forwarded them via serial interface to the JWFC Air Defense Systems Integrator (ADSI) at the JTASC in Suffolk, VA. The ADSI correlated the incoming track information with existing database information and updated track status for local display. Testing verified the correct receipt and parsing of each different track type by comparing model ground truth on the MAGTF Tactical Warfare Simulation Advanced User Interface (MAUI) workstation with JWFC ADSI displayed track data.

RESA to JWFC ADSI Simulation Data Flow Test (Blue Fixed-Wing/ Rotary-Wing Air)

Blue USN and USMC fixed-wing and USN rotary-wing aircraft tracks were created in the Navy Research, Evaluation and Systems Analysis (RESA) model, passed via the ALSP to JOISIM, converted to TADIL-J format, and forwarded to the JWFC ADSI. Testing verified the correct receipt and parsing of each different track type by comparing model ground truth on the MAUI workstation with JWFC ADSI displayed track data.

MTWS to JWFC ADSI Simulation Data Flow Test (Red and Blue Air)

OPFOR rotary-wing and USMC, USA, and SOF rotary-wing aircraft tracks were created in the MTWS model, passed via the ALSP to JOISIM, converted to TADIL-J format, and forwarded to the JWFC ADSI. Testing verified the correct receipt and parsing of each different track type by comparing model ground truth on the MAUI workstation with JWFC ADSI displayed track data.

JWFC ADSI to JFACC ADSI Simulation Data Flow Test (All Air)

Simulation TADIL-J air tracks from the JWFC ADSI were forwarded to the JFACC ADSI for correlation via dial-up STU-III (model 1910) modem. The tracks were then forwarded to the AFFOR Theater Battle Management Core System (TBMCS) Situation Awareness and Assessment (SAA) module. From there, they were forwarded via Secret Internet Protocol Router Network (SIPRNET) to the GCCS tactical database master server, on which the COP resided. This server was referred to as the TOP COP. Air tracks were then distributed from the TOP COP to the component's tactical display systems. Testing verified the correct receipt of each different type of track by comparing model ground truth on the MAUI workstation with TOP COP displayed track data. The TOP COP was located at JWFC for this test.

**Experiment Execution - Simulation Federation**

The MC02 M&S federation was the largest, most complex High Level Architecture (HLA) federation ever attempted. Nineteen core, 24 Service, and 16 stand-alone models or simulations made up the Joint Experimental Federation (JEF). Core simulations comprised the minimum essential set of simulations required to support the USJFCOM experimental objectives. Service simulations consisted of the tactical and operational simulations necessary for the Services to satisfy their unique experimental requirements while still participating in the MC02 overall M&S architecture. Stand-alone simulations, simulators, tools, and models fulfilled a variety of supporting roles, for both joint and Service experimentation. This virtual environment supported over 30,000 battlespace entities set up across eight operating locations spanning the United States. The federation provided excellent battlespace functionality based upon predicted 2007 joint and Service capabilities with similarly enhanced supporting environments for terrain, JISR, communications and jamming, logistics, TBM and infrastructure.

Created in April 2001, this joint federation was operated in close coordination with the Services, and was tied to a requirements development and testing process. The resulting federation used Service-nominated simulations to represent Service-unique capabilities, with USJFCOM provided funding for improvements and integration necessary to form the HLA federation. The Johns Hopkins University Applied Physics Laboratory conducted all validation and verification (V&V) testing on the JEF in accordance with DoD Instruction 5000.61 (draft); the V&V report was completed July 19, 2002. The USJFCOM accredited the JEF for use in MC02 on July 24, 2002.

### Experiment Execution – Hybrid Terrain

Scenario driven, exercise requirements dictated a combination of simulation activities that follow the constructive/virtual/live approach to accomplish the experiment goals. A series of modifications were made to the set of available Southwest United States data maps to allow live force exercise events occurring on western U.S. training ranges to appear in the correct locations (scenario-wise) on the virtual warfare maps displaying a make-believe world.

While certain components of the JFCOM modified terrain database effort were conventional, the database tailoring and other specific requirements increased its complexity. In particular, M&S tools required a correlated “play-box,” which became known as the “hybrid terrain,” that allowed for a shared common view of the constructive battlespace.

For consistency with the experiment/exercise scenario, the hybrid terrain was required to exhibit the following characteristics:

present the scenario on one geography to ensure one COP, create an environment that supports both live and virtual action, create a world that is NATO releasable, use data from real-world databases/sources.

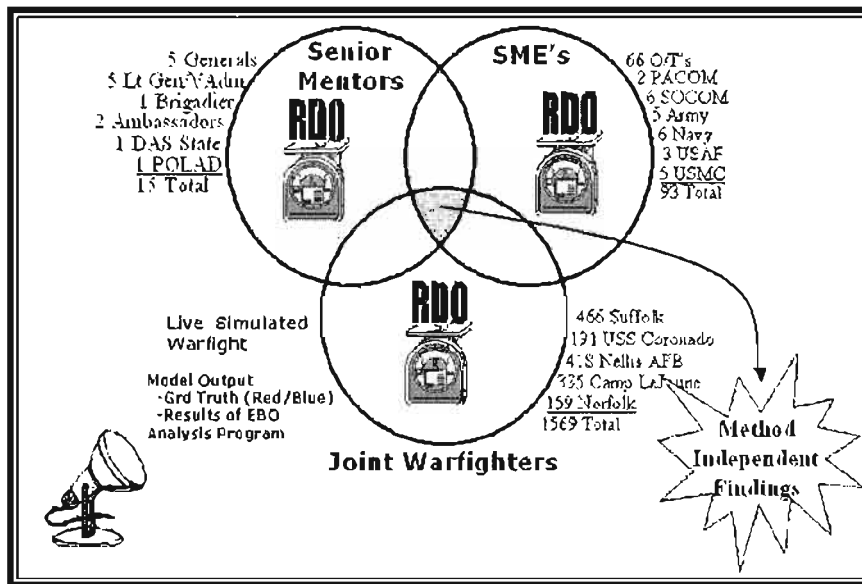


Figure 14: MC02 Assessment Methodology

Several special MC02 products including terrain, elevation, bathymetric and map data supplemented the real-world map and terrain products, were developed to support use of the hybrid terrain.

### Experiment Execution — Data Collection and Assessment

The data collection and assessment plan for MC02 was developed to support the concepts and objectives investigated in MC02. The comprehensive JFCOM Experiment Analysis Plan (JEAP) documents the plan for assessing MC02 and provides an overview of the intent, scope, concept, and methodology for that assessment.

A key element of the plan was the breadth and depth of the available data sources. A significant amount of quantitative data was collected from the experimental C<sup>4</sup>I systems, the modeling and simulation federation, and the CIE. This data has provided a basis for the in-depth analysis presented in Chapter 7. This analysis is further supported by robust qualitative data from senior mentors, trained subject matter experts, and warfighters (See Figure 14).

Senior mentor's provided input at daily, warfighting challenge-focused seminars, through direct participation in three facilitated after-action reviews during the experiment, and by submission of a comprehensive, consolidated report at the end of the experiment. SMEs, embedded in each headquarters, provided structured observations and responded to analyst-developed surveys. Military participants responded to targeted surveys and submitted unsolicited comments and observations that allowed them to discuss experiment concepts and objectives from the perspective of their position and experience.



## **Chapter 6 — Assumptions and Limitations**

MC02 was an extraordinary event, unlike any previously undertaken at JFCOM. It combined real world and simulated forces and it combined training and experimentation requirements. Beyond this, MC02 included both technological and intellectual challenges, which required leading edge solutions. Above all else, the MC02 experiment sought to replicate warfare—a daunting task.

Two key documents established the basis for the conduct of MC02.

Floyd D. Spence National Defense Authorization Act for FY2001 (Public Law 106-398):

“The Secretary of Defense shall carry out a joint field experiment in fiscal year 2002. The Secretary shall ensure that the planning for the joint field experiment is carried out in fiscal year 2001. The purpose of the joint field experiment is to explore critical warfighting challenges at the operational level of war that will confront United States joint military forces after 2010. The joint field experiment shall involve elements of the Army, Navy, Marine Corps, and Air Force, and shall include special operations forces. The forces designated to participate in the joint field experiment shall exemplify the concepts for organization, equipment, and doctrine that are conceived for the forces after 2010 under Joint Vision 2010 and Joint Vision 2020 (issued by the Joint Chiefs of Staff) and the current vision statements of the Chief of Staff of the Army, the Chief of Naval Operations, the Commandant of the Marine Corps, and the Chief of Staff of the Air Force, including the following concepts: (A) Army - “Medium Weight Brigades,” (B) Navy - “Forward-From-The-Sea,” (C) Air Force - “Expeditionary Aerospace Forces.”

Report from the Secretary of Defense to Congress pursuant to Floyd D. Spence National Defense Authorization Act of FY2001:

“MC02 is designed to examine some key operational capabilities of the future forces of the Army, Navy, Marine Corps, Air Force, and U.S. Special Operations Command (USSOCOM) within a joint warfighting context against an adaptive, competent adversary set in the year 2007. The experiment will yield doctrinal, organizational, and technological insights for potential changes to future concepts and capabilities that will ensure our qualitative advantages over potential regional adversaries in 2010 and beyond.

“The overall objective of this joint experiment is to examine the extent to which the joint force will be able to implement the primary concepts of JV 2020 (dominant maneuver, precision engagement, full dimensional protection, and focused logistics) by conducting Rapid Decisive Operations (RDO) within this decade. MC02 also serves as the primary venue to examine two additional considerations. The first is to provide the Services and USSOCOM a joint operational-level context in which they can develop future core competencies and secondly to determine how well the future joint force can actually work together. Improving the operational-level interoperability of future joint forces is a critical objective of our overall joint experimentation campaign and MC02 specifically.

“The central warfighting problem that MC02 will address is to determine how our joint forces of 2007 can conduct RDO in a matter of days and weeks rather than months against an adaptive, advanced adversary who possesses the capability and will to defeat U.S. Joint Forces.

The context for the scenario is at the high-end level of a small-scale contingency where tensions teeter on the verge of escalating into a major theater war if the adversary is not defeated.”

### **MC02 Assumptions**

During the planning and execution of MC02, assumptions were made that could have an impact on the conduct of the experiment and resulting analyses.

#### General Assumptions —

- Personnel assigned to the OPFOR, JTF and functional component commands would have the requisite education, training and experience necessary to perform their duties
- Warfighters understand knowledge management to include business rules, what knowledge should be managed and how to use management tools
- Sufficient training would be available to assigned personnel to allow them to become familiar with the concepts and tools to be used during the experiment

#### Scenario Assumptions —

- D-I-E efforts during pre-hostilities phases would not prevent crisis escalation to a state of war
- Neither JTF, nor OPFOR would be allowed to employ WMD during conduct of the experiment
- Scenario would not allow escalation to a major theater war
- JTF and OPFOR equipment and forces would represent the technology and capabilities expected to be available to them in 2007
- An adaptive adversary would provide the JTF with a determined 2007 enemy

#### JTF Assumptions—

- All operations would be unimpeded by real-world meteorological events
- JRSOI would be completed within 48 hours after arrival
- Real-world constraints were not experienced or imposed on JRSOI
- JTF would have unhindered access to local and national ISR assets
- JTF would have unimpeded access to the JOA

#### OPFOR Assumptions —

- OPFOR would be allowed to operate freely within the constraints of the scenario, the appropriate tactics, given the situation, its goals and the persona written for the OPFOR players
- OPFOR would be able to maintain communications with his forces and allies throughout the experiment using non-standard, non-electronic methods such as: couriers, smoke, flags and religious sermons
- OPFOR would have the capability and resources available to ascertain JTF satellite operating/coverage windows
- OPFOR would be allowed to covertly mine the shipping lanes prior to MC02 execution
- OPFOR attacks on commercial shipping as well as civilian populations in neighboring states would escalate throughout the scenario

#### Technological (Models and Simulations) Assumptions —

## U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

- A virtual landmass in California and Nevada linked to a geo-political database, to emulate real-world reach-back capabilities, could be created (Hybrid Terrain Model) to establish real-world, anti-access conditions against a capable adversary
- Live and simulated forces can be translated and integrated into a common operational level, virtually replicated, real-world battlespace
- Federation of models and simulations could provide the requisite fidelity for the conduct of the experiment

### **MC02 Limitations**

During the planning, execution, and analysis phases of the experiment, all of the qualities and requirements of MC02 needed to be united to meet the experiment objectives. The result was the existence of a recognized set of limitations that could influence the conduct of the experiment and the validity of the results. Some limitations were the result of existing technical shortfalls. Others, sometimes referred to as delimiters, were intentionally set to produce specific opportunities to explore the concepts and meet the experiment objectives. Still other limitations were used to balance and prioritize diverse requirements. Consequently, limitations themselves did not always indicate a negative impact on the validity of the experimental findings.

These comprehensive limitations area focal point of this report:

- MC02 was a single, one-time experiment without multiple trials
- MC02 placed a high reliance on the outcome of adjudication, particularly for soft effects
- “Actors,” albeit knowledgeable actors, role-played opposing forces
- Differences existed between the actual concepts and the way they were operationalized in the experiment

The first three of these limitations exemplify the difficulty of replicating warfare in an experimentation environment. The fourth one is unique and is included for its high relevance in assessing the value of the concepts. Ideally, the concepts would have been applied within the experiment exactly as the concept developers envisioned them. However, since these futuristic concepts often are ahead of available technology, surrogate systems were used to replicate required concept capabilities, even though such systems may depart from the exact intent of the concepts.

Other similar departures are the result of varying degrees of maturity for each of the concepts. For the less-developed concepts, MC02 represented a unique and valuable learning opportunity that knowingly would affect their subsequent assessment. Thus, the assessment of the individual concepts is relative to the degree to which they were accurately applied in the experiment.

Participants, analysts, and experiment controllers worked within these specific imitations:

#### **Scenario Limitations —**

The MC02 scenario was built deliberately to represent a future warfighting scenario, including time frame, threat, and corresponding geographic area. To that end, these scenario limitations were applied during the experiment to meet experiment objectives:

- Multi-national coalition military forces were not included
- Escalation to use of weapons of mass destruction was not allowed
- The use of a year 2007 scenario prevented the use of a “true” baseline

## U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

- Weather was not permitted to disrupt operations
- A hybrid, mixing of geographical regions, terrain was used
- Manually generated key events extracted from the master events scenario list were used to stimulate force actions

### Experiment Design Limitations —

- Simulations were used to replicate force movements, systems, and engagements
- Individual simulations had varying degrees of functionality and their output had varying degrees of fidelity
- Surrogate systems were used to replicate required concept system capabilities
- The JTF's experimental command and control network was a self contained and isolated network
- The OPFOR command headquarters staff was not robustly staffed
- The OPFOR command and control network was not completely replicated
- Combatant commander, other agency and reach back organizations were minimally staffed
- Timelines associated with the employment of real world forces had to be adhered to
- Assessors used some intrusive means to collect data
- Human adjudication of simulation results was required
- Participant training and knowledge of the concepts was less than could be expected upon fielding of the concepts
- JECG exercised selective control over opposition force activities

### Concept Limitations —

For the duration of MC02, the concepts were employed at varying degrees of development. In addition, certain concepts required the use of specific, yet-to-be-developed tools. Thus, resulting concept limitations included:

- A Joint Task Force and specifically a JTF headquarters perspective dominated the assessment of the concepts
- The CIE did not include decision support tools to the degree the concept envisions, open source information was not readily available and reach-back to centers of excellence and knowledge sources was limited
- The ONA tool was marginally populated with information at the beginning of the experiment
- Effects generated as part of JTF's Effects-Based Operations might not be recognizable within the time frame of the experiment

## Chapter 7 — The Findings



Figure 15: The Army's newest fighting vehicle, The STRYKER got a workout during MC02

## Assessment Area 1 — Establish and Maintain Information Superiority (IS)

### Overall Assessment Results

*“Know your enemy and know yourself and you can fight a hundred battles without disaster.” Sun Tzu*

Establishing and maintaining Information Superiority was one of the five MC02 objectives. Achievement of this objective was identified as being necessary for the JTF to conduct Rapid Decisive Operations.

Experiment results indicate that the JTF established and maintained Information Superiority in the form of superior information reach and richness. This superiority was established and maintained over the OPFOR except during the period of an adversary surprise attack and during an amphibious landing. This finding, while in part subjective, can be substantially validated. This conclusion is further supported by the JTF’s demonstrated ability to conduct continuous operations. Achievement of this objective is viewed as a requirement for RDO.

To be effective, military commanders must be able to understand, decide, and act. The ability to disseminate timely and accurate information, such as the Commander’s Intent, through a collaborative information environment significantly enhanced these actions. This was a primary factor in advantageously positioning the JTF with respect to information. Figure 16 illustrates the perceived relative informational positions of the JTF and opposing forces, JTF-South. This advantageous position supported the execution of RDO. Rapidity of operations was derived from the ability to execute rapid planning in response to a changing operational environment. Decisiveness was fostered using shared awareness and shared understanding to the degree that synchronization of forces could occur. These capabilities were most visible during the JTF’s island operations. In that instance, the planning process was initiated when the CJTF disseminated his intent to the JTF staff and components during a collaborative session. This session, which was supported by the collaborative tool, produced shared awareness and understanding with respect to CJTF intent. This session formed the foundation for the subsequent rapid planning. This foundation consisted primarily of accurate and dispersed information. Leveraging the same collaboration tool, the JTF and component planners were able to execute a planning process for a relatively complex joint operation in 24 hours. The plan, consisting of synchronized use of force, was successfully executed in the simulated environment.

Of specific and special value was the ability of the JTF staff to provide the CJTF with appropriate information and a very high confidence level that he understood “the situation.” A high level of confidence is a prerequisite for rapid, timely, and sound decision-making.

Across the participants, subject matter experts, and senior concept developers (SCDs), there was consensus that, of the experimental concepts, the CIE contributed the most to

### Overall Assessment Results

- JTF established and maintained IS...
- RDO information requirements met ...
- CIE primary factor in successful info dissemination...
- Collaborative sessions produced shared awareness...
- Provided the CJTF with appropriate information at a very high confidence level...
- CIE contributed the most to achieving and maintaining IS...

achieving and maintaining IS. Figure 17 depicts the JTF perspective on the contribution of the CIE to achieving IS. Additional supporting evidence is contained within the findings.

Both warfighting challenges associated with the Information Superiority objective were sufficiently addressed and achieved. Of note, the ability to provide a high level of situational awareness with respect to own force intent in a changing operational environment was demonstrated.

**Methodology**

No specific conceptual process was intended to be a panacea for the achievement of Information Superiority. Instead, the concepts in total, their supporting surrogate systems, and a set of standard processes would contribute synergistically to the result. The Collaborative Information Environment, Operational Net Assessment, Standing Joint Force Headquarters, Joint Interagency Coordination Group, and Joint Intelligence Surveillance and Reconnaissance concepts were recognized as probable contributors to achieving Information Superiority.

To assess the achievement of Information Superiority, analysts working with concept developers identified two Warfighting Challenges. Each addressed basic functionalities that were relevant to the concepts and surrogate tools. These functionalities were developed from the USJFCOM concepts of CIE; Joint Interactive Planning (JIP); and CROP; existing Information Superiority definitions; and, later from DoD Command and Control Research Program (CCRP) publication, *Understanding Information Age Warfare*, published in September, 2001. A central theme in the assessment of this objective became the paradigm that shared information leads to shared awareness, which contributes to collaboration leading to synchronization of forces on the battlefield. This theme would be used to mitigate problems associated with evaluating the quality of JTF-S information and retain a disciplined assessment process.

Analysts, working with the concept developers, then separated the warfighting challenges into supporting tasks and subtasks. At the task and subtask levels, appropriate data requirements were developed against which experimental data could be collected. This effort was finalized in the form of a data collection matrix that contained all the necessary information to support the data collection plan.

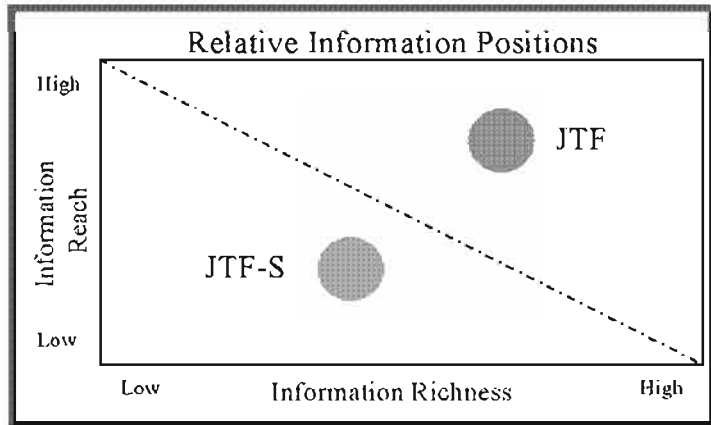


Figure 16: Relative information position

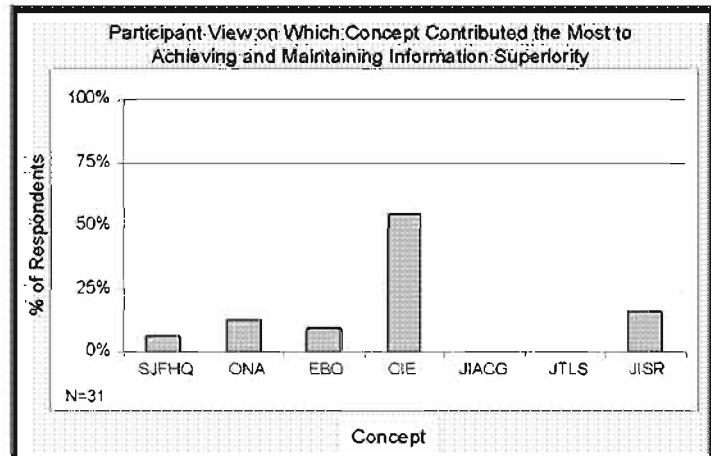


Figure 17: Participant View on Concept Contribution

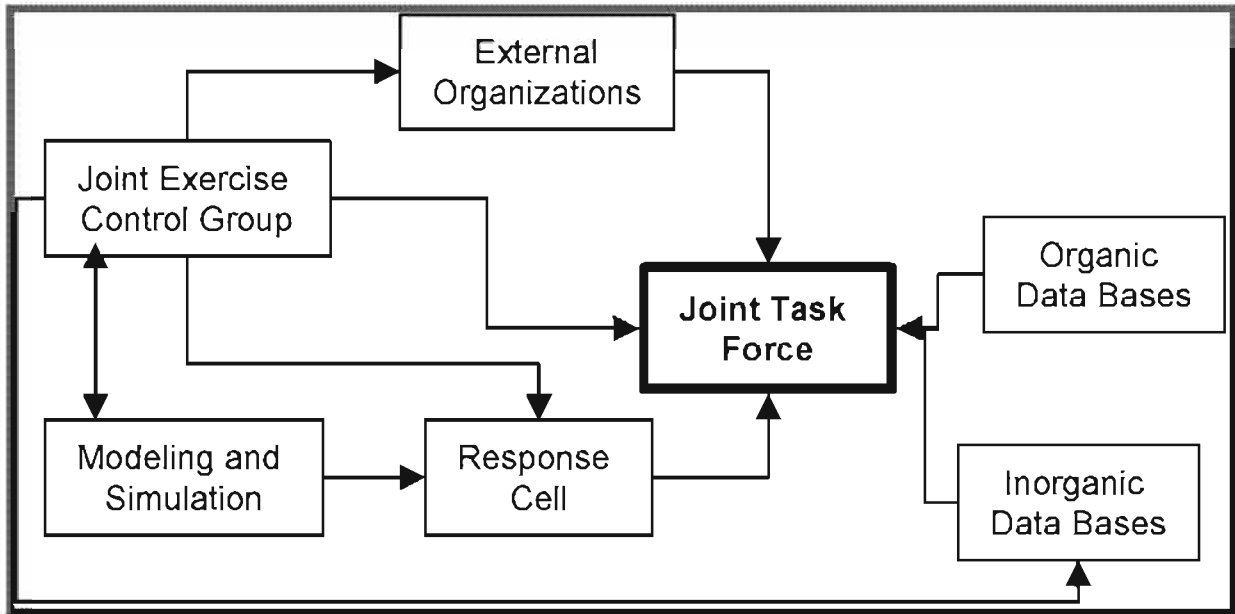


Figure 18: Experimentation Information Flow into the Joint Task Force

Data was collected from five primary sources: participant surveys, subject matter expert surveys, senior concept developer input, post-experiment interviews with participants, and electronic data captured from IWS logs, e-mail logs, results from the digital collection analysis and review system (DCARS) and web trend results. Figure 18 depicts the flow of information into the JTF during the experiment. These flow paths were part of the experimental design. It should be noted that the JECG was instrumental, and active, in determining the quantity and quality of information reaching the JTF.

Equivalent information flow paths existed for the opposition forces, JTF-S. The JECG was also active in restricting or directing participant actions as part of its control and adjudication functions. Other assessment constraints included actual JECG and modeling and simulation capabilities. These constraints caused periodic artificialities in the quantity and

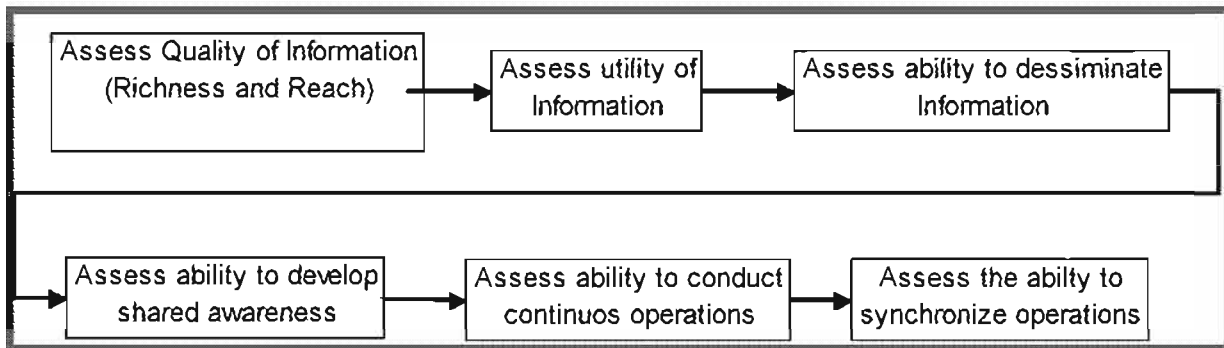


Figure 19: Information Superiority assessment process

quality of information provided to the participants. A final constraint was JTF-S did not use real-world systems for command and control. This was monitored and compensated for by JECG. Compensation methods included built-in delays between receipt of orders and actual CJTF-S



force movements. It was within this context that the achievement of Information Superiority was assessed.

Due to the above constraints, it was not feasible to assess the quality and attributes of CJTF-S information. Consequently, a direct comparison of JTF information levels to CJTF-S information levels or their respective informational needs was not feasible. In place of this, a focus was placed on assessing JTF information and the JTF's ability to use information to support operations. The resultant Information Superiority assessment process is shown in figure 19.

The final element of the assessment process was extracting data from the baseline, and comparing it to the MC02 results. These extractions are representative of traditional JTF problem areas relevant to the achievement of Information Superiority. The comparison identified gains and losses in JTF capabilities. Theoretically, these gains and losses would be attributable to the implementation of one or more of the concepts being assessed. However, the exact cause and effect relationships between concepts and changes in JTF capabilities or performance could not be identified due to the large number of concepts being assessed and the complex relationships between them.

The Information Superiority objective was broken down into two warfighting challenges. These were viewed as being relevant to demonstrating the potential impact of the experimental concepts and their importance in achieving and maintaining Information Superiority.

#### **Warfighting Challenge: Ability to provide situational awareness throughout the JTF**

The first of two warfighting challenges, which is identified above, involved the achievement of situational awareness, a product of information richness and reach. This challenge's two associated tasks and corresponding findings are listed below.

Task: Maintain and distribute a timely and accurate relevant integrated picture of JTF units, locations, status, and actions

Task: Determine and disseminate timely and accurate information on relevant adversary's operational capabilities, location, courses of action, and intentions

#### **Warfighting Challenge: Ability to use the CROP and collaboration to enhance JTF operations**

The second of two warfighting challenges, identified above, involved enhancement of JTF operations, an indirect product of collaboration and use of the CROP. This challenge's associated tasks and corresponding findings are listed below.

Task: Use information to prevent surprises by the adversary

Task: Use shared awareness and collaboration to maintain operational tempo

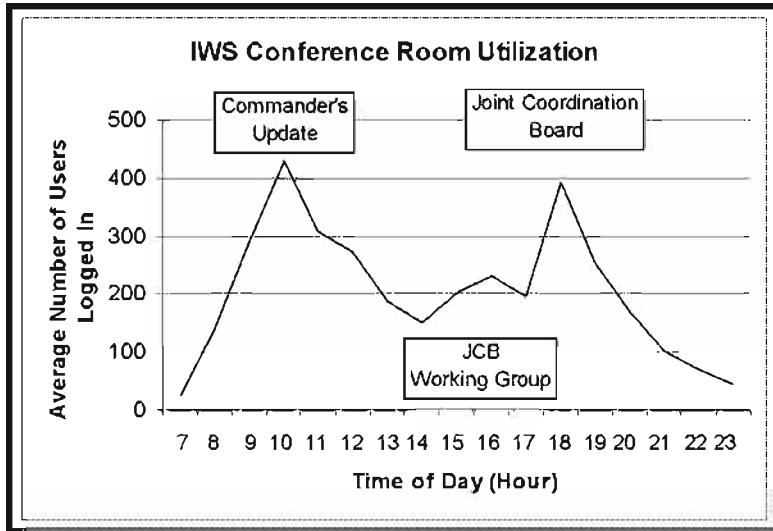
Task: Use shared awareness and collaboration to facilitate synchronization of forces

#### **Finding 1 ► As a result of operating in a CIE the CJTF was able to attain a high state of situational awareness.**

This finding results directly from specific CJTF comments describing his level of situational awareness and corroborating evidence. The CJTF firmly stated that the CIE ensured that his Commander's Intent "was distributed to his forces." Feedback from the same system

provided the CJTF with assurance that his intent was understood, and that follow-up actions, consistent with his intent, were occurring.

The result was that the CJTF, irrespective of any existing intelligence deficiencies or unknowns, was extremely confident that he understood the current state of his own forces and



the direction that they were heading. This knowledge provided him with a high level of confidence. The JTF's opinion was deemed accurate and was fully supported by the senior concept developers and subject matter experts. They further expanded this into the realm of decision superiority. They concluded decision superiority is a function of the commander's confidence in his staff and subordinate commanders. The CIE established the conditions to permit this. Not to be lost in this is the importance of the contributions to awareness

Figure 20: IWS Conference Room use described

made by the COP, which is residing in the CIE. This condition is specifically addressed in Assessment Area 9.

The two primary vehicles for the accurate dissemination of the JTF's intent and guidance were the daily commander's update briefing and the Joint Coordination Board. Each was a battle rhythm scheduled event, heavily attended by JTF members in the virtual environment created by

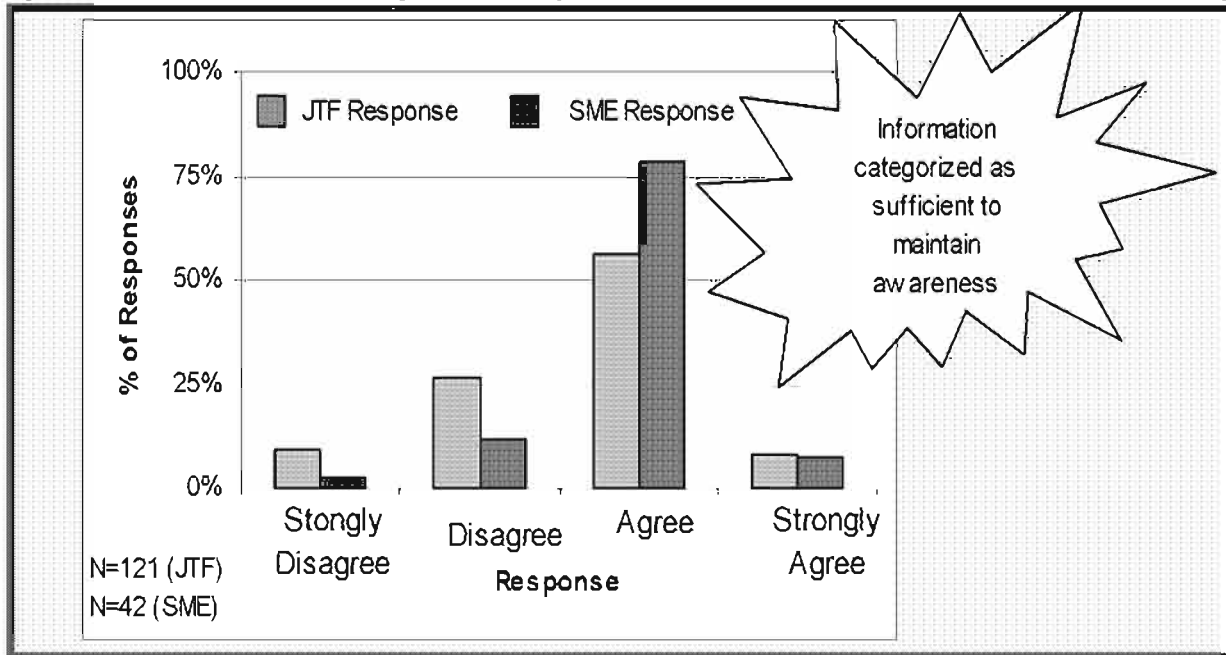


Figure 21: The information available in the CIE was sufficient to maintain a high level of awareness regarding both the friendly and enemy situations at all times.

IWS, the surrogate collaboration tool. JTF attendance for these events, shown in figure 20, confirmed the JTF’s opinion that his word was getting out. In addition, the JTF’s ability to broadcast was maintained when he physically departed the headquarters using the Joint En-route Mission Planning Rehearsal System – Near Term (JEMPRS-NT).

The investment in man-days, as depicted by the graph in figure 20, was the source of discussion among senior concept developers and participants. Two concerns arose; people needed time to think, and they needed time to work. Given the priceless nature of JTF’s situational awareness and understanding, this “cost” or one of similar magnitude is probably warranted. The CJTF thought the value gained outweighed the cost of the man-hours incurred by attending his collaborative sessions.

A representative cost in achieving the commander’s high state of situational awareness can be calculated in the form of JTF manhours expended in these briefings. A conservative application of the data, in which 50 percent of the users are non-JTF members, indicates a minimum of 50 eight-hour man-days per day, or based on a 12-hour experiment day, 33 man-days per day invested in these meetings. This level of effort was spread across the JTF HQ and component commands. It should be recognized that significantly more than just achievement of the JTF’s situational awareness was accomplished during these events.

Finally, further comments on decision superiority are warranted. It became evident during the experiment that decision superiority was a very important idea and that a process was needed for the JTF to assess its ability to make better, faster decisions as compared to those of the adversary.

From this, the senior concept developers’ notion, there emerged a recognized need to first address “knowledge readiness” and how it contributes to the idea of overall “decision superiority.”

**Finding 2► While operating in a CIE, the JTFHQ and component staffs were able to attain a high state of accurate and timely situational awareness.**

A critical piece of evidence that supports this finding is drawn from the previous finding. That is, if the JTF has an accurate, complete, and timely picture of the Commander’s Intent, then it has achieved a significant degree of situational awareness. The evidence that this occurred is included as part of the preceding finding.

Both the SMEs and the participants themselves support the finding. As shown in figure 21, both the JTF (64 percent) and the SMEs (85 percent) agreed that the information available in

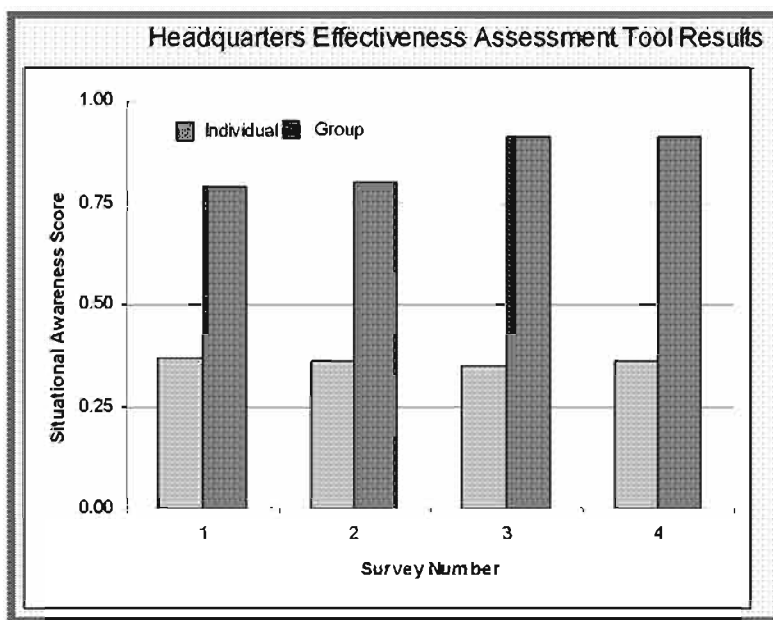


Figure 22: HQs effectiveness assessment tool results

the CIE was sufficiently rich with respect to quantity and quality to maintain a high level of awareness of both the friendly and enemy situations.

To substantiate that the data was sufficient to maintain situational awareness, analysts periodically examined the contents of the JCB and commanders update briefs for accuracy. Individual JTF members were also periodically queried on the situation during the experiment. The results indicated that the contents of the JCB and commanders briefs, shown as the group results in the figure 22, accurately reflected ground truth. The JTF was able to accurately portray the situation in these briefs. It had achieved a high state (>.75) of situational awareness.

The group results are relevant to this finding. The situational awareness scores for individuals are included because of what they might suggest. Individual situational awareness scores remained constant and were considerably lower than the group scores. Partial rationale for this is that JTF members focused their awareness on their specific functional areas and group situational awareness was achieved through the addition and integration of individual awareness levels, which was made possible by the CIE.

In addition, the graph suggests that the CJTF is in the best position and the one most likely, to achieve the maximum level of situation awareness. This afterthought supports the concept of commander-centric operations. The commander is in the best position to integrate the available information and achieve the highest awareness level. It is also the commander, who in all probability has the greatest experience; experience supports accurate decision-making.

**Finding 3 ► The increased visibility of information within the JTF produced an informal, but active information error detection and correction capability. ►**

By design, information contained or originating in the CIE was accessible to all members of the JTF and observation two corroborates that. In addition to and consistent with the design approach, JTF personnel were not procedurally constrained from accessing information. JTF personnel listened in to collaborative sessions not only when directed but also on their own accord. The viewing of CROP information outside of their immediate organization was similarly unconstrained. Consequently, information was extremely visible. Many individuals, each with his own perspective, were able to view and scrutinized large quantities of information. This had the effect of creating an informal information validation process.

An example of this occurred during a commander's daily update briefing that focused on the status of CJTF-S forces on several islands and is provided in figures 23 and 24. The text in each figure is copied from different IWS virtual locations, the JISC, and the INTEL rooms. The

|                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| JTFCOLLECTIONSOFF (4) (2:09:55 PM): JFMC: ADM "DELETED" just briefed that you all have indications of a "DELETED" radar on "LOCATION DELETED" Is this correct? |
| JFMopsIntel (2:10:19 PM): THAT IS CORRECT.                                                                                                                     |
| TFCOLLECTIONSOFF (4) (2:10:50 PM): What kind of report?                                                                                                        |
| JFMopsIntel (2:11:09 PM): "Report Type Deleted"                                                                                                                |
| JTFCOLLECTIONSOFF (4) (2:12:00 PM): Did you cue a "Deleted" asset to confirm presence of any other forces?                                                     |
| JFMopsIntel (2:12:34 PM): YES. A TST HAS ALSO BEEN SUBMITTED.                                                                                                  |

Figure 23: JISC Room Chat Text

meetings in these rooms were being held concurrent with, but independent of the commander's daily update briefing. The text reveals that the JTF collections officer was able to validate the

JFMCC's information concerning radar emissions by communicating with the JFM ops-intel and JTFRFIMAN within 59 seconds. Prior to this, the JTF collections officer's database did not include this relevant information and consequently he thought the new information might not be accurate. This information was then added to his database. Due to the transparency of the information databases, the JTF collections officer, while attending the commander's brief, was able to do this.

If developed further, this discovery could have important and favorable ramifications on

|                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| JTFCOLLECTIONSOFF (2:08:54 PM): JFMC: ADM "DELETED" just briefed that you all have indications of a "DELETED" radar on "LOCATION DELETED." Is this correct? |
| 2:11:59 PM: ANLISDEP is now in the chat session.                                                                                                            |
| JTFRFIMAN (2:13:44 PM): JTFCOLLECTIONSOFF—I know we received a "Deleted" hit from the islands                                                               |
| JTFCOLLECTIONSOFF (2:14:56 PM): Roger, I already confirmed with JFMC. They have established a TST there as well                                             |

Figure 24: Intel Room Chat Text

developing Information Superiority and on the ability to conduct operations in the information age. As future information requirements are met and the quantities of information exceed what might be astronomical numbers, an equally robust information validation capability is desirable. Many eyes emanating from uniquely different reference points and focused on the same piece of information, as was the case in MC02, provides a new means of validating information. If this technique can be formalized, harnessed, conceivably through training, then it may be of value. It is comparable to increasing the number of quality assurance inspectors peering over the production lines in a factory. Here, the product is information. Again if harnessed, the capability may hold value in determining what is the "truth."

**Finding 4** While operating in the collaborative environment the JTF was able to minimize, but not prevent, surprise attacks by opposing forces.

This finding is based on an instance in which the JTF did not have Information Superiority. At the end of Spiral 3, the planning phase of MC02, the JTF had identified the threat of a surprise attack by CJTF-S as the number one item on its' integration matrix. In fact, in the experiment CJTF-S did plan and execute a major preemptive attack against JTF forces. This attack ultimately caused the sinking of several JTF ships and became a primary source of controversy. Additional detail surrounding this surprise attack against the JTF includes both the CJTF and the JFMCC stating they thought the CJTF-S forces would conduct a preemptive attack. JFMCC had identified this JTF-S course of action in Spiral 3 and the CJTF, on the morning of the attack. After receiving the CJTF recognition of a high probability of attack, the JTF staff was unable to adequately validate JTF-S intentions in the short time frame, three hours, that it had available. At this point in the experiment, the JTF was still at the infancy stage in its ability to use the experimental C<sup>4</sup>I tools.

The controversy that ensued centered on shortfalls in experiment design and simulation capabilities. Examples include; a time lag in intelligence, surveillance, and reconnaissance information being forwarded to the JTF by the JECG early in the execution phase of the experiment, unrealistic response cell actions in particular the positioning of JTF ships and the actual attrition results produced by the simulations. Given these shortfalls, JECG adjudication

reduced the initial number of ships that the simulations had reported sunk to a level that would permit a less turbulent continuation of the experiment. In doing so, the JECG adjudication validated the surprise attack.

However, the result does warrant some further comment. CJTF-S stated that he chose to conduct the preemptive attack because he was (situationally) aware of the JTF's ability to conduct rapid and decisive operations. He calculated a preemptive attack as being his best course of action. This was the CJTF-S's dominant strategy, in that it produced his perceived highest probability of success. The concern is that a RDO capability will drive the decision process of opponents in other scenarios to the same conclusion. If this is the case then the relevancy of assured access should be elevated to mitigate the impact of an increase in the probability of preemptive attacks on JTF's conducting Rapid Decisive Operations. Furthermore, and with respect to achieving Information Superiority it may be wiser to achieve it prior to rather than during the execution of Rapid Decisive Operations. This would also tend to offset an increase in the probability of preemptive attacks on JTF's conducting Rapid Decisive Operations.

Following the events associated with the preemptive attack, the JTF was able to quickly adapt to its plans. This is the best indicator that the JTF had reduced its probability of being surprised. Of the 35 fragmentary orders (FRAGO) issued by the JTF, only one was the result of a "surprise," that being the previously discussed preemptive attack.

Furthermore, potential CJTF-S actions were always included as part of the Joint Coordination Board. A specific section of the brief was dedicated to this. The presentation methodology had the presenter role-playing the CJTF-S. During the briefs, the CJTF provided his view of what JTF-S's next actions would be. Predictions of JTF-S actions became commander-centric, which was facilitated by the CIE.

In total, the JTF continually attempted to prevent surprise by collaborating on potential future JTF-S actions. The CJTF, himself, was part of this collaboration process. The impact was a lack of reactive, JTF-S-induced, FRAGOs.

**Finding 5► The JTF was able to use shared awareness and collaboration to gain and maintain high operational tempo.**

During the experiment, the JTF was required to plan and execute operations that would generate seven different effects. The use of effects as opposed to missions, objectives, or tasks is consistent with the Effects-Based Operations concept. In addition, the combatant commander increased the scope of the initial JTF mission by requiring the JTF to resolve the threat posed by the weapons of mass effect. Senior concept developers considered the size and complexity of the resulting operations to be high relative to previous exercises.

In order to maintain operational tempo, the JTF used FRAGOs to refine the direction of the operation. Figure 25 shows the rate at which FRAGOs were issued and implicitly the responsiveness of the JTF. During operations, the JTF issued 37 FRAGOs. As mentioned previously only one FRAGO was reactive in nature. All others were attempts to maintain operational tempo in light of the emerging, daily, changes in the operational environment. The need for a FRAGO was normally identified during the daily, CIE enabled, meetings with the CJTF. Each FRAGO was then produced and disseminated within the CIE.

An example of this was the reprioritization of the effects listed in the Prioritized Effects List (PEL), in order to eliminate JTF-S's command and control capability. This action was done in response to indications that JTF-S was successfully commanding and controlling his forces.

**Finding 6** ► The JTF was able to use shared awareness and collaboration to synchronize its forces.

The strongest, and most easily depicted, evidence that synchronization of forces occurred was the JTF’s offensive operation against the islands on day D+12. In his summary, JFLCC, the supported commander for the operation, described the air portion of the operation as follows:

“We had a USMC air operations cell directing USAF and USN aircraft in support of USA ground operations.” This accomplishment was achieved because of a plan derived from a 12-hour collaborative planning session.

In addition to the specific incident cited above, participants and SMEs also acknowledged through survey results and comments that operations were synchronized. Perspectives on the degree to which synchronization was achieved were obtained using surveys.

The data is presented in a quantified format in figure 26. A direct method was used and it queried participants and SMEs as to what degree they believed synchronization occurred. The lines in the figure indicate these results. They show a level of synchronization that averages approximately .4 on a scale of minus 1, for conflicting, and a positive 1, for fully synchronized.

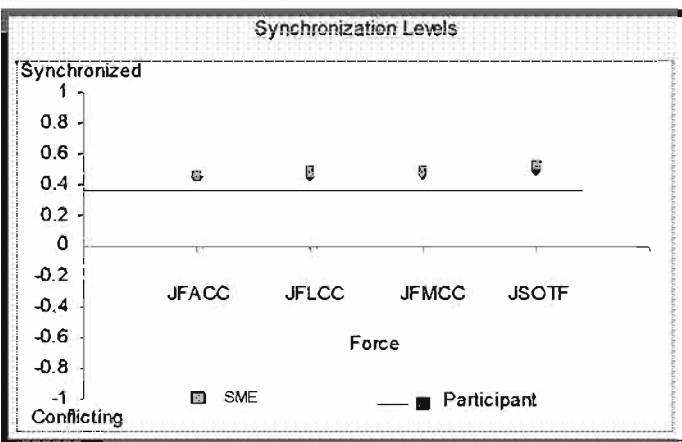


Figure 26: Synchronization levels

the conclusion that the tasks associated with the warfighting challenges were accomplished with the notable exception the task—being able to completely prevent surprise. The findings were derived from a mix of qualitative and quantitative data. The data suggests, that with less than perfect information, the JTF was able to aggressively share information, collaborate, maintain operational tempo and synchronize its forces. The evidence further indicates that these successes were inextricably linked to the capability provided by the CIE and most notably the collaboration

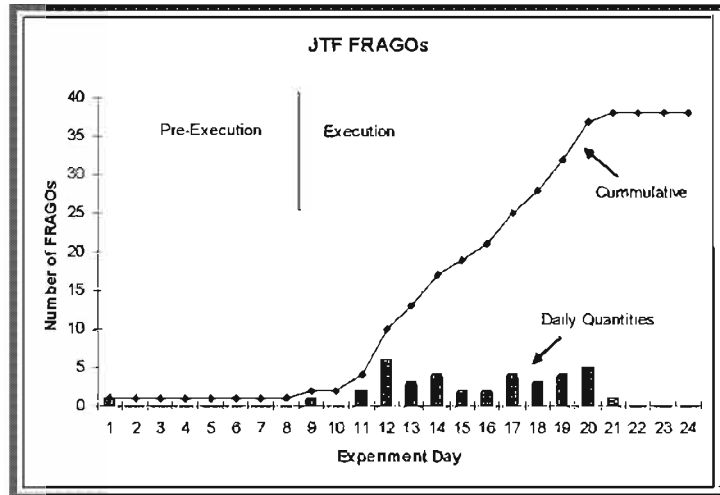


Figure 25: JTF FRAGO described in data reduction

SMEs were queried as to what degree each component was synchronized with the other components. A pair wise comparison was done with these results and they are shown as dots on the graph. These results show that synchronization occurred (value greater than 0), and that the level can be characterized as approximately 45 percent (.45 of 1.0) of maximum synchronization. Both methods produced nearly equal results and provide corroborating evidence that supports the JFLCC’s comments.

In summary, the findings support

capability. In turn, the warfighting challenges and the achievement and maintenance of the Information Superiority objective were met.

**Finding 7► Information requirements will grow with the adoption of EBO.**

The EBO concept requires the JTF to assess the achievement of effects. In performing this assessment function, information requirements not normally associated with traditional ISR operations and capabilities are likely to be encountered. As currently structured, this function is additive to existing battle damage assessment requirements. Effects assessment is difficult,

especially relating to the intangible nature of many effects such as information, economics, and social networks. Both senior concept developers and subject matter experts made these observations.

In today's information age, we have the opportunity to replace the inefficient application of mass that was based on uncertainty, to a more precise application of national power based on

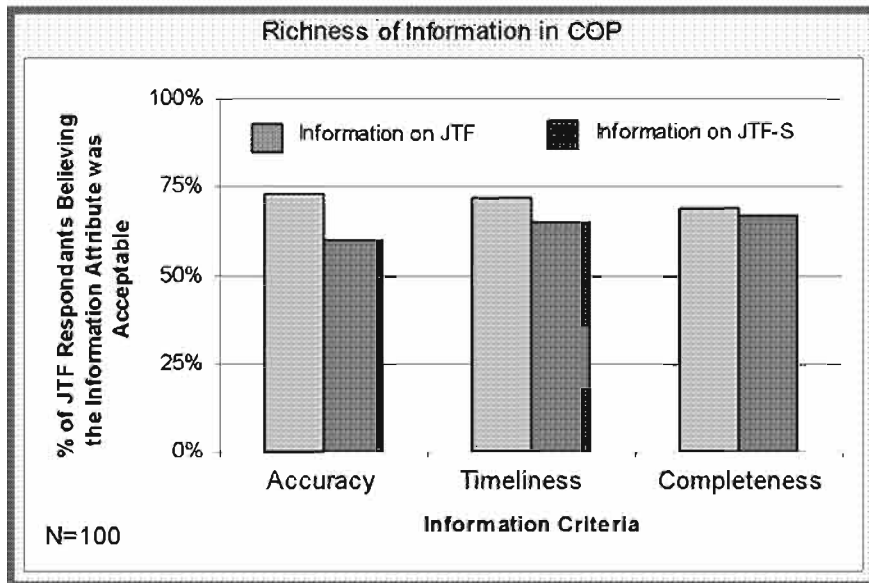


Figure 27: Richness of information in the COP, on both friend and foe, was considered acceptable by a majority of JTF staff members.

knowledge. Effects-Based Operations has the potential

to be the "operational art of the information age." It is apparent that with this will come additional demand for more information.

**Other Observations**

**Observation 1: Information provided to the JTF through surrogate systems used in the experiment was of sufficient richness to maintain an accurate and relevant integrated picture.**

The richness of the JTF's information was assessed using four primary criteria: accuracy, precision, timeliness, and relevancy. The participants and the subject matter experts provided the data relevant to this observation.

The primary information repositories examined were the experimental COP and the CROP. For purposes of simplicity, the COP equates to the window into the Global Command and Control System (GCCS), where friendly and opposing forces were displayed and tracked and the CROP was the web portal used by the JTF to post and display relevant information. Detailed descriptions of the COP and CROP can be found in the Collaborative Information Environment section of Chapter 3, Concepts. The richness of the information available within these systems was highly dependent on the quality of the data provided by originating sources such as Joint Intelligence Surveillance and Reconnaissance (JISR). The primary information dissemination system examined was a surrogate collaboration system, InfoWorkSpace (IWS) 2.5.



With respect to information accuracy, timeliness, and completeness participant views on the richness of JTF and JTF-S information contained within the COP, was characterized as acceptable by more than 60 percent of the respondents. This is shown in the preceding figure, figure 27. The implication is that the COP, even with surrogate systems, presented information at acceptable levels. This information was used primarily to monitor both friendly and hostile forces.

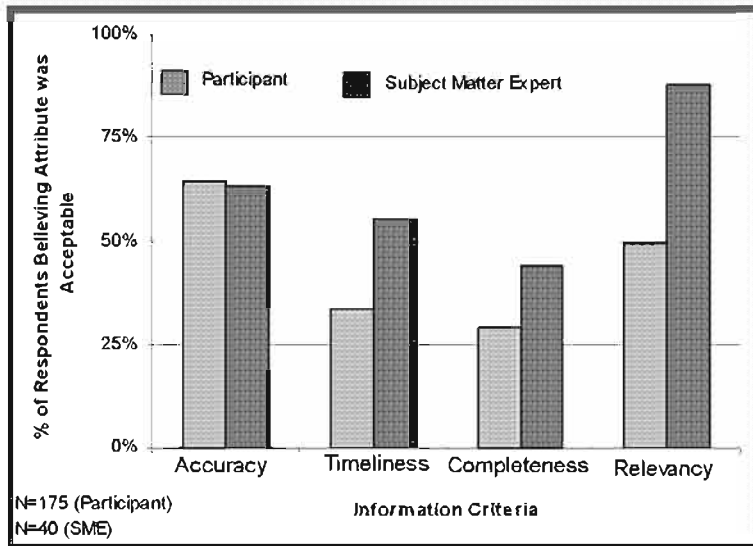


Figure 28: Richness of information in the CROP

Using similar criteria, as shown in figure 28, JTF information contained within the CROP, using as its surrogate SharePoint Portal Server, was characterized as being slightly less acceptable. On average, 44 percent found the information to be acceptable. The participant data revealed that the CROP information was not as timely or complete as

information contained within COP. However, as shown in the same figure, the SME perception of information in the CROP was higher. On average, 62 percent found it acceptable with respect to the criteria, with its relevancy being considered acceptable by more than 75 percent of the respondents. The combined information richness data for the COP and CROP reveals that the JTF did not have, or possibly could not find, all the information it desired, when it desired it. However, the surrogate systems did demonstrate a capability to meet the JTF's information

requirements. It can be expected that the overall richness of the information will improve as surrogate systems are replaced with production models and personnel become more adept at using the systems. The data in figure 29 is a soft indicator of this. It shows participants believed that the quality and quantity of information contained in the CROP improved as the experiment proceeded and suggests improvements in information quality are achievable.

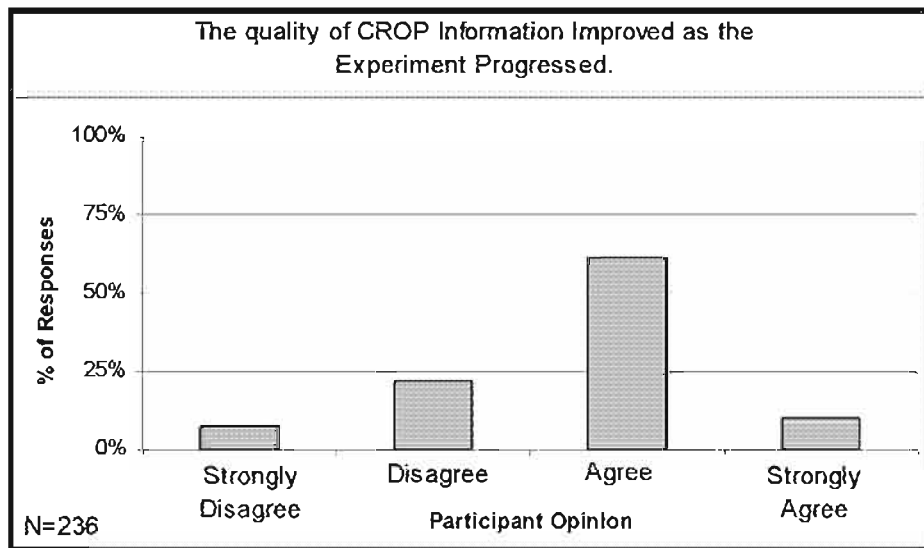


Figure 29: Most thought the quality of the CROP improved with time

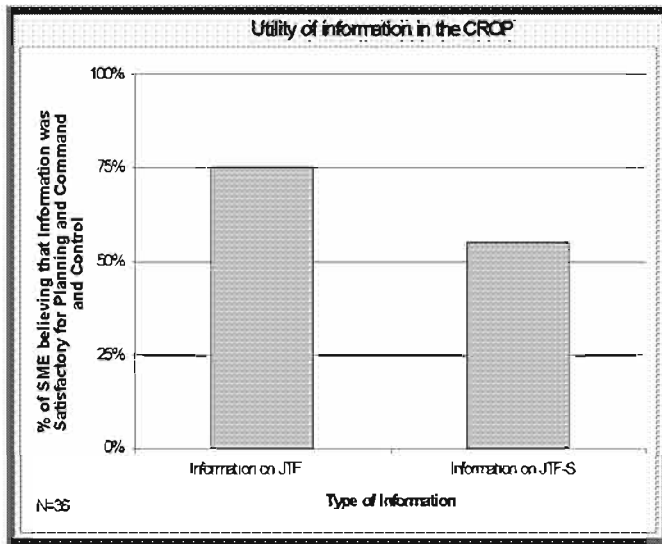


Figure 30: Utility of information in the CROP

To further assess the quality of the information, subject matter experts were asked to qualify the utility of the information with respect to the JTF’s planning and command and control functions. The results are shown in figure 30. Here, seventy-five percent of the subject matter experts believed that friendly force information contained in the CROP was adequate for planning and command and control, and 55 percent believed that opposing force information was adequate for the same functions.

In summary, information contained in the CROP and COP, while not perfect, was rich enough for the JTF to perform its primary functions.

**Observation 2: Information provided to the JTF through the surrogate systems had sufficient reach to distribute an integrated picture.**

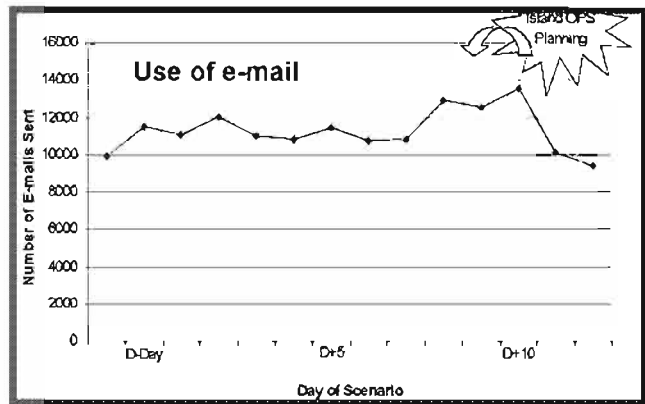
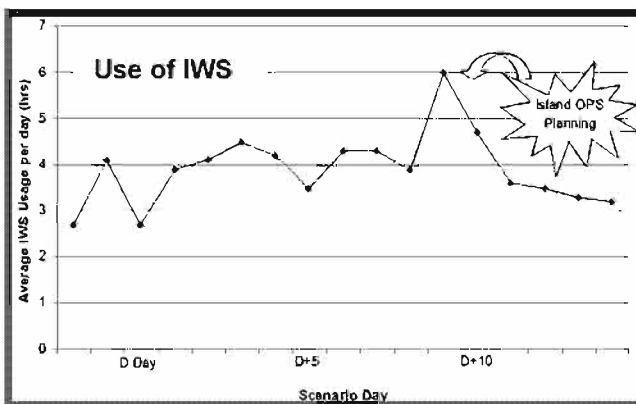


Figure 31 A & B: Participants’ use of IWS peaked during the Island Operations campaign (left), which corresponded with high levels of e-mail use, shown at right

The CIE and supporting surrogate systems used to disseminate information were designed to maximize connectivity and information accessibility. As shown in figure 32 the participants identified the collaboration system, IWS, and e-mail as their primary means of gaining access to information.

IWS provided synchronous information dissemination and access capabilities. E-mail provided the equivalent capabilities asynchronously. Both of these systems provided virtually unconstrained connectivity for JTF personnel and organizations. System reliability rates for both were high. Reach-back, communications outside of the JTF, was constrained by experimental design.

Usage rates of the two systems are depicted in the two figures 31A and 31B. The graphs demonstrate steady continuous use of and reliance on both systems. This supports the data contained in figure 32. A 53 percent increase in IWS usage occurred on days Day+10 and D+11.

This is reflective of the additional information needs necessitated by the requirement to plan for the island operations.

A 20 percent spike in e-mail usage was recorded for this same time frame. In total, the two systems provided a persistent means of communicating, moving information, across organizational and geographic boundaries during both high and low optempos.

Of special note is the difference in the size of the IWS and e-mail usage spikes during the planning for the island operations, days D+10, and 11. The 53 percent increase for IWS as opposed to the 20 percent increase for e-mail provides strong evidence that IWS was the primary planning tool for this operation. This conclusion is consistent with SME observations. Its significance cannot be understated as it validates the collaboration system, IWS, as a planning tool.

The use of data and the inherent capabilities of the two systems support the finding that the JTF was able to and did disseminate needed information widely and readily, with sufficient reach, across the JTF.

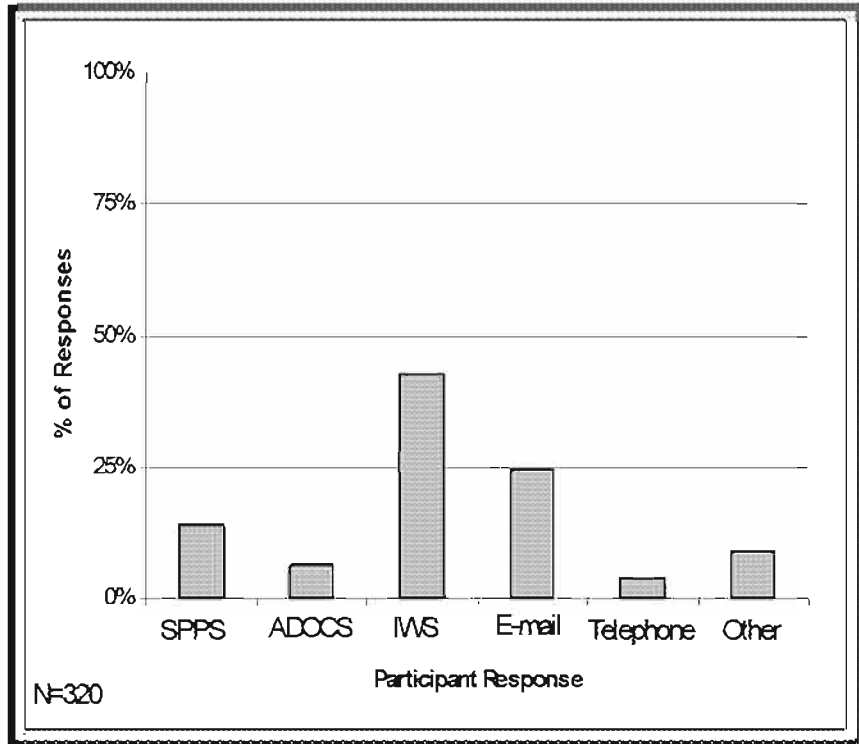


Figure 32: Tools, which provided the most useful information

**Observation 3: The JTF was unable to use the formal information validation process as described in the Knowledge Information Management Plan (KIMP) because it was not feasible.**

The KIMP provided a detailed process that was to be used by the JTF to qualify the reliability, currency, and completeness of information. This process was called the information confidence convention. Ideally, and in accordance with the KIMP, individual JTF members would individually qualify information that they had generated.

During senior concept developers meetings, discussions with the subject matter experts and post experiment interviews with the participants it was obvious that the information confidence convention was not used. Knowledge managers, a pivotal position for information assurance, described the proposed convention as impractical and too time consuming to implement. At times, it did not seem possible to validate specific information. In other cases, the relationship between reliability and currency became problematic. Everything gets old and the operating environment is dynamic. The JTF was not able to rectify the problem.

Senior concept developers validated the need for an information confidence mechanism. They noted that there were instances when bad information had been dispersed throughout the JTF. The potential for this to affect operations caused legitimate concern among the senior

concept developers. The logic behind their concern was that bad information was worse than no information. In summary, as we move further into the information age, and the quantity of information handled by the JTF grows, it is not feasible to assume information confidence levels can be assigned satisfactorily using a process that is primarily a manual process. This is not to say the process should not involve members of the JTF, but rather that the integrity of the process can not depend fully on the actions of individual JTF members because the quantity of information and the corresponding amount of effort required to perform the task is likely to be too high.

**Observation 4: There may be a conflict between the time required to gain the maximum benefit provided by an abundance of information and rapid operations.**

This observation was derived from senior concept developer comments. The rationale was that the maximum benefit of an abundance of relevant information could only be attained through deep reflective thought, which requires time. The JTF operational, rapid, tempo did not permit this. Although the exact speed at which operations are supposed to occur is not defined in minutes and hours by the RDO concept it implies faster is better. It should be recognized that “permitting” time for reflective thought is potentially counterproductive to “rapid” operations. The two may be at odds with each other. It is conceivable that the experiment environment contributed to or exacerbated the problem.

Nonetheless, this finding recognizes the physical limitations of the human mind. Implied within this finding is that the CIE was successful to such a degree that it may have outpaced the thinking capabilities of the JTF.

Suggested compensating actions included use of reach-back capabilities and incorporation of decision support tools. It is not clear to what degree these compensating actions will mitigate the problem, if one exists. Another alternative is the emergence of pattern recognition as the primary decision making process, as opposed to the classical approach of evaluating pros and cons, for rapid decisive operations. This points towards achievement of commander-centric operations as being critical, as it is the commander (minus information available through reach back), who has the most experience and will be best able to recognize patterns.

A key learning point when transitioning from a staff-centric operation to a commander-centric operation is the need for time to think. The concept of the battle rhythm was brought forward by the JTF because no one could conceive of operating any differently. What no one realized is that the current battle rhythm is focused on production (documents, plans, etc) where in a commander-centric operation, the focus should be on decisions, or at least informed discussions.

**Observation 5: Achievement and maintenance of Information Superiority in support of RDO is manpower intensive.**

There was considerable evidence that selected JTF members were “over worked” because of the combined requirements to participate in collaboration sessions and support planning and execution of operations. This cannot be overstated. However, survey results indicated that time spent in collaboration sessions favorably supported the completion of planning and operational tasks. There is a legitimate, but hard to understand dilemma. In addition, it should be noted “over worked” personnel are not conducive to knowledge-centric operations where alert minds are a valuable commodity.

Some of this effect could be mitigated using extensive reach-back capabilities. Additional solutions may reside in battle rhythm, staffing, and process changes. Resolution of this problem will be necessary to reliably execute Rapid Decisive Operations in a knowledge-centric organization.

### **Relationship to Other Objectives**

Other objectives associated with RDO were Setting Conditions, Assured Access, Effects-Based Operations, and Agile Sustainment. Joint Vision 2020 identifies those qualities associated with Information Superiority as precursors to and enablers of the desired capabilities of force protection, maneuver, fires, and logistics. A parallel relationship existed in the experiment between the Information Superiority objective and the four other experiment objectives. Information, preferably Information Superiority, was necessary to achieve the other objectives.

A controversial event in the experiment was the preemptive attack by JTF-S on the JTF. In spite of the controversy, this event provides insight into the relationship between Information Superiority and the objectives of setting conditions and assured access. Accurate information about the intent of CJTF-S was required to prevent or avoid the preemptive attack. Conversely, JTF-S did know that the JTF had a rapid and decisive operational capability. As stated by the CJTF-S, this was sufficient to influence his decision making process. His resultant decision was to conduct a preemptive attack. That attack occurred during the condition setting phase and placed access at risk. The preceding description of events is a brief but relevant portrayal of events.

The CJTF-S decision to conduct a preemptive attack is interesting in its own right with respect to Information Superiority and Rapid Decisive Operations. The implication is that a rapid and decisive operational capability, while potentially a deterrent to an adversary, provides the enemy with knowledge that he is currently vulnerable to imminent attack and defeat. This knowledge dictates that his dominant strategy will be to attack first. This provides him with the greatest, and perhaps only, possibility of winning.

### **Relationship to Concepts**

As previously shown, achievement of the Information Superiority objective was perceived to be attributable to the impact of multiple concepts. These concepts were the Collaborative Information Environment, which has been addressed; the Standing Joint Force Headquarters; Operational Net Assessment; Effects Based Operations; and Joint Intelligence, Surveillance, and Reconnaissance. Although not identified by the participants, other data identified the Joint Inter-Agency Coordination Group as an information source and consequently a contributor to the achievement of Information Superiority.

#### **Standing Joint Force Headquarters (SJFHQ)**

- The Standing Joint Force Headquarters supported objective achievement through the general military knowledge and regional specific knowledge of its members. It provided intellectual capital and advanced system operating skills required to function in a CIE. Evidence of each is provided in Assessment Area 6

#### **Operational Net Assessment (ONA)**

- The ONA concept was visible in the information domain primarily through the ONA tool. This tool resided in the collaborative information environment as a section of the JTF's CROP. The

ONA information added to the overall quantity and quality of information because it was fully integrated, and described the threat. This information was highly valued. However, during the experiment, the ONA information was intentionally designed to be accurate. This was done to facilitate experimentation of the ONA process. This created an "input equaled output" result. The true impact of the ONA on establishing Information Superiority would be heavily dependent on the ability to accurately identify the cause and effect relationships contained in the database. A senior concept developer stated that, "ONA-like processes have an insatiable appetite for information." This observation is consistent with existing literature that describes building databases for complex, nonlinear problems, such as determining cause and effect relationships, as being extremely resource intensive in order to make it accurate. While it is envisioned that the ONA database would be developed prior to JTF operations and maintained at the combatant commander level, there is potential for the ONA to generate additional information requirements on the JTF. The difficulty experienced during the experiment in maintaining the database provides some evidence to this accord

#### Effects-Based Operations (EBO)

- EBO was identified as a contributor to the achievement of the Information Superiority objective, based on its ability to facilitate integration of information operations with kinetic operations. It is a very desirable capability, and one that is very relevant to achieving Information Superiority. However, the quality of information operation in MC02 was considered less than desirable. The most visible insight into the impact of EBO was the probable increase in the level of information required in order to assess effects. During the experiment, sufficient numbers and types of ISR assets existed to meet stated surveillance requirements. Consequently, JISR capabilities were not stressed and the full impact of effects assessment on information requirements could not be determined

#### Joint Intelligence Surveillance and Reconnaissance (JISR)

- JISR is an integral part of the achievement of Information Superiority. It is a primary source of information pertaining to the threat. Any improvements in JISR operations would favorably effect objective achievement. During the experiment, JISR operations were conducted under multiple experiment design and JECG induced constraints, most notably were the abundance of JISR assets and JECG deficiencies in supplying the JTF with timely information, specifically during the initial days of the experiment. The JISR concept is discussed in Assessment Area 13

#### Joint Inter-Agency Coordination Group (JIACG)

- The JIACG operated within the collaborative environment. It provided required information to the JTF as necessary and supplemented it with a different perspective. Each had value in objective achievement

- The most visible contribution came in support of planning for transition operations. This was significant because it filled a recognized information void. The void exists because little emphasis has been placed on transition operations in joint training programs. This is true even though problems associated with transition are well documented. The result was a transition plan, judged to be of a higher quality than previously produced joint exercise plans

Joint Theater Logistics Management (JTLM)

- Participants did not identify JTLM as a contributor to achievement of this objective. Logistics operations benefited from unconstrained access to planning and operational information. In turn, this supported JTF flexibility and readiness. Additionally the logistics CROP was identified as being the most robust and customer orientated

**Relationship to Baseline Analysis**

Experimental observations compared favorably to the baseline findings.

- High profile difference between the baseline findings and the experiment observations are that the emergence of knowledge management as a more effective information dissemination capability was achieved in the experiment. In addition, a greater reliance was placed on individual skills and initiative in the experiment (See Table 6)

Table 6: Selected baseline findings and corresponding observations

| Baseline Finding                                                                                                                                                                                                                                                                                                                                                                                                   | Experiment Observation                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IM is a critical element of successful JTF headquarters operations. That success depends on a well developed IMP and a capable IMO. The inverse is also indicated; JTF staffs struggle when the IMP and/or the IMO are weak or lacking.                                                                                                                                                                            | Knowledge Management has been added as a critical element for successful JTF headquarters operations. Success is probably related to a well developed KIMP and dependent upon skilled Knowledge Management Officers (KMO) and skills and initiative of individual JTF members.                                                                                         |
| Having all commanders at a single meeting for back-briefs facilitated cross-component understanding of each other's plans, and identified cross-component coordination and interoperability issues.                                                                                                                                                                                                                | This was done routinely with commanders at distributed HQs using IWS, with the same result.                                                                                                                                                                                                                                                                            |
| "The extraordinary success that the JTF experienced in handling, analyzing, and providing critical information to the commander can be attributed to four key factors: commonly understood IM processes, employment of a JTF Homepage, accessibility of the commander, and a manageable RFI process."                                                                                                              | Of the four key factors, three of them were improved or expanded upon: the JTF homepage in the form of the SPPS portals, accessibility to the commander, and the RFI process. The contents and process described in the KIMP were not commonly understood. The processes associated with the CIE were commonly understood.                                             |
| The task of disseminating information is difficult even when all conditions are met. Rapid advances in, and unfamiliarity with, available technology often cause information to be misrouted or inaccessible, which may result in required actions not being taken. When using web-based technology for disseminating information, it is necessary to ensure that the data is not buried too deeply in the system. | The task of disseminating information was not difficult. In general, technology did not cause information to become inaccessible; the opposite was true. In cases where it was inaccessible, it was due to a lack of a discipline in storing information. It was still necessary to ensure data was not buried too deeply. The search functions did not overcome this. |
| "Initially, information was difficult to locate on the Homepage. Many documents were filed within the file structure of the originating staff, rather than under a topical label. For instance, the exercise IMP was filed on the exercise Homepage under J3 Current Operations, instead of under IMP. For staff members who                                                                                       | No change, the same basic problem was observed.                                                                                                                                                                                                                                                                                                                        |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Baseline Finding                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Experiment Observation                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| did not know the origin of documents, it took considerable time to locate them."                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                   |
| "Worthy of specific note was the command emphasis on IM. At the outset, the commander emphasized his concern for accessing critical decision-making information from the anticipated vast accumulation of general information and data. His guidance was clear - the Homepage should not become a huge and cumbersome electronic filing cabinet.                                                                                                                                               | No equivalent command emphasis was placed on KM; it was placed on collaboration. No worries were observed with regard to a "vast collection of data."                                                                                                                                                                                                             |
| JTF information managers had to constantly review, evaluate, and prioritize information on the web pages to ensure that information was current and not buried under layers of directories.                                                                                                                                                                                                                                                                                                    | No change. In addition, the JTF KM organization was heavily burdened with maintaining the systems. This interfered with the ability to execute the described process. Individual JTF members were responsible for these actions as well. The JTF KM organizations were not resourced with standard tools to execute the review, evaluate, and prioritize process. |
| Web-based technology does not replace active command and control (C2).                                                                                                                                                                                                                                                                                                                                                                                                                         | No change with respect to Web-based technology. The collaboration system did effectively support and supplement command and control.                                                                                                                                                                                                                              |
| Access and security issues also hinder execution of a good IMP. In exercises and operations that include allies and coalition partners, problems often arise with gaining access to U.S. systems.                                                                                                                                                                                                                                                                                              | This problem was not encountered in the experiment because allies and coalition partners were not part of the experiment. There was no indication that this challenge would be overcome by adoption of the concepts.                                                                                                                                              |
| IW activities were accomplished in the J3Command and Control Warfare (C2W) cell. As course of action (COA) development preceded, the commander decided to form another organization to address IW. He had several options: 1) form a J3IW element as part of the Operations Directorate; 2) create a Joint (J) (IW) Directorate on a par with the other "J" codes; 3) form functional component Joint Information Warfare Centers (JIWC); 4) create a Joint Information Warfare Center (JIWC). | The JTF experienced similar problems in developing and integrating information warfare operations.                                                                                                                                                                                                                                                                |
| Boards, centers, cells, and agencies placed a heavy time demand on the JTF staff, in some cases becoming counterproductive.                                                                                                                                                                                                                                                                                                                                                                    | No change.                                                                                                                                                                                                                                                                                                                                                        |

**DOTMLPF Linkage**

- This Information Superiority assessment area supports on-going DOTMLPF CIE submissions, specifically those related to fielding a collaboration system. It demonstrates significant value in using an XC<sup>4</sup>I-like system for the development of CJTF and JTF situational awareness and use of the systems is consistent with information age operational needs. It also points out that there is a need to further refine, the CIE technology (M), and realign the training (T) and education (L)



of our military personnel (P) in order to better prepare them to serve in an information age environment

## **Recommendations**

1. DoD, immediately select a common collaborative capability (including JEMPRS-NT) for use as an interim joint command and control tool. Concurrently, USJFCOM, supported by unified commanders, Services and other agencies, develop a joint C<sup>4</sup>I architecture for the purposes of merging the two efforts for the fielding of a DoD-wide collaborative information environment by 2005. ►

- CIE, in particular the collaborative tool, empowered the JTF by enhancing open dialogue, compressing the decision-making process and decision to action cycle. The CIE allowed the combatant command headquarters, the JTF headquarters and the components to share information and ideas both horizontally (across components) and vertically (from the components, through the JTF to the combatant command staff), resulting in dramatically reduced planning timelines and enhanced organizational effectiveness. During MC02, the CIE allowed command guidance and intent to be better and more simultaneously understood at all echelons within the environment. It allowed the commander to maintain continuous participation in the collaborative environment while moving from one location to another. The ability to collaborate in real time enhanced trust and confidence across the JTF's organizations. The CIE significantly empowered the important relationships that underlie any organization. Thus, the focus and unity of effort that are usually resident only in very small groups was replicated at large geographic scales and across sizable organizations. This was a new and compelling phenomenon. Ultimately, the CIE allowed a more synchronous application of military capabilities, and was seen by participants as a "gold medal" winner of MC02.

- The collaborative information environment (CIE) used in MC02 was built as a coherently joint experimental C<sup>4</sup>I (XC<sup>4</sup>I) system that linked the knowledge and decision centers, such as the combatant command headquarters, the JTF and components, and external agencies. This XC<sup>4</sup>I system was a surrogate built using commercial (and government) off-the-shelf applications. It used high-speed bandwidth connectivity and electronic collaborative tools to facilitate rapid information sharing. XC<sup>4</sup>I was never intended to be fielded, but was exemplary of the technologies that could be quickly fielded. Consequently, DoD and USJFCOM must identify an effective and suitable collaboration system for fielding.

2. USJFCOM, in conjunction with the Services and other combatant commanders, work to redefine and document the meaning, relationships and importance of Information Superiority, information operations, decision superiority, knowledge superiority, knowledge readiness and commander centric operations so a commonly understood lexicon is developed. ►

- MC02 demonstrated that a gap in military readiness exists, as we enter and operate in the information age that prevents us from fully realizing the gains that might be achieved through transformation. Capitalizing on advances in information technology is pivotal to transformation. It is part of the reason we are transforming. Given this, it is imperative that we understand the intricacies and meaning of achieving Information Superiority. This begins with the basics, understanding of the meaning, relationships and importance of Information Superiority, information operations, decision superiority, knowledge superiority, knowledge readiness, and commander-centric operations. Each of these terms is relevant to operating effectively in the

information age. There is likely to be still yet more information age terms that appropriately can be added to the list.

- The military has not been completely void of addressing the issue. For example; the RDO concept defines decision superiority as: "The ability of the commander, based upon Information Superiority and situational understanding, to make effective decisions more rapidly than the adversary, thereby allowing him to dramatically increase the pace, coherence, and effectiveness of operations." Definitions for some of the other phrases also exist, but like the preceding one, they tend to be complex and often leave the reader asking, "How do you do that?" There is an overall lack of clarity and unanimity surrounding how to operate in the information age.

3. USJFCOM, conduct a manpower study on a JTF supported by a SJFHQ and operating in a collaborative information environment to determine its' manpower requirements. ►

- Multiple findings highlighted the large quantity of time that was spent by the JTF staff using the collaborative system. This quantity was periodically identified as being excessive and the cause of overworked personnel. Furthermore, in MC02, the CIE was overlaid on existing JTF processes without expressed elimination of any traditional tasks. The appearance was that additional work had been added without additional resources. While the notion "greater knowledge created by the CIE would enable faster task accomplishment" has merit, time management difficulties emerged. At times, personnel choose between attending collaborative sessions and performing another task. It is not reasonable to assume MC02 JTF staffing approached optimality. It is highly likely that JTF operations can be improved upon through a more precise application of manpower to function, process, and tasks.



Figure 33: An F-16 engages a target over the Nevada firing ranges in response to an MC02 tasking order

## Assessment Area 2 — Rapidly Set Conditions for Decisive Operations

### Overall Assessment Results

The joint force deployment planning procedures and tools developed to support the task 'Position Combat-Configured Forces for Joint Operations' were not as effective as might have been anticipated. The Joint Force Capabilities Register (JFCR), a planning tool, was not used as envisioned for two reasons. First, due to the nature of the experiment, the available force list was already determined, so the components saw little utility in using the JFCR to select capabilities to accomplish an effect. Secondly, the JFCR is still in development and participants reported it did not have sufficient detail in some areas.

No one envisioned the impact that the CIE had on the course of action (COA) development and the impact that Effects-Based planning and operations had on the deployment planning process. In certain cases it streamlined planning because of the concurrent collaborative planning capability. However, collaboration seemed to blur some of the habitual understanding of deployment planning roles, responsibilities and functions.

In effects-based planning, the relationship between COA development and deployment planning was not fully understood. It was envisioned that as effects-based missions (task, purpose, and effects) were assigned to components they would select a capability to accomplish the task. Once the capabilities were selected by the components, the JTF, using the JFCR, would begin sequencing the force flow with the priority of effects desired. The new capability selection process should have been coordinated and arbitrated at the JTF level.

During the experiment, the JTF developed its operating concept based on the commander's intent and guidance and the priority effects list (PEL). The JTF assigned effects-based missions (task, purpose, and effects) to components, which developed COAs for their effects-based missions based on supported and supporting command relationships. There was good component horizontal collaboration within each effects-based mission, but the components developed their COAs without the benefit of an integrating JTF COA. The JTF COA would have included a JTF concept of deployment that supported a JTF concept of employment. Consequently, the components' plans used unconstrained forces and force flow for their COAs. The JTF (influenced by non effects-producing capabilities, the desire to show off their true capabilities, and efforts to attain Service exercise objectives, which did not match MC02 objectives) began COA analysis without an integrated JTF COA. Because of the lack of force flow sequencing, it was difficult, if not impossible, to determine what resources were to flow where and when. After

### Overall Assessment Results

- Joint force deployment planning procedures and tools...were not as effective as anticipated...
- Joint Force Capabilities Register (JFCR) was not used as envisioned...
- No one envisioned the impact that the CIE had on the COA development...
- In EB, the relationship between COA Development and deployment planning was not fully understood...
- There was good component horizontal collaboration within each effects-based mission...
- (ISB) was used to streamline deployment and to minimize the logistics footprint in the JOA...

the COA wargaming was complete, the JTF put all the component force flow requirements together and discovered they were beyond their force flow capability. The JTF adjusted the forces and the flow and, once the two were integrated, they had a feasible COA from a deployment perspective. However, during execution, artificialities applied to the movement of forces further calls into question the ability of current deployment processes and capabilities effectively support RDO.

Prepositioned (PREPO) material was used to offset deployment requirements. Intermediate staging and support bases (ISB) were used to streamline deployment and to minimize the logistics footprint in the JOA. Where possible, host nation support was used to minimize the logistics footprint. The effects of JRSOI could not be assessed because no actual JRSOI was conducted or simulated, and that is the only way to accurately assess the process. The Log CROP, although a great information source, was not seen as effective in synchronizing deployment flow.

### **Methodology**

More than 215 experiment participants and observers evaluated Rapidly Setting Conditions for Decisive Operations. A series of 32 questions were given to the warfighters, 34 questions were submitted to the SMEs, five C<sup>4</sup>I inputs were gathered, and two modeling and simulation inputs were gathered addressing this objective. The questions were directed to the specific person or group that was responsible for the desired information or subject area. Specific information was sought from the C<sup>4</sup>I systems and the M&S systems during and at the conclusion of the experiment. Data from the modeling and simulation areas were gathered via DCARS; the C<sup>4</sup>I information was gathered from SPPS. JDCAT captured the warfighters' and SMEs' information. All of these sources provided the information that was reviewed and analyzed for this objective. Additionally, after action reviews from various working groups and comments and recommendations captured via JDCAT were used to supplement the programmed data capture. The responses were screened, sorted, analyzed, and tabulated. The data was rolled up through the element, data requirement, measure, subtask, task, and the warfighting challenge levels to answer the objective. Azimuth check papers for this objective were written in which the key points of the objective were listed and brought to the attention of the SMEs, analysts and the SCDs. The papers were available through the SPPS system, and were the focal point during 26-27 July SMEs, analysts, and SCDs meetings.

The "Rapidly Set Conditions for Decisive Operations Objective" was broken into two warfighting challenges: 1) ability to establish advantageous positions for decisive operations, and 2) ability to decrease joint force vulnerability to disruption. The first warfighting challenge was broken into two tasks, and 10 sub tasks. The second warfighting challenge was broken into one task and six measures. The data for this objective was split between logistics and effects-based functions. Therefore, the logistical analysis team concentrated on the first task of the first warfighting challenge, and the effects analysis team concentrated on the second task of the first warfighting challenge and on the entire second warfighting challenge.

Due to experiment guidance, enemy forces were restricted from attacking Blue forces for 16 days prior to the start of hostilities. Many asymmetric and some kinetic enemy actions might have been directed against Blue forces flowing into the region had there been no forced inactivity. If the enemy had attacked Blue forces earlier, the pre-emptive strike may have had a smaller effect or not occurred at all. However, earlier enemy activity may have had a greater impact on Blue at the operational level, and affected Blue's ability to gain entry into the JOA.

To analyze the primary sub task, use joint force deployment planning procedures, six key areas were reviewed to determine the effectiveness of the joint force planning process:

- Use of the joint deployment process initiatives, joint force capability register (JFCR), and collaboration during the joint deployment planning process
- The tactics, techniques, and procedures (TTP) and standing operating procedures (SOP) that comprise the joint SOP (JSOP) on deployment planning procedures
- Number of deployment flow changes made in the first seven days and why they were made
- Tailoring of initial and follow-on logistics packages to reduce lift requirements and minimize logistics footprint in theater
- Procedures to develop and approve COA quicker for logistics supportability
- Procedures and systems for sourcing, tailoring, and validating the time-phased force and deployment data (TPFDD)

Supporting subtasks were addressed as follows:

- Impact of various PREPO alternatives on the ability to rapidly close a force
- Reduce JRSOI processing time
- Assess deployment distribution structure
- Determine the information, communications and systems and tools that are required to synchronize the deployment flow
- Determine the amount of asset visibility required to divert assets
- Determine the utility of the high speed vessel (HSV) for positioning/supporting combat-configured forces for decisive operations

Data was collected, primarily, from the logistics participants and subject matter experts using automated questionnaires and from the comments and recommendations provided by all participants, various after action reviews (AARs) and in-focus sessions. The locations and number of the logisticians follows: plans group, 14; operations group, 12; SMEs, 12; functional component, 5; Joint Logistics Management Center (JLMC), 16; and the JECG deployment sustainment support cell (DSSC), 17.

**Warfighting Challenges: Ability to establish advantageous positions for decisive operations; and ability to decrease joint force vulnerability to disruption.**

The deployment portion of the warfighting challenge, 'ability to establish advantageous positions for decisive operations', was postulated because of reliance on infrastructure-dependent deployment methods that prevent joint forces from direct deployment into the joint operations area (JOA); therefore, the delivery of highly mobile forces in non-continuous operations cannot be accomplished efficiently. From this warfighting challenge, metrics (tasks, subtasks, questions and data elements) were developed based on information from several sources, most notable are:

- *Concept Experimentation Strategy (CES) to Deploy and Sustain the Force in Rapid Decisive Operations* (RDO, 2/14/01)
- *Focused Logistics: Enabling Early Decisive Operations* (10/10/99), *Strategic Deployment* (5/10/00) and *Rapid Decisive Operations* (3/1/02) White papers
- *Standing Joint Force Headquarters (SJFHQ) Concept of Employment for MC02* (8/17/01)
- *Deployment & Sustainment in MC02 Concept of Operations* (3/18/02)
- *Deployment & Sustainment in MC02 Tactics, Techniques and Procedures* (1/9/02)

- *MC02 Joint Standing Operating Procedure*

These sources were used to generate the metrics and formed the basis for data collection plan development. The data collection plan was vetted with the logistics concept developers and other members of the JFCOM Analysis Division. The high order metrics follow:

Task: Position combat-configured joint forces for decisive operations

- SubTask: Use joint force deployment planning procedures
- SubTask: Determine the impact of various PREPO alternatives on the ability to rapidly close a force
- SubTask: Reduce JRSOI processing time
- SubTask: Assess deployment distribution structure
- SubTask: Determine the information, communications and systems and tools that are required to synchronize the deployment flow
- SubTask: Determine the amount of asset visibility required to divert assets
- SubTask: Determine the utility of the HSV for positioning/supporting combat-configured forces for decisive operations.

Although enemy actions negatively impacted the force's operational mobility, these detractions were not enough to stop the JTF from establishing advantageous positions during some operations in time and space. Blue was able to position its forces and create combat-configured packages for decisive operations. Effects planning procedures showed continual improvement as the experiment progressed, though more work is required. At times when Blue achieved advantageous positioning, it was not always able to successfully execute the planned operation; additional preparation of the battlefield was required.

Blue achieved a high level of logistical build-up flexibility. However, force tailoring could have been better as the components erred on the side of retaining in-house capabilities versus leaving those capabilities behind, even though another component had the same capability. One war fighter mentioned, "The logistics plans-ops transition worked better than the JTF plans-ops transition." Additionally, node-action-resource level of planning proficiency was not attained from an effects planning perspective. Footprint minimization could also improve with the streamlining of JTF capabilities. Planning was comparable to legacy methods, but there is much more room for improvement by using CIE in conjunction with effects planners and operators. TPFDD measurements were not meaningful due to the lack of fidelity in the experiment.

Another participant observed, "MC02 never got advanced enough to allow or drive the TPFDD refinement process." PREPO supplies and equipment were a success, supporting the flexibility and timeliness of the JTF and effects operations. JRSOI could not be properly measured during MC02 due to the lack of fidelity in RSOI areas. ISBs show promise, but participants commented that other systems are necessary for the success and implementation of the ISB concept. The information, communications, systems, and tools that are required to synchronize the deployment flow were generally available to the experiment audience. Most respondents indicated that the CIE, with collaboration, allowed the movement of JTF forces in a much more condensed time frame. The visibility required for the diversion of assets in support of RDO was met during MC02.

**Finding 1** ► The CIE streamlined deployment-planning coordination, but the MC02 joint force deployment planning procedures did not improve joint force planning or help develop the JTF TPFDD.

The JSOP caused some problems for deployment planning, partially because the document was not clear on the division of duties and responsibilities for deployment planning, and partially because the deployment planner was located in the log plans portion of the plans group. As a result, the JTF planners looked to the log planners to develop the TPFDD without operational planning involvement. This resulted in some unproductive deployment planning sessions, as the deployment planners had no employment plan or force flow from which to work.

During deployment planning, experiment observers expected that JTF and component planners and operators would use the JFCR to identify potential forces for use and then conduct transportation feasibility analyses to identify constraints. However, the JFCR was not used as anticipated. The JTF assigned missions to components and then asked for a deployment force list. In turn, the components, already familiar with their unit capabilities, simply chose units from the already prepared MC02 force list. There was never a need to use the JFCR or any other tool.

Those that attempted to use the JFCR were hampered by a lack of training with the newly produced tool and, not surprisingly, found it lacking. Representative comments included these:

“Although partial engineering data is included in the register, the force modules populating the register are too large and too generic to aid as an effective search tool to meet the objectives of MC02.”

“The JFCR does not provide the level of detail that the medical planners need. The medical community needs information on what each unit brings with it and how it is configured.”

Sustainment details had not been rolled into the JFCR for some components, causing planners to use other sources for planning details. Most participants responded that with additional development it would be a useful tool for combatant command-level or SJFHQ core planners in identifying capabilities available for use against effects, and determining rough-order transportation requirements, as they develop their CONOPS.

The CIE’s impact on deployment planning was not clearly envisioned. While it had some very obvious benefits in reducing planning time by enabling concurrent planning by the JTF, components and subordinate commands, there was a misunderstanding about what concurrent planning could and could not do. An experiment goal was to reduce the planning time needed to begin operations — reduce or eliminate the one-third, two-third time allocation rule for mission

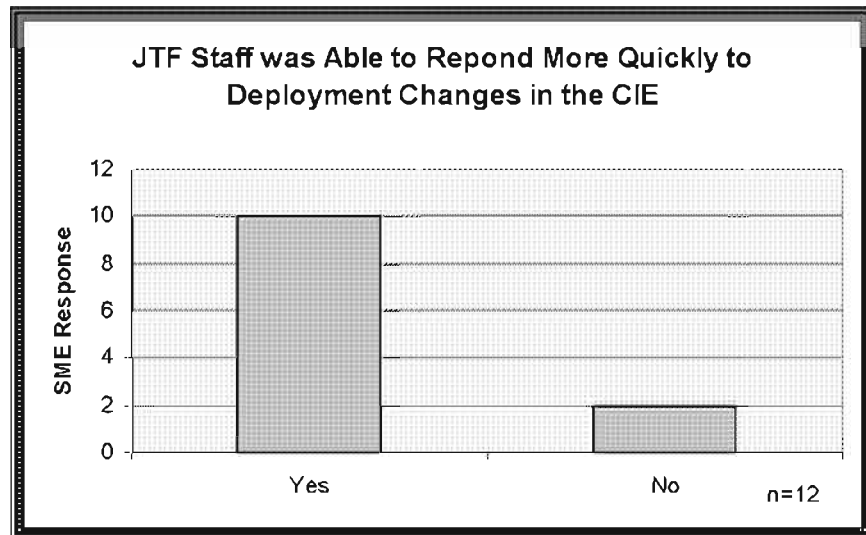


Figure 34: SMEs thought the JTF staff was able to respond more quickly to deployment changes in the CIE



planning — through early and concurrent JTF-component participation in the planning process. However, this goal was not portrayed clearly to experiment participants and as a result, components and subordinate commands said pressured for deployment information in the absence of a finalized JTF COA and force list.

Significant adjustments were made to the initial deployment flow in the first week of experiment execution because the TPFDD had not been finalized before the end of Spiral 3. Changes were made at the direction of the JTF commander and, on request, from the components. As depicted in figure 34, the CIE made these requests and the coordination process much easier.

**Finding 2► Intermediate staging and support bases (ISBs) were suited to rapidly moving forces and equipment and, with host nation support, instrumental in reducing the logistics footprint in the JOA.**

As depicted in figure 35 below, the majority of participants understood that the ISBs described in the deployment and sustainment MC02 CONOPS were suited to rapidly moving and integrating forces.

However, the experiment was not able to actually measure the reduction in JRSOI time as it was not conducted in simulation and unit RSOI was assumed completed 48 hours after arrival.

ISB locations were seen as being effective in extending operational reach and were selected based on facility availability, and dispersed to provide maximum force protection and reduce vulnerability.

The JTF maximized the

use of host nation support and civil augmentation program support to minimize the logistics footprint in the JOA. A key point for any deployment is that regardless of the deploying force’s readiness or packaging, assembly will still be required before the force can be employed.

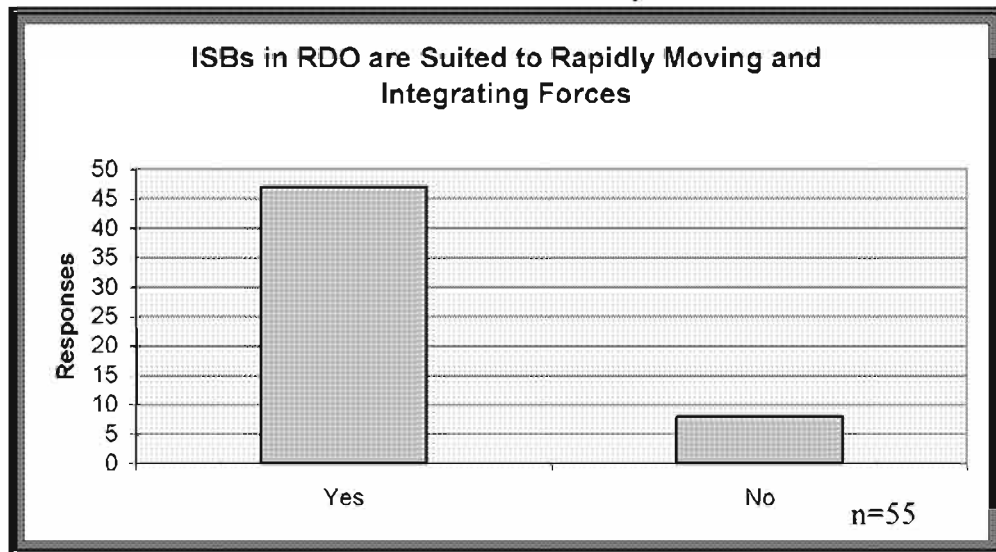


Figure 35: Most agreed that ISBs were well suited to moving forces

**Finding 3► The CIE was effective in synchronizing deployment flow.**

Participants noted that CIE effectively synchronized deployment flow and that it allowed them to address issues and to coordinate necessary changes. Some participants’ comments included:

“Collaboration was the only way this would have happened in the time it was accomplished.”

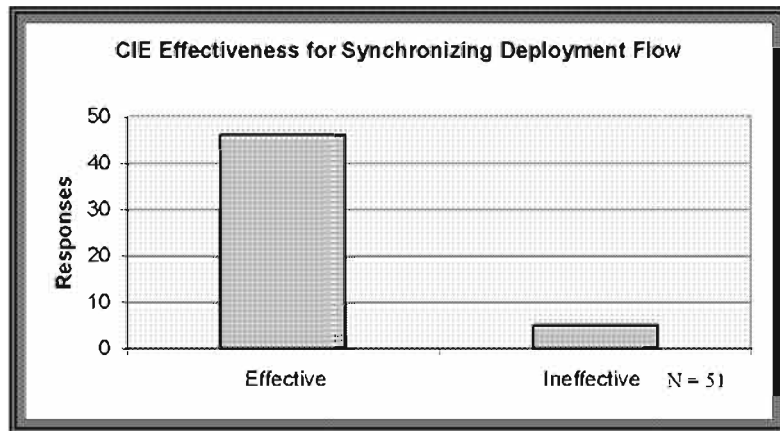
“The JTF surgeon and the Service components used [the] collaborative environment to deconflict issues for medical units.”

“Thus far in the exercise, it appears that [the] CIE was the key factor that achieved synchronization for deployment and sustainment.”

Figure 36 depicts participant evaluation of the CIE effectiveness on deployment synchronization.

**Finding 4► The Log CROP, an element of the CIE, was a useful information source for tracking deployment flow, but not for synchronizing it.**

The majority of respondents (43 of 55) found the Log CROP to be a useful information source for tracking deployment flow. However, some also reported that it did little to actually synchronize the flow. Initially, participants had difficulty locating the deployment flow status on the Log CROP; this improved over time. Afterward, it became an issue of information currency and accuracy. What finally evolved were discussions in the Logistics Action Response Board (LARB) to resolve deployment related issues. Participants provided the



following comments on the utility of the Log CROP in deployment flow tracking:

Figure 36: CIE effectively synchronized deployment force flow

“The Log CROP was a great tool however [it] had little relevance to synchronizing deployment flow.”

“Force flow charts were compiled from information from GTN/ Global Transportation Network Exercise System (GES) and posted on the Log CROP which gave visibility on the deployment.”

“The Log CROP is looked at more as a source of general information than a planning tool.”

“OK, but all the systems take a lot of training, need to be user friendly.”

“Better than manually reviewing Service planning docs, but not fully used by planners.”

**Finding 5► The Log CROP provided sufficient information to allow the CJTF to divert PREPO materiel or inbound supplies to satisfy needs elsewhere in the JOA.**

Of 58 respondents, 44 stated the Log CROP provided sufficient information to allow the CJTF to divert PREPO materiel or inbound supplies to satisfy needs elsewhere in the JOA (See Figure 37). However, surveys indicated a participant view that the JTF would coordinate with components before redirecting materiel.

**Finding 6► Blue Forces were able to conduct operational maneuver in support of Effects-Based Operations.**

Through situational awareness and superior mobility and firepower, Blue was able to monitor enemy movements and choose the time and location for counter-mobility operations. Blue constrained CJTF-S's movement of forces using aerial targeting of his mobile forces. The adversary did not retain freedom of movement to conduct major operations. At other times, Blue could maintain situational awareness for EBO through just monitoring enemy movements. Yet, the OPFOR was able to move two reserve, armored brigades over 200KMs without being attacked. These brigades were subsequently attrited when they were moved into direct action. Blue successfully conducted counter-mobility operations against enemy forces whenever necessary or as needed in support of EBO and RDO.

All of the forces allocated to the JTF for planning purposes were deployed into the theater, with a majority arriving ahead of schedule. However, because there was insufficient resolution of the exercise timeline in the 16 days preceding execution start, the actual TPFDD deployment status was unclear. During this pre-execution period, the OPFOR was not allowed to attack Blue force deployment efforts.

Therefore, Blue was able to deploy into the theater unimpaired. Blue positioned its forces in operational formations with little concern for terrorist or other enemy actions. All necessary forces and support elements were positioned to ensure freedom of navigation, neutralization of weapons of mass effects, and subsequent transitioning of the JOA to follow-on forces and agencies. Blue positioned its forces so operational formations could form and operate, but there could have been better coordination and synchronization between the components and JTF and between logistics personnel and operators. Better use of the ONA, better information sharing, and better operations to logistics planning would have aided effects accomplishments.

Blue was able to assemble its forces in the JOA in a timely, but uncontested manner, and in sufficient numbers to begin effects operations by C+17, in accordance with planning timelines.

The JTF commander used "effects packages" on several occasions to achieve his early, desired effects. These "effects packages" were not built until the component elements reached their designated assembly areas in the JOA. The Service elements in these "effects packages" were controlled through supported-supporting command relationships. In each of those actions, that relationship caused these collective units to be somewhat different from units incorporated in joint tactical action (JTA) elements where all elements in the JTA fall under the command of a joint force commander.

Operations requiring "joint tactical operations" were identified early in the planning process, using the collaborative construct. Operations as small as direct action efforts to seize specified locations ranging from small to large events such as the seizure of the islands, and defense against swarm boat attacks, required frequent use of "joint tactical actions." Collaboration allowed the JTF and components to quickly determine requirements and rapidly de-conflict resources. Subsequent to the arrival of Blue forces in the JOA, OPFOR detected and

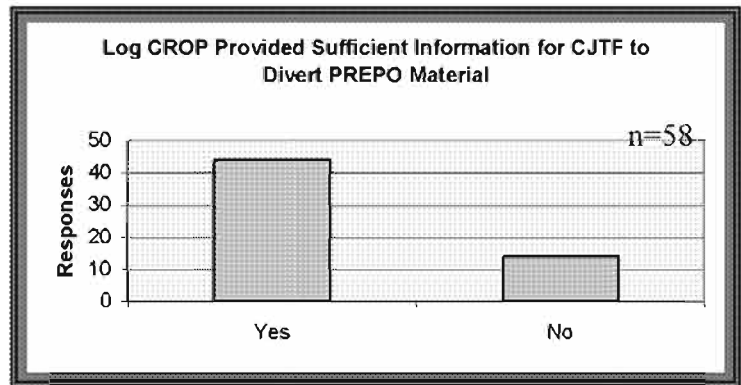


Figure 37: Majority thought Log CROP provided sufficient information to divert PREPO material

attacked both air and maritime elements causing damages and losses. These attacks did not have a large enough effect to stop Blue from setting conditions for decisive operations.

Blue exercised operational mobility into and through the JOA. The OPFOR, however, did delay, disrupt, and modify Blue operational mobility, by mining the waters in the area of operations; conducting pre-emptive strikes on Blue forces in the JOA; and by conducting terrorist attacks on Blue lines of communications, and APODs and SPODs. In spite of the obstacles encountered, Blue retained operational level mobility.

To ensure the proper execution of the TPFDD, consideration should be given to the early securing of lines of communication (LOC). LOCs should be secured in the period prior to the commencement of hostilities and prior to forces flowing into a JOA. At the tactical level, Blue maritime forces were slowed due to OPFOR mining efforts. Blue was forced to conduct mine clearing operations to open sea-lanes, while APODs and SPODs were closed due to potential chemical/biological contamination, physical damages to infrastructure, and from environmental damage to port facilities. These enemy actions forced disruption and delays on Blue's planned timelines, and were effective tactical-level distracters.

Blue forces were successful in counter mobility operations against enemy forces as demonstrated by Blue air interdiction of an enemy ground forces moving toward Blue forces at objective Pioneer. Blue forces retained the ability to restrict or stop enemy forces. The exception was the enemy's pre-emptive attack. That very effective strike had a major, short-term effect on Blue's operational freedom of maritime maneuver, but the OPFOR was not able to gain any lasting advantage as the momentum passed back to Blue shortly after the attack. Operationally, the OPFOR had very limited conventional military options after launching pre-emptive strikes on Blue forces moving into the JOA. Primarily, the OPFOR spent the vast majority of its air, missile, and maritime attack capability in the initial attack. With nothing more to follow-up or forces to hold ground, the JTF continued to conduct operational maneuver within the JOA, deploying, positioning, assembling, and using the desired forces/capabilities at their disposal.

The enemy forces may have been able to delay, disrupt, and modify the flow of forces by maritime mining and terrorist activities against the APODs and SPODs, but they could not operate to a degree that placed significant operational limitations on Blue forces. In some instances, the OPFOR was able to severely limit Blue's operational maneuver. One such case was the Blue Ship-to-Objective Maneuver (STOM) that came ashore before the battlefield was properly prepared. This miscue resulted in significant Blue losses and a JECG controlled administrative withdrawal. After the lesson learned was filed away, the exercise was continued, allowing Blue to assemble the necessary personnel, equipment, and supplies by D-1 and begin effects operations, in support of operational maneuvers.

**Finding 7** ► **Blue reduced joint force vulnerability to disruption; however, it was not able to prevent OPFOR observation of its forces, due to sympathizers, terrorist cells, and during the initial days of the operation, commercial satellite imagery.**

Blue reduced its vulnerability to disruption by tailoring forces to meet requirements for specific effects, minimizing the footprint within the JOA, and reducing adversary access to satellite and other open source intelligence data.

Blue also reduced its vulnerability by:

- using weapon system range and standoff range of delivery systems
- establishing rear area security operations
- diverting airflow to APODs with lower risk levels

- damaging adversary electronic communications capabilities
- using the capabilities of the HSV, the OV-22, and the C-17
- using PREPO supplies outside of the JOA
- using host nation support, diplomatic and informational initiatives

Additionally, much of the senior terrorist leadership was targeted and destroyed through a scripted event. Despite the OPFOR’s ability to use both regular and terrorist forces to disrupt Blue air, naval and land forces and facilities, Blue was able to establish some advantageous positions to conduct decisive operations.

Through positioning of forces within the JOA, minimizing their footprint in the JOA, and maximizing aircraft operational ranges, Blue minimized any OPFOR initiated disruption (See Figure 38).

These Blue initiatives strengthened already in place force protection measures, safeguarding friendly assets. Therefore, while Red was able to disrupt Blue’s logistical elements by mining and terrorist activities, the disruptions were not to the degree where Blue operational forces were noticeably affected. Some of the potential impacts due to OPFOR operations were adjudicated out by the JECG, to keep the experiment on track.

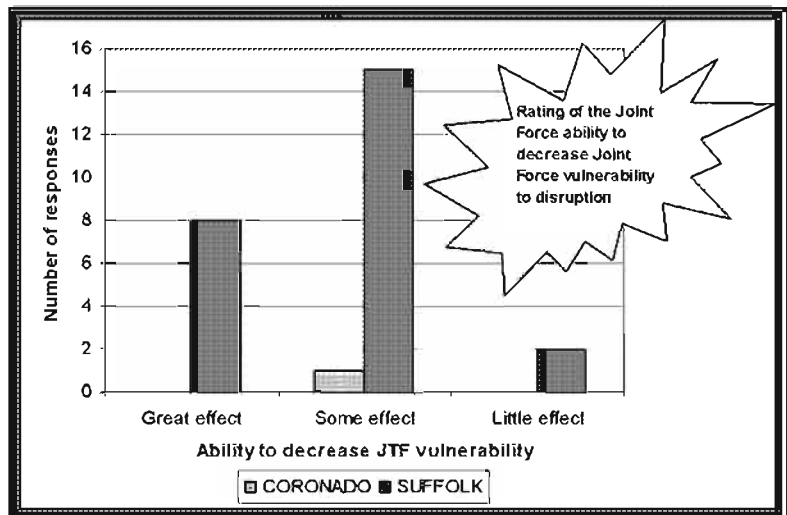


Figure 38: Ability to decrease JTF vulnerability

Daily reports on enemy or terrorist activities observed at APODs and SPODs were made to the headquarters and activity was generally very limited. This type of activity was managed at times by the JECG to ensure accomplishment of experiment objectives. Experiment participants reported on the JTF’s ability to reduce its vulnerability due to disruption. The majority of responses received (26 of 32) indicated that the JTF was able to reduce its vulnerability to disruption to varying degrees. This was contrary to the OPFOR terrorist view that it initially had relatively free access to Blue targets throughout the JOA. This access was degraded over time by counter-terrorism efforts and by JECG controllers.

OPFOR was able to inflict some damage on Blue causing tactical level disruption, but through counter-measures, and flexibility, Blue was able to overcome enemy efforts.

Above the operational level, CJTF-S forces or sympathizers were able to interrupt the flow of maritime forces through one LOC to the JOA. Terrorist and enemy activity did play a noticeable part in SPOD and APOD operations and rear area Blue personnel were killed and wounded by terrorist/enemy attacks. Additionally, Blue logistical operations were degraded when an SPOD was closed due to the grounding of a hazardous materials laden ship. Attempts by OPFOR forces to attack APODs with TBMs were thwarted by Blue defenses — defenses that included FY 2007 capabilities. APOD and SPOD operations were modified to accommodate temporary closures due to OPFOR actions. Though the OPFOR were not allowed to target civil

reserve aircraft, it was noted that had such an operation been permitted, it would have had an impact.

**Finding 8** ► The roles, responsibilities, and functions for deployment planning remained somewhat unchanged with the MC02 JTF organization.

The matching of capabilities required to the effects desired, somewhat without regard to Service, is one of the most important aspects of effects-based planning. Force flow must be sequenced with consideration for the desired priority of effects. There was little to no input from the operational and planning communities in the development of the initial force flow and requirements as participants fell back on habitual understandings of the roles and responsibilities of logisticians. It is critical to the success of deployment planning to have operators involved in the decision processes that will intimately decide on force employment. Some senior mentor comments on deployment bring out some key concerns:

“When we talk about deployment, we have to talk about employment. The adversaries have learned that the way to deal with us is to disrupt power projection through asymmetric attacks. They can slime bases in the U.S. so force protection goes far below the operational level of war in the JOA. Force integration will have to be done in the U.S.”

“Force deployment tools are inadequate. They are labor intensive and are not user friendly. Single keystrokes can delete masses of painfully constructed data. The Joint Force Capabilities Register is a step in the right direction insofar as tool development is concerned. Additional improvements are needed.”

**Finding 9** ► An assessment of the JRSOI process could not be made during MC02 because the JRSOI process was not visible in the experiment.

JRSOI was not part of the simulation and was assumed completed. Real-world constraints were not experienced or imposed.

**Finding 10** ► The CONUS, with its posts, camps, stations, bases, lines of communication, sea ports of embarkation, and aerial ports of embarkation are part of the battlespace and vulnerable to asymmetric attack.

Multi-dimensional (cyber, sea, air, space, and ground) attacks should become part of the training regime. An enemy will attack these vital, yet vulnerable, aspects of our national military power and the results of those attacks and the cascading effects of such attacks against key concepts such as synchronization, just in time logistics, protect the force should be played out.

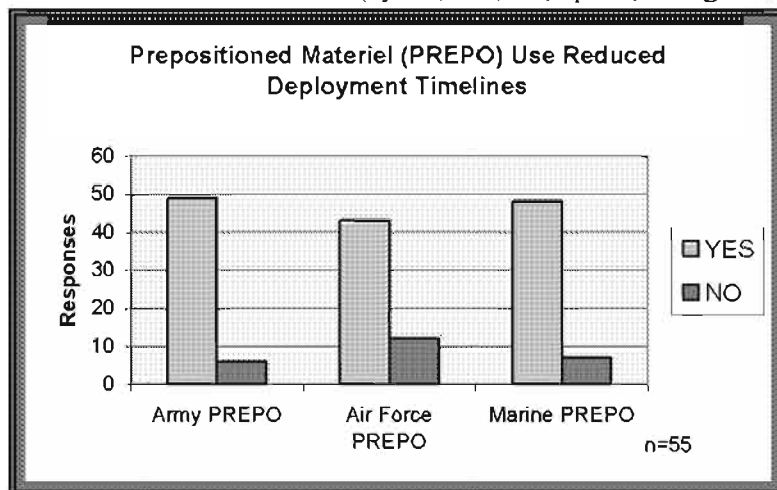


Figure 39: Services thought PREPO reduced timelines

An enemy will attack these vital, yet vulnerable, aspects of our national military power and the results of those attacks and the cascading effects of such attacks against key concepts such as synchronization, just in time logistics, protect the force should be played out.

**Other Observations**

**Observation 1:** Using pre-positioned (PREPO) materiel as an alternative to deploying

**materiel from CONUS was seen generally to be beneficial to rapidly closing a force.**

Reducing materiel transportation times and requirements benefited force closure rates, according to participants' comments and as depicted in figure 39, below. The key is to place the correct equipment and sustainment in sufficient quantities near the crisis area. This is important because as Services begin to transform and modernize their forces, they will need to ensure acquisition of sufficient "spares" and sustainment to place into PREPO. During MC02, participants were limited to using real world PREPO. This became apparent to the JTF planners because certain experimental unit materials were not available in PREPO to affect deployment or replacement.

PREPO reduced deploying sustainment, as planners were able to take advantage of what was available as common items of support, such as water, fuel, and ammunition. It is imperative that all planners know what is available in PREPO and know how to find it. The medical planner did not have any information about medical materiel available in PREPO because it wasn't clear to him what medical units and equipment were available.

**Observation 2: Logistics decision support tools' performance mixed in test to synchronize deployment flow.**

Logistics decision support tools (DSTs), including the Global Transportation Network (GTN), Global Status of Resources and Training (GSORTS), Joint Operations Planning and Execution System (JOPES), Joint Total Asset Visibility System (JTAV), National Imagery and Mapping Agency (NIMA), and Port and Airfield Collaborative Environment (PACE), received mixed reviews. Whether a tool received a positive or negative review often depended on the reviewer's level of training and his or her proficiency with the tool. In some instances, users were not able to access the tools because they did not have a Service-provided SIPRNET Public Key Infrastructure (PKI) Certification (experiment artificiality). One major criticism was the lack of data or fidelity behind some of the tools for this experiment (experiment artificiality).

### **Relationship to Other Objectives**

#### **SJFHQ**

- Force deployment and sustainment planning functions of personnel in log operations and log plans positions in SJFHQ

#### **ONA**

- Database research for facilities and infrastructure to support deployment and logistics operations in the JOA

#### **Effects Base Operations (EBO) [Planning]**

- Develop deployment and logistics concepts of support for Effects-Based Operations and future branches and sequels

#### **Sustainment**

- Plan and provide logistics sustainment for the JTF

Collaborative Information Environment (CIE)

- Environment for collaborative planning and coordinating logistics operations, force deployment and sustainment, horizontally and vertically; i.e. Logistics Action Response Board

Interagency Agency (IA)

- Interaction for coordinating host nation support (food, facilities, equipment) and humanitarian assistance

Joint Intelligence, Surveillance, and Reconnaissance (JISR)

- Intelligence on the JOA and adversary activities therein that would adversely impact force deployment and logistics operations

Initiatives

- Introduction and experimentation of new logistics tools suite

Assured Access (AA)

- Ensuring access into the JOA and facilities therein to support force deployment

Effects Based Operations (EBO) [Conduct]

- Support force deployment and execute logistics operations to sustain forces conducting Effects-Based Operations

**Relationship to Baseline Analysis**

The following entries are relevant to major observations made during MC02.

Baseline entry: The deployment branch was not manned to handle assigned responsibilities and the branch staff did not have relevant experience or technical expertise. This resulted in poor time-phased force and deployment data (TPFDD) performance in the conduct of movement planning and execution

MC02 Result: No Change

Baseline entry: The JMC had difficulty in force tracking; reducing force capability to develop and execute movement plans

MC02 Result: The Log CROP, with the CIE, improved the tracking capability

Baseline entry: The major challenge of JTF TPFDD managers was obtaining a common understanding of the relationship between prioritization, synchronization, and flow of forces within the constraints of lift and throughput

MC02 Result: No change, continued emphasis is needed in this area

**DOTMLPF Linkage**

Training

- Deployment and sustainment planners should be fully integrated into the CIE



- Consider developing training programs for multi-functional joint logistics planners, knowledgeable in all Service capabilities
- Reassess time allocation for subordinate command mission planning time in a CIE
- Consider programs to develop and maintain proficiency in logistics decision support tools

#### Material

- Formalize the Log CROP

#### Leadership

- Train leaders on the importance of lift and logistics integration in EBO
- Reinforce adequate allocation of time for subordinate's mission planning requirements

#### Facilities

- Facilities (CONUS air/sea ports) to support deployment

### **Recommendations**

1. The JFCOM Joint Logistics Transformation Center (JLTC) with the JFCOM Joint Deployment Process Office (JDPO) should, in the near term, host seminars, work shops or limited objective experiments (LOEs) to explore what changes have to take place to the effects-based planning and execution process. They should also examine the means to fully integrate force deployment, employment, and sustainment. Additionally, the group should review what decision support tools are needed by the SJFHQ to allow them to rapidly assess the feasibility, availability of transportation resources, of force deployment and employment scenarios in the same timeline that effects-based planning takes place. ►
2. JFCR development should continue. JFCOM, JLTC and the Services should continue to populate the JFCR with warfighting capabilities and application usage that supports units aligned with their capabilities. ►
3. JFCOM JDPO should develop decision support tools to support deployment planning. ►
4. All Services should identify personnel to be trained and function solely as JOPES operators. ►
5. All Services should review use of PREPO in support of RDO, and ensure PREPO assets are kept current with force modernization. ►
6. For ISB planning, Service components should collaborate as much as possible to reduce duplication of logistics capability in order to minimize the ISB footprint. ►
7. DoD, develop or modify doctrine to jointly coordinate the movement of forces into the JOA to facilitate initiation of effects operations upon entry. Include the IA to ensure DIE aspects are integrated into these efforts. ►
8. DoD, develop doctrine establishing APODs and SPODs, which are protected against asymmetric attacks. ►
  - Consideration should be placed on ADA, anti-ship, anti-submarine systems placement, and the ability of authorities to restrict the flow of civilian traffic into and around the APODS/SPODS.
9. DoD, incorporate asymmetric attacks on posts, camps, stations and bases plus APOEs and SPOEs into all deployment exercises. ►



Figure 40: A soldier prepares a PSC-5 communications set as Blue forces assault an OPFOR airfield during MC02

## Assessment Area 3 — Assure Access Into and Through the Battlespace

### Overall Assessment Results

Friendly forces successfully assured access into and through the battlespace; however, exercise constraints prevented enemy anti-access play for the 16-day period prior to the start of hostilities, when Blue soldiers were not available to participate.

Two of the three warfighting challenges—providing sufficient operational reach and enhancing force protection—were achieved, but Blue was not consistently able to provide selective dimensional superiority. Blue did not accomplish this objective unscathed, however, and there were several caveats to Blue's success.

First, Blue forces sustained significant losses, especially to its maritime component, when the enemy launched a successful pre-emptive strike. The pre-emptive strike was a tactical success and nearly achieved an operational-level effect on Blue forces, but Blue was able to accomplish effects tasking order 1 (ETO) with its remaining assets.

Second, terrorist forces were able to successfully attack Blue aircraft flying near APODS and they were able to mine shipping lanes, thus affecting friendly lines of communication. Again, this type of attack had a tactical effect, but was not severe enough to initiate a friendly force change in operations. Third, Blue forces were not able to defend against enemy air attacks because the adversary used civilian aircraft. These enemy attacks deceived friendly air defenses, but did not affect friendly actions at the operational level.

In summarizing the three warfighting challenges: Blue was not able to consistently provide selective dimensional superiority, was only moderately successful at providing sufficient operational reach in all instances, and had moderate success in enhancing force protection. Nevertheless, in total, Blue successfully and at will, entered and transited the battlespace in support of RDO and this MC02 objective.

### Overall Assessment Results

➤ Friendly forces successfully assured access into and through the battlespace...

➤ But, exercise constraints prevented enemy anti-access play for the 16-day period prior to the start of hostilities...

➤ Blue did not accomplish this objective unscathed, and there were several caveats to Blue's ability to successfully achieve this objective...

### Methodology

Subject matter experts, experiment participants, and observers evaluated this objective. A series of 12 questions were submitted to the SMEs, one question was given to the warfighters, 19 command, control, communication, computers, and intelligence inputs were gathered, and 27 modeling and simulations inputs were collected throughout the experiment to address this objective. The questions were directed to the specific person or group that was responsible for the desired information or subject area. Specific information was gathered from the C<sup>4</sup>I systems and the M&S systems during and at the conclusion of the experiment. Data from the modeling and simulation areas were gathered via DCARS, the C<sup>4</sup>I information was gathered from the SharePoint Portal Server (SPPS). JDCAT captured the warfighters and SME's information.

In addition, working group after-action reviews, and comments and recommendations, captured via JDCAT, were used to supplement the programmed data capture. The responses were screened, sorted, analyzed, and tabulated. The data was rolled up through the element, data requirement, measure, subtask, task, and the warfighting challenge levels to answer the objective. Azimuth check papers were written, underscoring key points of the objective and brought to the attention of the SMEs, analysts, and the SCDs. These papers were available through the SPPS system, and they were the focal points during the July 29 and August 3 sessions.

The assessment area was divided into three warfighting challenges: 1) the ability to provide selective dimensional superiority, 2) the ability to provide sufficient operational reach, and 3) the ability to enhance force protection.

The first warfighting challenge was broken into three tasks, of six measures, three measures, and two measures respectively.

The second warfighting challenge consisted of only one task, but had three subtasks, with three, two and four measures, respectively.

The third warfighting challenge was divided into three tasks: One of those had four measures and one had one measure; the third task contained four subtasks of two, five, two, and two measures, respectively.

The following systems and methods were used to collect data on these three warfighting challenges:

- COP/CROP to maintain situational awareness of attack by adversarial systems during specific periods of time and in designated areas in the JOA; be aware of operations directed into, directed from and occurring within the JOA, considering Blue systems capabilities and ranges; and Blue force protection operations within the JOA
- CIE and the ONA to identify and control the attacks on the enemy's key PMESII nodes and associated linkages
- CIE to control joint forces from their home bases to the target area and back and for coordination of force protection measures
- ONA to assist in identifying potential threats
- JISR for surveillance and assessment of PMESII nodes, to position joint forces so that mission accomplishment is minimally impacted by adversarial system positioning, and for surveillance and assessment of potential and actual threats
- EBP and EA processes to maximize joint force effectiveness and efficiency
- Joint forces systems capabilities, such as stealth and standoff ability, in the JIP process to mitigate adversarial system capabilities
- EBO/EBA to position defensive forces and systems

Concepts, which impacted on these war-fighting challenges, include: CIE (COP/CROP), JIACG, ONA, EBP, EBO, EA, JISR, and the JIP.

### **Warfighting Challenge: Ability to provide selective dimensional superiority**

This warfighting challenge addresses the ability of the joint force to dominate the adversary during specific periods of time and in specific locations during RDO. This challenge is oriented towards the military aspect of the DIME/PMESII domains. The joint force must be able to dominate the adversary in specific locations and for set periods to provide an acceptable

environment for RDO. By maximizing the use of intelligence, communications capabilities and weapons employment techniques and abilities, the joint force can attack targets selectively so that the combatant commander may create the desired effects in the adversary's systems while minimizing collateral damage, and friendly forces losses.

In conclusion, Blue did not provide selective dimensional superiority for all operations. Blue capabilities were degraded by an apparent lack of M&S ISR fidelity and timeliness. The less than optimal M&S ISR process contributed to the unsuccessful Blue STOM executed by the Marine component. Significantly, Blue forces did not counter the enemy's pre-emptive strike successfully. Comments from both the Blue air and land components indicate that further refinement in the definition, criteria, and processes is necessary for properly executing this warfighting challenge.

### **Warfighting Challenge: Ability to provide sufficient operational reach**

This warfighting challenge addresses the ability of the joint force to provide sufficient operational reach in support of RDO. This challenge is oriented towards the military aspect of the DIME/PMESII domains. Blue power projection philosophy rests upon the ability to deploy from present locations into the JOA. Blue forces are susceptible to numerous operational detractors, both military and non-military. This warfighting challenge is designed to test the joint force's ability to operate while minimizing any negative effects the adversary may direct towards it.

In conclusion, Blue provided sufficient operational reach, however, not all systems were sited to exploit their full range of capabilities. Sufficient or redundant friendly weapon systems and sensors were positioned to provide Blue forces the ability to monitor areas of interest and attack enemy targets. In some instances, while Blue weapon and sensor systems were placed where they could complete their missions, those emplacements exposed the forces to undue or excessive risk. Redundant capabilities and large force numbers allowed Blue more flexibility in positioning systems than might otherwise have been feasible.

Diplomatic constraints on the positioning of friendly systems were inherent prior to and during hostilities. Other friendly assets were requested to supplement or replace constrained or ineffective assets thereby ensuring Blue capabilities remained. However, benefit analysis may have precluded the implementation of some of these options.

Most friendly assets used by the JTF were staged inside the JOA. The physical presence of Blue forces staged in areas under enemy influence provided easier targets for terrorist and partisan activities. Populations of sympathetic or apathetic individuals provided the terrorists many opportunities that may have been precluded if friendly assets were staged in low threat areas.

Stealth capabilities were successfully employed during the experiment. They provided more capabilities to the JTF commander than comparable non-stealth assets, and did so with a lower loss rate. Caution is necessary in this area, as the fidelity of the experimental data analyzed thus far cannot distinguish type of targets, or level of danger the different airframes were subject to during their attacks.

ISR system positioning was initially constrained by diplomatic issues, causing non-optimal coverage of some of the enemy's capabilities. As hostilities commenced, those assets moved to orbits and routes that were more favorable. However, while the JTF was asset rich, the processing of ISR information through the M&S systems was not optimal and as a result planning, operations and assessment did not benefit from the numbers of assets.

Blue weapons ranges were not maximized in all instances, but the redundant capabilities offered by the components provided flexibility in the choice of weapon to employ on the enemy's nodes.

An interesting after action review comment was made concerning the fact that two fights were occurring. The first fight was in the traditional realm. An example of a fight in the traditional realm could be the destruction or neutralization of coastal defense systems. The second fight was against the asymmetrical threats. Asymmetrical examples might include deep, behind enemy lines operations—Special Forces reconnaissance or HUMINT. Operational reach was addressed more in the traditional fight than in the asymmetrical fight. As fighting progressed, Blue's use of its IO assets improved, specifically in the use of press coverage, press conferences, pushing broadcasts, and leaflets. Operational reach in the asymmetrical fight has different meaning and parameters than in the traditional sense.

**Warfighting Challenge: Ability to enhance force protection**

This warfighting challenge addresses the JTF's ability to enhance force protection in support of RDO. Enhanced protection of the joint forces provides the combatant commander greater flexibility to employ effects packages. Force protection encompasses not only military elements, but also the non-combatants and systems of all DIME domains in the JOA. Adversarial political, military, terrorist, and criminal elements as well as adversary-sympathetic entities are potential threats to the combatant commander's joint force.

In conclusion, Blue was able to provide limited protection for systems, capabilities, and non-combatants in the JOA; forces in the rear area; and, with a few exceptions, forces in the combatant areas. Except for OPFOR's pre-emptive naval attack, successful terrorist attacks near Blue APODs, and the use of civilian aircraft in attacking Blue infrastructure, operational air, space, and missile defense was well executed. Systems and capabilities were generally well protected.

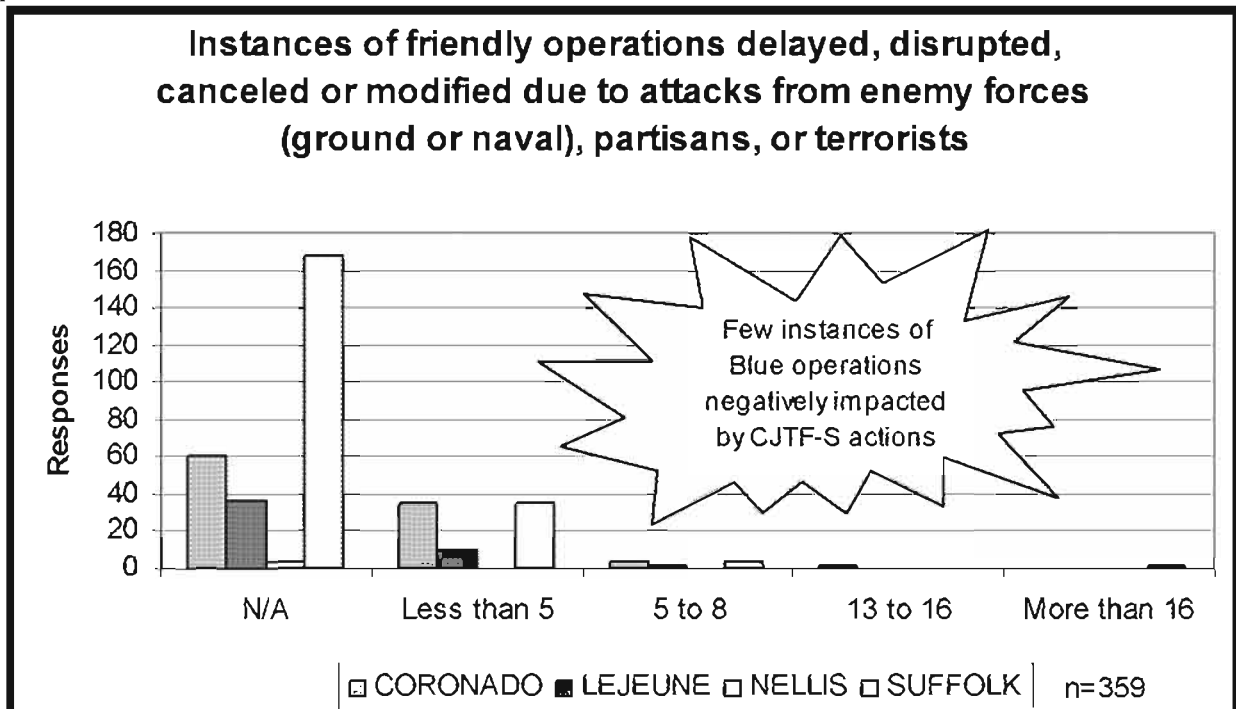


Figure 41: Instances of friendly operations delayed, disrupted, and canceled because of the actions of an enemy force

Blue forces suffered some personnel and materiel losses from enemy forces and terrorists, but friendly force protection measures provided a sufficient level of security level to allow the JTF commander flexibility in his range of options. The damages and losses Blue forces sustained did not cause any alterations at the operational level, and few tactical changes (See Figure 41).

With the assets available to the JTF during this exercise, TBM defense was 100 percent effective in protecting the JTF's rear areas and security measures were adequate for the protection of Blue personnel, as well as material and facilities, contributing to relatively low material losses and limited casualties in the rear areas. The integrated friendly air and missile defense was operational prior to the start of hostilities, and no enemy military aircraft successfully struck the JTF rear areas.

With the exception of the Marine STOM, Blue intentions were sufficiently shaded from enemy forces so that conditions were set for successful Blue RDO. Additionally, Blue had one special reconnaissance operation compromised and five Blue personnel were captured as a result.

**Finding 1 ► Blue forces could not isolate or suppress enemy anti-access capabilities consistently during the experiment.**

Numerous enemy anti-access targets were identified and destroyed, but CJTF-S retained an anti-access capability throughout most of the experiment. CJTF-S used the majority of his anti-access capabilities during the pre-emptive strike on Blue forces entering the JOA. Additionally, he used deception and concealment to retain some of these assets. CJTF-S's use of asymmetric assets such as civilian aircraft, terrorist MANPADS (man-portable-air-defense-system) and naval mining enhanced his anti-access campaign. CJTF-S could not stop Blue forces entering the area AOR, but he definitely disrupted Blue forces entering the JOA. IO efforts above the JTF level would have played a large part in the success of Blue's ability to suppress adversarial anti-access capabilities and IO play may have contributed to the constraining of terrorist or other asymmetrical threats to friendly forces, prior to and during hostilities. There were, however, no indications of IO play above the JTF echelon.

From the completion of the Blue planning phase until Blue's entry in the JOA, OPFOR forces took no kinetic actions against friendly forces. Many asymmetric and some kinetic enemy actions might have been directed against Blue forces flowing into the region during this lull in combat. If the enemy had attacked Blue forces during this period, the pre-emptive strike may have had less effect or may have been precluded entirely. Nevertheless, an OPFOR anti-access campaign initiated, during this period, may have hampered Blue's ability to gain entry into the JOA.

Most respondents reported the friendly strategy to counter the enemy anti-access strategy was adequate (See Figure 42), but it was not adequate at the operational level. If CJTF-S had a few more assets, his strategy probably would have had an operational effect on Blue forces. As the experiment demonstrated, CJTF-S was able to disrupt Blue's flow into the JOA. One respondent commented, "Enemy strategy has not significantly degraded the ability of BLUE to access or move within the theater. I do not perceive that the enemy (CJTF-S) intended to restrict access. Most of the focus was to disrupt the ability and garner world sympathy to his plight. Estimating that he (CJTF-S) could not totally prevent access to RED, his use of forces to attack and degrade capabilities seems to be more effective than trying to totally prevent access."

Another participant said, "Friendly [Blue] commanders were able to anticipate enemy activity, but not pre-empt (it)." "Blue has done a good job of collecting information on Red units

and disposition.” “Assessment was dead on. Information gathered enabled Blue forces to assess, plan, and execute their operation to fruition.”

The OPFOR pre-emptive strike was a good example of assessing the risk, but failing to take the necessary action to address that risk. Blue considered a pre-emptive strike possible, but

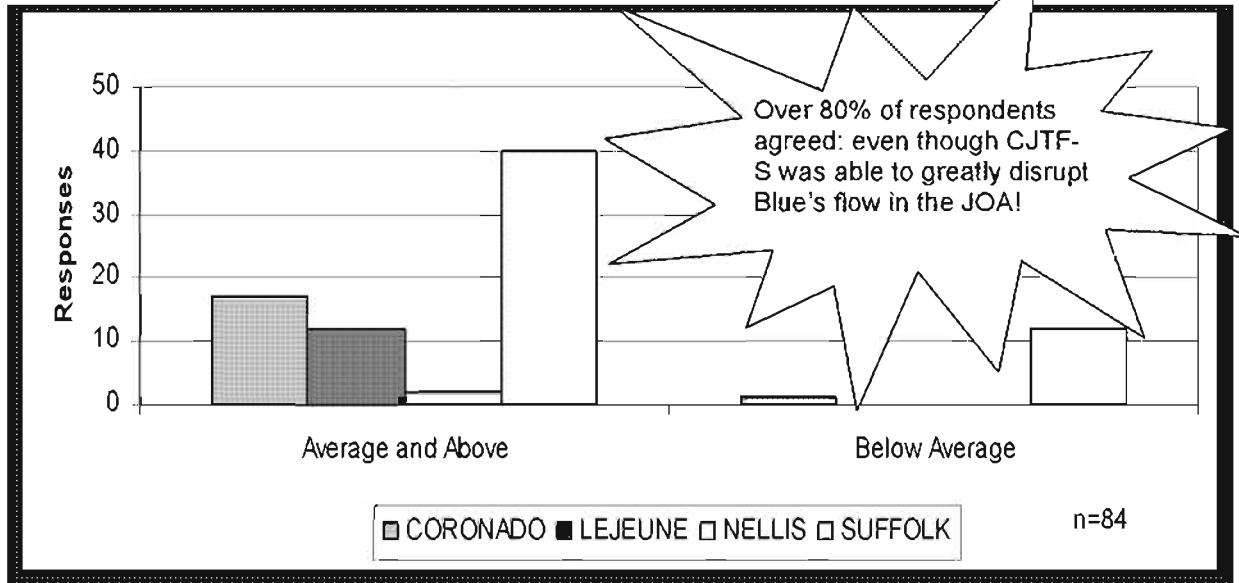


Figure 42: Rating of adequacy of friendly strategy to counter enemy anti-access strategy

was not fully prepared for the CJTF-S’s attack. Blue apparently identified and considered the possibility of an enemy pre-emptive attack as part of the base plan during Spiral 3, but countering that possible CJTF-S option was not further pursued by the JTF at the start of the execution phase. Possible contributing factors to Blue’s moderately unsuccessful handling of the enemy’s anti-access strategy may be due to inexperienced personnel, the lack of familiarity with Blue staffing structure and processes, and information overload. These factors affected the staff’s ability to distill the important information from the tremendous amount of data available to the JTF and process it through the proper sections in a timely, orderly fashion.

At the component level, measures were considered and emplaced for their entries into the JOA, but there was an apparent failure at the JTF level to assimilate/integrate the component’s JOA entry plans into a coherent JTF level entry plan. A mitigating factor here may be that the heavy, mission-planning load, which occurred concurrently with JOA entry, may have overshadowed counter-strategies for OPFOR anti-access initiatives.

Apparently, there was no conceptual linkage between the components and the JTF for joint entry operations. The joint rear area coordinator (JRAC) appeared to have the majority of the security and protection assets in place prior to hostilities. On D+2, a JFACC observer/trainer indicated that the isolation and suppression of CJTF-S’s anti-access capabilities were a primary objective for the JFACC. Specific JFACC actions for freedom of navigation operations (FON) were to fly CAP to support JFMCC efforts to restore FON, support JFMCC efforts to neutralize CJTF-S threat to FON in the littorals and the chokepoints, support the JFMCC to neutralize CJTF-S mine-laying capabilities, and find and deny/destroy CJTF-S CDCM capabilities.

The JFMCC appeared prepared for most enemy contingencies, unfortunately the enemy’s pre-emptive strike overwhelmed Blue’s air defense capabilities. Friendly force flow into the JOA appeared well thought out and executed. The TPFDD process received a few comments



indicating that a closer relationship between logisticians, planners, and operators would improve RDO operations.

Senior concept developer comments indicated that the CIE environment helped with both the isolation and suppression of adversary anti-access capabilities and with Blue's ability to achieve operational sanctuaries of space and time necessary to execute RDO. The clear delineation of the supporting/supported relationships between the components also contributed to the success of both of these warfighting challenges. Although numerous ISR assets were available to Blue forces, the limited feedback from these systems (through modeling and simulations), hindered planning and operations. Prior deliberate planning must occur and force protection must continue when Blue executes missions to achieve operational sanctuaries.

The SCD also noted, there were no apparent re-supplying actions of enemy forces once hostilities began from external sources. There were internal enemy re-supply operations within the JOA between CJTF-S forces, in particular supply runs to the disputed islands where military supplies were hidden amongst civilian supplies. Additionally, there was also an unconfirmed report of an attempted shipment of military equipment inter-coastally to one of CJTF-S's residences on D+2.

Comments included, "At 030937Z Merchant vessels seen making continuous re-supply runs to the islands." "A military element in [CJTF-S controlled coastal location] was preparing to deliver unidentified military equipment to CJTF-S during the late Zulu hours of 28 July 07. The equipment was to be delivered to one of the CJTF-S's residences during the early hours of 29 July."

There was no evidence of active DIME support for CJTF-S from outside the JOA. However, passive assistance in the diplomatic arena came through sympathy to CJTF-S, including some foot-dragging by some regional officials on investigations and actions for incidents in which Blue forces were targeted by terrorists in neighboring countries, as well as intermittent support from the government of Red. Protests occurred in neutral countries, not for the OPFOR, but against Blue's actions in the region. The enemy was receiving open source information from some countries, until that flow of information was shut down in response to a Blue request. No noted military assistance flowed to the enemy. Additionally, there was no indication of economic support to assist the enemy.

**Finding 2► Blue did not successfully create operational sanctuaries in time and space necessary for conducting RDO.**

The OPFOR pre-emptive strike, the Marine STOM and to a lesser degree, the compromised Special Forces reconnaissance mission demonstrate Blue's inability to achieve and or maintain operational sanctuaries in time and space. However, Blue was able to overcome each of these specific events and successfully accomplish the assigned missions.

Although Blue suffered land, air, and sea forces losses, Blue was able to consistently achieve local superiority at the time and location of its choosing. Blue was able to achieve operational sanctuaries of time and space necessary to conduct RDO with two notable exceptions: the enemy's pre-emptive strike on Blue forces in the JOA, and the Marine STOM. OPFOR still posed threats in the air, land, and sea environments, but generally, they could not fend off Blue military attacks against their PMESII nodes. Blue's aircraft losses are shown in Table 7. Blue ship losses are shown in Table 8. Blue personnel losses are shown in Table 9 and ground system losses are shown in Table 10. The majority of air and naval losses were due to air

and missile attacks during the OPFOR pre-emptive strike. Naval mines also contributed to Blue losses. Further analysis is necessary to determine the specific systems causing the damage.

The majority of Blue aircraft losses were due to enemy SAM activity. As reported on DCARS, 74 UAVs were destroyed and 349 manned Blue aircraft. These losses did not stop Blue from achieving operational sanctions except during the pre-emptive strike and the Marine STOM.

Table 7: Aircraft losses by type and component

| Aircraft | Equipment  | Authorized | Loss | Replacement | Available |
|----------|------------|------------|------|-------------|-----------|
| JFACC    | Fixed Wing | 448        | 32   | 5           | 421       |
|          | Helo       | 6          | 0    | 0           | 6         |
| JFLCC    | Fixed Wing | 12         | 0    | 0           | 12        |
|          | Helo       | 42         | 4    | 0           | 38        |
| MARFOR   | Fixed Wing | 75         | 7    | 4           | 72        |
|          | Helo       | 123        | 24   | 9           | 108       |
| JFMCC    | Fixed Wing | 143        | 11   | 0           | 132       |
|          | Helo       | 55         | 11   | 0           | 44        |
|          | MPA        | 10         | 0    | 0           | 10        |
|          | UAV        | 30         | 4    | 0           | 26        |
|          | Logistics  | 4          | 0    | 0           | 4         |
| JSOTF    | Fixed Wing | 26         | 1    | 0           | 25        |
|          | Helo       | 35         | 0    | 0           | 35        |
| JPOTF    | N/A        |            |      |             |           |

Blue reported 13 ships lost to CJTF-S action, with other ships sustaining varying degrees of damage (See Table 8). Enemy forces inflicted this maritime damage and destruction through a combination of CDCMs, surface to surface, SWARM attacks, mines, and mini-sub/mine activities. Except for the pre-emptive strike, Blue naval forces provided sanctuaries in time and space.

Table 8: Ship losses by type and component

| Ships | Equipment    | Authorized | Loss | NMC/PMC | Available |
|-------|--------------|------------|------|---------|-----------|
| JFMCC | Carrier      | 2          | 0    | 0       | 2         |
|       | CRUDES       | 13         | 3    | 0       | 10        |
|       | AMPHIB       | 6          | 0    | 0       | 6         |
|       | Support/Mine | 19         | 6    | 0       | 13        |
|       | HSV/HSS      | 9          | 4    | 2       | 2         |
|       | Submarines   | 4          | 0    | 0       | 4         |
| JFLCC | N/A          |            |      |         |           |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Ships     |           |            |      |         |           |
|-----------|-----------|------------|------|---------|-----------|
| Component | Equipment | Authorized | Loss | NMC/PMC | Available |
| JFACC     | N/A       |            |      |         |           |
| JSOTF     | Various   | 20         | 0    | 0       | 20        |
| JPOTF     | N/A       |            |      |         |           |

Blue land forces established sanctuaries in time and space, except during the Marine STOM when the majority of land component losses occurred. Further analysis is necessary to determine the specific enemy systems that caused the Blue losses.

Blue personnel losses were concentrated during the pre-emptive strike period and during the Marine STOM. Again, with these two exceptions, Blue forces established sanctuaries in time and space. A SOF team was compromised, resulting in the capture of five of its personnel, exemplifying a small but significant loss of Blue sanctuary.

Table 9: Personnel Killed, Wounded, and Missing

| Unit     | KIA | Wounded | Missing | Percent Available |
|----------|-----|---------|---------|-------------------|
| X MEB    | 151 | 330     | 1       | 92%               |
| Army Div | 794 | 224     | 0       | 91%               |
| MEU      | 23  | 117     | 0       | 90%               |
| JRAC     | 0   | 0       | 0       | 100%              |
| JFLCC    | 968 | 671     | 1       | 91%               |

Table 10: Friendly ground system losses

| Ground Systems |           |            |      |         |           |
|----------------|-----------|------------|------|---------|-----------|
| Component      | Equipment | Authorized | Loss | NMC/PMC | Available |
| JFLCC          |           |            |      |         |           |
|                | MLRS      | 18         | 0    | 0       | 18        |
|                | HMMWV     | 69         | 4    | 7       | 58        |
|                | Stryker   | 274        | 2    | 0       | 272       |
| MARFOR         | M1A1      | 68         | 0    |         | 68        |
|                | AAAV      | 153        | 0    |         | 153       |
|                | IAV       | 274        | 3    |         | 271       |
|                | LAV       | 53         | 8    |         | 45        |
| JFACC          | -         | 861        | 0    | 29      | 803       |
| JFMCC          | N/A       |            |      |         |           |
| JSOTF          | N/A       |            |      |         |           |
| JPOTF          | Various   | 69         | 0    | 0       | 69        |
| JTF            |           | 1839       | 17   | 36      | 1757      |

**Finding 3► Despite persistent targeting and rapid engagement, Blue could not deny the enemy sanctuary.**

Enemy forces re-grouped during lulls between Blue attacks. CJTF-S's pre-emptive strike denied Blue targets, which his anti-access assets would have presented had they not been used first. CJTF-S forces also used dispersion, cover, concealment, and deception to preserve assets. Blue forces dominated enemy forces during specific engagements, but enemy capabilities that remained operational after Blue's immediate objective was achieved, had the potential to impact other remaining effects desired by the Blue forces.

Blue's persistent targeting and rapid engagement of OPFOR did not serve to deny sanctuary to the enemy. Moreover, as the OPFOR regrouped between Blue's strikes, Blue's efforts were shown as 'not persistent.' The ONA provided a good starting point in conjunction with the joint intelligence preparation of the battlespace (JIPB) to target key enemy locations, equipment, and forces. The joint fires element (JFE) was responsive to information received, but the time it took the JISR process to feed new and updated information to the other elements in the system was problematic. This delay diminished Blue's efforts to counter enemy PMESII nodes.

The JFACC indicated that the CJTF-S's pre-emptive strike pushed Blue air power somewhat off balance, and that a great effort was necessary to keep Blue air corridors open. Additionally, the lack of M&S ISR fidelity caused frustration amongst the JFACC staff. The JFMCC said the definition for rapidly setting conditions for decisive operations needed to be adjusted before they could become comfortable with it. The Marine STOM was initially unsuccessful and was an indicator that Blue could not consistently set the conditions and successfully execute all operations necessary to achieve the desired effects against enemy PMESII nodes.

To counter enemy anti-access strategies, Blue combined the efforts of the components with the JFMCC targeting C2, TBMs, CDCMs, IADS, surface and sub-surface maritime targets, terrorists, and pirates. The JFACC targeted C2, TBMs, and enemy air and provided support to the JFMCC. The JSOTF targeted terrorists, enemy leadership, communications nodes, and assisted the JFMCC with anti-surface attack against enemy vessels.

Blue reported that 24 percent (12 of 49 node groups for freedom of navigation operations) were effectively struck during ETO 1 operations, on D+4. Additional freedom of navigation nodes were struck, but were not degraded sufficiently to meet the desired effects levels. Forty-three percent (21 of 49) of the node groups attacked in ETO 1 were only partially destroyed, while 16 node groups (33 percent) were rated as not meeting the desired effects levels. During ETO 1A, the percentage of effectively struck node groups rose to 78 percent (38 of 49 node groups for effect 823 during ETO 1A). Partially achieved effects came to 20 percent (10 of 49 node groups), and unachieved effects node groups totaled two percent (1 of 49 node groups). Many of the anti-access PMESII nodes were similar for both ETO 1 and ETO 1A, which allowed the ETO 1 effects achieved to contribute to the ETO 1A effects. This cumulative achievement of effects directly reflects in the increased percentage of effectively struck node groups for ETO 1A versus ETO 1.

**Finding 4► Blue provided sufficient forces, capabilities, and positioning of sensors necessary to conduct EBO and to accomplish the assured access mission.**

Blue forces considered the diplomatic and enemy situations and placed complimentary weapon and sensor systems to provide the necessary capabilities to the JTF commander. When a

Blue system could not be placed to take advantage of its inherent capabilities, other Blue assets filled the void.

An observer/trainer indicated that Blue's redundant capabilities provided incentive to ensure that friendly weapon systems were positioned to take advantage of their operational reach. Additionally, most observers indicated Blue positioning was good and that it accommodated constraints imposed by OPFOR systems.

"Planners are moving JIACG constraining, ISR platform tracks to optimize coverage for the current desired effects(s). The limitation was IADS and for AA threat."

"Again, from what I can tell, and with the limitations, placed on the JTF from the JIACG, they were deployed to exploit the (IR) maximum capabilities."

Had the JTF been tailored (reduced in size) to a greater extent, the components would have placed much more emphasis on weapon system placement. Blue force positioning factors included OPFOR air, IADS, CDCMs, and TBM range capabilities as well as political considerations constraining Blue force deployment, basing, and employment. A senior concept developer mentioned that MC02 might not provide the proper venue to properly test Blue's ability to provide sufficient operational reach.

Blue had mixed results with the placement of systems to find enemy forces and capabilities. Some individual pieces of equipment could not be placed for maximum operational reach; however, other Blue assets performed the necessary functions. Initial friendly force positioning somewhat limited Blue's ability to find and monitor enemy assets. When the JTF placed equipment in non-optimal locations, it was usually because of diplomatic or geographical reasons. Prior to hostilities, friendly ISR devices were positioned away from enemy territory so that optimal systems coverage was not possible for many assets. However, friendly maritime assets were stationed in or transited waters within the enemy's monitor and attack radius. Some Blue war fighters defended this use of friendly maritime assets as being within the range of acceptable risk, and because this course of action would allow more flexibility for the anticipated follow-on mission of capturing the disputed islands.

Additionally, an experiment related shortfall might have caused critical intelligence data from reaching the right people. There was a possible breakdown in the complete and timely transmission of data from sensors to end users, which may have been due to a modeling/scripting shortfall.

Blue used assets based both in and out of the JOA. Approximately seven percent of fixed wing air power, including B-52s, KC-10s, B-1s, and B-2s, were based outside the JOA, and Blue forces took advantage of these systems' operational reach. Additionally, various higher echelon ISR assets were based outside the JOA, although, much of their collection efforts went to the JTF.

Given the initial diplomatic and geographical constraints, the early designation of component ownership of rear area control responsibilities may have eased de-confliction issues, and may have resulted in a more optimal positioning of assets. As fuel was supplied through host nation support, Blue systems again, may not have been optimally positioned to take advantage of their inherent operational reach. Organization and planning, such as that done for the 82D Airborne Division assets, could have resulted in better use of operational reach. In the 82D's case, a smaller rear area footprint, a reduced TPFDD requirement, and a smaller force flow may have resulted from a better use of the unit's operational reach capabilities, if deployed without intermediate staging in the rear area. If the airborne forces flow straight from their home base to

their combat mission, there would be a reduced requirement for a logistics tail at ISBs and a corresponding reduction in the overall number of support personnel.

Other key points that affected force positioning included the need to have more and better joint training, highly capable command and control capability (especially for the joint tactical actions that in the future may be an integral component of the JTF), and an ability to dynamically re-task components. Strategic choke points, such as the Suez and Panama Canals, and various straits may be rendered impassible to traffic, which in turn could force units to occupy alternate locations.

Terrorist activities at APODs and SPODs will also contribute heavily to the non-optimal positioning of friendly forces. A balance between the safety of forces and the ability to use asset's capabilities to the fullest may shift positioning criteria. A C-17 full of paratroopers may be safer and more effective dropping over an enemy objective than landing in the theater rear area due to MANPAD-equipped terrorists operating near the APODs. As a senior concept developer indicated, U.S. forces may have to consider the boundaries of the continental U.S. as the line of departure/line of contact. Although not noticed in this experiment, the positioning of forces for a deception plan may be reason enough not to optimally position forces, for their range capabilities, but rather for their desired effects on the enemy.

Blue was able to successfully employ stealth assets against numerous enemy nodes. Friendly stealth aircraft conducted a disproportionate percentage of the mission strikes compared to non-stealth aircraft. Stealth aircraft constituted only 10 percent of the friendly attacking fixed winged assets, yet they conducted 16 percent of the strike missions. Additionally, stealth losses were only five percent of overall attack aircraft losses with the downing of a single B-2. Time constraints precluded an assessment of data to determine targeting breakout between stealth and non-stealth assets, but generally, Blue stealth assets were more effective than non-stealth assets against the enemy forces.

Prior to hostilities, diplomatic constraints caused some friendly ISR assets to be placed in constrained locations negatively impacting their coverage of OPFOR assets and capabilities. Additionally, Blue did not want to upset the government of Red by operating ISR platforms too close to their borders.

Once hostilities began, Blue repositioned its sensor systems to provide coverage of the enemy's assets. Tactically, some airborne sensors had modifications to their tracks to accommodate potential enemy SAM locations. One SME stated, "In looking at other possible target areas, it was determined that intelligence coverage was desired. When analyzing the available coverage, the UAVs did not have the required range. Re-evaluation of BLUE SOF elements was conducted and it was determined that it was not economical (man-power or material-wise) to task currently employed forces. Coordination to gain national assets to cover the intelligence gap was surfaced." When certain Blue assets lacked the capacity to fulfill a specific mission, the JTF used other assets to perform that mission, or a request for higher echelon assistance was forwarded to the combatant commander.

Other comments indicated that there were sufficient Blue ISR assets to cover the PMESII nodes. Space assets were used in general support, but there was no indication of specific PMESII nodes being covered by space assets. Airborne sensor positions were limited by pre-hostilities diplomatic constraints and later by enemy anti-aircraft defensive systems once hostilities began. These constrained locations prevented friendly assets from using their full capabilities against enemy forces and systems. Some instances of Blue stand off weapons include: air and sea

launched cruise missiles, guided anti-tank weapons, directed bombs, and surface to surface missiles.

The level of detail available for analysis precludes the ability to distinguish specific PMESII nodes covered by space assets; however, Blue briefings indicated that space assets provided general JOA coverage.

No specific instances were discernable where a weapon was assigned to an enemy PMESII node when a longer range, equally capable weapon was available. However, generalities such as the “Weapons used were appropriate,” and “ATACMS vs. B-2 for soft targets” were mentioned by SMEs. These SME comments indicated that Blue had sufficient capabilities to choose among various types of ordnances to accomplish a mission. Therefore, Blue was not forced to use less optimal weapons during operations (See Figure 43).

Comments included using the appropriate assets to target PMESII nodes and noted concern about failure to reach certain targets due to range limitations of the UAV. Additional assets were being investigated fill holes in the coverage. The limited range of some aerial assets precluded them from accomplishing some long-range missions. The asymmetrical nature of RDO pushed the need for lower echelon units to have longer-range ISR capabilities.

Instances of attacks on PMESII nodes have occurred, but those attacks were ordered by conscious decision. Range is only a small portion of the equation. There are collateral damage concerns, which may require precision guided munitions or non-lethal platforms when attacking PMESII nodes.

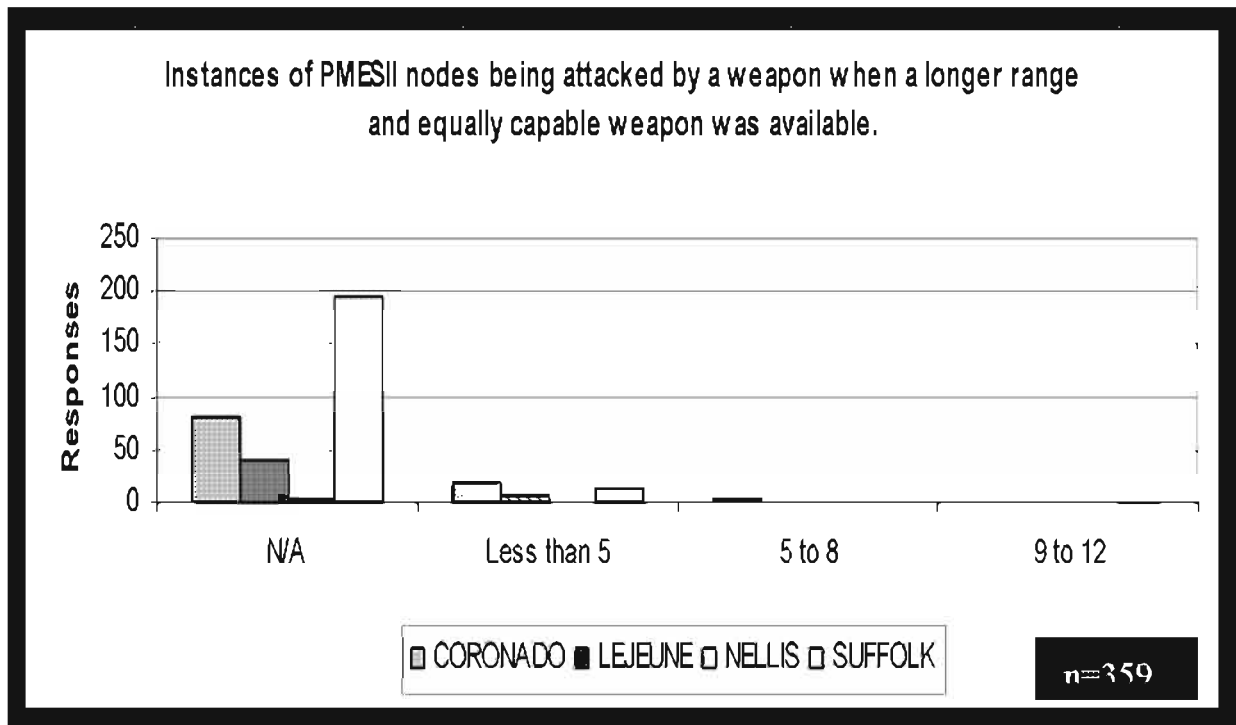


Figure 43: Instances of less than optimum weapon selection

**Finding 5** ► At the operational level, Blue was able to provide protection for operational forces, means, and noncombatants in the JOA.

Blue successfully protected the personnel and assets engaged in RDO. Blue was very successful in protecting civilians (both in the CJTFs controlled areas and in areas friendly to Blue forces) from both enemy actions and unintended friendly actions. MC02 experiment warfighters reported few instances where friendly operations were delayed, disrupted, canceled, or modified due to attacks by enemy forces, partisans, or terrorists. The respondents appeared to refer solely to tactical operations in their comments on this question. SCDs, SMEs, and OPFOR observers stated that the enemy inflicted operational level damage on Blue assets specifically referring to the preemptive strike. Some of the success of the pre-emptive strike may be due to the experiment artificialities and scripting limitations experienced during the experiment.

**Supporting Analysis:**

Blue provided protection against enemy missile and air attacks in the rear areas. But, the enemy was able to conduct successful attacks using civilian airplanes and vessels, and did so primarily to impede APOD and SPOD operations. Additionally, using terrorists, enemy forces attacked supporting, host-nation infrastructure and personnel along with any key leadership whom they thought were aiding the Blue effort.

Operationally, Blue continued its planned missions throughout the exercise without delay, disruption, cancellation, or modification. Blue’s depth in resources more than made up for any losses caused by enemy hostile action. Although the enemy was able to delay, disrupt, and modify Blue actions at the tactical level, including sinking Blue ships and downing Blue aircraft, they were not able to cause the cancellation of Blue operational actions.

Senior warfighters and concept developers warned that the rear area commander should be identified early on in the JTF process. This would allow the command and control and working relationships between the elements from the participating components, and the host nations sufficient time to jell. Designation of a rear area, component commander, to fulfill both the JRHC and the component synchronization of supporting functions duties, is a possible solution. Although the enemy inflicted personnel losses and equipment damages and losses on Blue, the OPFOR could not force Blue to change its operational goals.

Table 11: Forces OPCON to the JRAC by Phase

|                 | Phase 1 | Phase 2 | Phase 3 |
|-----------------|---------|---------|---------|
| Inf Bn (USMC)   | 1       |         |         |
| MV-22 (USMC)    | 2       |         |         |
| MP CO (USMC)    | 1       | 1       |         |
| F-18 (USMC)     | 2       |         |         |
| Inf BN (ARMY)   |         | 2       | 1       |
| UH-60 CO (ARMY) |         | 1       | 1       |
| AH-64 CO (ARMY) |         | 1       | 1       |

Approximately four percent of Blue ground forces were assigned to rear area security. That number nearly tripled depending on the phase of rear area operation if OPCON forces are included in the JRAC ground personnel count.

**Finding 6► Blue was moderately successful in providing operational air, space, and missile defense.**



Blue actions, although generally successful, had notable shortcomings. A preemptive, combined, air and missile attack on forces in the JOA showcased a Blue shortcoming. The Blue maritime component was unable to provide air defense against an overwhelming attacking force, absorbing a tremendous strike, which damaged and sunk several high-value ships. Additionally, Blue was unable to control the airspace around the SPODS and APODS as the OPFOR used civilian aircraft to penetrate friendly airspace. Blue shortcomings may have resulted from:

- Planning for the most likely enemy COA versus planning for the most dangerous COA
- Linkage between component entry capabilities and the JTF JOA entry plan left vulnerabilities open for enemy attack
- Maximum operational reach may not have been used due to positioning for successive missions
- Vulnerability to terrorist attacks against APODs, SPODs, aircraft, and personnel

Blue successfully provided integrated air and missile defense to the degree that the only Blue operational modification was a disrupted entry into the JOA at the beginning of Operation Sovereign Passage. Blue's air and missile defense system was largely in place prior to the commencement of hostilities. Blue prevented all enemy military air and missile attacks from causing damage to the JROAC areas.

Enemy civilian (terrorist) airplanes caused tactical level damage due to the inability to determine the intent of the civilian plane's operators. Blue forces were aware of the aircraft, but could not ascertain the intentions of the pilot. On occasion, these aircraft would veer off their flight paths at the last moment to attack Blue facilities, crashing civilian airplanes into friendly facilities, causing damage to aircraft and killing or wounding personnel. Some of these aircraft were suspected of carrying chemical or biological weapons.

The JTF took 19 days to complete its anti-air umbrella, from the movement to the SPODs on C-5 until the assumption of the JOA responsibilities on C+14. A missile defense battery flown into theater was in place by C+5 for an establishment time of four days. Six missile defense batteries were reported operational, protecting 10 CAL sites by C+16. Four CAL sites were covered by Aegis systems, and host nation missile defenses covered three other CAL sites. Limited THAAD coverage was also in place.

CJTF-S's early preemptive strike was the sole instance where Blue operational level actions were affected by enemy offensive air or missile attacks during the entire exercise. JFMCC sustained significant damage; enough to disrupt his freedom of navigation goal. Other enemy missile attacks became tactically significant, especially when Blue, or merchant vessels were struck, damaged, or sunk. These tactical actions, however, did not cause Blue operational delay, disruption, modification, or cancellation (See Figure 44). This result should be considered within the context of the experiment assumptions and limitations presented in Chapter 6.

Friendly forces successfully identified, attacked and destroyed, or neutralized enemy offensive military air assets. They identified all enemy military aircraft and destroyed 87 percent of them (90 percent of fixed wing, over 80 percent of rotary-winged assets). There were no indications that there were any lapses in Blue's monitoring of enemy aircraft and missile usage against Blue forces. The level of model and simulation detail and the supplemental scripting levels, however, did not provide detailed information specific enough to obtain a definitive answer.

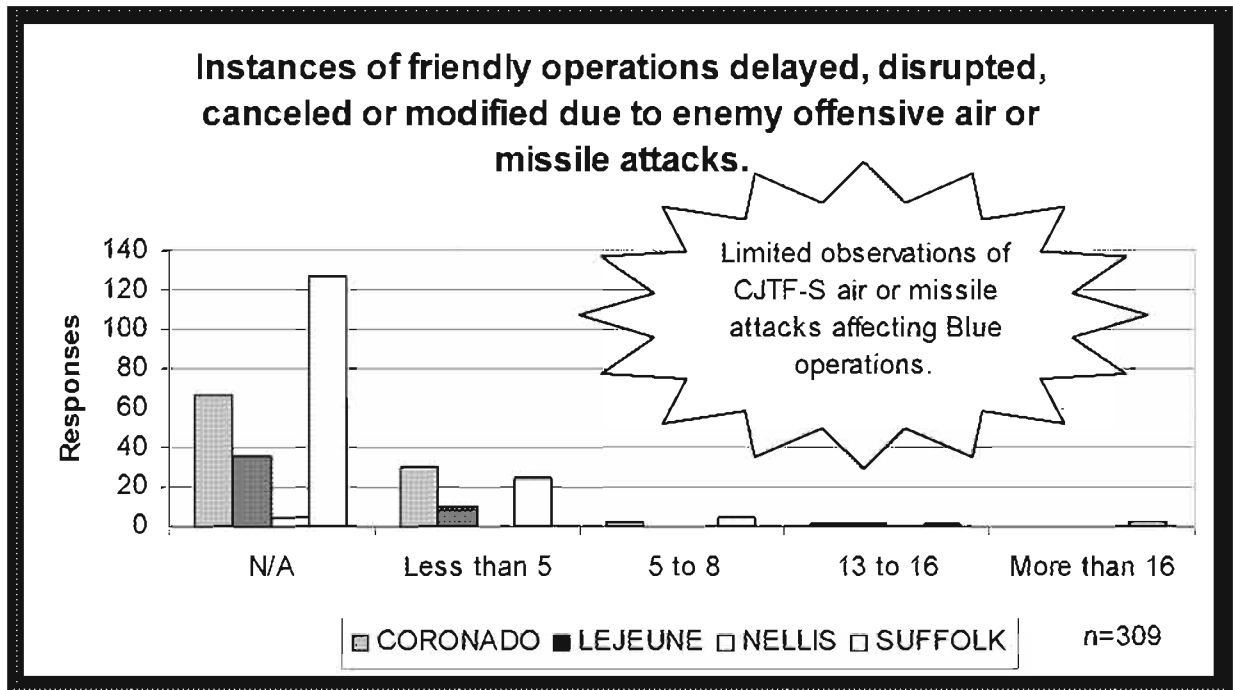


Figure 44: Instances of friendly operations delayed by enemy actions, by days of delay

MANPADS, used by terrorists near friendly airfields, were successfully employed by OPFOR, bringing down three large support aircraft, including a C-5, a 767, and a KC-135.

Approximately 76 percent of offensive enemy missiles were destroyed in flight. Blue naval forces suffered early losses as 11 ships were hit and suffered some level of damage: one AOR, two DDGs, one DDX, three HSVs, one MCM, one MHC, one T-AGOS, and one MPS.

The friendly rear area was very well defended against TBM attacks, with no reported destruction or damage due to those enemy missile systems.

Grading the conduct of tactical warning and attack assessment in the JOA, Blue was successful in identifying incoming missile and air attacks, except during the enemy's pre-emptive strike. The enemy's plan to distract, then overwhelm, Blue anti-air and anti-missile assets produced a great deal of damage and destruction of maritime assets during the opening engagement of the war.

### Other Observations

#### Observation 1: Blue forces protected systems and capabilities in the JOA.

No operations and security (OPSEC) violations were reported neither were there any incidences of Blue action or inaction that conveyed intent to the enemy, such that Blue joint operations were delayed, disrupted, canceled, or modified.

Some minor Blue OPSEC breaches occurred, but these incidences had no effect on Blue operations (See Figure 45).

A Special Forces team was compromised, causing the loss of personnel, but there was no noticeable impact on joint operations that resulted in delay, disruption, cancellation, or modifications to plans. One SME stated, "Friendly intentions were not compromised due to a team being discovered." Had the experiment lasted longer, Blue would most likely have added further missions to rescue the captured SF personnel.

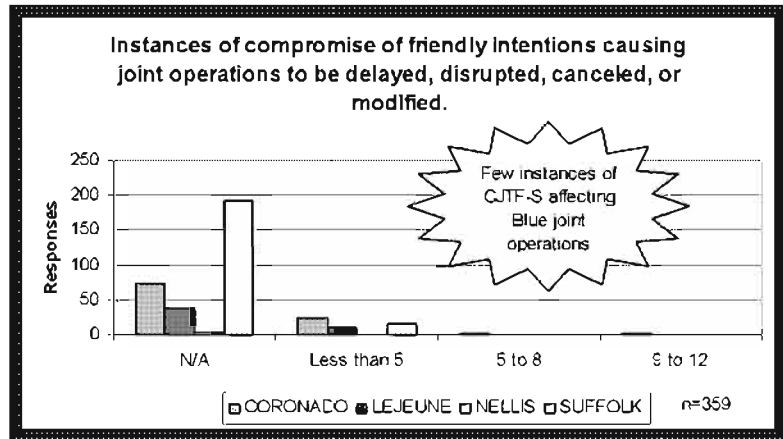


Figure 45: Instances of compromised intentions

### Relationship to Other Objectives

Assessment Area 3 impacted several other experimental concepts and assessment areas. The ones affected are discussed below.

#### ONA

- Database research for facilities and infrastructure provides support to access operations into and throughout the JOA

#### EBO

- EBO assists with the development and execution of Assured Access plans and operations. Assured Access is an integral component necessary to ensure that further Effects Based Operations can occur in the JOA

#### Sustainment

- Assured access permits sustainment of the JTF

#### Collaborative Information Environment

- CIE provides the environment for collaborative planning and coordinating logistics and operations in support of Assured Access operations

#### Interagency

- Interagency relations affect the interaction for coordinating host nation support (food, facilities, equipment) and humanitarian assistance in preparation for and execution of Assured Access operations

#### JISR

- JISR impacts the intelligence on the deployment routes, the JOA and adversary activities therein that would adversely impact force deployment and Assured Access operations

IS

- Information Superiority is a major component in ensuring conditions for assured access operations

EBO Decisive Operations

- Assured access is an instrumental condition for the execution of decisive operations in the JOA

EBO Planning and Assessment

- Effects Based Planning is essential for successful assured access planning and operations

Sustain the Force

- Assured access is necessary for force sustainment operations. Sustainment operations to the JOA are vital for successful assured access operations

**Relationship to Baseline Analysis**

The following entries are relevant to major observations made during MC02.

Baseline entry: The JMC had difficulty in force tracking; reducing force capability to develop and execute movement plans

MC02 Result: The JFMCC showed a vast improvement in this area

Baseline entry: Forces arrived late in the JOA, severely degrading the commander, joint task force (CJTF) ability to successfully prosecute his assigned missions

MC02 Result: During MC02 the JFMCC showed an improvement in his ability to integrate forces arriving in the JOA

Baseline entry: The JTF did not maintain adequate visibility on rear area operations (RAO)

MC02 Result: During MC02 the JTF had very good visibility of the RAO, with CIE, LOG CROP etc. assisting in the situational awareness

Baseline entry: There was little coordination between the theater missile defense (TMD) cell and the joint fires element (JFE). This resulted in ineffective targeting guidance

MC02 Result: During MC02 the JTF was very successful in coordination of TMD and effective targeting guidance given to firing elements. Rear area missile defense was conducted in an exemplary fashion with near perfect performance

Baseline entry: The joint rear area (JRA) was not defined until well after the planning phase, causing general confusion in JRA operations

MC02 Result: During MC02 the JRA was defined early on in the experiment. The rear area planning and coordination for operations was performed in a very organized manner and this resulted in a successful RAO defense

### **DOTMLPF Linkage**

- There is no DOTMLPF package associated with Assured Access

### **Recommendations**

1. JFCOM, develop an Assured Access concept to support EBO and RDO. ►

2. JFCOM, conduct an LOE to explore integration of D, I, and E with JTF operations. ►

- All aspects of the DIME elements of national power should be considered collaboratively, when dealing with an enemy. Collaboration between the D and M aspects of the national elements of power is a pre-requisite for a successful counter to enemy anti-access strategies. For example, regarding the diplomatic to military linkage, a demarche's likely effects on the enemy need to be considered prior to the commitment of friendly military elements. A specific set of ROE for implementation with the issuance of the demarche may increase Blue's ability to successfully counter enemy anti-access strategies. If an enemy is diplomatically backed into a corner where his best and only viable alternative is a pre-emptive attack, the friendly forces in the area should be aware and prepared for that possibility before the enemy attacks.

3. JFCOM, investigate the establishment of an IO group or task force to integrate IO into JTF operations. ►

4. JFCOM, conduct further concept development, experimentation and analysis on JRSOI to focus on effects capabilities in support of EBO/RDO. ►

5. JFCOM, conduct further experimentation on the tailoring of forces from the components for integration into the JTF. ►

- The JTA concept may need to be revised or eliminated, as the supported-supporting relationships seemed to be more than sufficient for all the joint missions executed by the JTF. The tailoring of forces should help reduce the JTF footprint in the JOA, reduce the redundancy of capabilities brought into the JOA by each of the components, reduce the transportation asset requirements for the JTF, and indirectly force the logistics to planner/operations relationships to become more intertwined and streamlined.

6. JFCOM, improve the effectiveness of decision support tools for the deployment and redeployment of JTF resources. ►

7. JFCOM, revise concept documents to specify a closer working relationship between the logistics personnel and the operational planners for RDO logistical integration. ►

- Logistical integration should be much more important in EBO and RDO than in legacy operations. Therefore, a closer and timelier link between the traditional planning and logistics functions is needed. An ONA conduit or linkage for logistical information should assist in the conduct of EBO/RDO.

8. JFCOM, research new metrics for assessment of non-kinetic attacks on non-traditional targets. ►

- Blue forces understood and resourced traditional targets without difficulty. However, asymmetrical targets, such as IO targets or deep land component targets, needed dedicated servicing (complete target cycle) designed for that effect. This servicing implies that a new metric is needed for asymmetric targets, including operational reach. Operational reach in the asymmetrical fight, which has different meaning and parameters than in the traditional sense, should be researched further.

9. JFCOM, explore assigning ISR platforms at lower echelons to meet the tactical ISR demands placed on tactical units by the asymmetrical nature of EBO/RDO. ►

10. JFCOM, develop a dedicated, joint, rear-area command concept refined for EBO/RDO. ►

11. JFCOM, provide guidance on pre-hostility ROE change implementation to support RDO actions, and to ensure the safety of friendly forces and capabilities in the JOA. ►

- Specifically, establish clear guidelines for civilian aircraft transiting the JOA. This guidance should help ensure safety in the JOA from civilian aircraft, whose intentions are unknown. The guidance should give friendly forces the time and space necessary to react to civilian aircraft once their intentions are determined.

12. JFCOM, refine joint air and space missile defense doctrine to support effects-based operations. ►

- Both force packaging of ADA assets and TPFDD flows of ADA assets, combined with naval air defensive capabilities and host nation ADA capabilities, are ingredients necessary to ensure JOA air and space missile defense is provided through JOA establishment, operations, and disestablishment.



Figure 46: SEAL Team transportation standing by to embark riders to an objective area

## Assessment Area 4 — Conduct Decisive Effects-Based Operations (EBO)

### Overall Assessment Results

The ability to conduct decisive Effects-Based Operations demonstrated future potential as a defense application during this experiment. The JTF proved it could coordinate the actions of a diverse force throughout a large geographic area against a determined and diverse adversary using EBO concepts, processes, and tools. This objective was comprised of three warfighting challenges: to demonstrate the ability to synchronize the application of the full range of joint capabilities in order to engage decisive points in time and space; to demonstrate the ability to integrate full joint capabilities against tactical level objectives; to demonstrate the ability to integrate execution of information operations into Effects-Based Operations.

The ability to synchronize the application of the full range of joint capabilities in order to engage decisive points in time and space was successfully demonstrated during this experiment and was greatly enhanced by the use of Effects-Based Planning. The use of CIE tools gave the JTF and functional components the ability to plan simultaneously both vertically and horizontally allowing better developed responses to the adversary's actions. The availability of the ONA and the ability to access non-military resources through the JIACG and reach-back capability enabled the JTF to access and better understand the application of all facets of National Power (DIME). It also allowed the JTF to achieve desired effects and to respond in a more comprehensive manner to changes in the political and economic scenario. The joint fires initiative (JFI) and time sensitive target (TST) concept, in conjunction with CIE tools, greatly enhanced the JTF's ability to identify, locate, and prosecute targets and to achieve desired effects. However, the ability to conduct operational combat assessment was not successfully demonstrated during the experiment. The ability to conduct combat assessment was hindered in part by experiment constraints, M&S fidelity, and manning of the assessment cells. There are also indications that some of the EBO concepts were not fully used or understood by the participants.

The ability to integrate full joint capabilities against tactical level objectives was demonstrated during this experiment. Although the JTF successfully met this challenge, there was ample evidence that it did not adhere to all of the concepts of Effects-Based Operations and Planning. There is evidence that JTF planners did not develop branches and sequels based on effects assessment, deficiency analysis and predictive analysis as required by the concept. In addition, planning was driven more by the commander than by the principles of effects-based planning. Wargaming was conducted only sporadically during the experiment by JTF and component planners, and then only at the tactical level, leading to an overall inability to anticipate OPFOR's moves and plan proper responses to counter them. The use of collaboration

### Overall Assessment Results

- The JTF demonstrated the ability to coordinate the actions of a diverse force over a large geographic area...
- The ability to synchronize joint capabilities was greatly enhanced...
- The ability to conduct operational combat assessment was not successfully demonstrated...
- The ability to integrate full joint capabilities against tactical level objectives was demonstrated...



and CIE tools enabled the JTF to overcome some of the problems that could have been caused by failure to follow the concept methods. The result of not following concept guidelines was that the JTF was unable to get inside OPFOR's decision cycle and anticipate its moves. The JTF was, as a result, more reactive than proactive in the prosecution of the conflict. Even so, JTF was able to quickly assemble, synchronize, and employ joint forces against key tactical and operational objectives to achieve desired effects, and able to maintain the initiative and dictate the tempo of operations throughout the experiment. Most of the problems observed during the execution of this warfighting challenge can be corrected through training and experience.

The ability to integrate execution of information operations into effects-based operations was not successfully demonstrated during the experiment. Although IO capabilities were considered during operational planning, and some were executed, all IO capabilities were not used and integrated into JTF operations. During the experiment, the assessment of the contribution of IO actions was not fully considered or used to modify or initiate plans and actions. Whether this was a process problem or caused by limitations due to M&S, assessment of the contribution of IO actions was not considered. The JTFs IO campaign plan was mostly ineffective, failing to win over the hearts and minds of the adversary or have a significant impact on the JTFs ability to achieve desired effects.

Special technical operations (STO) was a notable exception in the IO campaign. STO actions were coordinated at the component level, and the information was disseminated to the JTF via STO personnel assigned to the JTF. However, STO actions were not fully integrated across the JTF or into the JTF IO plan. IO was planned, coordinated, and executed at the JTF and component levels, but it was not integrated across the force. Due to poor BDA, the effects of the IO campaign were not always recognized by either the JTF or components; this led to allocation of resources against IO targets that may have already been neutralized. This warfighting challenge needs to be re-evaluated in future experiments.

## **Methodology**

More than 215 experiment participants and observers evaluated this assessment area. A series of 50 questions were given to the warfighters, 68 questions were submitted to the SMEs, 49 C<sup>4</sup>I questions were asked, and 40 M&S questions went out, which were addressing this objective. The questions were directed to the specific person or group that was responsible for the desired information or subject area. Specific information was sought from the C<sup>4</sup>I systems and the M&S systems personnel during and at the conclusion of the experiment via SPPS and DCARS, respectively. JDCAT was used to record the warfighters' and SMEs' surveys and comments. In addition, AARs from various working group, boildown sessions conducted at the conclusion of the experiment with senior JTF HQ and component participants were recorded and comments and recommendations (captured via JDCAT) were used to supplement the programmed data capture. The responses were screened, sorted, analyzed, and tabulated. The data was rolled up through the element, data requirement, measure, subtask, task, and the warfighting challenge levels to answer the objective question. 'Azimuth check' papers for this objective were written in which the key points of the objective were listed and brought to the attention of the SMEs, analysts and the senior concept developers. The papers were available through the SPPS system, and they were the focal points during several August meetings of the SMEs, analysts, and SCDs.

**Warfighting Challenge: Ability to synchronize the application of the full range of joint capabilities in order to engage decisive points in time and space**

This warfighting challenge addresses the ability of the joint force to identify, target, attack, disrupt, and destroy an adversary's PMESII key nodes, linkages, and TSTs in support of EBO.

The ability to synchronize the application of the full range of joint DIME capabilities in order to engage decisive points in time and space depends on the ability to rapidly identify potential targets. Also, sought are the ability to engage TST targets, assigning the appropriate DIME capability to engage the target, and the ability to accurately assess the success or failure of the engagement, determining if the desired effects have been achieved. The specific tasks used to assess this warfighting challenge were: Conduct joint force targeting to support EBO, attack operational targets to achieve desired effects, and coordinate and integrate joint, multinational and interagency support for EBO.

In conclusion, the ability to synchronize the application of the full range of joint capabilities in order to engage decisive points in time and space, as demonstrated in this experiment, was enhanced by the use of Effects Based Operations and Planning. The use of CIE tools gave the JTF and Functional components the ability to plan simultaneously both horizontally and vertically allowing quicker and better-developed responses to an adversary's actions. The availability of the ONA and reach back capability gave the JTF the ability to access and understand the application of all facets of national power (DIME) to achieve desired effects and enabled the JTF to respond in a more comprehensive manner to changes in the political and economic scenario. The ability to develop operational targets was successfully demonstrated and the ability of the JTF to prosecute TST targets using JFI/TST procedures was a significant success. Collaboration enabled the functional components to quickly identify and prosecute TSTs as they were found. It also enabled cross-cueing of targets and provided a nearly flawless transfer of target responsibility from one functional component to another.

The ability of the JTF to conduct operational combat assessment was not demonstrated successfully, possibly due to problems with obtaining timely and accurate BDA and organizational and training deficiencies in the effects assessment cell. The ability to obtain accurate and timely BDA and to assess the success or failure of JTF target prosecution was hindered by poor M&S fidelity and the ISR model's inability to accurately replicate ISR assets. Without accurate and timely BDA, some JTF assets were tasked to re-attack targets already destroyed, or targets that required re-attack were not placed back on the target list.

JTF demonstrated the ability to attack operational targets successfully, using the ONA and reach-back capabilities to determine weapon and target selection to attain the desired effects promulgated in the ETO. The consensus indicated that the TST procedures used during MC02 were nearly ready to use as a joint standard. Some of the procedures and techniques were modified during the experiment and these changes need to be incorporated in the TTP. ADOCS proved to be a viable targeting tool, especially for TST presentation. It should be fielded as an interim improvement, now. However, some users indicated that ADOCS needs further development to become user-friendly. Prior to fielding, the ADOCS interface should be tested to ensure compatibility with other software systems used throughout the JTF.

The ability to integrate joint, multinational, and interagency support for EBO is a concept that showed great potential during the experiment. The use of DIE pillars of national power can have a powerful effect on the battlefield. With the potential impact of DIE actions on the battlespace and the diverse organizations and individuals needed to implement DIE actions, who

should coordinate DIE actions and where should the JIACG be located? The JIACG, as used in this experiment, was constituted as a cell/board within the JECG. Most DIE assets are not controlled by CJTF and the effects they generate are most associated with combatant commander/national goals (nation building, regime change, coalition building, humanitarian aid) as opposed to CJTF desired effects; and in some instances can work against CJTFs plans.

A senior concept developer said, "The CJTF doesn't have the horsepower or authority to access all aspects of DIME."

One recommendation for the JIACG calls for a JIACG forward element to serve as a liaison cell/group on the JTF staff. The group would apprise the JTF of the DIE actions being conducted or contemplated and would solicit feedback regarding these actions' effects on CJTF's overall campaign plan. The liaison cell also would emphasize a JIACG-like element on the combatant commanders staff to direct and coordinate DIE actions. In this experiment, the JTF discussed and contemplated DIE actions, but did not implement them. Due to the construct of the experiment, the major emphasis of the JTF's campaign was focused on the military aspects of DIME.

### **Warfighting Challenge: Ability to integrate full joint capabilities against tactical level objectives**

This warfighting challenge addresses the ability of the joint force to assemble and deploy forces to take advantage of a rapidly changing scenario. The change in situation may be caused by disruption or destruction of the adversary's capabilities, in which case the force is required to dynamically re-task effects packages. Re-tasking is used for follow-on actions or in response to an adversary's surprise attack or when an operational branch is no longer available, suitable, or acceptable for the mission.

Execution of this warfighting challenge depends on the ability of the joint force to respond to a rapidly changing scenario, rapidly assessing an adversary's actions and assembling the appropriate effects packages to take advantage of the changes in the adversary's capabilities or actions. The specific tasks used to assess this warfighting challenge were: Synchronize and employ joint capabilities against key tactical objectives, and dynamically re-task effects packages for follow-on actions.

In conclusion, the JTF successfully demonstrated the ability to integrate full joint capabilities against tactical level objectives. However, although JTF successfully met this challenge, there is ample evidence that JTF did not adhere to all of the concepts of effects-based planning and operations. There is evidence that JTF planners did not develop branches and sequels based on effects assessment and predictive analysis as the EBO concept required. Wargaming was conducted only sporadically at the JTF and component levels, contributing to an inability to anticipate and counter OPFOR's moves. The use of collaboration and CIE tools enabled the JTF to overcome most of the problems that could have been caused by not following the concept methods. The JTF was reactive instead of proactive throughout the experiment.

Horizontal and vertical collaboration allowed the JTF to quickly assemble, synchronize, and employ joint forces against key tactical objectives. When tasked by the combatant commander to secure OPFOR's WME sites, the JTF quickly was able to assemble the required forces, assign a commander to develop a sound plan for implementation, deploy the forces, and conduct RDO (all in less than 48 hours). Under current procedures and doctrine, an operation of this scale could have taken much longer to develop and execute. Using collaboration, the correct

level of leadership interacted directly to rapidly and efficiently resolve all the inherent problems associated with a task of this magnitude.

OPFOR's reaction to the ultimatum delivered by regional governments surprised Blue commanders. However, after an initial setback, coming in the wake of OPFOR's opening attack, Blue quickly regained the initiative and dictated the tempo of operations throughout the JOA. With few exceptions, the JTF conducted operations in the JOA with a minimum of disruption and delay. Due more to overwhelming force than to the use of EBO concepts, the JTF took advantage of disruptions to OPFOR's operations and changes in relative strength and position on the battlefield to achieve desired effects.

The concepts concerning joint tactical actions and effects packages need to be redefined. There is no universally accepted definition of what JTAs or effects packages are, nor is there documentation to explain how to employ, control, and sustain them. Nevertheless, JTAs and effects packages, as defined in this experiment, were successfully conducted. The JTF was able to assemble forces, assign a commander to plan and execute a specific mission, and then after the mission was completed, reintegrate the forces back into the JTF command structure.

Other than as noted above, analysis indicates that the JTF successfully met the warfighting challenge to integrate full joint capabilities against tactical level targets.

### **Warfighting Challenge: Ability to integrate execution of information operations into EBO**

EBO uses the cohesive, rational, timely, and synergistic application of the DIME elements of national power to affect the coherence of an adversary's war making potential. EBO focuses on the adversary's PMESII centers of gravity. The foundation of IO within EBO is to create desired effects or outcomes that influence an adversary's behavior and will.

This warfighting challenge would use IO to provide the commander with a flexible means to manipulate or influence an adversary's societal coherence and to affect, that which is cherished by the society, regardless of technical competency. According to the IO concept, if planned and executed properly, IO can defuse crises, reduce periods of friction and confrontation, and enhance other DIME elements of U.S. national power. The specific task written to assess this warfighting challenge was 'execute offensive information operations, to include PSYOP and military deception'.

In conclusion, the ability to integrate execution of information operations into effects-based operations was not successfully demonstrated during the experiment. Although IO capabilities were considered during operational planning, and some were executed, not all IO capabilities were used or integrated into JTF operations. Whether this was a process problem or this lack of IO activity was caused by limitations in M&S, assessment of the contribution of IO actions was incomplete.

STO was the one bright spot in the IO effort, STO actions were coordinated with the components, and the information was passed to the JTF via STO personnel assigned to the ISG. However, STO actions were not integrated across the JTF and was not fully integrated into the JTF IO plan. IO was planned, coordinated, and executed at the JTF and component levels, but it was not integrated across the force. Due to poor BDA, the effects of the IO campaign were not always recognized by either the JTF or components; this led to allocation of resources against IO targets that may have already been neutralized.

In summary, the JTFs IO campaign plan was mostly ineffective and failed to win over the hearts and minds of the adversary or have a significant impact on the JTFs ability to achieve desired effects.

**Finding 1 ► Joint force targeting was greatly enhanced in a CIE, with an ONA, reach-back capabilities, and effective combat assessment. However, the ability to conduct effective operational combat assessment was not demonstrated.**

Joint force targeting in support of Effects-Based Operations was demonstrated during this experiment. Collaboration enabled the rapid flow of information both horizontally and vertically, and gave all the players a forum to interact closely to quickly resolve issues of resource allocation, battlespace deconfliction, target allocation/prioritization, and command relationship.

CIE tools, such as SPPS and ADOCS, provided the force with access to the information required to achieve greater situational awareness within the JOA. However, these tools were not as user friendly as they could have been and accessing information was sometimes cumbersome. IWS, on the other hand, smoothly handled dynamic re-tasking of assets with minimal impact on other operations. Asset retasking was necessary to meet emerging threats and operations, ensuring that the appropriate weapon and platform was assigned to the mission,

Collaboration and CIE tools (ADOCS, IWS, and SPPS) were big winners in this experiment, though. IWS was credited with improving situational awareness throughout the force. On the negative side, however, excessive time spent with this tool appeared to become burdensome, especially for decision makers.

Targeting was also enhanced by other concept tools such as ONA, reach-back and the ATO/MTO/ETO process, however, while all of those tools showed great promise, none of them was sufficiently robust or sufficiently refined during MC02 to have a major impact on events.

Although a robust ONA was not developed for this experiment, ONA demonstrated that it could have a major impact on future JTF operations. However, at this stage of its development, ONA was not user friendly.

Reach-back in support of targeting could have been an effective tool, however, there were only limited reach back resources available to test the process.

The ATO and MTO proved to be excellent tools in their domains; however, they were insufficient to integrate the actions of all components including JFLCC and JSOTF.

The ETO showed great potential as a vehicle to provide the commander's guidance and intentions to the JTF. Additionally, the use of the ETO to provide force coordination, tasking, target allocation, ROE, and target prioritization gave the force a single source for all command information. However, based on the small number of the nodes actually attacked and the large number of nodes associated with the CJTF PEL, there appears to be a disconnect between the processes and linkages between the ONA, the ETO and the PEL.

Assessment may be the key to Effects-Based Operations, however due to limitations in M&S fidelity and experiment constraints, accurate BDA, and combat assessments were not always available.

The performance of the effects assessment cell (EAC) was marginal at best. EAC's problems were caused primarily by inaccurate, inadequate, and time-late BDA from M&S; an absence of ISR analysis tools; and an inadequately trained/prepared team.

Predictive analysis was not regularly conducted and as a result, the JTF did little "What if" planning. Branches and sequels were not developed, in accordance with EBO concepts, anticipating what CJTF-S might do, but were based more on what was happening at the moment. As a result, the JTF was more reactive than proactive in prosecution of the conflict.

Supporting Analysis. The PEL is the portion of the ETO that the CJTF uses to establish the effects he wants to achieve in order to meet the combatant commander's objectives for the crisis/conflict; the PEL is modified or changed only when there is a major change in the course of the conflict.

The JFACC uses the joint integrated priority target list (JIPTL) to identify his allocation of airpower, to meet the requirements identified in the PEL; the JIPTL is published daily. Component operations SMEs were surveyed to determine if there were any issues concerning the relationship of the PEL to the JIPTL. Based on 36 surveys, 91

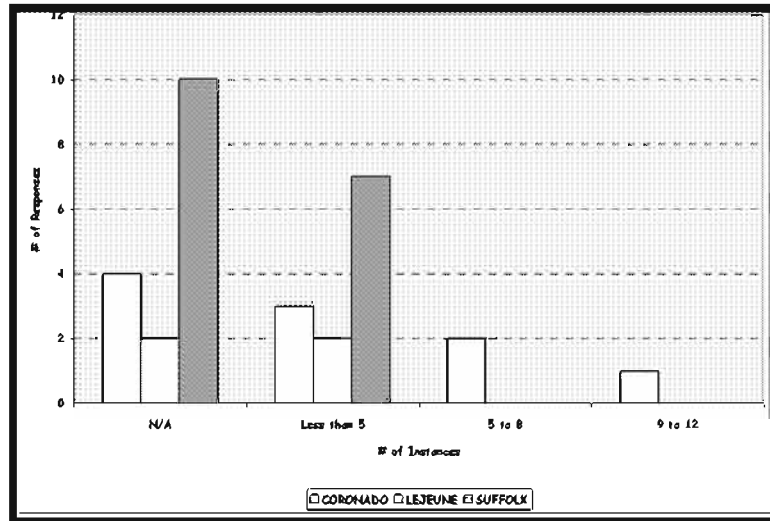


Figure 47: Instances of issues concerning relationship of PEL to JIPTL

percent of the respondents indicated that they found none (See Figure 47). As presented during the JCB meetings, the JPITL paralleled and addressed all items listed in the PEL and indicated the allocation of air resources to each PEL item, effectively complimenting and amplifying the PEL and ETO.

Comments received from some of the SMEs are included below:

“Components were very good about deleting target nominations which no longer reflected the priorities established in the PEL. Frequently, they nominated new targets as a result of PEL changes.”

“The PEL was definitely used for planning; the maritime target list was consolidated in the MTO and passed to the JFACC as a part of the MTO/ATO integration.”  
On the negative side, these comments were noted:

“The JIPTL has seemed to jump around from WME, to islands, to maritime superiority with accompanying shifts of main effort from JFMCC to JFLCC and back.”

“Focus changes a lot after 1-3 days and the JIPTL may conflict with PEL of the day (that the JIPTL is in effect.)”

The JIPTL proved to be an effective tool for turning the PEL's desired effects into a plan for allocation of assets via the ATO/MTO.

The ETO is the document published by the JTF to impart his guidance and intent, force allocations, ROE, PEL, target restrictions, and other vital information to his subordinates. After publishing, the ETO was usually modified by issuance of FRAGOs. New ETOs were issued when there was a major change in the emphasis of the conflict and to direct Branches and Sequels to the ETO.

The ATO and the MTO were developed and published daily by the JFACC and JFMCC. Survey responses obtained during the experiment and anecdotal evidence obtained from senior concept developers, testers and warfighters during Azimuth, Infocus sessions and AAR briefings all indicate that there were no significant issues concerning the cyclical targeting cycle and the

non-cyclical ETO process. Component operations SMEs were also surveyed and 94 percent of the respondents (based on 36 surveys returned) indicated that there were no significant issues (less than five instances noted), concerning the cyclical targeting cycle and the non-cyclical ETO process.

The ETO was modified by FRAGOs as incidents occurred and the conflict changed scope and direction, the ATO/MTO was modified daily, as required, in response to the FRAGOs, JTF guidance and to meet the requirements specified in the FRAGOs. In this experiment, the targeting cycle as represented in the ATO/MTO was unaffected by the ETO cycle, and was able to respond quickly and efficiently to changes in the ETO targeting requirements as promulgated in the FRAGOs. However, the need to rework ATO/MTOs in response to the issuance of the FRAGO could lead to problems developing future ATO/MTOs, possibly a shorter ATO/MTO cycle or the development of a cycle within the cycle needs to be developed.

Of those that identified instances of issues, the following comments were submitted:

“The added issue of the indirect link between non-cyclic ETO process and targeting cycle is amplified. When in a responsive mode (as in after the enemy preemptive strike), the change in the desired effects in the ETO process will directly affect the targeting cycle. It may be a significant issue as in drastically changing the targeting priorities due to a major shift in effects-based operational planning. Or it may result in a small change in the target priorities due to the lack of expected results from the first effects-based operational assessment.”

“Planning on the fly for multiple ATO/MTOs. ATO ‘C’ required significant rework. Rework of both ATO ‘K’, ‘L’ slowed down ATO ‘M’. A shorter ATO cycle might be considered to support RDO or create a cycle within a cycle.” (JFMCC SME)

“There were some issues revolving around the need to match the MTO to the ATO. The internal maritime planning process imposed constraints on the IO cell in an attempt to coordinate a deception plan. The MSR deadline precluded flexibility in developing the plan. In this exercise PEL equaled tasks not effects.” (JFMCC operations chief)

“ETO process was off concept. New ETOs should have been issued in place of some FRAGOs that were issued when changes to the situation required a change in tactics or emphasis. TST priorities were changed via FRAGO when the concept called for a new ETO to be issued.” (A component operations chief)

Senior concept developers held that the future belonged to a new generation of automated orders. The ATO and MTO are excellent tools in their domains, but they can’t integrate the action of all components including JFLCC and JSOTF/JATF necessary to create joint effects. Said one developer, “I believe we should move from the ETO to a JTO, and eventually replace all the Service orders (with a FRAGO or a JTO). We should move toward a Joint Integrated Tasking Order (JTO or JITO) to complement the ETO. The ETO itself should continue to focus at the operational level, and should not itself substitute for a tactical execution order like the ATO.”

The CJTF said, “To seize the islands within 48 hours, the battle rhythm went out the window. The capability of the ETO, empowered by the ATO-MTO, coupled with commanders’ understanding of my guidance and intent could turn the entire force within two days—this is phenomenal. We turned it physically and mentally, with diplomatic support as well. Everything we needed was there. Rapid and decisive actions were empowered without orders.”

High Payoff Target List (HPTL). The HPTL was developed during Spiral 3 (regarding OPFOR Targets). MARFOR and JFACC addressed the use of the HPTL in their CONPLANS.

However, based on the responses from 36 of 40 surveys sent to component operations SMEs during the execution phase of the experiment, the HPTL developed during Spiral 3 was neither modified nor referenced during execution. For JFMCC there was a list of non-TSTs that were high priority and the ATO/MTO was modified to accommodate them. Those targets were directly related to the PEL/JIPTL. High payoff targets were addressed as part of the JCB brief to CJTF and identified in the PEL/JIPTL/TST target lists. However, there were no known issues of its relationship to the PEL/JIPTL and TST Priority List.

SME comments included:

"TST list has remained relatively stable. High payoff targets have shifted with the changing priorities of the main effort/JIPTL."

"For JFMCC, there is a list of non-TSTs that are high priority and the ATO/MTO may be modified to accommodate them. Those targets are directly related to the PEL/JIPTL."

"The TST is being used extensively in the JSOTF. All executions of missions are listed and prioritized on the TST priority listing."

The reach-back concept was envisioned as a method for warfighters to gain direct access to resources such as centers of excellence (COE), academia, and Service colleges as needed. The concept allowed them to garner pertinent information that could help them choose the target, the appropriate weapon, and the platform to inflict the most damage on an adversary's capabilities, while inflicting a minimum of collateral damage on the civilian population.

Although experiment constraints prevented creation of a robust reach-back capability, there is anecdotal evidence that reach-back was successfully used to augment the ONA when

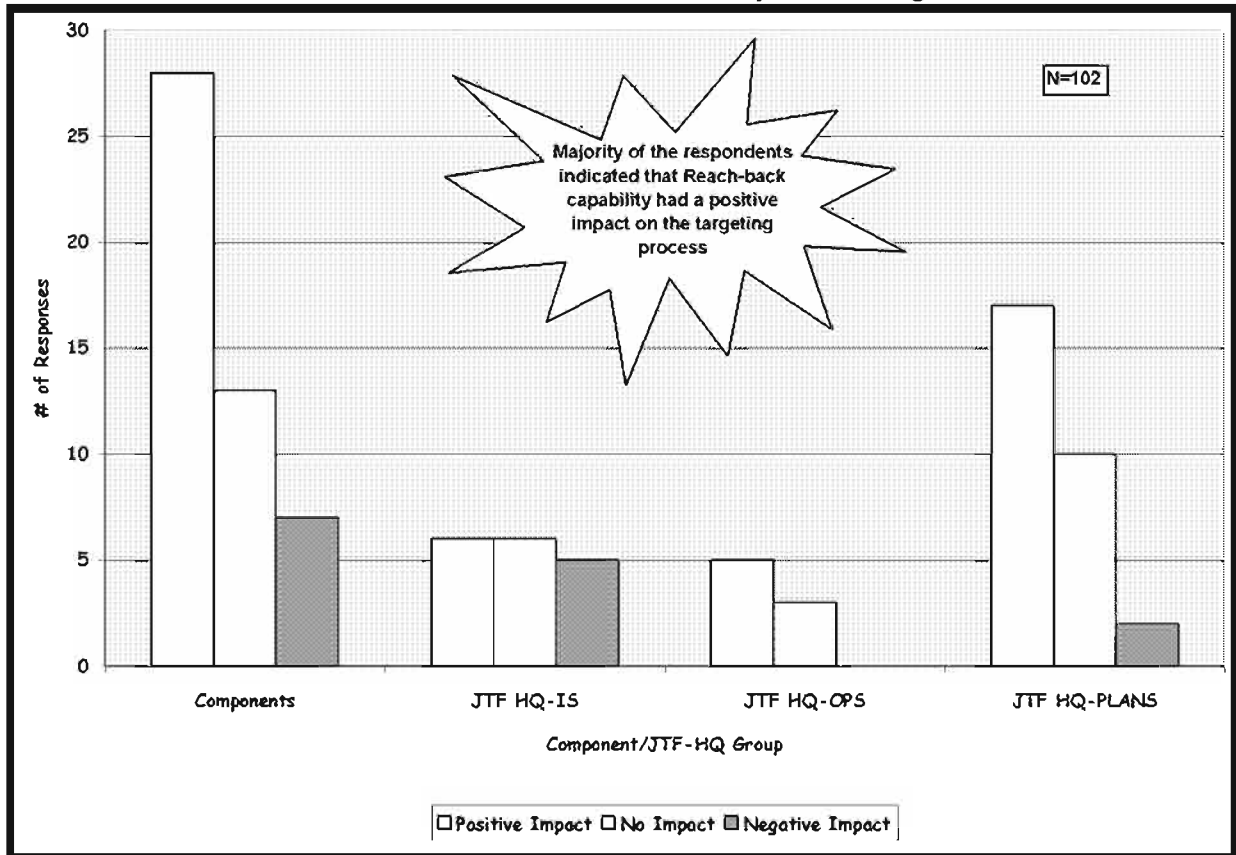


Figure 48: Reach-back capability had a positive impact on the targeting process



researching targets for prosecution. The biggest use of reach-back was to assess collateral damage probabilities on selected targets. Of 102 survey responses from SMEs (See Figure 48), 55 percent indicated that the reach-back capability provided a positive impact on the targeting process.

Forty-five percent indicated “No Impact” (31 percent) or “Negative Impact” (14 percent); however, there were few comments provided from the SMEs as to why they indicated that the

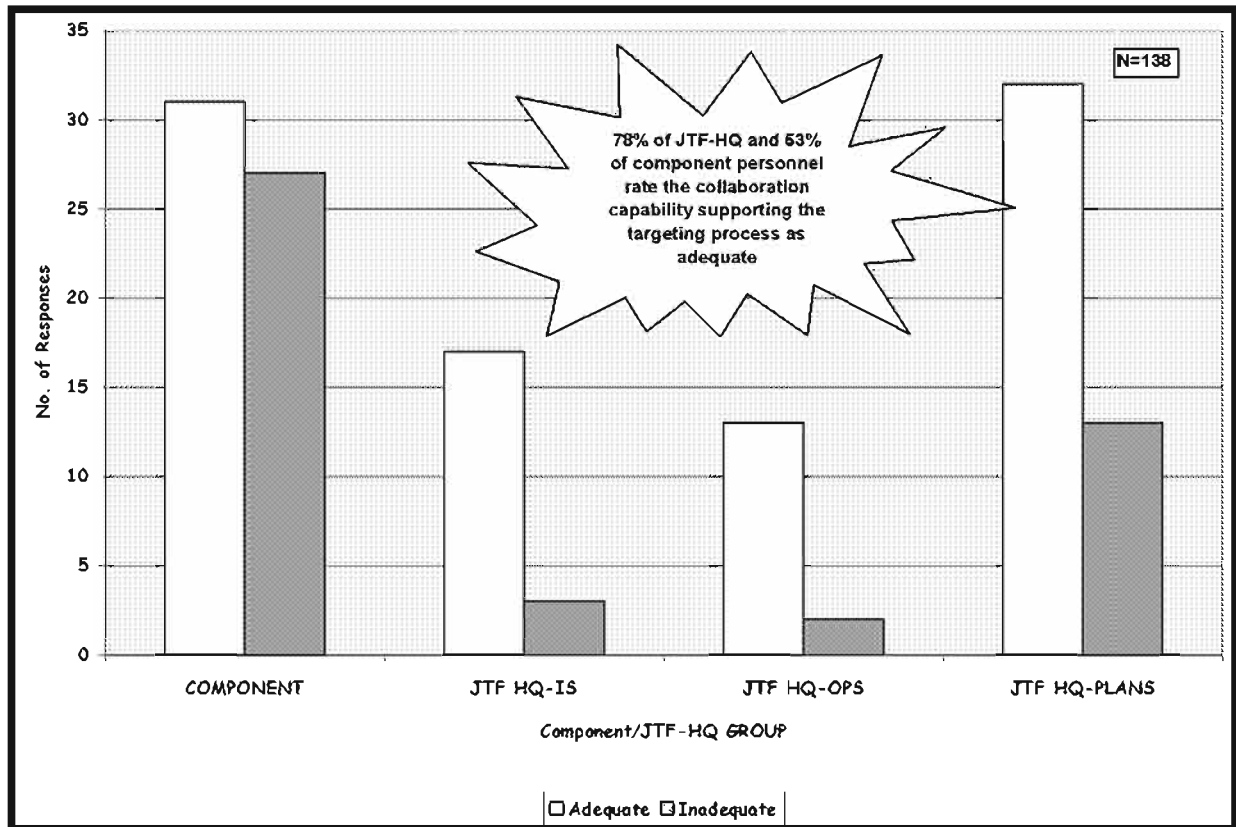


Figure 49: Collaboration capability is adequate

impact of reach-back in support of the targeting process was negative. Said one SME, “IWS provides great reach-back to national level agencies to support targeting,” he said “reach-back to FIWC helped targeting IO targets.” In regards to the robustness of the capability, a JTF HQ IS and plans SME said, “Simulated reach-back did not replicate requirements,” and “it could not exercise full capabilities due to the artificiality of the current ONA database.”

Although reach-back capability in support of the targeting process could not be fully demonstrated during this experiment, it showed great potential.

Collaboration, specifically using IWS, was rated an overwhelming success in supporting the targeting process. In the prosecution of TSTs, the JFE’s ability to more rapidly and efficiently service targets was improved.

Collaboration allows a significant amount of information to be delivered to many people quickly; however, this information still must be processed and put into action. Too many CIE meetings can lead to too little time for turning the information into knowledge and into coherent actions. Considering the number of people who can access a collaborative session, rules are needed to avoid lengthy and complicated sessions that slow the targeting process. In addition, some participants indicated that the meetings were more informational than decisional; the

meetings should have provided information that would lead to discussions of options that could lead to decisions. Some warfighters indicated that the CIE tools needed a better balance of push/pull and that more information should be pushed to the users.

Overall, collaboration enabled the rapid flow of information both horizontally and vertically between components and the JTF staff. Pop-up and emerging targets could be identified, located, assigned, and prosecuted quickly using the appropriate weapons and platforms for the task. Collaboration gave the force the ability to de-conflict the battlespace, and resolve attendant collateral damage issues in an open forum allowing for efficient use of assets against these targets. Some problem areas include an over use of CIE can lead to wasted time in virtual meetings, the ability for anyone to attend a CIE meeting can lead to too many people in meetings and not enough people doing real work. Good business rules need to be in place to streamline the CIE process. Figure 49 above shows the breakdown of survey responses by both JTF and component participants. Based on 138 responses, 63 percent of the respondents agreed that the collaboration capability supporting the targeting process was adequate.

Comments included, "The potential capability these collaborative systems afford us in the targeting process is very good," said one. "It was helpful to have instant feedback from the coordination component during the TST fire missions. IWS and ADOCS were helpful in clearing targets and airspace to ensure fratricide incidents were minimized." Another officer noted, "There seemed to be enough interaction among key players. All participants were encouraged to add their opinions and no decisions were made without hearing from everyone -- well done -- wonderful concept, collaboration is a great tool." The JTF deputy director of plans said, "the ability to collaborate with higher and adjacent commands in CIE gave us the opportunity to work efficiently through issues that previously would have taken hours or days of man-hours."

However, not all comments were approving. There is an "inability to automatically track between ONA nodes and BE numbers, which essentially stopped the JTF IO cell from tracking and redirecting the IO fight in any meaningful way. It was too slow. Targeting is a dynamic process. Collaboration gives everyone an opportunity to contribute to the process. That is not a good thing— people with nothing to contribute can waste the time of those attempting to do actual targeting. In theory, collaboration should speed everything up, but in MC02, it slowed things to a crawl, while people spent enormous amounts of wasted time in chat rooms and briefings and got nothing out of it." Said another, "It was too complicated and took too much time. From what I observed in passing TSTs from either JFACC, JFLCC, or JFMCC, there needs to be a standard method of gathering imagery, mensurating coordinates, and a common reference point for the TST cell's to be truly effective. Simply put, I need to be completely sure that the target JFACC is passing off to JFMCC is accurately targeted for a GPS weapon. Too much time was spent determining the credibility of a TSTs position."

A JTF planner said, "We can only do one thing at a time, especially in a collaborative environment. We must decide when to use collaboration. It's not always necessary. We must be disciplined – who really needs to play?" In addition, from a component operations chief, "CIE and its tools made situational awareness better, but it also tied the commanders to too many meetings. There was little discipline in the CIE meetings, too much meandering, no real time for planning, CIE can lead to virtual creep, and CIE can adversely affect both JTF and component battle rhythms."

The senior mentors thought collaboration worked exceptionally well. "The collaborative tools greatly facilitated execution, while a mission was ongoing, permitting commanders to discuss branches, modifications, in a quick and outstanding manner," said one mentor. IWS

helped the JCB to achieve overall synchronization." A second mentor said, "The components collaborated on the CIE quickly, developed a common SOP, and used the ADOCS and other tools. It improved TST cross-cueing component to component."

The following responses were received during the combatant commander's In Focus session:

"Key enabler, huge impact horizontally and vertically, allowed the commanders to command."

"Process allows you to build your own "CROP" – once you have the CROP, you do not need to drill down to the tactical level."

"Command enabled because everyone understood the commander's intent, provided ultimate in "mission type orders."

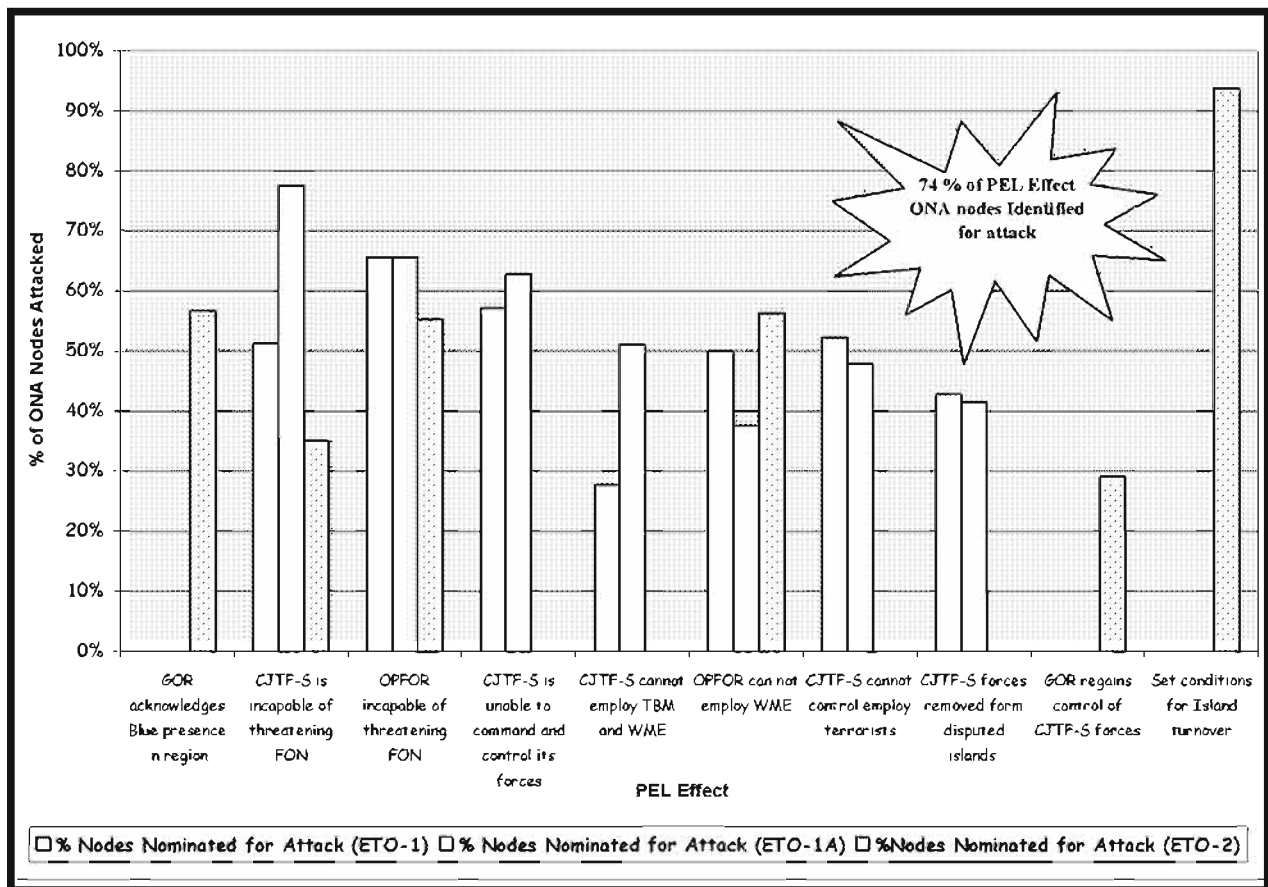


Figure 50: Percent of ONA nodes identified for attack

The ability to rapidly locate, identify, and prosecute targets, within in the JOA, can be enhanced by the use of reach-back and collaborative tools such as IWS and ADOCS. The improved prosecution of TSTs was especially successful during the experiment, due to the use of Collaborative tools. The use of reach-back to augment the information in the ONA allowed the planners to more thoroughly asses the probable unintended consequences of an attack on the target, enabling them to choose the appropriate weapon while minimizing collateral damage. The ability to reach-back to centers of excellence for assistance in determining target priorities and to

help identify the possible unintended consequences of striking particular targets can be a powerful tool in the targeting process. Reach-back in support of targeting can be a very effective tool. However, only limited reach-back resources such as access to the Defense Threat Reduction Agency (DTRA), Fleet Information Warfare Center (FIWC), and the Joint Forces Warfighting Center (JFWC) were available during the experiment. The ability to directly contact centers of excellence, academia, industry, and Service colleges gives the JTF sources of information to help select the appropriate resources to achieve the desired effects. These sources can help the planners and operators choose the appropriate targets, and the appropriate weapon to minimize collateral damage while creating the desired effect

The Prioritized Effects List. The prioritized, desired effects identified in ETO-1, ETO-1A, and ETO-2 and their associated PELs (PEL 001, PEL 001A, and PEL 002) were compared with the nodes associated with those effects in the ONA. Figure 50 on the preceding page graphically shows the comparison of the percent of ONA nodes, nominated for attack, for each promulgated ETO by effect. Based on this comparison, ETO-1 (Operation Sovereign Passage), as identified in PEL 001 and promulgated on July 25, nominated 48 percent of the nodes identified in the ONA for attack. Additionally, 58 percent of the ONA nodes, linked to the desired effects for ETO-1A (Operation Joint Strike), as identified in PEL 001A promulgated on July 29, were nominated for attack. In addition, 47 percent of the ONA nodes, linked to the desired effects for ETO-2 (Operation Joint Stability), as identified in PEL 002 and promulgated on August 13, were nominated for attack. A review of the ONA identified 377 nodes associated with the 10 prioritized effects identified in ETO-1 (seven effects/300 nodes), ETO-1A (seven effects/300 nodes), and ETO-2 (six effects/202 nodes). ETO-1 identified 143 nodes, ETO-1A identified 173 nodes, and ETO-2 identified 94 nodes for attack.

ONA. During this experiment, a robust ONA was not fully developed, likewise all attendant nodes and key linkages were not identified or available. However, ONA demonstrated its potential for future JTF operations. With a fully developed ONA, the JTF will be able to select target nodes and linkages for disruption, neutralization, or destruction that have the greatest impact on an adversary's capabilities while minimizing the impact on the civilian population by minimizing collateral damage. The information contained in the ONA will help the JTF select the appropriate level of force and resources to accomplish his goals quickly and efficiently, and will help put the JTF inside the adversary's decision cycle.

ONA is an essential tool for successful EBO. However, new tools need to be developed to help users to more efficiently and quickly access the data. A more robust ONA, incorporating better search engines and tools, needs to be presented in future exercises and experiments. Most of the MC02 play concentrated on the military aspects of PMESII. Therefore, the targeting guidance was heavily weighted towards the military effects without much thought being given to other components of PMESII that, if attacked, might have achieved the JTF's objectives more quickly with fewer casualties and losses on both sides.

The need to re-task assets in response to the discovery of critical enemy nodes may negatively affect the overall campaign if the re-tasking is not managed to minimize the impact on preplanned and ongoing missions. Surveys sent to component and joint fires cell SMEs noted that throughout the experiment numerous critical targets were discovered and attacked during ETO execution. In all cases, appropriate air, sea or ground assets were assigned to prosecute the new targets.

For example, during the execution of ETO-1, CJTF-S used a regional radio station to transmit orders and information to his forces, making this station a critical node in his C<sup>2</sup> system.

The CJTF immediately made the neutralization/destruction of the radio station a top priority in the PEL and ordered the force to take the radio station off the air. The ATO was adjusted to allocate increased ISR and other air and land assets to the problem. Blue air, sea, ground, and SOF forces repeatedly attacked JTF-S missile sites as well as WME sites. In order to preserve his WME assets, CJTF-S moved part of his WME assets to hide sites. These sites were located and attacked as they were found. Providing strike assets required the dynamic re-tasking of air and land units and changes in the ATO/MTO "on-the-fly." In all cases, prosecution of these emerging targets was handled efficiently with minimal impact on the overall ETO targeting plan. In these and other cases not listed here, collaboration and CIE tools enabled the CJTF to quickly issue guidance and intent to the components, and rapidly and efficiently formulate a plan, and coordinate all phases of the operation. CIE tools, especially IWS, allowed the components to effectively and decisively resolve issues such as resource allocation, collateral damage, and unintended consequences.

Because of the re-tasking of assets to prosecute critical targets of opportunity or emerging TSTs, other operations may have been delayed, disrupted, or even canceled, which could have had a negative impact on the JTF's overall campaign. However, surveys, sent out to component and JTF HQ operations SMEs, found the opposite. Ninety-two percent of respondents reported that there were no operations delayed, disrupted, canceled, or modified, while awaiting operational firepower support. Of the 8 percent of responses indicating that operations were delayed or disrupted, one JFMCC SME indicated that approximately eight operations were affected by the lack of operational firepower as follows: "Three operations were delayed due to fire support. Five canceled awaiting fire support that was destroyed or damaged in initial enemy attack." No other incidents of delays or disruptions were noted by the other SMEs surveyed.

During ETO execution a number of critical operational targets and targets of opportunity were discovered that had not been previously identified for investigation or prosecution. As these new targets were identified, the JTF rapidly re-tasked surveillance and attack assets, using CIE tools, to investigate and prosecute them, with minimal impact on ATO/MTO operations. This experiment demonstrated that the use of collaborative tools in a CIE greatly enhances the ability of the JTF to rapidly identify and attack critical enemy nodes and key linkages found during ETO execution.

Combat assessment is an essential part of EBO. Poor, or inadequate BDA, may lead to a misallocation of resources, and an underestimation of the adversary's true capabilities and intent. Surveys were sent daily to 57 component and JTF HQ plans SMEs, throughout the experiment, in an effort to determine the percentage of targets for which combat assessment was available. Most of the 36 responding SMEs stated that they could not accurately arrive at an answer for this question. Others indicated that as few as 20 to more than 100, targets could be assessed. The following comments were received:

"Assessment is the key to EBO. Effects assessment cell is supposed to fuse information into usable data. The EAC's efforts degraded from effects to BDA as the experiment progressed. Multiple attacks on the same targets were conducted due to poor BDA – a lot of infrastructure was damaged chasing CJTF-S in disregard to PEL (minimize damage to infrastructure). EAC was not really looking at effects." (Component operations chief)

"Most targets can be combat assessed, although many are time late."

"Difficult to tell. A number of targets were nominated for strike but feedback from the effort was inconsistent. Much of the BDA that was received was in the form of level 2 rollup reports."

“Unsure at this time. We are trying to resolve discrepancies with COP display and BDA from response to enemy action.”

“...Had difficulty receiving BDA for component MOPs which impacted ability to make judgments on MOE by the EAC. Suspect overall problem was a modeling simulation problem but it caused us to put greater emphasis on certain effects, (i.e. take more action with air strikes) and ISR collection efforts on enemy C<sup>2</sup>. ”

“Getting BDA for C<sup>2</sup> was very difficult. ISR did not seem to be coordinated to confirm this high priority from CJTF. JTF ISR planners' believed the problem was at the JFACC level in that they were not coordinating TOT windows to effect ISR collection. MJIC provided phase 3 BDA assessment of C<sup>2</sup> (believe white cell input) which allowed the EAC to change assessment from red to amber - this was a go-no-go area for 30 Jul AM airborne drop. ”

Poor BDA can lead to the unnecessary assignment of assets and resources to prosecute targets that are already destroyed or out of action or allow still combat effective targets to remain unchallenged. Surveys were sent to component effects assessment SMEs to determine what percent of targets assessed as ‘killed’ were actually still combat effective. Most indicated that there was very little BDA available to confirm kills, requiring EAC to use secondary methods, such as media reports, and tactical intercept to determine effects. EAC received poor BDA during the experiment mostly due to a lack of M&S fidelity and exercise/experiment constraints and limitations.

A JCB participant said, "Failure to provide adequate assessment of JTF-S's C<sup>2</sup> status, allowed JTF-S to launch a full scale coordinated attack on the Blue force insertion into objective areas #1 & 2. ”

Anecdotal evidence brought up by component commanders and briefers at various JTF update sessions, indicated that the percentage of unnecessary target re-attacks was higher than expected. Poor BDA (inaccurate, insufficient, and late), due to experiment constraints/limitations and M&S ISR fidelity, delivered to the assessment cells, was blamed for the high reattack rate. From a component planner, “lack of BDA was a factor. We probably got good effects, but didn't always know, so we had to go back and re-attack.”

Summarizing this finding, this experiment showed that joint force targeting can be greatly enhanced by using collaborative tools, reach-back, and effective combat assessment. Collaboration, using IWS, helped clear away the ‘Fog of War’ and gave all the players a forum to interact, to resolve resource allocation issues, battlespace deconfliction, target allocation and prioritization, and command relationships. CIE tools, such as SPPS and ADOCS, provided the force with access to the information required to achieve greater situational awareness within the JOA. Emerging targets were identified, located, and assigned for prosecution quickly and efficiently, using ADOCS and IWS to facilitate cross-cueing and asset allocation. Dynamic re-tasking of assets, to meet emerging threats and operations, was handled smoothly using IWS, ensuring that the appropriate weapon and platform was assigned to the mission with minimal impact on other operations. Collaboration and CIE tools (ADOCS, IWS, and SPPS) were the big winners in this experiment. Throughout the experiment, as users became more comfortable with the tools and procedures, their usefulness became more pronounced. The basic concepts are sound; however, more work is necessary on TTPs and development of business rules.

This experiment also demonstrated the JTF's ability to develop operational targets during ETO execution. Using IWS and ADOCS, the JTF was able to identify, locate, and prosecute emerging targets while minimizing the impact on other operations. IWS enabled the force to

quickly prioritize targets, allocate resources, and de-conflict the battlespace as necessary to prosecute the targets quickly and efficiently.

Assessment is the key to EBO. The ability to conduct operational combat assessment in the real world depends on the assets the JTF and components have to dedicate to BDA. In this experiment, there were no asset limitations. However, due to limitations in M&S fidelity and experiment constraints, accurate BDA, and combat assessments were not always available to the JTF HQ or the components.

Over the course of the experiment, the EAC regressed from assessing effects to assessing Battle Damage. As stated by one component operations chief, "Overall, effects assessment didn't work. There were some success stories (Island Campaign), but overall it missed the boat."

"BDA looks through a 'Blue lens'," said one senior officer. "Effects assessment, done properly, looks through a 'red lens'. Effects assessment should examine the state of Red from Red's perspective."

During this experiment, the performance of the EAC was marginal at best. The preponderance of evidence indicates that the EAC's problems were caused primarily by inaccurate, inadequate, and late BDA provided by M&S, and a lack of adequate personnel assigned to the cell. Correction of the M&S problems will require the development of new or modifications to current models to more accurately provide the specificity needed for this type of experimentation. In addition, ISR tools need to be developed to assist the assessment cell with the analysis of the, sometimes, overwhelming data that comes into the cell from ISR and other sources. On the personnel issue, the opinion of a number of SMEs, senior mentors, and OTs was that the EAC was undermanned, not organized efficiently, and not manned with the correct mix of specialties. The following recommendations were made by senior mentors, IS SMEs, and other component and JTF personnel during Azimuth, Infocus and AAR briefings:

The EAC needs to be removed from control of the ISG and placed in either OPS or PLANS. The EAC is currently manned with IS personnel, this is effective in interpreting BDA data, but this information needs to be turned into knowledge that can be used by the operators.

Manning in the EAC should be balanced with IS personnel, to process BDA information, and OPS personnel to conduct predictive analysis and turn the intelligence information into knowledge of the adversary's capabilities and intentions that OPS and PLANS cells can use to develop future operations.

The EAC should be organized into three functional groups:

- Intelligence and BDA data collection and analysis (IS personnel)
- Effects assessment (IS/OPS personnel)
- Predictive analysis (OPS personnel)

Under this organization, operations personnel would be responsible for predictive analysis. As stated earlier in this finding, there was ample evidence indicating that predictive analysis was not being conducted.

**Finding 2► The JTF was able to effectively attack operational targets to achieve desired military effects using EBO concepts, collaboration and CIE tools, (SPPS, ONA, IWS and ADOCS).**

Based on attrition data, the JTF was successful in neutralizing or destroying CJTF-S's ability to conduct war. Over 80 percent of CJTF-S's air and naval forces were destroyed, his primary WME facilities and equipment were captured and/or neutralized, and most of his ground

forces were rendered combat ineffective with the destruction of over 60 percent of his equipment and 40 percent of his personnel.

The JTF's use of the ONA, to establish the key nodes and linkages that would most greatly affect CJTF-S's ability to conduct his operations, and the use of CIE tools and collaboration to coordinate his forces enabled JTF to quickly and efficiently counter CJTF-S's force movements.

Although the ONA used during this experiment was not robust and reach-back capabilities were limited, the information contained in the ONA coupled with reach-back capability and collaboration gave the JTF the tools needed to select the appropriate weapons and platforms to achieve the desired effects while minimizing collateral damage to civilians and local infrastructure. The ONA also helped minimize the risks of potential fratricide. See Finding 1 for additional discussion on this subject.

In addition, as described in Finding 1, some of the nodes that were attacked were not identified as critical nodes for the effects contained in either the ETO or the PEL. This is an indication that the assessment cells were not conducting nodal and deficiency analysis in accordance with the EBO concept doctrine. Due to the poor BDA provided by M&S during the experiment and the lack of good ISR models, there were higher incidents of targets already neutralized being re-attacked and targets still combat effective not being re-attacked, than expected.

The joint fires initiative coupled with TST procedures was very successful.

The ability of the force to use collaboration and CIE tools for cross-cueing of TST and other targets, coordination of forces within the battlespace to minimize mutual interference and battlespace deconfliction issues improved target prosecution significantly.

Collaboration enhanced the ability of the components to coordinate the handoff of TST targets from one component to another.

Collaboration as part of the TST process greatly changed the dynamics of the process, coordination at all levels (horizontally and vertically) was enhanced, and time from target nomination to prosecution was improved.

Although some minor ADOCS problems were experienced during the experiment, when used properly, ADOCS provided a good visual display of the battlefield, providing operators and planners at all levels, improved situational awareness, combat assessment of the TST mission, and the information required to make quick decisions on re-strike nominations. ADOCS, when used in coordination with other CIE tools (specifically IWS), simplified the airspace and operations deconfliction process and made the assignment of assets to prosecute TST targets more efficient.

IWS was a powerful tool that quickly provided amplifying information to all participants in the TST process (perfectly complimented ADOCS/TBMCS), however, use of this tool could become excessive and burdensome and business rules were needed to limit the time spent in lengthy chat room sessions.

#### Finding 2 Supporting Analysis:

The JTF's ability to attack operational targets to achieve desired effects was assessed. In order to establish the JTF's success or failure, it was necessary to determine what nodes were available for attack and the percentage of nodes that were successfully attacked. The ONA used during the experiment contained 706 unique PMESII nodes, with 189 (377 total nodes) associated with the effects published in the ETOs. Reviewing the PELs for each ETO identified



140 unique PMESII nodes that were selected for attack, many of which consisted of multiple targets and aim points. Based on BDA information contained in the ONA, 214 enemy PMESII nodes were successfully attacked, 70 of which were directly linked to ETO effects. The remaining 144 nodes were mostly targets of opportunity or emerging TST targets selected to support ongoing operations. It should be noted, however, that after assessment of available data, it was determined that most of the collected attrition data did not identify the specific PMESII nodes attacked. The disparity between the number of ETO-designated nodes (70) and the total nodes attacked (214) could be related to either the lack of a robust ONA, poor deficiency analysis within the EAC, or poor nodal analysis conducted by the planners.

A thorough nodal analysis within the planning cells should have been able to isolate those nodes that would have had the greatest impact on achieving the desired effect, and limiting the target list to only those nodes. Done properly, this would have reduced the resources required and the time necessary to achieve the desired effect. Deficiency analysis is used to determine why kinetic and non-kinetic attacks are not achieving the desired effects and quickly determine if the correct nodes were selected for attack or if additional nodes need to be attacked to achieve the goal. As noted in Finding 1, there was evidence that deficiency analysis was not being conducted in the effects assessment cells for a variety of reasons, including inaccurate and time late BDA, insufficient manning, wrong mix of specialties within the cell, and the commander centric mindset that developed as the experiment progressed. It is uncertain, based on the available data, whether any nodal analysis was done in the planning cells.

Using only the minimal level of force necessary to achieve the desired effect is one of the key concepts of EBO. Matching force to effect in manner minimizes collateral damage and maximizes the use of available resources. In order to achieve this goal, it is necessary to understand the intended and unintended consequences of the actions being taken to achieve the desired effect.

EA cell SMEs were surveyed daily to determine instances of friendly actions having unintended effects. The results indicated that there were no instances of friendly actions having unintended affects that violated ROE or SECDEF guidance. However, anecdotal evidence of one incident was brought up at an azimuth check briefing, where an attack on a WME storage facility could have resulted in the release of poisonous gas. A second incident was the issuing of the ultimatum, which had the unintended consequence of CJTF-S's initiation of hostilities. Another instance was the disruption of a major power grid. OPFOR turned the attack into a PR disaster for Blue, claiming that the power disruption caused a major chemical/gas leak at an aluminum factory that resulted in thousands of civilian casualties. Blue did not have sufficient information about the factory to refute OPFOR claims.

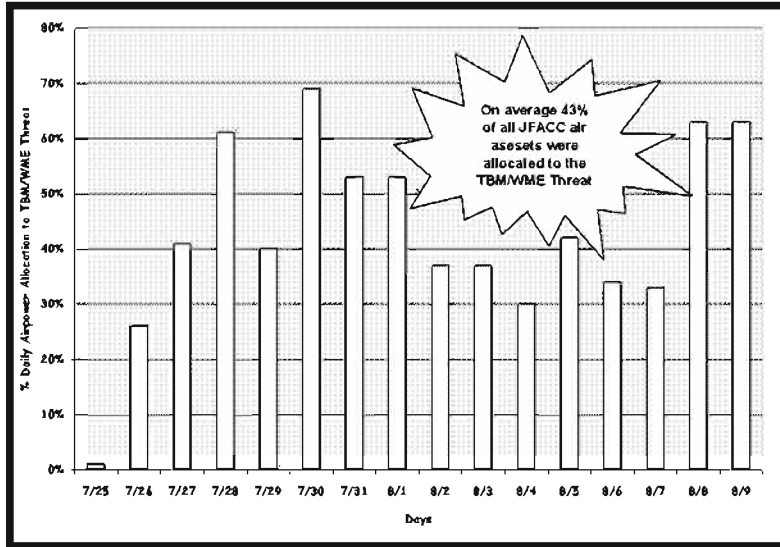
Minimizing collateral damage and fratricide was another aspect to the task of 'attacking operational targets'. No instances of collateral damage and fratricide were noted by SMEs. However, senior mentors recounted one instance of unintended, collateral damage. An attack on the power grid of a major Red city led to a loss of electrical power at a large number of hospitals in Red. Due to a lack of back up electrical generators, a large number of unintended civilian casualties occurred.

Over all, the use of EBO & EBP procedures to attack operational targets was successful.

Due to the importance of neutralizing or destroying OPFOR's WME and TBM sites, the JFACC apportioned air assets to these threats at an equal level of importance. JFACC air allocation for attacks on TBM and WME sites were combined in the PEL and in the JIPTL into one grouping. Based on data obtained from daily JFACC ATO/MTO and JIPTLs submitted to

the JCB, on average 43 percent of available airpower was tasked to the TBM/WME threat. Figure 51 shows JFACC's daily allocation of airpower to the TBM/WME problem.

CJTf used air and SOF assets to neutralize or destroy 133 enemy TBMs and 33 TBM launchers. The destruction of 83 percent of OPFOR's TBM launchers effectively eliminated the TBM threat to Blue forces and Coalition partners in the JOA. Use of procedures developed as part of the joint fires initiative and TST tools developed during the experiment were the key to



Blue's success against OPFOR's TBM threat. Use of collaboration and CIE tools between components enabled the JFACC to rapidly assign air assets to counter the threat, as the location of OPFOR's TBM assets became known. JSOTF assets were used to locate TBM sites and destroy the TBMs and their launchers or relay target information back to JFACC for air prosecution. Naval surface and air forces, in conjunction with JFACC air assets, were successful in destroying TBMs in flight.

Figure 51: Forty-three percent of JFACC assets were allocated to the TBM/WME threat

Table 12 shows the status of OPFOR's TBM assets at the cessation of hostilities.

Table 12: OPFOR TBM Forces Neutralized or Destroyed

| Enemy Theater Missile Forces Neutralized/Destroyed |                 |           |           |                       |                                 |
|----------------------------------------------------|-----------------|-----------|-----------|-----------------------|---------------------------------|
| Type TBM                                           | Order of Battle | Destroyed | Remaining | Percent TBM Destroyed | Percent TBM Launchers Destroyed |
| MRBM (1300km)                                      | 1               | 1         | 0         | 100                   |                                 |
| SRBM (500km)                                       | 120             | 44        | 76        | 37                    |                                 |
| SRBM (250km)                                       | 40              | 8         | 32        | 20                    |                                 |
| SRBM (200km)                                       | 50              | 50        | 0         | 100                   |                                 |
| SRBM (150km)                                       | 100             | 30        | 70        | 30                    |                                 |
| TBM Totals                                         | 311             | 133       | 178       | 43                    |                                 |
| Launcher Totals                                    | 40              | 33        | 7         |                       | 83                              |

The ONA provided the JTF with the location of all of OPFOR's WME sites prior to the start of hostilities. When hostilities commenced, the combatant commander determined that there was an immediate need to secure OPFOR's WME sites, as they were a threat to JTF forces and coalition partners within the JOA.

Using collaboration and CIE tools, JTF formulated a plan to rapidly and decisively take control of OPFOR's primary WME sites. JFLCC was assigned the task to capture and neutralize the WME sites. All of CJTF-S's WME primary facilities were captured or neutralized by Blue

MARFOR/ARFOR/SOF forces. However, prior to Blue's attack on the WME sites, CJTF-S moved WME material and assets to hide sites. Blue forces were able to locate and capture these sites as well, using the ONA and CIE tools (IWS, ADOCS, and SPPS) to coordinate assets and mission assignments.

Describing the planning that went into the WME operation, the JTF deputy director of plans said, "The ability to collaborate with higher and adjacent commands in a CIE gave us the opportunity to work efficiently through issues that previously would have taken hours or days."

At the beginning of the conflict, CJTF-S had over 1800 pieces of major ground equipment, including heavy and light tanks, APCs, MRLs, large and small caliber howitzers, and recoilless rifles and it took the full breadth of Blue's forces to neutralize OPFOR's ground capabilities. The use of ADOCS, IWS, and SPPS to provide a visual display of OPFOR's movements and disposition gave Blue the ability to rapidly redeploy forces and to quickly and decisively counter OPFOR's moves. Collaboration, both horizontally and vertically, using IWS, enabled the rapid resolution of potential targeting and battlespace deconfliction issues between components. It also allowed JTF to assign the appropriate force for the task. Table 13 below shows the breakdown of OPFOR's major ground equipment, by type, neutralized, or destroyed by Blue forces.

Table 13: Major Ground Equipment Neutralized or Destroyed

| Enemy Major Ground Equipment Neutralized/Destroyed |                 |                       |                               |
|----------------------------------------------------|-----------------|-----------------------|-------------------------------|
| Category                                           | Order of Battle | Destroyed/Neutralized | Percent Destroyed/Neutralized |
| Tanks                                              | 315             | 238                   | 76                            |
| TOW                                                | 111             | 86                    | 77                            |
| APCs                                               | 9               | 7                     | 78                            |
| MRLs                                               | 129             | 110                   | 85                            |
| Artillery                                          | 442             | 374                   | 85                            |
| Mortars                                            | 775             | 388                   | 50                            |
| CDCMs                                              | 32              | 29                    | 91                            |
| Total Equipment                                    | 1813            | 1232                  | 68                            |

Based on an examination of DCARS, ADOCS data, and ground unit end strengths reported by OPFOR during the course of the experiment, Blue forces neutralized or destroyed 45 percent of OPFOR's ground forces. Coupled with Blue's destruction of 68 percent of his major equipment, listed above, OPFOR's ground forces were effectively rendered "Combat Ineffective." The table below shows OPFOR's ground unit combat effectiveness at the conclusion of hostilities.

Table 14: OPFOR ground unit combat effectiveness as of the end of the experiment.

| Headquarters    | Unit                 | Combat Effectiveness |
|-----------------|----------------------|----------------------|
| Ground Force HQ | Division Strength    | 63                   |
|                 | 2nd Mech BDE/8th DIV | 100                  |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Headquarters  | Unit                         | Combat Effectiveness |
|---------------|------------------------------|----------------------|
|               | 3rd Armor BDE/8th DIV        | 100                  |
|               | 1st Armor BDE/88th Armor DIV | 100                  |
|               | 300th ARTY BN                | 100                  |
|               | 2nd Armor BDE/88th Armor DIV | 100                  |
|               | 381st ARTY BN                | 100                  |
|               | 1st Marine BDE               | 3                    |
|               | 2nd Marine BDE               | 3                    |
|               | 34th Marine BDE              | 89                   |
|               | 91st SAR Flight              | 15                   |
|               | 41st ATK/ASLT BN             | 25                   |
|               | 3rd ATK BN                   | 26                   |
|               | 4th ASLT BN                  | 25                   |
| 19th INF DIV  | Division Strength            | 68                   |
|               | 1st INF BDE                  | 95                   |
|               | 2nd INF BDE                  | 96                   |
|               | 3rd INF BDE                  | 100                  |
|               | 4th Mech BDE                 | 22                   |
|               | 19th DIV ARTY                | 38                   |
|               | 48th INF BDE                 | 75                   |
|               | 33rd Airborne BDE            | 81                   |
|               | 37th Armor BDE               | 39                   |
| 41st MECH DIV | Division Strength            | 29                   |
|               | 1st INF BDE                  | 56                   |
|               | 2nd Mech BDE                 | 2                    |
|               | 3rd Armor BDE                | 46                   |
|               | 4th INF BDE                  | 79                   |
|               | 55th Airborne BDE            | 33                   |
|               | 28th Armor BDE               | 26                   |
|               | 56th ARTY Group              | 7                    |
|               | 1st CAV SQDN                 | 5                    |
|               | 41st DIVARTY                 | 3                    |

At the onset of hostilities, the adversary had a robust naval force consisting of large diesel and mini submarines, medium surface combatants, amphibious and logistics ships and a large inventory of small boats, including Bog Hammers, minelayers, and Boston Whaler type boats.

All small craft were equipped with machineguns and RPGs. Using collaborative tools for coordination and deconfliction, Blue naval forces successfully neutralized or destroyed 53 percent of OPFOR's naval assets (one SSN defected to GOR prior to the end of hostilities), including 80 percent of OPFOR's major combatants and 40 percent of the small boats. Table 15

below shows a breakdown of OPFOR’s naval forces neutralized or destroyed by Blue during hostilities.

Table 15: Enemy Naval Vessels Neutralized or Destroyed

| Enemy Naval vessels Neutralized/Destroyed |                 |                           |                                   |
|-------------------------------------------|-----------------|---------------------------|-----------------------------------|
| Ship Type                                 | Order of Battle | Destroyed/<br>Neutralized | Percent Destroyed/<br>Neutralized |
| Submarines                                | 8               | 8                         | 100                               |
| Surface Ships                             | 30              | 28                        | 93                                |
| Small boats                               | 133             | 53                        | 40                                |
| Amphibious/Logistics                      | 23              | 13                        | 57                                |
| Totals                                    | 194             | 102                       | 53                                |

Blue was very successful in targeting, neutralizing and/or destroying OPFOR aircraft, SAMs, and radar systems. JFACC, using an integrated ATO/MTO, was able to effectively use all available Blue assets to locate, target and attack OPFOR’s SEAD and IADS. Use of collaborative tools, specifically IWS and ADOCS, enabled JFACC to assign the appropriate assets and deconflict the airspace to effectively prosecute air, SEAD, and IADS Targets. Table 16 below shows the breakdown of OPFOR’s air, IADS, and SEADs systems that were destroyed or neutralized by Blue forces.

Table 16: Enemy Aircraft/SAMS/Radars Neutralized or Destroyed

| Enemy Aircraft/SAMS Neutralized/Destroyed |                 |           |                                   |
|-------------------------------------------|-----------------|-----------|-----------------------------------|
| Type Aircraft                             | Order of Battle | Destroyed | Percent Destroyed/<br>Neutralized |
| Fighters                                  | 76              | 65        | 86                                |
| Recon/SAR                                 | 1               | 1         | 100                               |
| C2/ECW                                    | 10              | 10        | 100                               |
| Support                                   | 12              | 10        | 83                                |
| Misc                                      | 60              | 52        | 87                                |
| IADS Radars                               | 14              | 14        | 100                               |
| SAMS                                      | 19              | 19        | 100                               |
| Totals                                    | 192             | 171       | 89                                |

A review of the enemy nodes selected by the JTF for attack showed that 53 ETO designated nodes and 39 non-ETO designated nodes could be attacked with non-kinetic weapons. Of the nodes that could be attacked using non-kinetic weapons, only five nodes were identified. The non-kinetic attacks were successful and helped the JTF achieve its desired effects. Due to the experiment's construct and constraints, the JTF did not have the time or resources to employ non-kinetic weapons against all targets capable of being affected in this manner. As a result, JTF quickly defaulted to the kinetic option to achieve his goals. A more robust JIACG and reach-back capability would have allowed the JTF more latitude in the use of non-kinetic weapons to achieve some of the effects identified in the ETOs.

There were two incidents of potential fratricide noted during the experiment. Both of these incidents were caused by software problems associated with ADOCS and AFATDS. During the course of the experiment, procedures were developed to correct this problem and make ADOCS more effective and useful as a targeting tool. These new procedures need to be re-tested in future experiments and then incorporated into the TTP.

Based on a review of available target data, approximately 927 targets, within the JOA, were identified as potential TST targets, meeting the TST requirements and priorities established by CJTF in ETO-1, 1A & 2. Of these available targets, 444 (48 percent) were located, identified, and nominated for attack by friendly forces. JFMCC nominated 40 percent of the TST targets for attack, with JFACC nominating 35 percent, JFLCC 14 percent, and JSOTF 11 percent. Of the 444 targets identified and nominated for attack, 327 (78 percent) targets were prosecuted and 122 (27 percent) of those were assessed as destroyed or neutralized. Figure 52 shows the breakdown of targets nominated, prosecuted, and neutralized by each functional component.

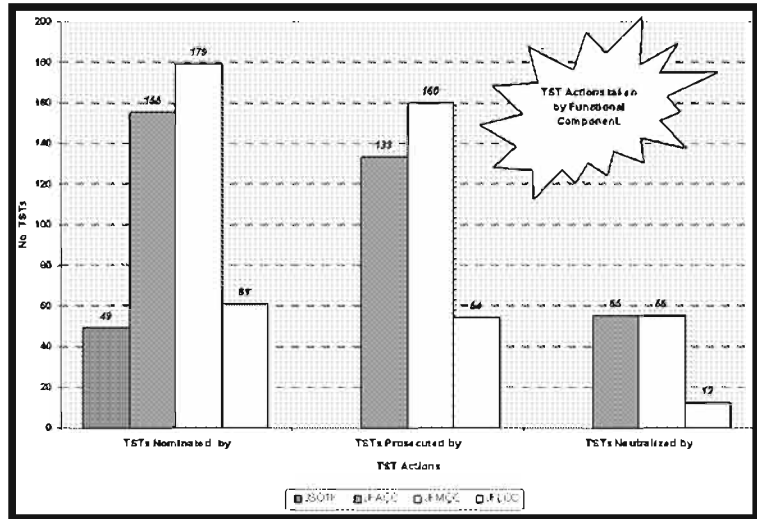


Figure 52: The JFMCC and JFACC were responsible for acting against time sensitive targets

Seventy-eight percent of identified and nominated TST targets were engaged by friendly assets. The percentage breakdown of TST targets engaged by friendly forces follows: JFACC assets engaged 38 percent, JFMCC assets engaged 46 percent, and JFLCC assets engaged 16 percent. Table 17 below describes the breakdown of TST attacks by the functional commander. It is significant to note that SOF assets were not used to attack TST targets; they were however used to locate, identify, and spot TST targets.

Table 17: TSTs attacked by the functional component

| TST Nominating Component | # Targets Nominated | TSTs Attacked by JSOTF | TSTs Attacked by JFACC | TSTs Attacked by JFMCC | TSTs Attacked by JFLCC | Totals |
|--------------------------|---------------------|------------------------|------------------------|------------------------|------------------------|--------|
| JSOTF                    | 49                  | 0                      | 15                     | 21                     | 2                      | 38     |
| JFACC                    | 155                 | 0                      | 81                     | 36                     | 13                     | 130    |
| JFMCC                    | 179                 | 0                      | 27                     | 92                     | 23                     | 142    |
| JFLCC                    | 61                  | 0                      | 10                     | 11                     | 16                     | 37     |
| Totals                   | 444                 | 0                      | 133                    | 160                    | 54                     | 347    |

Twenty-seven percent (122) of the identified TSTs engaged by friendly assets were successfully neutralized or destroyed. JFACC assets neutralized 45 percent, JFMCC assets neutralized 45 percent, and JFLCC assets neutralized 10 percent.

During this experiment, the JTF was able to demonstrate the ability to conduct precision engagement against time sensitive targets (TST). Potential TST targets were identified and prioritized by CJTF, in his ETOs, based on their impact on JTF operations and desired effects. Components located and identified TSTs IAW JTF ETO guidance and nominated targets for attack. JTF used CIE tools to coordinate and assign resources to attack the nominated TSTs.

Surveys were sent to component and JTF-HQ Operations SMEs periodically during the experiment to determine if there were any instances of TST resource allocation that required JTF-HQ adjudication. Based on the responses received, there were a few instances noted when TST resource issues needed to be adjudicated by JTF HQ. Most of the instances concerned weapons selection to reduce or minimize collateral damage. The JFMCC SME noted, "JTF weighed in on approx. 10 instances in resource allocation."

Although JFACC and JFMCC attempted to mitigate the probability of disruption, cancellation, or modification of operations due to emerging TST missions, by pre-designating resources to the TST mission in the ATO/MTO, there were still instances where the ATO/MTO had to be modified on the fly to accommodate emerging TST missions. However, in general, overall operations were not delayed, disrupted, canceled, or modified due to TST missions. One instance was noted by a senior mentor, "most targets were nominated above the line, except on one occasion when 48 JFLCC targets were nominated below the line. This happened because JFMCC had set aside an air package for TST purposes, and therefore, the JFLCC targets were not hit. JFLCC was supposed to be the main effort."

Initial TST guidance was issued by the JTF commander under ETO-1 (Operation Sovereign Passage) and modified by FRAGO #s 015, 018, 021, 023, and 027. Initial TST targets were identified by priority and amplifying information on each target type was provided. Each FRAGO was issued to reprioritize targets, and to add or delete target types as the scenario progressed. No TST guidance was issued in either ETO-1A or ETO-2.

Surveys were sent to component and JTF-HQ operations SMEs to identify instances of TST priority categories and their impact on TST operations. The results of the surveys indicated that instances of the usage of TST priority categories were identified, but none had any significant impact on TST operations. "TST priority categories were used with the TST targets," said one SME observer. "All targets were tracked and passed to the JFACC in a timely manner and acted upon." (JSOTF SME). TST priority categories had no negative impact on targets being struck." Moreover, he said, "priorities on TSTs did not hamper them being struck."

Based on surveys sent to component operations SMEs and JTF HQ TST cell SMEs and other anecdotal evidence, throughout the experiment there was no degradation of TST capability during transfers of TST responsibility from one functional component to another. In fact, due to IWS, the JFE/TST process and ADOCS/TBMCS protocols developed during the experiment, TST transfers were virtually flawless and seamless from one functional component to another.

"Great coordination by JFMCC and JFACC operations groups in execution of TSTs," said one expert. "Smooth handoffs generally between functional components thanks to good collaboration using IWS, ADOCS, and TBMCS." Another SME noted, "IWS and ADOCS have been excellent tools in supporting collaboration and prosecution. All TST missions were transferred without degraded capabilities."

Based on the information received from the surveys submitted from various component and JTF HQ SMEs as shown above, it appears that the TST process, linked to the joint fires initiative, worked extremely well. "The TST process worked, but we need more ISR M&S to accurately represent TSTs; need to differentiate between TSTs and TCTs and how they should be

attacked and screened for collateral damage," said a component operations chief. In addition, according to one senior officer, "The JFI and TST are bullet proof. We got good response. The JFI is one of the success stories and so far is focused on TST."

Anecdotal evidence indicates that the driving factors for the success of the TST/JFI process were CIE (especially IWS) and ADOCS procedures developed during the experiment. Over 200 TSTs were prosecuted during the experiment. "The CIE has been essential," said a senior mentor. "The JTF has executed over 200+ TSTs, an amazing feat. However, there is a tradeoff because those assets have been planned to hit other targets. However, all components requirements were filled."

The time to process TSTs from nomination to prosecution initially was slow to develop, however, as familiarity with the procedures and tools increased, the time delay between nomination and prosecution decreased dramatically. The use of ADOCS with IWS enabled the smooth flow of information as TST responsibility was passed from one functional commander to another for prosecution.

"The process for TST collaboration was mature within the Air Force," said the JFACC

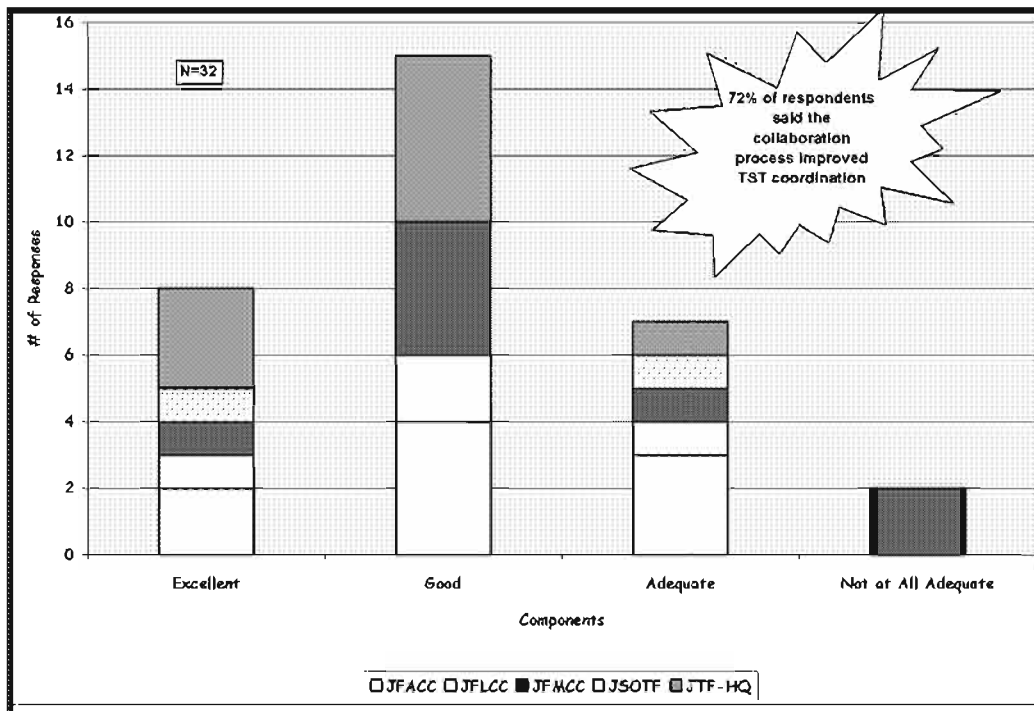


Figure 53: Participants thought collaboration improved TST coordination

commander. "JFI and ADOCS helped component collaboration." The ability to identify TST targets and post them in ADOCS enabled all components to maintain good situational awareness of the TST threats.

There were some shortfalls. During a number of 'Azimuth Check' briefings, senior mentors observed that although the TST process apparently worked very successfully, some of the targets assigned, as TST targets probably did not qualify as TST targets. In their opinion, some components were using the TST process solely to improve the priority of targets they wanted prosecuted, even if those targets didn't meet TST requirements. "We had many TSTs that were not truly TSTs," said one plans chief. "The term TST still has a confusing, dysfunctional definition because it covers too broad a range of eventualities," according to a senior concept



developer. "We need to distinguish between threatening targets that need to be killed immediately when identified, and those that are fleeting, highly lucrative targets. One definitional term cannot adequately cover both eventualities without confusion in planning and execution. There are differences that need to be sorted out between TST, HPT, and HVT because there is still much confusion."

The procedures for using CIE tools for consolidating and coordinating TST information and prosecution were refined and improved during the experiment. These revised procedures need to be verified during future exercises and codified in the TTP.

The TST process and concept, incorporating lessons learned and the revised procedures developed during the experiment, needs to be verified and tested during future exercise and experiments.

According to 32 JTF-HQ SMEs surveyed, the collaboration process greatly enhanced the process for JTF and component planning and TST identification and prosecution. Seventy-two percent of the respondents rated the process as "Good" or "Excellent," 22 percent rated the process as "Adequate" and six percent rated the process as "Not at All Adequate." Figure 53

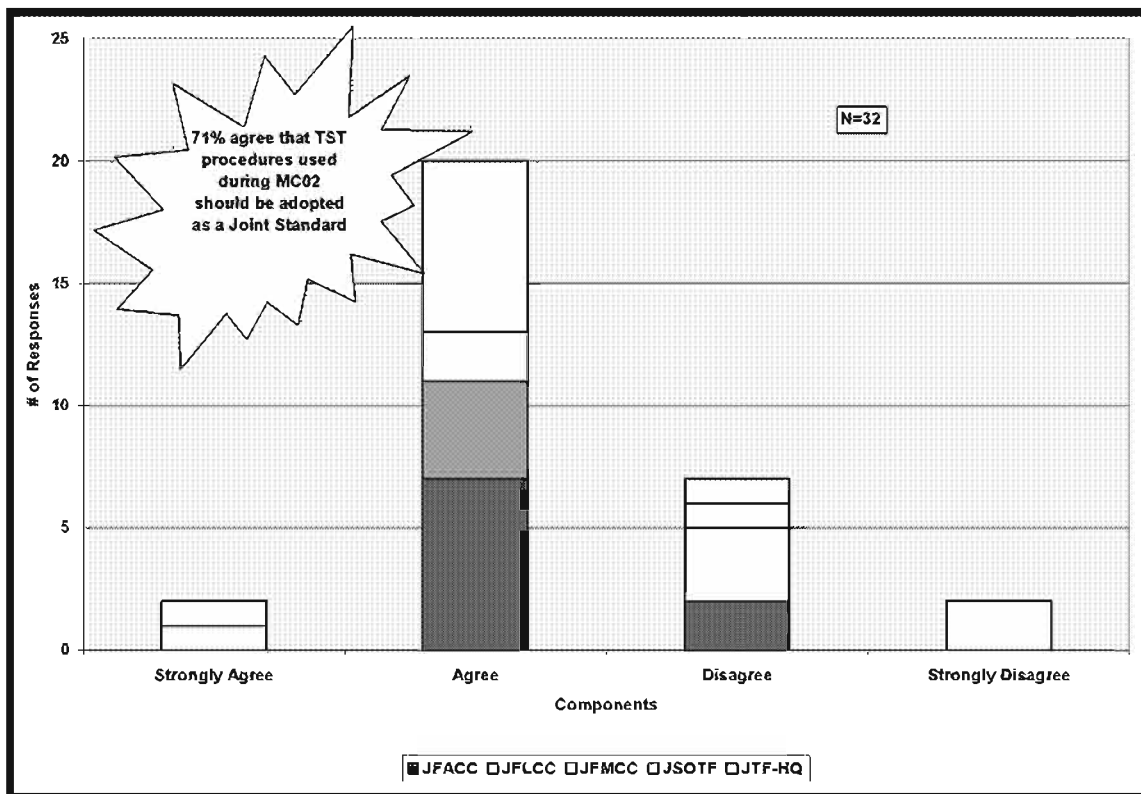


Figure 54: Most thought MC02 TST procedures should be adopted as a joint standard

shows the breakdown of responses.

Collaboration and standardization were the most appreciated attributes of the CIE tools, according to SMEs. "The tool really supported getting everyone on the same page, and worked towards standardization of reporting," said one expert. "More emphasis needs to be placed on business rules enforcement, and each component needs to put more thought into their doctrine behind TST." Said another, "Without chat, the immediacy of TST might have been lost. Weapon to platform was coordinated quickly, as opposed to entering data into a target card, having it

fully understood, and perhaps not knowing who was going to engage.” “The tool is good right now with the potential to be great. Keep pressing.” Said another, “It needs to be fielded and manned down to MSCs as it is at the components.”

On the negative side, one user noted, “With multiple users using multiple tools, there were numerous opportunities for human error, such as multiple conversations in several rooms, information being dropped or acted on by multiple parties. The process needs to be more automated with better error data.” Another’s remarks were more tempered, “The only problem was that the components weren't updating the TST info in the DTL,” he said. “If the components don't support the system, the process and/or info in the system are corrupt.”

Seventy-one percent of JTF-HQ SMEs surveyed (32) indicated that the TST procedures used during the experiment were well prepared. They added that with some changes, identified and implemented during the experiment, the process should be adopted as a joint standard. Twenty-nine percent of the respondents indicated that the procedures were not ready for

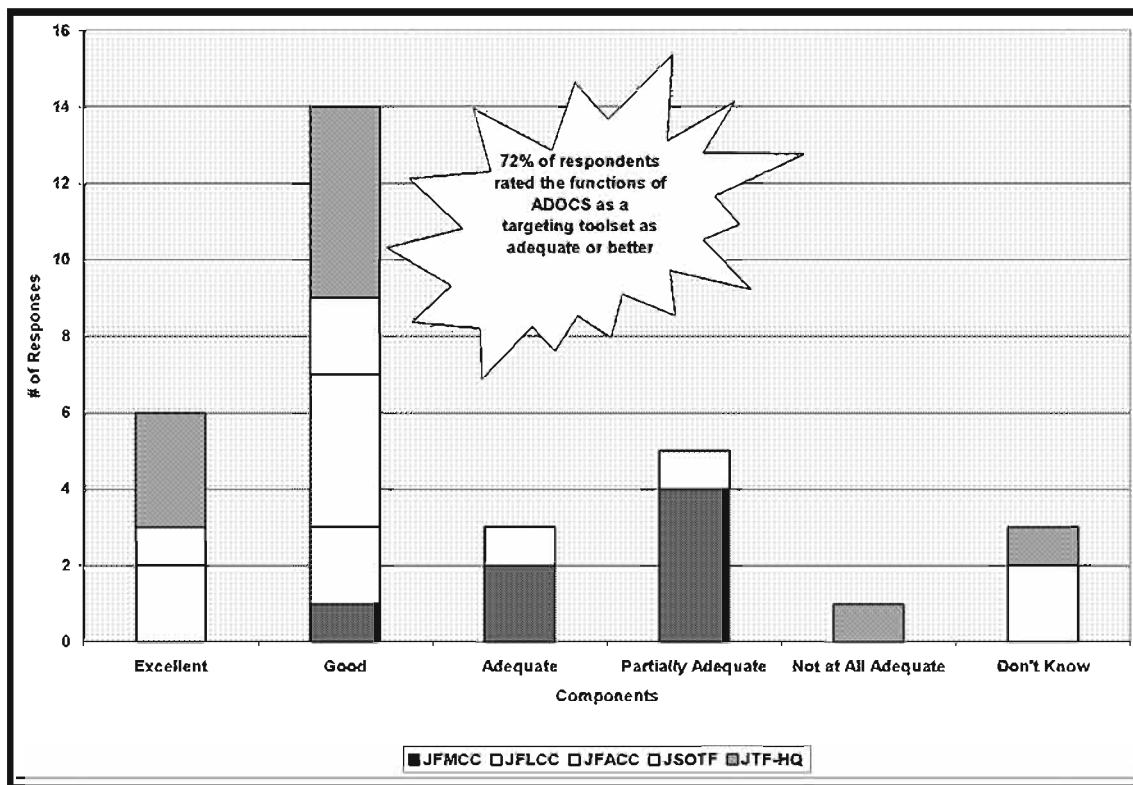


Figure 55: ADOCS viewed as 'better than adequate' for use as a targeting tool

implementation as a joint standard (See Figure 54).

But others thought the system had some maturing to do before it is fielded, “This system has a long way to go before it is ready for fleet use,” a participant said, “it has integration and human factors issues. CONOPS also need to be refined and improved especially in the area of CM and BDA.” Said another, “Almost there. There is a good baseline to work with, but not quite ready to go prime time. That's not the purpose anyway. The purpose is to experiment and learn—then refine and go to prime time. I think details need to be provided, especially in terms of reporting processes, and access to reports. As one of the folks in charge of BDA analysis, I had extreme difficulty in obtaining timely reporting from other components.”

With regard to ADOCS' contribution to this process, 72 percent SME respondents rated ADOCS 'excellent' as a common targeting tool. Eighteen percent said that ADOCS was not adequate (See Figure 55).

Some favored ADOCS, "Works as long as components are disciplined and close the loop with the TST in the Target Card," said one expert. "System has the right blocks, but hard to get them filled in."

However, not all agreed, "There is support, but I don't think we components within the JTF have come to a common understanding of what information to put in the blocks, when, and when to turn colors," said one participant, "It appears there are coordination issues there as well. Our BDA assessment person had to manually monitor and follow up on everything."

Overall, most indicated ADOCS had great potential as a targeting toolset. More fidelity may be required to identify TST targets and some procedures need to be modified and added. However, evidence indicates that TST prosecution is greatly enhanced by an ADOCS-like tool. Most thought ADOCS should be fielded as a TST targeting tool. Given the current developmental status of the ADOCS software program, fielding as an interim target toolset may best serve the warfighter.

In summary, the JTF attacked operational targets and thereby achieved desired effects. The JTF neutralized or destroyed OPFOR's ability to conduct war. The ONA was used to establish the key nodes and linkages that most affected OPFOR's ability to conduct his operations. Additionally, the use of CIE tools and collaboration to coordinate his forces enabled JTF to quickly and efficiently counter OPFOR's force movements.

Although some ADOCS problems were experienced during the experiment, ADOCS generally provided a good visual display of the battlefield, providing operators improved common situational awareness, combat assessment of the TST mission, and the quick decisions to re-strike targets. ADOCS, when used in coordination with other CIE tools (specifically IWS) simplified the airspace and operations deconfliction process and made the assignment of assets to prosecute TST targets more efficiently.

The handoff of TST responsibility between functional components was quicker and less complicated, ensuring that the appropriate weapon and platform was assigned to the target. IWS proved it was a powerful tool and that it complimented ADOCS/TBMCS.

**Finding 3► The JTF exhibited increased ability to coordinate and integrate joint and interagency assets for EBO. However, the use of DIE elements of national power to produce JTF desired effects was not effective.**

The potential for this concept is enormous and could become the cornerstone of a combatant commander's CONPLAN.

The JIACG concept as demonstrated during the experiment shows great potential to become a powerful tool in the JTF's arsenal.

The use of DIE actions is sometimes very slow moving and not very conducive to RDO. However, CJTF's ability to use DIE actions to achieve goals with a minimum loss of life and resources cannot be overstated. One problem with using DIE actions is a lack of the assets and tools needed to measure success or failure. Many DIE effects can only be sensed by the adversary, while others are so subtle, as to be immeasurable. Therefore, it is sometimes difficult to determine which actions are producing desired effects and which ones are not.

Due to the lack of a robust JIACG component and reach-back capability, non-kinetic weapons were seldom used and most DIE actions, although considered in planning were not conducted. The experiment concentrated mostly on the military (M) portion of DIME.

**Finding 3 Supporting Analysis:**

After reviewing the ONA, ETO-1, ETO-1A, ETO-2 and their associated PELs, the PELs identified 140 targets for attack, of these, 53 nodes were identified as DIE targets (38 percent). Thirty-nine additional nodes, not associated with an ETO desired effect, were also selected for attack. Only five of the selected nodes were attacked using DIE actions and these actions were all successful. This experiment was heavily weighted for the use of the military portion of national power with minimal consideration of DIE actions. This was driven by the construct of the experiment and the lack of a robust JIACG component and the lack of reach-back capability.

A SME said, "Have not observed any DIE means from the EAC. EAC is focused on "M" only, although they constantly get system of systems analysis (SOSA) inputs from Pol/Mil and ONA effects in their assessment decisions." He added, "We do not see much DIE activity from this point of view." Another SME saw some activity, "We started to factor economic aspects into the plan, but no attacks resulted," "...discussed using economic, PA means to influence enemy leadership."

As one observer noted, "The 'M' portion of DIME can be rapid and decisive, DIE portions take time to implement and effect the situation." The lack of a robust JIACG contingent and reach-back capabilities to key centers of excellence may have been the reason for the short shrift given to DIE components of national power. Another limitation to the implementation of DIE alternatives was the construct of the scenario.

Said an operations chief, "The role of DIE was underplayed in the scenario. More emphasis on the non-kinetic aspects of DIME could have preempted the outbreak of hostilities." Additional observations included, "We didn't have much IA input. Centers of excellence are useful for day-to-day operations. However, when planning RDO, they don't have much utility because things move too fast. They can help in the planning process, especially with infrastructure. They are useful in providing resources to fill the gaps in our knowledge." "We must have good IA input into the ONA process."

Experiment constraints had a negative impact, according to some participants. "IA visibility was limited by experiment constraints. We need live contact for it to be effective." Yet one former Deputy Assistant Secretary of State had seen enough to make up his mind with regard to the usefulness of the JIACG, "The concept is validated. Future operational planning must be an interagency enterprise."

**Finding 4► The JTF improved its ability to synchronize and employ joint forces against key tactical objectives, despite not strictly adhering to the concepts of EBO.**

By taking advantage of tactical opportunities presented to them, the JTF was consistently able to disrupt OPFOR operations and control the timing and tempo of the campaign. Using the supported/supporting command structure, Blue assembled and employed the appropriate forces needed to rapidly respond to changes in OPFOR's operations.

The success on the battlefield came despite the fact that the JTF, shunning branch and sequel development based on effects assessment and predictive analysis, did not adhere to the strict renderings of the EBO concept. Additionally, wargaming was conducted only sporadically

at the JTF and component level, hindering the commander's ability to anticipate OPFOR's strategy and develop counter plans.

However, use of collaboration and CIE tools may have provided Blue with a significant enough force multiplier, that in this instance, failure to follow the concept methods was mitigated. Using collaboration and the CIE tools, Blue was able to maintain good situational awareness within the JOA. That awareness enabled the JTF to rapidly plan actions in response to the changing scenario, resolve target priorities, and command issues, including deconfliction of the battlespace. It also helped the JTF identify, allocate, and deploy the resources needed for the accomplishment of the mission and take advantage of opportunities presented by the opposition.

JTAs and effects packages, as defined in this experiment, were successfully conducted. JTF was able to assemble forces, assign a commander to plan and execute a specific mission, and then after the mission was completed, reintegrate the forces back into the JTF command structure. However, JTA packages were played as a loosely defined concept and neither warfighters, nor SMEs were given adequate information to accurately assess this concept

#### Finding 4 Supporting Analysis:

The preponderance of observations indicated that branch plans weren't developed at either the JTF or the component level. Sequels were being developed for transition and emerging operations (WME), but the development of branch plans was not evident.

"The JTF has not developed any 'what if' branch plans," said one observer. "They are currently focused on sequel transition planning." "From the JSOTF perspective, I have not seen any operational branches that have opened to BLUE due to current operations disrupting the adversary."

A JFMCC observer noted, "I did not see evidence of any branch plans developed by JFMCC, although there were such plans at CJTF. Re-planning by JFMCC planning cell was always reactive. They seemed to be driven to provide supporting plans to the JTF as they developed alternatives (FRAGOs)."

One plans chief observed, "JTF micromanaged planning and focused on tactical vice operational details. RDO does not translate to rapid decisive planning and until the commander and his staff turn the commander's decision into COAs. The components can't plan completely."

Anecdotal evidence indicated that the planning process was commander-centric. The process did not allow time for plans to be developed at the component and JTF-HQ level. With adequate time, the components, using JTF guidance to develop several COAs, could have wargamed the COAs and identified the best plan based on full knowledge of the intended and unintended consequences inherent in each COA. Instead, the commander's ideas, voiced during the JCB, were taken as gospel by the staff and plans were developed accordingly.

Said a senior component planner, "I had no CONPLAN to counter enemy acts. No one looked to see if the priority intelligence requirements (PIR) were being answered... and if they were, no one had a branch plan to respond."

"There was no wargaming at the JTF looking beyond what effects-based missions planning the components were doing," said another plans officer. "The JTF should look beyond the current operations," said a senior mentor. "No one is looking to see what else the enemy could be doing. No one is operationalizing the plan, so there is no branch plan to be active and exploit sudden advantages. They are focused on FRAGOs vice branch plans."

JTF-HQ operations and plans SMEs were asked if there were any instances of operational branches, formerly closed to Blue, becoming feasible and acceptable due to disruptions to

OPFOR operations. Based on responses, Blue did not need to use formerly closed operational branches because the opposition was already disrupted.

There was some evidence that branches, formerly open to OPFOR, became unfeasible, suitable, or acceptable due to disruption of Red's C<sup>2</sup> and infrastructure. For example, due to the destruction of C<sup>2</sup> systems, OPFOR was unable to communicate with terrorists and this loss degraded their control over pirate operations, making Red campaign strategy more one dimensional and predictable. As Blue attrited JTF-S naval units, JTF-S was forced to abandon its White shipping escort program (a ploy to look magnanimous to regional governments).

Eighty-eight percent of surveyed EA SMEs said they knew of no instances of operational branches that were formerly open to Blue being no longer feasible, suitable, or acceptable. The preponderance of observations from the SMEs indicated that little or no thought went into the preparation of branch plans at either the JTF or the component level. Anecdotal evidence points to a lack of war-gaming at the JTF level as the major cause of this. If alternative courses of action were being investigated at either the JTF or the component level, they were not made available to all levels of planning.

Although there is little indication that planners at either the JTF or the component level were developing branch plans, JTF and the components were able to take advantage of tactical opportunities presented to them by changes in the adversary's capabilities and disruption of his operations. On the other hand, even though Blue was forced to delay or modify some of its operations due to OPFOR's actions, such as mining of navigable waterways and mass attack against JFMCC assets, and OPFOR's decision to defend the islands, Blue was able to dictate the tempo of operations throughout the JOA. All other Blue tactical operations were executed without delay or disruption.

Neither the JTF-HQ, nor the component staffs completely understood the EBO planning process. This finding was based on the JTF's lack of wargaming, apparent lack of development of branch plans and sequels, and the use of effects assessment and predictive analysis.

For the most part, at the operational level, it did not appear that OPFOR was surprised by Blue's tactics or operations; however, at the tactical level, Blue conducted actions that did catch OPFOR off guard. One OPFOR SME said, "Blue achieved tactical surprise by picking the time and the place of attacks, but never achieved operational surprise."

One action by Blue did surprise OPFOR. OPFOR was taken by surprise at Blue's issuance of a political 'ultimatum' just prior to the start of hostilities.

Said one participant, "JTF-S was surprised by the tone, timeline, and manner of delivery of the 25 July demands. Delivery to CJTF-S without routing through the national capital was seen as a pre-cursor to Blue combat operations."

A JFMCC operations chief described another surprise event, "The SOF raid on a location of significant importance was probably an unpredictable move that caught OPFOR by surprise." Anecdotal evidence indicates that OPFOR knew what Blue wanted to do in advance of Blue's actions; however, they were unable to capitalize on this information due to Blue's overwhelming force. "We used known and practiced tactics which made us predictable," said an operations chief.

Nevertheless, Blue was equally susceptible to the surprise move. Blue was caught by surprise when OPFOR initiated hostilities, launching a massed coordinated attack on Blue naval units, transiting a narrow strait. "Operational surprise was achieved by OPFOR conducting pre-emptive strikes against Blue naval forces and ISBs," said a headquarters observer. "The enemy achieved tactical (not operational) surprise when they initiated hostilities." "Blue was surprised

at the two major naval attacks despite anticipating them and being prepared,” noted another observer.

OPFOR’s attempt to close an important international waterway by mining also caught Blue by surprise. “The two big attacks, the restricted passage closing, and the terrorist attacks were surprising despite anticipating them.” In addition, Blue anticipated neither the ferocity, nor the determination of the pirates’ and terrorists’ attack in their drive to undermine Blue’s influence and disrupt Blue’s re-supply efforts. They also failed to foresee the breadth and depth of the terrorist activity against coalition partners. The ability and intensity of the terrorist attacks on Blue APODs and SPODs caught Blue by surprise, as well.

It took less than one hour for Blue to detect the initiation of an OPFOR attack (detection of an OPFOR TBM launch was immediate), according to 91 percent of SMEs surveyed and 71 percent then declared that Blue was able to change plans in reaction to an OPFOR attack within the same one-hour time span.

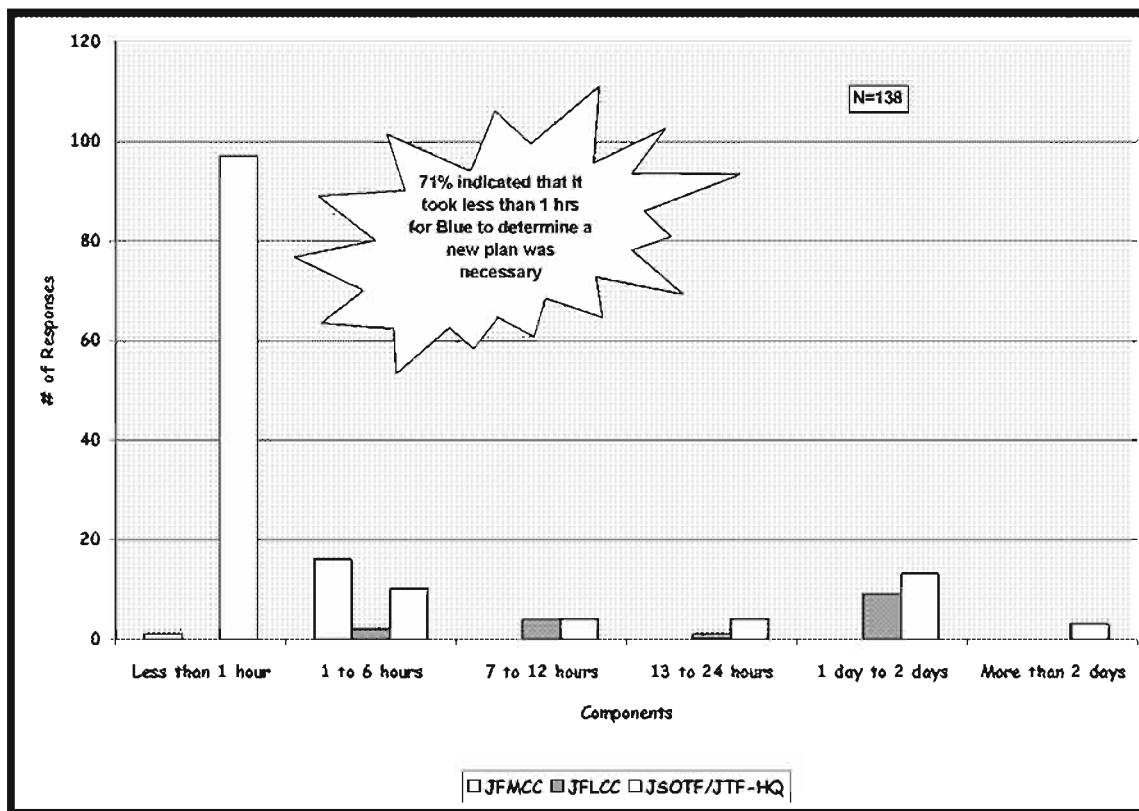


Figure 56: Time required for Blue to determine a new plan is required less than 1 hour

However, 15 percent claimed that it took more than 24 hours for Blue to determine a new plan was required, especially after the initial attack. Figure 56 shows the breakout of responses received.

“On notification that SR 411 was compromised, the JSOTF immediately initiated contingency plans and began working additional branches, while plans was looking at options based on today’s events and working 48 to 96 hours out, discussing viable options,” one participant said.

“The JTF received an order from the combatant commander to take the islands within 48 hours after an ultimatum was issued. The CJTF, within a few hours, met the commanders and their staffs in the CIE and developed and issued a FRAGO in about 1.5 hours.”

“CJTF-S attack drove the JTF to execute combat operations approximately 20 hours earlier than planned. Decision to execute early took about three minutes from JTF-S’ attack.”

“After the initial attack, JFMCC plans realized right away plans would be modified as priorities changed.”

When indications that CJTF-S intended to move WME weapons and material to other sites, a plan to secure the WME sites was formulated within 24 hrs. Based on the survey results, it is apparent that Blue was quick to grasp the need for new or revised plans in response to OPFOR’s actions.

Eighty-seven percent of survey respondents indicated that the time to prepare and disseminate a new plan following CJTF’s decision to act was less than six hours. The planning cells were able to react quickly once guidance was received from CJTF, in regards to how he wanted to respond to emerging scenarios.

The ability to rapidly prepare and disseminate new plans in response to OPFOR actions may have been due to the planning cells proactive approach to the planning cycle, and explicit guidance given by the CJTF, to the components and JTF planning staff at the daily JCB briefings as to how he expected the operation to flow. Although little branch planning was evident, the planners were kept cognizant of OPFOR actions and the possible effects they had on Blue

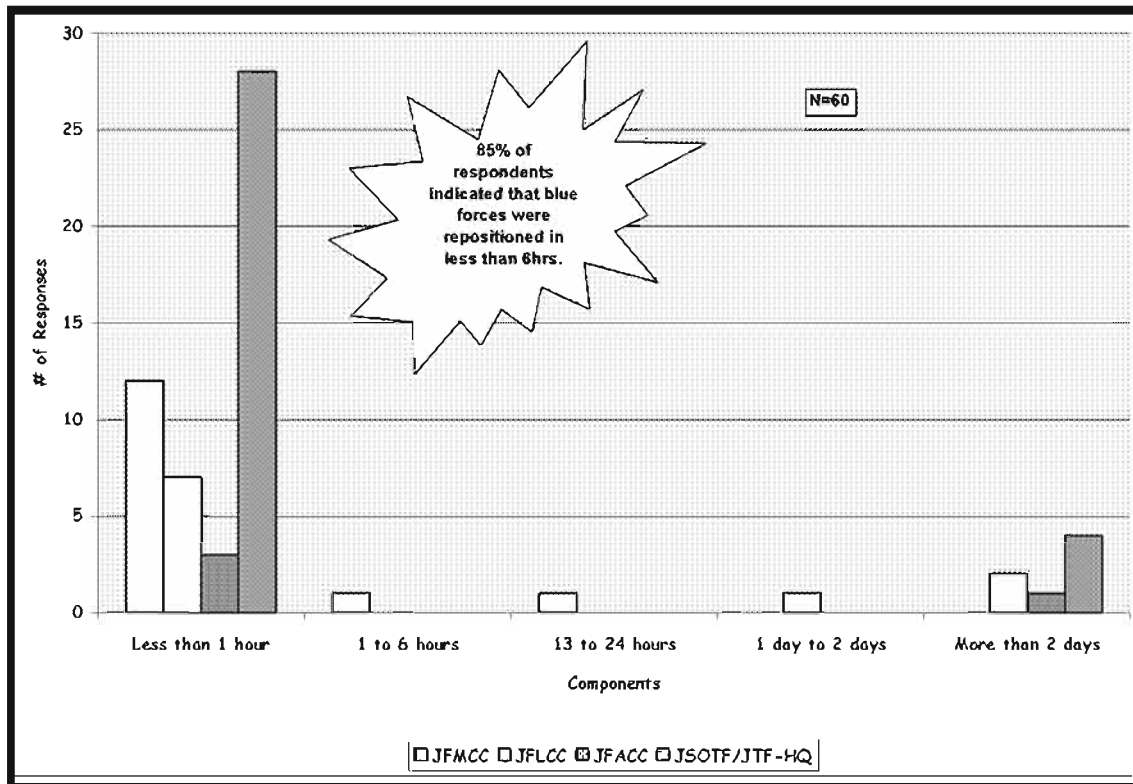


Figure 57: Eighty-five percent of respondents indicated that Blue forces were repositioned in less than six hours operations and they were prepared to issue FRAGOs. Thirty-six FRAGOs were issued for ETO -



1, 13 FRAGOs were issued for ETO-1A, and three FRAGOs were issued for ETO-2. Use of collaboration and CIE tools greatly enhanced the ability of JTF to develop and implement new plans to counter OPFOR actions.

Eighty-five percent of respondents indicated that from the time a new plan was disseminated, Blue required less than six hours to get forces repositioned to counter an adversary's attack. Figure 57 shows the breakdown of responses from the SMEs.

In summary, Blue was able to conduct operations in the JOA, virtually at will. Although data indicates that OPFOR usually anticipated Blue operations, Blue's superior capabilities made this knowledge moot. The JTF and components were able to act quickly in response to OPFOR's actions through the extensive use of collaboration and CIE tools such as IWS and ADOCS. The CIE concept and tools allowed the flow of information to move swiftly throughout the force, both vertically and horizontally, and provided a coherent operational picture to the entire force. Situational awareness was improved at all levels, and the ability to communicate directly through IWS eliminated deconfliction problems inherent in the majority of past exercises and operations. Collaboration enabled rapid resolution of targeting problems and asset allocation to maximize effects on the battlefield. With CIE, prioritization of targets between components could be quickly and efficiently resolved. Although Blue was initially caught off guard by the intensity of OPFOR's response to the ultimatum, JTF was quickly able to regain the initiative and follow through with its operational plans.

As the scenario progressed and Blue determined that new plans were required to counter OPFOR's movements, the CIE concept in conjunction with ADOCS, IWS and SPPS enabled the components and JTF HQ to rapidly formulate new strategies, assign tasks and allocate resources to carry out the new plan. Collaboration allowed all participants to voice their opinions, present their case in regards to resources, and target priorities. Using IWS and SPPS, the new plan was rapidly disseminated to the force for implementation. ADOCS provided a COP to the entire force, displaying OPFOR and Blue force positional data and force strength as obtained from intelligence sources positioned throughout the JOA. This improved situational awareness enabled Blue to react quickly to OPFOR's movements and rapidly shift forces in response to OPFOR's moves.

Joint tactical action (JTA) packages were played as a loosely defined concept during experiment execution. Neither warfighters nor SMEs were given adequate information to accurately assess this concept. The concept developers intended for the effects packages to be single Service/component actions designed to achieve an effect, for this analysis, JTA packages were taken to be joint Service/component actions designed to achieve an effect outside the normal supporting /supported command structure. A component operations chief, who was able to infer the difference between a JTA and an effects package made this comment: "JTAs are high risk and they presuppose that a problem exists with the supporting/supported command concept."

Surveys revealed that participants were unsure of the difference between a JTA and an effects package. Senior concept developers and senior mentors also had differing opinions about JTAs.

"By giving out effects-based missions, I had a lot of flexibility to accomplish the mission," said the commander of the JSOTF. "It allowed me to look at numerous ways to do a mission rather than being given a solution."

"When JTAs are assigned to the functional components and are required to be conducted simultaneously, who will synchronize the actions in time and space, resources, and outcome?" asked a concept developer. "Will the ability to conduct JTAs require functional component staffs

to be joint?” “There is no concept for JTA, but even if we have a force that has embraced all four concepts successfully, how do these new opportunities manifest themselves? In the past, we have not been full, networked, or effects-based. We couldn't successfully optimize joint tactical actions.”

The JTA concept needs clearer definitions of what a JTA is intended to be as compared to an effects package, how to employ it, and who has OPCON and TACON of the forces assigned. This concept is not ready for force implementation.

**Finding 5► The JTF failed to execute and integrate information operations, including PSYOP and military deception.**

While IO capabilities were considered during JTF operational planning and execution, not all IO capabilities were used and or integrated into JTF operations. Likewise, the assessment of IO actions was neither fully considered, nor fully used to modify or initiate plans and operations. Finally, assessment of the success or failure of IO actions was also not fully considered.

IO was planned, coordinated, and conducted at the JTF and component levels, but it was not integrated across the force. Due to poor BDA, the effects of the IO campaign were never really recognized by either the JTF or components. Anecdotal evidence from OPFOR SMEs and analysts indicate that OPFOR believed Blue's IO campaign was ineffective, disorganized, and uncoordinated. OPFOR believed that it had won the IO war and Blue failed to win over the hearts and minds of OPFOR's supporters. STO was a notable exception in the IO campaign, STO actions were coordinated at the component level, and the information was disseminated to the JTF via STO personnel assigned to the JTF. However, STO actions were not fully integrated across the JTF or into the JTF IO plan.

**Finding 5 Supporting Analysis:**

The following comments were received from participants:

- “It's ugly” (senior mentor)
- “Need to build a functional and JTF level IO structure” (senior mentor)
- “IO redefines “Broke” and the problem goes well beyond the JTF and combatant commander levels” (senior mentor)
- “Need organization to bring the five pillars of IO together at the combatant commander level” (senior mentor)
- “IO integration component wide needed a lot of work” (senior mentor)
- “JTF slow to integrate IO into plans” (JTF IS SME)
- “Full time IO person was needed in plans cell.” (JTF IS SME)
- “Special IO tools need to be developed.” (JTF IS SME)
- “IO needs to be defined and integrated into all facets of operations.” (JFMCC SME)

Fifty-seven JTFHQ and component IS SMEs were surveyed over the course of the experiment. Eighty-five percent of the 34 SMEs who provided comments indicated that appropriate IO resources and capabilities were factored into operational plans and actions.

“IO resources have been an integral part of the planning process,” said one expert. “JFMCC IO cell did a good job of incorporating IO aspects into the planning. Believe they are ahead of the game in timing and capability analysis. The only weakness noted was OP level

deception. JFMCC was planning and conducting tactical deception in conjunction with transit. Computer Network Defense (CND) conditions were upgraded.”

Another observer noted that the IO rep was present at all guidance, apportionment, and targeting and master air attack plan sessions to direct and suggest non-kinetic actions to support the effects planning. “Absolutely! At the JFLCC, the commander was very straightforward on what his desires were in terms of IO integration and maximizing the capabilities of IO within their mission.”

Nevertheless, there are always improvements that can be made. “JFMCC IO capabilities were not clearly defined for the CJFMCC,” one observer noted. “IO was underused during the initial surge operations. While PAO, EW and PSYOP planning was progressing well, a lack of guidance for the theater deception plan significantly hindered IO efforts.”

Said one observer during the experiment, “the IO cell is integrated into all of the planning meetings held at the JTF and JFLCC levels. Their awareness of the commander’s intent is high. However, awareness of the IO objectives is not universal across the staff, yet, primarily because the planning is in early stages at this point. Expect awareness of IO objectives and planning will increase dramatically after JTF/JFLCC holds an IO working group to develop fidelity on these issues.”

The majority of 26 survey respondents indicated that all available resources and capabilities were factored into operational plans and actions. Many provided comments such as:

“Use of IO resources was maximized.”

“IO plans appeared to be well planned and used available resources.”

“Did not see where resources and capabilities failed to be factored into operational plans.”

“Members of the JIACG could have more effect in getting the message to the adversary through national media instead of the IO cell writing local articles. More effective collaboration at all levels should resolve this issue.”

“Some resources are used more than others in planning efforts, but nothing has been left out of the planning efforts at this point.”

“Not enough leaflets being dropped due to problems getting this worked into the ATO.”

“PSYOPS and Civil Military Operations. CMO also plays a major role in D, I, E and it is not being used in this experiment.”

“In concert with JIACG, need to make better use of PAO to convey message through CNN and other national media.”

While most SMEs thought that IO was fully considered and factored into operational plans and actions, a majority (87 percent) thought that even if no IO resources and capabilities had been factored, there would have been minimal impact on operations.

JFMCC’s operations chief said, “The IO plan was not seen as effective. IO was considered and planned, however, kinetic options were quicker and more visible. Certainty of success of the IO campaign was not visible, therefore, efforts went to kinetic options, which were quicker.” “Big effect on operations, especially Commando Solo,” said another operations officer. “Leaflet drop operations and TARBS broadcasts made the island campaign easier.”

Component and JTF-HQ planners had the following significant comments in regards to IO use and exploitation efforts:

“IO should not become another functional component stovepipe. Doing so hampers integration.”

“We do not have visibility at the JPC of how we are incorporating IO into our plan.”

“IO needs to be embedded in the planning process. It does not help to have IO as part of the IS folks.”

“If the JTF commander does not understand what IO is or what he wants from it, the plans cannot incorporate IO in a useful manner.”

Combat assessment of IO actions was equally inadequate due probably to a lack of M&S fidelity and experiment constraints. Assessing the effects of the IO campaign can be very difficult. Red could only perceive some IO actions, while other actions took a long time to bear fruit. However, failure to assess the success or failure of the IO campaign can lead to the misallocation of resources and an underestimation of the adversary’s resources and capabilities. In this experiment, there were sufficient ISR assets available to assess IO actions, and, based on the daily ISR allocation plan, they were positioned adequately to monitor the IO targets. However, M&S could not provide the fidelity necessary to provide the EAC with adequate information to properly assess the effects of the IO actions.

There is insufficient information to determine when the initial and modified IO plans were completed and submitted for approval. For example, a JTF IO plan was approved for implementation on 12 June 2002 (MC02 Spiral 3) and modified on 4 August 2002 (MC02 Execution.)

Based on the responses received from daily surveys given to effects assessment cell SMEs, there were no instances of unintended IO actions causing disruption or delay of operational plans and objectives noted. However, the destruction of a major radio station may have deprived Blue of a vital method for gauging public sentiment and the effects of their actions on OPFOR.

Due to OPFOR known and suspected IADS/SEAD positions and movements, some IO mission air resources and tracks were modified. However, there were no known disruptions in IO actions due to adversary IO actions. There were only a few instances of operational IO actions discarded due to timeliness. One SME indicated, “Deception plan coordination could not be accomplished within the established timelines to support MTO development.” Another SME observed that, “some delays were noted due to the rigid nature of the JFMCC planning process and its reliance on MSRs. Current Ops responses to activity were timely.”

A JFMCC SME reported that a planned attack on a radio site was denied due to ‘a disconnect’ with the desired effect. The IO cell cited a ‘deny/damage’ level, but the item was changed to ‘destroy’ by plans/MTO IO intended a non-lethal means, but the brief did not match the request.

The JFACC senior mentor observed, “The process to get IO targets approved up thru the SECDEF level is slow.” Because of these delays, a number of IO targets nominated for prosecution had to be dropped or delayed because of the delays in the approval process.

Full combat assessment of attacks on IO targets was never achieved. M&S was unable to provide the level of BDA required to assess the IO campaign adequately, could not be provided due to lack of M&S fidelity and ability to accurately replicate ISR assets, and because of this, an average time to provide full combat assessment of attacks on IO targets couldn’t be calculated. Although sufficient ISR assets were available and allocated to evaluate IO targets, M&S lacked the fidelity to interpret the results. In addition, due to the lack of adequate and timely BDA a significant number of IO targets were re-struck before combat assessment was available.

The IO plan identified 20 individual effects and 88 key nodes/targets from the ONA for prosecution during the IO campaign. Most surveyed SMEs couldn’t judge whether the IO

campaign was a success or failure (See figure 58). Of the 16 who responded to the survey, three-fourths rated the campaign a success.

Some comments received from the IS SMEs include:

“Indications, thus far, show that IO is having some of the desired effects. However, developing and collecting on indicators is relatively new and personnel are still working on it.”

“There were no IO indicators developed for the Intel collection plan. Development of these indicators is the responsibility of the IO cell. Subsequent to this, IO indicators have been developed, and are being refined, and should be included in subsequent collection plans.”

“Believe the overall campaign had good measure of success. The JFMCC staff was very proactive in their approach. In fact that may be to a fault - some actions not fully coordinated across the naval force or with the JTF. Collaboration helped identify most of these (since they were mentioned during briefings, updates, or meetings) and resulted in a better overall product.”

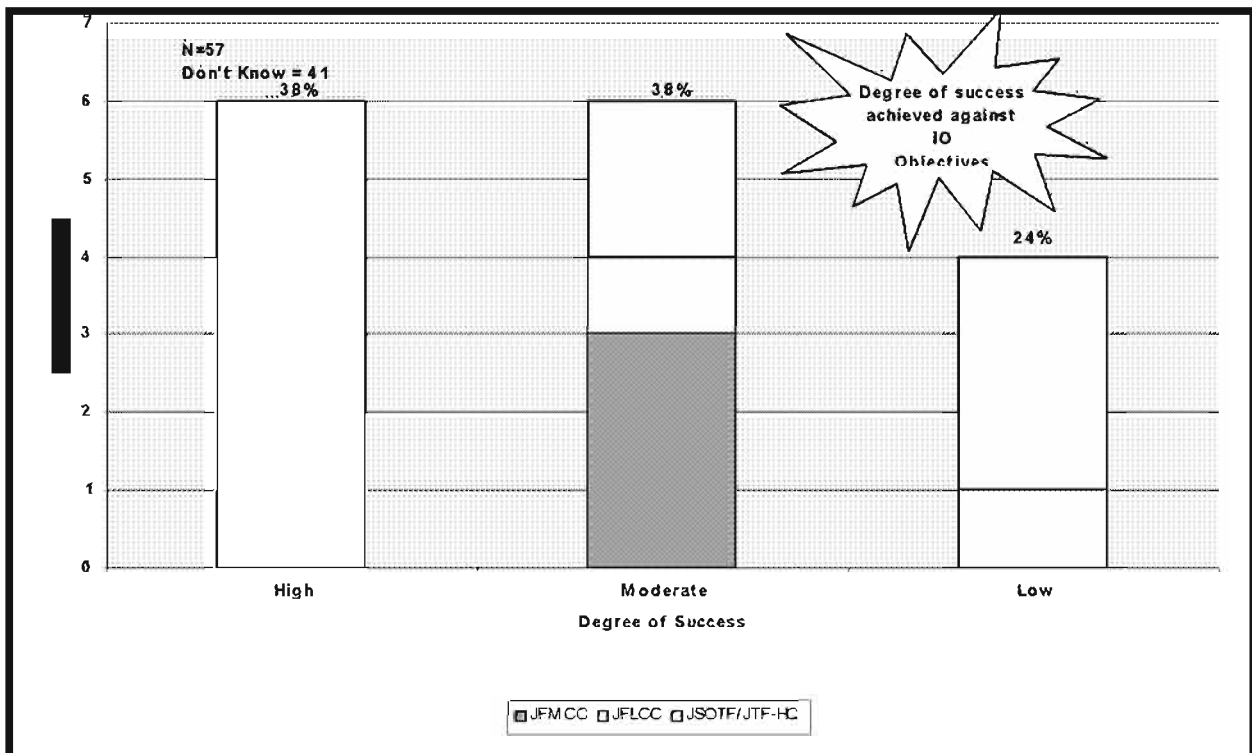


Figure 58: Degree of success achieved against IO objectives

“Everything was considered, having some success. Some targets are hard to evaluate.”

A comment from an OPFOR SME paints a different picture, “The IO campaign is not winning the war over the hearts and minds of Red,” and “the IO program is not reaching the people.”

This comment was received from a JTF IS Mentor, “JTF has been unable to use IO to get into OPFOR’s decision loop.”

The lack of credible BDA was the biggest problem associated with, assessing the success or failure of the IO campaign. There were no apparent MOPs or MOEs established to be used to evaluate the effects on the campaign on the selected targets. There were sufficient ISR assets to be used to assess the IO campaign, but there was little evidence that the information was getting back to the effects assessment cell for evaluation. In addition, HUMINT assets were not

considered in the IO plan, either to carry out or provide BDA assessment of IO actions. One reason may have been the lack of fidelity in the models to interpret the ISR data properly for IO actions or lack of adequate and timely JECG injects to the assessment cells regarding BDA. Another reason may have been due to experiment constraints. It has been recommended by SMEs and senior mentors that IO personnel are integrated into the JTF plans and JTF operations cells in order to maximize the benefits of IO capabilities.

STO/SAP actions were conducted at the component level and fed to the JTF through STO personnel assigned to the staff. The following STO/SAP comments were received from SCDs:

“CIE empowered us, with the exception of the STO, where we had little or no collaboration.” (CJFMCC)

“We made great progress with STO...” (SCD)

“STO helped me figure out what not to do.” (CJTF)

“We made landmark progress in STO, but not so in IO.” (SCD)

“We had SCI and STO and we had no good chat room. We need to get classified programs at the unit level.” (CJFACC)

“The STO activities provided unparalleled opportunities to examine our capabilities that are important to the joint fight. We need a covered and secure organization to bring access to all service programs.” (CJTF)

In summary, IO was planned, coordinated, and conducted at the JTF and component levels, but it was not integrated across the force. Due to poor BDA, the effects of the IO campaign were never really recognized by either the JTF or components. One notable IO success was the IO Island Campaign. Commando Solo and leaflet drops were used to convince CJTF-S's forces to surrender. On two of the islands, CJTF-S forces surrendered without resistance, thereby minimizing casualties, and the time and resources needed to liberate the Islands. Anecdotal evidence from OPFOR SMEs and analysts indicate that OPFOR considered Blue's IO campaign ineffective, disorganized, and uncoordinated. OPFOR believed that it had won the IO war and Blue failed to win over the hearts and minds of OPFOR's supporters.

## **Other Observations**

**Observation 1: JTF exhibited the ability to dynamically re-task JISR assets for follow-on actions and emerging tasks. It should be noted, however, that the JTF was allocated a large, disproportionate number of national assets.**

As noted in Finding 4, the participants were not given an adequate definition of the differences between a JTA and an effects package, therefore analysis of this task concentrated on how JTF organized and controlled forces to conduct limited or special operations missions.

Surveys were sent out to JTF-HQ and component operations SMEs to assess the JTF's ability to dynamically re-task effects packages for follow-on actions. The majority of the responses to all of the questions regarding effects packages indicated that they could not accurately answer the questions because they were unsure of the difference between a JTA and an effects package. However, regardless of whether or not they knew the difference between a JTA and an effects package, they could comment on whether the JTF could successfully re-task assets as required to meet emerging mission requirements. During the course of the experiment, four missions were conducted that could be considered either JTA or effects package missions, Neutralization of OPFOR's WME primary storage facilities, the raid on the fisheries to capture

terrorist leaders, the raids to secure WME weapons/material at OPFOR's WME "hide sites," and the operation to capture CJTF-S.

Surveys were sent to component operations SMEs to determine if there were any instances of effects packages, previously committed to action, not being redeployed in response to newly developing situation. The response from the majority of the SMEs indicated that there was no need to redeploy the assets of any of the effects packages/JTAs in response to emerging situations, because there were adequate assets in theater to handle all missions assigned.

Component and JTF-HQ operations SMEs were asked if JTF assets were double tasked. The response from all of the respondents indicated that no unusual double tasking of units occurred. They did note that many JTF assets are multitasked as part of normal operations. A good example of this is most naval surface ships are tasked with multiple missions and it is not uncommon to have a unit conducting a gunfire support mission, while also conducting an ASW mission in support of JFMCC, and a strike mission in support of JFACC.

To be effective, effects/JTA packages may require additional support from assets not directly allocated as part of the effect/JTA package. A review of the data, to date, indicates that neither CONUS AOR assets, nor assets transiting the AOR were used to support effects/JTA packages. Forward presence forces were assigned to the JTF and these assets may have been used in support of effects/JTA packages on or after C-Day.

Effects/JTA packages either can be under the direct control of the JTF or assigned to another commander within the JTF for control. All of the missions identified above were under the control and supervision of commanders assigned to the task by the JTF; none of the missions were under JTF direct supervision.

As the need for special missions became apparent, CJTF assigned a commander to plan, organize, and execute the mission. Resources were drawn from JTF assigned forces as needed to complete the mission. When the mission was completed, these forces were returned to the control of their component commanders for reassignment. Forward presence units were fully integrated into the JTF as part of his assigned forces. Therefore, some of these units did participate in support of these actions.

### **Relationship to Other Objectives**

The following assessment areas or concepts are either directly linked to the conduct of Effects-Based Operations or provide a necessary function in support of EBO.

#### **Establish and Maintain Information Superiority (IO)**

- The ability to establish and maintain Information Superiority, enables the JTF to operate his forces with a full knowledge of the adversary's capabilities and intentions, and enables him to deny the adversary knowledge of his own capabilities and intentions. In addition, information operations can help the JTF shape the battlespace to facilitate the conduct of effects-based operations

#### **Rapidly Set Conditions for Decisive Operations**

- For EBO to be effective, all JTF forces must be available in theater, with the equipment needed to conduct the operations, and be in position to conduct RDO. In addition, JTF must be able to shape the battlespace to maximize the effectiveness of his forces while reducing the enemy's capability to react to his actions

Assure Access

- JTF forces must be able to enter the JOA and transit to assigned areas of operations with minimal interruption and loss in order to conduct EBO

Operational Net Assessment (ONA)

- EBO requires an enormous amount information and knowledge to be effective. ONA incorporates an information database on the adversary's PMESII nodes and linkages with a reach-back capability, allowing planners and targeteers access to centers of excellence, academia, industry, government labs, etc. to determine what targets should be neutralized or destroyed, to ensure that the JTF's desired effects can be achieved with a minimum of collateral damage and loss

Effects-Based Operations (EBO)

- EBO cannot be successfully accomplished without effects-based planning and assessment. EBO must be planned to achieve the JTF's desired effects. Planners must use ONA and reach-back to identify the targets, to allocate the assets to accomplish the tasks and the timing and sequencing of force deployment to accomplish the assigned tasks. ISR assets must be positioned to assess the success or failure of the individual actions, and the intended and unintended consequences of conducting the actions then must be understood. Planning must also take into account and understand how the adversary will react and what actions he may take in response to JTF actions and how this will impact on the JTF's ability to achieve his goals. Assessment must be conducted to evaluate how the success or failure of JTF actions is contributing to his desired effects. Poor assessment can result in under or over estimating an adversary's strengths and weaknesses and can lead to inefficient use of resources to attack targets already destroyed/neutralized or not required to achieve the desired effects, or can result in the failure to re-attack important targets that have not been previously neutralized or destroyed

Collaborative Information Environment (CIE)

- Provides the tools and environment to integrate planning functions vertically and horizontally and provides the tools (ADOCS/SPPS) used to provide situational awareness across the force

Joint Interagency Coordinating Group (JIACG)

- Coordinates and integrates the DIE portions of national power to support and/or supplement EBO actions

Joint Initiatives

- Specifically in this experiment the joint fires initiative (JFI), time sensitive targets concept, IWS, ADOCS tools, and ONA tools were fully implemented and used to support EBO

**Relationship to Baseline Analysis**

- No baseline information exists for this, Conduct Decisive Effects Based Operations, assessment area



### **DOTMLPF Linkage**

-The JFCOM capability change recommendation (DOTMLPF format) for Effects-Based Operations can be based on the following findings garnered by JFCOM J-9 analysts during MC02 Spiral 3 and MC02 execution:

- Effects-based thinking has the potential to become the joint operational concept for the information age
- Effects-based planning necessitates change to the military decision-making thought process.
- Developing an effects-based mindset and applying that mindset will require focused education programs
- Effects-based Operations have the potential to be the future doctrinal centerpiece for planning, execution, and assessing joint military actions
- The combatant commander's staff, including the SJFHQ, supported by ONA and the Joint Interagency Coordination Group (JIACG) plays an essential role in effects-based planning, execution, and assessment
- Continued EBO concept refinement will improve national abilities to orchestrate political and military activities in support of future joint operations

### **Recommendations**

The EBO concept showed great potential during this experiment and has the potential to be our future doctrinal centerpiece for planning, executing, and assessing joint military actions. However, due to the limited training received by the participants prior to the start of the experiment, not all EBO concepts were adequately understood or practiced during this experiment. Most of the problems observed during the experiment can easily be overcome with training and practice.

1. JFCOM, develop a PME template to the Service schools and NDU for inclusion in their curriculum. ►
2. NDU and Services, incorporate the JFCOM EBO template in the curricula of joint and Service warfare colleges. ►
3. JFCOM, refine EBO concept and procedures in future experiments to develop EBO tools and TTPs. ►
4. JFCOM, exercise the collaborative process and CIE tools in an LOE to refine the business rules and processes required to maximize the usefulness of these tools. ►
5. JFCOM, in conjunction with a combatant command, develop a robust ONA tool incorporating better search engines and data visualization tools to help users more quickly and efficiently access and understand the data contained in the ONA. ►
6. JFCOM, further define the reach-back concept as part of future experiments. ►
7. JFCOM, lead an effort to develop a joint integrated tasking order to complement the ETO and integrate the actions of all components including JFLCC and JSOTF necessary to create joint effects. ►

- The integrated ATO and maritime tasking order (MTO) are excellent tools in their domains; however, they are insufficient to integrate all other actions necessary to create joint effects.

8. JFCOM, continue the development and refinement of the CONOPS and TTPs necessary to build an ETO defining linkages between the ETO, PEL and ONA. ►

9. JFCOM, foster development of ISR systems and M&S tools to replicate ISR systems to better assess results of EBO effects. ►

- There is currently no method of obtaining this information in current ISR architecture.

Senior mentors, SMEs, and JTF personnel have made the following recommendations for improvement of EAC operations:

10. JFCOM, in the SJFHQ concept, move the effect assessment cell from the Information Superiority group to the plans group. ►

11. JFCOM, reorganize the EAC to include IS personnel, to process BDA data, and operations personnel to conduct predictive analysis to turn the data into information that can be used to predict an adversary's capabilities and intentions. ►

12. JFCOM, organize the EAC into three (3) functional groups: intelligence and BDA data collection and analysis (IS personnel)- effects assessment (IS/OPS personnel)- predictive/deficiency analysis (OPS personnel). ►

13. JFCOM, examine effects assessment in future experiments with an emphasis on organization, manning, tools, and doctrine (TTP). ►

14. JFCOM, in conjunction with Service and joint schools, incorporate nodal and deficiency analysis into curriculum to reinforce the EBO concept. ►

15. JFCOM, develop a coherent definition of TST, highlighting the differences between a target that needs to be prosecuted immediately (TBM, CDCM, etc.) and one that can wait until an asset is available to prosecute it. ►

16. DoD, field ADOCS as an interim targeting toolset. ►

- ADOCS as a common targeting toolset showed great potential during MC02, however more fidelity may be required, and procedures need to be modified or added to make the process and toolset user-friendly.

17. DoD, field TST process and JFI concept, incorporating lessons learned and the revised procedures developed during MC02 as a joint procedure immediately. ►

18. DoD, develop M&S tools to better replicate non-kinetic weapon capabilities and effects in exercise, wargame and experiment events. ►

19. JFCOM, modify the JIACG concept to include the Pol/Mil planner as the forward element liaison between the JIACG and the JTF staff. ►

- A recommendation for the JIACG, proposed by some senior mentors and players, constitutes a JIACG forward element as a liaison cell/group on the JTF staff, to apprise the JTF on what DIE actions are being conducted or contemplated, and to solicit inputs on how these actions are effecting or will effect CJTFs overall campaign plan. This places the main emphasis on a JIACG-like element on the combatant commanders staff to harmonize DIE actions.

20. DoD, develop M&S tools to assist with the assessment of DIE actions. ►

21. JFCOM, continue development of the effects-based planning process and training for members of the JTF staffs. ►

- Effects-Based Planning necessitates a change in the military decision-making thought process. The lack of war gaming at the JTF level and the apparent lack of development of branch plans and sequels based on the use of effects assessment and predictive analysis indicates that EBO planning process as described by the EBO concept developers was not completely adhered to by the JTF-HQ staff. The concept itself appears to be sound, however, based on this experiment more in-depth training is needed to insure that all members of the JTF and component staffs follow the planning principles of EBO.

22. JFCOM, develop an acceptable mechanism for coordinating SAP/STO actions and integrating SAP/STO program information into the JTF IO campaign. ►

23. JFCOM, take the lead in evaluating inclusion of STO in the JTF CIE, and in determining if more STO billets are required throughout the JTF. ►



Figure 59: US Navy medical teams work on the wounded during MC02 field exercises

## Assessment Area 5 — Sustain the Force

### Overall Assessment Results

The procedures developed to satisfy the warfighting challenge ‘Ability to Provide Agile Sustainment for Joint Forces in Rapid Decisive Operations’ could not be completely validated because of the experiment construct. As discussed below, some of the procedures require further experimentation.

The logistics common relevant operational picture (Log CROP) proved to be a powerful and well-received tool, enabling the JTF to rapidly process data and generate logistics knowledge by integrating sustainment as an integral part of Effects-Based Operations. The watchboard was the most commented on and used part of the Log CROP. However, it did not provide a predictive logistics capability.

The experiment construct did not enable an accurate assessment of the ability to ‘Employ a Networked Sustainment Distribution Structure to Satisfy the JFC Sustainment Requirements for RDO’ because the structure was not simulated and was not visible to the participants. However, insights gained from participants showed that while the Log CROP provided sufficient information to be able to tailor logistics forces, sufficient planning time was not allocated to arrive at a tailored solution in either force structure or sustainment packaging. ISBs and host nation support were used efficiently to minimize the logistics footprint in the JOA. JRSOI procedures and networked distribution, however, could not be evaluated without benefit of more detailed modeling because of all the factors that affect those procedures. The JTF successfully used a combination of delivery platforms for sustainment distribution, including using strategic lift assets. However, the high speed vessel (HSV) was never used for sustainment distribution during the experiment because the JFMCC and the JTF could not agree on how the revolutionary new vessel should be employed.

In the area of ‘Gain and Maintain Knowledge of Force Health Status’, the Theater Medical Information Program (TMIP) was not mature enough or sufficiently integrated into the MC02 C<sup>4</sup>ISR design to provide situational awareness to the JTF surgeon staff or to assist in their planning, coordinating, and decision-making process.

The assessment of ‘Provide Medical Care’ was inconclusive. The joint medical semi-automated forces (JMedSAF) simulation did not portray movement of casualties from point of injury, to Level 1, and to Level 2 treatment. In addition, Level 1 units were not played and not all Level 2 units were played in JMedSAF. Whether those units were capable of providing adequate medical care in the JOA could not be determined.

### Methodology

In analyzing the task, ‘Rapidly Process Data and Generate Logistics Knowledge by Integrating Sustainment as an Integral Part of Effects-Based Operations’, the Log CROP, which was seen as the key area to review, was broken down as follows:

#### Overall Assessment Results

- The Log CROP proved to be a powerful and well-received tool..
- The Experiment construct did not enable an accurate assessment...
- The Theater Medical Information Program (TMIP) was not mature enough to provide situational awareness...
- The assessment of Provide Medical Care was inconclusive...

- Collecting, processing, and displaying full visibility of operations and logistics information
- Log CROP ability to display complex logistics information
- Log CROP ability to ensure a "predictive" capability for logistics
- Ability to acquire critical logistics information from the Log CROP for planning and analysis and dissemination to subordinate logistics commanders

The second task, 'Employ a Networked Sustainment Distribution Structure to Satisfy the JFC Sustainment Requirements for RDO' addressed the following:

- Tailor sustainment for synchronization with deploying forces
- Shape the logistics footprint in JOA to extend operational reach
- Procedures and practices to ensure time-definite delivery and support for agile mobile forces
- Use strategic lift to augment theater distribution
- Employ a combination of delivery platforms to ensure time-definite delivery, improve throughput, and support agile mobile forces

The last tasks, 'Gain and Maintain Knowledge of Force Health Status and Provide Medical Care', were assessed by:

- Track patients throughout the theater of operations and to CONUS
- Monitor DNBI/combat casualty rates as related to force readiness
- Determine the tool required to provide the JFC and subordinates the knowledge needed to assess the medical feasibility of operational activities
- Determine patient data trending

Data was collected primarily from the logistics participants and SMEs using automated questionnaires and from the written comments and recommendations provided by all participants, various after action reviews, and In-Focus Sessions. The locations and number of the logisticians follows: plans group, 14; operations group, 12; SMEs, 12; functional component, 5; JLMC, 16; and the JECG deployment sustainment support cell (DSSC), 17.

### **Warfighting Challenge: Ability to Provide Agile Sustainment**

The warfighting challenge, 'Ability to Provide Agile Sustainment', was developed because the current force sustainment methodology requires establishing a large vulnerable infrastructure to collect equipment, personnel, and consumables and to perform employment and sustainment functions. Because of its size and its nature, it is challenged to provide agile sustainment to highly mobile forces in non-contiguous operations. The tasks, subtasks, questions, and data elements constituting this study were developed based on information from several sources, most notable being:

- *Focused Logistics: Enabling Early Decisive Operations* (FLEEDO, 10/10/99)
- *Concept Experimentation Strategy (CES) to Deploy and Sustain the Force in Rapid Decisive Operations* (RDO, 2/14/01)
- *Strategic Deployment* (SD, 5/10/00)
- *RDO White papers* (3/1/02)
- *Standing Joint Force Headquarters (SJFHQ) Concept of Employment for MC02* (8/17/01)
- *Deployment & Sustainment in MC02 Concept of Operations* (CONOPS, 3/18/02)
- *Deployment & Sustainment in MC02 Tactics, Techniques and Procedures* (TTPs, 1/9/02)

- *MC02 Joint Standing Operating Procedure (JSOP)*

These sources were used to generate the metrics and form the basis for data collection plan development. The logistics concept developers, including the Joint Logistics Transformation Center (JLTC) and medical SMEs, and JFCOM analysts vetted the data collection plan. The high order metrics:

- Task: Rapidly process data and generate logistics knowledge by integrating sustainment as an integral part of effects-based operations
- Task: Employ a networked sustainment distribution structure to satisfy the JFC sustainment requirements for RDO
  - Subtask: Tailor sustainment for synchronization with deploying forces
  - Subtask: Shape the logistics footprint in JOA to extend operational reach
  - Subtask: Employ a combination of delivery platforms to ensure time-definite delivery, improve throughput and support agile mobile forces
  - Subtask: Determine the impact of using strategic lift to augment theater distribution
- Task: Gain and maintain knowledge of force health status
  - Subtask: Track patients throughout the theater of operations and to CONUS
  - Subtask: Determine the tools required to provide the JFC and subordinates the knowledge needed to assess the medical feasibility of operational activities
- Task: Provide medical care
  - Subtask: Determine the impact of using lifts of opportunity vs. dedicated air evacuation to move patients from the battlefield
  - Subtask: Determine the means of reducing the medical footprint in the JOA

**Finding 1► The Log CROP became the key tool for displaying logistics information and providing logistics situational awareness.**

As depicted in figure 60 below, most participants, logisticians and operators alike, saw the Log CROP as the most effective tool in the experiment for capturing and displaying logistics information. From it, commanders and staff could select areas of information relevant to them. The most widely used part of the Log CROP was the watchboard, which was a “stoplight chart” that provided a near real time view of component status of critical classes of supply and flow capacity across critical nodes and lines of communication. MC02 effectiveness notwithstanding, the Log CROP needs continued refinement to provide an automated method of integrating logistical information across all echelons, and to ensure the links to information sources are kept current. JTF component and MSC elements, with information posted on the watchboard piece of the Log CROP, or available via links on the watchboard, must also keep those links current. Business or knowledge management rules also need to be developed, as an SOP, to standardize Log CROP use and update procedures.

In some instances, participants recommended deleting some links and recommended adding others. Of significance was the lack of engineer and medical information sources linked to the Log CROP.

The JTF log operations director did not see the Log CROP as a “predictive logistics” tool. To become such a tool would require adding a forecasting capability, enabling forecasting out to 96 hours, or adding links to component or Service forecasting tools.

“JTF/Corps-level logisticians don’t live 24-48 hours out; they live 72-96 hours out; otherwise, they can’t affect anything in time to make a difference,” said one participant. “Some means of building projections, some kind of predictive capability into the data on the log watchboard would be highly desirable,” said another.

Information on the log watchboard was not seen as actionable. Respondents reported that the log watchboard served more as a location to place component and subordinate command status information. Having the log watchboard as a source for actionable information should come about over time. JTF elements must become more familiar with it, and SOPs must be developed.

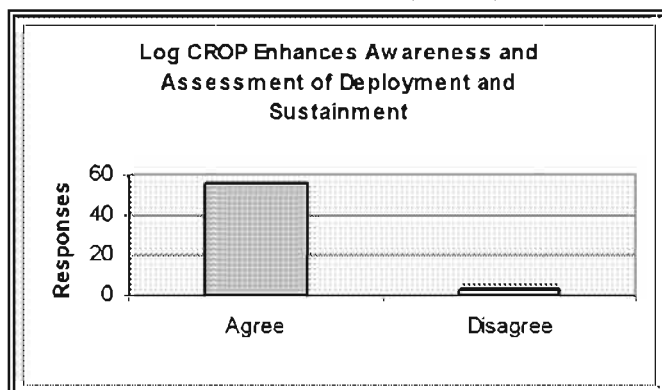


Figure 60: Log CROP enhances awareness (n=59)

Some respondents indicated there was too much information on the Log CROP, and desired the ability to tailor the display to their needs. “We should have the ability to individually sculpt the page when it opens up, based on the person’s log in,” said one participant. Another noted, “We should have some ability to tailor what’s seen on the page so people can put what’s most important to them, where they can find it easiest.”

One analyst observation was that none of the logistics systems was incorporated or linked to the ONA database. Since the ONA is supposed to present both Blue and OPFOR information pertaining to the JOA, the issue of whether or not the two information sources should be integrated or linked should be investigated.

**Finding 2► Sustainment packages were not tailored for deploying units. ISBs shaped the logistics footprint. The JTF made good use of multiple delivery platforms for sustainment distribution.**

Tailoring sustainment packages for deploying units was not well executed. Participants noted that there was insufficient time to allow for the detailed planning necessary to develop tailored sustainment. Said one player, “The planning timeline developed by the JTF did not allow our subordinate commands to do the planning necessary to come up with a task organized sustainment package.”

As shown in figure 61 below, the Log CROP provided the JTF sufficient visibility over logistical assets to be able to tailor logistics for deployed forces; however, as stated previously there was insufficient planning time to go through the process to arrive at a tailored solution. While the tool exists (Log CROP), appropriate time must still be made available for planning.

With respect to the use of ISB to support sustainment distribution, the JTF positioned ISBs to reduce the logistics footprint in the JOA and extend operational reach, while still considering force protection. One concern raised was that by reducing the footprint in the JOA, the JTF was limiting its in-theater support options, while at the same time downsizing facilities outside the JOA, which would cause difficulties for follow-on forces. This was a meaningful and



essential constraint in MC02. The real key was the desire for large effects in the JOA, but realized via Effects-Based Planning, that large forces were not required.

Maintaining sustainment aboard ship served to minimize the logistics footprint in the JOA. Even with the intent of minimizing the log footprint, the JTF still ended up with two sizeable ISBs in the JOA. There were also forward operating bases that had to expand because of the number of personnel operating from them. While not directly stated, this would indicate insufficient coordination among components to minimize supply stockage and duplicate forces. Extensive use of host nation resources helped to offset the log footprint in the number of U.S. forces personnel and amount of sustainment required.

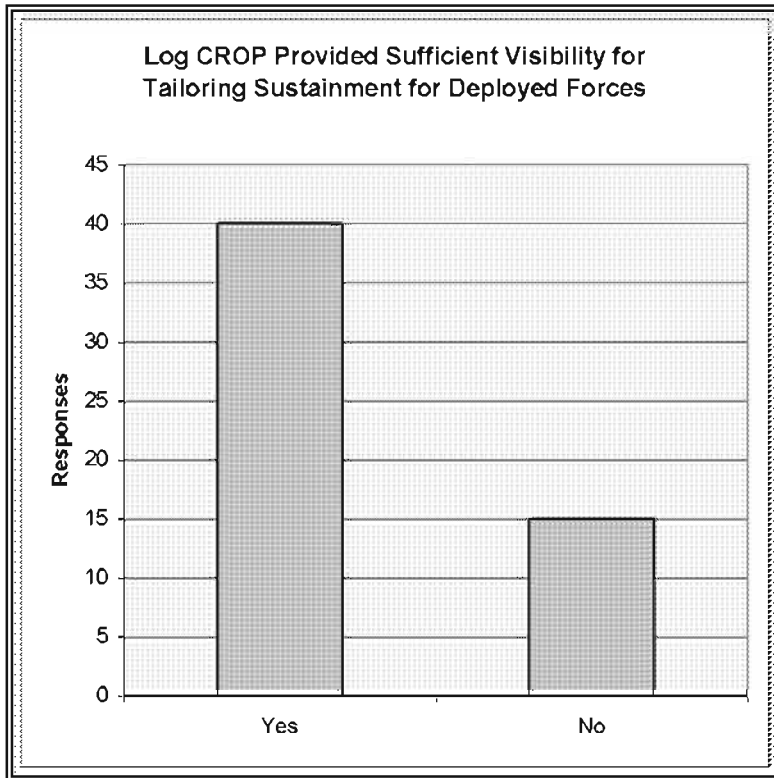


Figure 61: Log CROP provides visibility-tailoring sustainment of deployed forces (n=55)

The JTF successfully used a combination of delivery platforms for sustainment distribution; including using strategic lift assets to resupply the JFLCC subordinate commands. However, the high speed vessel (HSV) was never used for sustainment distribution during the experiment. The JFMCC used the HSV as one of its operational assets rather than as a theater common-use transportation asset.

The JTF successfully coordinated with USTRANSCOM to retain strategic lift into the JOA and to support aerial transportation requirements following the airborne insertion. This reallocation of strategic lift proved to be essential for accomplishing the mission in Red, and showed the degree of

increased airlift resources that might be required to support Army operations on this scale.

**Finding 3► Immature development and insufficient integration of the Theater Medical Information Program (TMIP) had a negative impact on the ability of the JTF staff to gain and maintain knowledge of force health status.**

The lack of early planning and knowledge of what assets were already in theater slowed the delivery of focused medical support services. Comments included, “Since medical play was never designed into the MC02 exercise and experimental construct, the flow of information between the response cells to the functional components and on to the JTF, because of the numerous work-a-rounds, was cumbersome, confusing, and the ROE changed almost daily.” Another noted, “...For this experiment, TMIP did not have the capability to track patients. NavMedWatch was better at this [tracking patients] than TMIP. We would have needed

additional information scripted, to put into TMIP in order to show the evacuation, additional visits, and patient encounters.”

### **Other Observations**

#### **Observation 1: The assessment of “Provide Battlefield Medical Care” was inconclusive.**

No assessment can be made regarding the subtask, ‘Determine the Impact of Using Lifts of Opportunity vs. Dedicated Air Evacuation’ to move patients from the battlefield; or the subtask ‘Determine the Means of Reducing the Medical Footprint in the JOA’. The lack of medical planning for MC02 and the poor integration of the experimental systems with Service reporting prevents any meaningful review of these subtasks.

The joint medical semi-automated forces (JMedSAF) simulation did not portray movement of casualties from point of injury, to Level 1 care, or to Level 2. JMedSAF automatically placed casualties into Level 2 medical facilities. In addition, Level 1 units were not played, and not all Level 2 units were played in JMedSAF. Whether those units were capable of providing adequate medical care in the JOA could not be determined. As such, the JTF medical staff had no capability to make a decision regarding whether their medical footprint in the JOA was effective. Because lifts of opportunity were not simulated, no assessment can be made as to whether they were effective, or whether casualties were dying due to no dedicated air evacuation assets in the JOA.

The concept of using ‘lifts of opportunity’ to evacuate casualties elicited a strong response from one experiment participant, “Patient evacuation by lift of opportunity should be used as an exception, not as the rule,” he said. “In RDO, with a minimal (or nonexistent) medical footprint in the JOA, dedicated medical lift, with embarked, skilled, medical personnel to monitor and treat stabilized patients, as they are evacuated from stabilization platforms like an FST, EMEDS, or CRTS, to definitive care is necessary. Lift of opportunity is for stable patients that require little or less medical expertise during evacuation. If we make opportune lift our primary means of evacuation, soldiers, sailors, airmen and marines will die en-route.”

#### **Observation 2: Deployment and sustainment planners should be fully integrated into the CIE**

According to one senior mentor, joint interactive planning (JIP) should apply to functions as well as forces. “They should be participants, not observers, as courses of action are developed, evaluated, and selected. Transportation feasibility and sustainment supportability assessments should be considered during COA development, and not during comparison and selection.”

### **Relationship to Other Objectives**

Standing Joint Forces headquarters (SJFHQ)

- Functions of personnel in log operations and log plans positions in SJFHQ

Operational Net Assessment (ONA)

- Database research for facilities and infrastructure to support logistics operations in JOA

Effects-Based Operations (EBO)

- Develop logistics concept of support for Effects-Based Operation(s) and future branches and sequels

**Sustainment**

- Plan and provide logistics sustainment for the JTF

**Collaborative Information Environment (CIE)**

- Environment for collaborative planning and coordinating logistics operations, force deployment and sustainment, horizontally and vertically; i.e. logistics action response board (LARB)

**Interagency Agency (IA)**

- Interaction for coordinating host nation support (food, facilities, equipment) and humanitarian assistance

**Joint Information Surveillance & Reconnaissance (JISR)**

- Intelligence on the JOA and adversary activities therein that would adversely impact force deployment and logistics operations

**Joint Initiatives**

- Introduction and experimentation of new joint logistics tools (JL Tools)

**Assured Access (AA)**

- Ensuring access into the JOA and facilities therein to support force deployment

**Effects Based Operations (EBO)**

- Execute logistics operations to sustain forces conducting effects-based operations

**Joint Theater Logistics Management (JTLM)**

- None

**Relationship to Baseline Analysis**

The following entries are relevant to major observations made during MC02.

Baseline entry: The J-4 was not able to adequately track key trigger points throughout the operation, or monitor major changes during the campaign

MC02 Result: The Log CROP, with the CIE, improved the capability to track key trigger points

Baseline entry: The JTF requested and received directive authority for logistics, enabling the JTF to direct or assign common user items and services to specific components. The resulting continuous flow of support was crucial to mission accomplishment

MC02 Result: In MC02, directive authority for logistics with the lead Service for classes I, III and IV was recognized as a good support combination

**DOTMLPF Linkage**

**Doctrine**

- TTP/SOP is needed for Log CROP knowledge management: keeping the Log CROP current

- TTP/SOP are needed for employment of new systems (TMIP)

Organization

- Improve reach-back capability for CONOPS medical planning

Training

- Deployment and sustainment planners should be fully integrated into the collaborative information environment (CIE)
- Consider developing training programs for multi-functional joint log planners, knowledgeable in all Service capabilities
- Reinforce adequate allocation of time for subordinate's mission planning requirements
- Consider training programs to develop and maintain proficiency in logistics decision support tools

Materiel

- Formalize the Log CROP
- TMIP needs to be refined before employment

Leadership

- Reinforce adequate allocation of time for subordinate's mission planning requirements

Personnel

- None

Facilities

- None

**Recommendations**

1. JFCOM JLTC, through future experimentation events using the CIE, develop joint sustainment structure(s) that support RDO scenarios such as those used in MC02.
2. MEDCOM, field-test theater medical information program (TMIP) to validate Service data integration prior to acceptance.
3. JFCOM JLTC, examine networked distribution structure as part of an LOE on satisfying joint force sustainment requirements for RDO.
4. JFCOM JLTC, Joint Staff J4, DISA, and Services, continue to refine the Log CROP and its functionality based on user comments and the availability of new or advanced technologies.
  - Include the need to automatically integrate logistical information across all echelons in this effort.
5. JFCOM JLTC, pursue examination and definition of 'predictive logistics tools'.



Figure 62: Getting ready for the Global Strike Task Force mission during MC02 exercises

## Assessment Area 6 — Standing Joint Force Headquarters (SJFHQ)

### Overall Assessment Results

The SJFHQ assisted the Joint Task Force (JTF) headquarters in quickly achieving command and control (C2) of the JTF formed to resolve the crisis presented by the MC02 experiment scenario. The value-added by the SJFHQ was unquestionable and prevalent throughout the experiment. The SJFHQ members reduced the ad hoc characteristics normally associated with the activation of a JTF, helped surmount the JTF standup learning curve, and provided continuity in planning and operations from pre-crisis through execution to transition — invaluable contributors to the JTF staff according to participants, SMEs, and senior mentors.

Although the SJFHQ added value to the JTF, refinement of its organization and composition is still warranted. The organization and composition need minor refinement, however not a major overhaul. The SJFHQ group organization—command group (CmdGrp), plans group (PG), operations group (OpsGrp), information superiority group (ISG), and knowledge management group (KMG)—doesn't require changes. Further study is recommended with regards to a proposed elimination of the ISG and the KMG and redistribution of its members within the organization. Further study is also recommended to investigate the addition of a logistics support. Assessment of the SJFHQ group compositions describes the addition of five people to the SJFHQ: a commander, to be incorporated into the command group; added expertise in the areas of strategic lift, personnel, and engineering as part of the PG; and the addition of a fires officer in the operations group. Individual attributes, knowledge, and experience of the SJFHQ members are critical to credibility and effectiveness. There is also concern regarding the mix of military, government, and contracted personnel — military and government personnel cannot be subordinate to contractors. This assessment pertains to the specific SJFHQ structure and not the JTF. The CJTF organizes the JTF based on requirements.

The boards, centers, cells, and working groups (BCCWG) envisioned by the SJFHQ concept provided a suitable structure to the JTF staff for joint force C2. Most BCCWGs were adequately organized and were able to meet the needs of the JTF. The BCCWG structure enhanced JTF operations and enhanced interaction between the JTF headquarters and the component and combatant commander staffs. The BCCWGs used during MC02 and discussed below are the same organizations that the SJFHQ uses when it operates as a stand alone JTF and are only a starting point from which the CJTF and his staff can add, delete, or adjust based on the requirements of the situation.

The SJFHQ and what it brought to the fight, especially the CIE, altered the role of component LNOs at the JTF headquarters. The SJFHQ and CIE facilitated a reduction in the

### Overall Assessment Results

- Value-added by the SJFHQ was unquestionable...
- SJFHQ members reduced the ad hoc characteristics of standing up a JTF...
- SJFHQ provided continuity in planning and operations...
- Minor refinement of SJFHQ organization and composition is warranted...
- Most BCCWGs are organized about right and met the needs of the JTF...
- SJFHQ and CIE altered role of LNOs at JTF HQ...

workload. The SJFHQ provided an in-place understanding and experience in joint operations and the CIE served as a substitute for face-to-face communications. However, the increased tempo, brought on by faster, better, and more accurate data substantiated the need for well-trained LNOs with analytical skills necessary to process the data and discern what was important and when actions needed to be taken. This coupled with the necessity for the LNO to perform his traditional roles when the CIE went down, showed a potential increase in the importance of the LNO and the necessity of the LNO being the commander's representative with his full trust and confidence.

Highlighted throughout this assessment of the SJFHQ is the importance of the CIE. Respondents noted that the CIE was the key to the success of the SJFHQ and to the effectiveness of the groups and BCCWGs, during pre-crisis activities through transition. The SJFHQ and CIE were inextricably linked and had a synergistic effect to enhance JTF operations. The CIE was the means through which many SJFHQ and JTF functions were performed. It enabled the SJFHQ and JTF to rapidly and effectively perform EBO and UJTL tasks. The SJFHQ's expertise with the collaborative processes employed was the most valued of the SJFHQ attributes.

Review of the MC02 *UJTL Baseline Report*, dated 11 July 2002, indicates the SJFHQ and its concept of employment are to provide a means to alleviate major difficulties in accomplishing UJTL task OP5, Provide Command and Control. The concept directly addresses root causes of some cross-task performance issues, and provide a means to overcome some aspects of five of the 10 JTF challenges as stated in the baseline report.

## **Methodology**

The data, provided by experiment participants, subject matter experts and senior concept developers, was predominantly qualitative. The data was gathered from personnel who emulated the combatant commander's staff and SMEs, who were positioned at key nodes within the JTF headquarters and at the locations of the five functional component commander headquarters located throughout the United States. Two SMEs also accompanied the selected members of the JTF headquarters (Forward), who deployed to the USS *Coronado*, July 30 to August 2.

Experiment participants and SMEs were asked to complete surveys at selected points throughout the experiment to gather data regarding the use of the SJFHQ. The surveys were administered electronically using the web-based JBC Data Collection Analysis Tool (JDCAT). A total of 52 participant surveys and 33 SME surveys were issued during Spiral 3, 3-14 June 2002, and during MC02 Execution, July 24 to August 14, 2002. These resulted in approximately 8,000 individual surveys completed and submitted by the SMEs and participants. The survey completion rate was approximately 80 percent overall. Experiment participants and SMEs were also asked to submit observations concerning any strengths or weaknesses of the organizations, processes, procedures, and tools used in the experiment. These observations were narrative in nature and were collected using an electronic format persistently available at every computer workstation that also carried JDCAT.

This capability allowed for rapid compilation of data and daily roll-ups, which was provided to experiment analyst personnel. This was a rich source of experiment data and generated approximately 360 observations related to the SJFHQ. Participant and SME representatives also participated in a post-execution SJFHQ working group session that discussed all aspects of the SJFHQ. This session developed additional data used in this analysis. Senior concept developer input was gathered during daily In-Focus and Azimuth Check sessions and weekly after action reviews. A compilation of the senior concept developer comments made

in these venues was also used as source data for this analysis. Analysts also interviewed selected senior concept developers and key JTF headquarters staff members, to include the chief of staff, and the group directors to further develop data used for this analysis.

The organizational structures, functions, and products of the SJFHQ concept were the focus of this evaluation. The analysis process consisted of a daily, preliminary review of the incoming data from the sources described above and the daily production of emerging insights for presentation to the senior experiment analysts. These emerging insights became the basis for the development of the findings presented in this analysis. Logical groupings of survey and comment data from the experiment participants, SMEs, and senior concept developers, from Spiral 3 and Execution, were then distilled to the information presented herein.

### **Warfighting Challenge: Ability to quickly achieve cohesive C2 of a joint force**

A JTF, enhanced with a SJFHQ, should be able to more quickly achieve cohesive C2 of a joint force than it would if it did not have a SJFHQ. Therefore, the SJFHQ facilitates the JTF's conduct of RDO. The SJFHQ should provide the ability to rapidly integrate precise knowledge and understanding of the adversary into early planning and execution by the JTF headquarters, providing the degree of continuity in planning and operations that enables execution of RDO. The SJFHQ should be a key component, helping the JTF to quickly achieve cohesive C2 of a joint force, facilitating RDO.

The RDO concept paper (Jan 16, 2001) reads:

RDO requires a greater coherence of operational level advanced planning and command and control than current ad hoc or augmented Service core headquarters can generate. Successful, rapid response in future operations requires a headquarters that has a detailed understanding of the area of operations and is immediately responsive to the geographical combatant commander for crisis response planning and execution.

The SJFHQ Concept of Employment paper (Aug 17, 2001) reads:

The SJFHQ is intended to provide each warfighting joint theater commander with a trained and equipped standing, joint command and control (C2) capability specifically organized to reduce lag time involved in setting up a JTF headquarters ready to rapidly and decisively conduct contingency operations.

Given this warfighting challenge, metrics (tasks, subtasks, questions and data elements) were developed based on information from the various sources listed below:

- *Rapid Decisive Operations Concept Paper* (RDO, Jan 16, 2001)
- *Rapid Decisive Operations Concept Paper* (RDO, Jan 26, 2001)*Rapid Decisive Operations Concept Paper* (RDO, 09 08 01)*USJFCOM Adaptive Joint Command and Control (AJC2) White Paper*
- *USJFCOM Adaptive Joint Command & Control (AJC2) Concept Baseline Collective Assessment (BCA) Standing Joint Force Headquarters (SJFHQ) Concept of Employment for MC02* (Aug 17, 2001)
- *MC02 Joint Standing Operating Procedure (JSOP)*
- Ideas extracted from works by RAND; Institute for Defense Analysis; Defense Group, Inc; and Service concepts for future operations



These sources were used to generate the metrics and formed the basis for data collection plan development. Data collection was aimed at the goal of determining if each of the developed tasks and sub-tasks was performed or achieved. Successful task accomplishment is the basis for a determination that the warfighting challenge was overcome. The data collection plan was vetted with the SJFHQ Concept Developers and USJFCOM analysts.

The high order task and sub-task architecture follows:

- TASK: Quickly establish a JTF headquarters ready to conduct RDO
  - Subtask: Establish a standing element of a Joint Force headquarters (SJFHQ)
  - Subtask: Employ the SJFHQ to conduct pre-crisis planning
  - Subtask: Integrate the SJFHQ into the JTF headquarters to perform RDO planning and execution
  
- TASK: Provide continuity in planning and operations from pre-crisis through execution and transition
  - Subtask: Establish cell-organized JTF headquarters around the SJFHQ structure and processes
  - Subtask: Use SJFHQ architecture to establish a joint force C2 structure
  - Subtask: Employ the SJFHQ to assist with deployment of the forward headquarters
  - Subtask: Employ the SJFHQ to assist in the conduct of staff operations
  - Subtask: Employ the SJFHQ to assist in coordination and integration of joint and interagency support

**Finding 1** ► **The SJFHQ provided value added to JTF staff for C2 of the joint force. It reduced the ad hoc nature of activating a JTF, helped surmount the JTF standup learning curve, and provided continuity in planning and operations from pre-crisis through execution to transition.**

This finding is supported by the following detailed 'facts':

- The SJFHQ completed expected pre-crisis activities
- The SJFHQ provided the pre-crisis products necessary for the JTF to more rapidly surmount the learning curve
- The MC02 JTF performed expected JTF functions
- The SJFHQ reduced the ad hoc nature of JTF headquarters activation
- The SJFHQ enhanced JTF performance of EBO and UJTL tasks
- The SJFHQ contributed to the continuity demonstrated by the MC02 JTF
- The presence of the SJFHQ provided value-added to the JTF's accomplishment of the MC02 experiment objectives
- The organizational structures described by the SJFHQ concept and used in MC02 enhanced the function of the JTF
- The function of the forward headquarters was enhanced by the presence of a portion of the SJFHQ

**Fact: The SJFHQ completed expected pre-crisis activities.**

The data for this fact was provided by key SJFHQ personnel. Analysis was performed comparing the actual activities and products that the SJFHQ provided with the activities and

products required by the reference documents, specifically, the concept for employment (CONEMP) and the JTF standard operating procedures (JSOP).

**Background.** The 55-man, SJFHQ was formally established on February 19, 2002. Its organization evolved from research done during Joint Experiment Unified Vision 2001 and from subsequent limited objective experiments. The actual MC02 team carried 59 personnel as four training slots were added. Although there were nine administrative membership changes within the group from start-up date to MC02 execution, the SJFHQ remained in a stable organizational environment throughout.

**Pre-Crisis Activities.** From the CONEMP, the SJFHQ concentrates on three primary tasks during pre-crisis activity: combatant commander engagement, planning, and training. The duties involved in combatant commander engagement include identifying the mission essential roles for allied and regional partners by collaborating with those partners and developing situational awareness and understanding. Planning duties focus on identifying and characterizing key nodes and vulnerabilities of potential adversaries within the framework of ONA parameters. This information is integrated into a focused area ONA and used to develop effects-based options. In developing the ONA and contingency plans, the SJFHQ produces and ensures that a coherent, understandable joint standard operating procedures (JSOP) document exists. Training duties, both internal and external to the SJFHQ, include training in use of collaboration and decision support tools, understanding command relationships, improving lines of communication between headquarters and external support, participation in exercises with component headquarters and combatant commander staffs, and training the augmentees and liaisons who will participate with the SJFHQ in contingency operations.

Interviews were conducted with key SJFHQ personnel to determine whether the SJFHQ was conducting pre-crisis activities in accordance with the CONEMP. These key personnel included the deputy chief of staff, the joint operations center chief, the plans director, the operations director, the lead knowledge management officer, and the information superiority coordinator. Results of these interviews indicated that the SJFHQ engaged in the following pre-crisis activities: JSOP development, building the ONA, developing the Pol/Mil plan, coordination with component headquarters, CONOPS development, training (both internal and external), knowledge and information management plan (KIMP) development, and technical testing of computer networks. All respondents indicated that building the ONA and developing the JSOP were the activities that required the majority of their time. Concerning the development of the ONA, one participant commented, "There is not enough time to put together a good/comprehensive ONA."

He then went on to state that the system of systems analysis (SoSA) cell helped the SJFHQ to develop the ONA. The SoSA cell is not a part of the SJFHQ; however, one participant stated that they should be members of the SJFHQ, while another participant said that the SoSA cell should reside in the combatant commander's joint intelligence center (JIC). The planning activities prescribed by the CONEMP, but not accomplished by the SJFHQ were due to experiment artificialities. The SJFHQ was unable to exercise reach-back or relationship building with the combatant commander's staff or the centers of excellence because the experiment design indicated that the combatant commander's staff would only participate with representatives in the JECG.

SJFHQ personnel attended the following preparatory training:

- JTF Doctrinal Review (five days)
- RDO Concept (two days)

- EBO Concept (one day)
- SJFHQ Concept (two days)
- XC<sup>4</sup>I (three days)
- ONA Refinement
- CONPLAN Development
- SOP Refinement
- ONA, ADOCS, IWS, SPPS, JISR (Tool Suite, combatant commander Collection Plan, Requirements, Allocation, Matrix, Targets, Tasks, JCMC Agenda, Re-tasking)
- IO, ATO/MTO, TOP COP, EA Concept, LOG (Collaboration, Command and Control, PA, JFCR, GTN EX System, Sustainment Overview, Reports, AMMO, Fuel, Intra-theater Transportation Operations, HSV, C-130, Rotary Wing, Casualty Management, Evacuation Procedures, Medical Reports, MED CROP, Medical Practical Applications, Patient Tracking, Casualty Evacuation)

The SJFHQ provided training to III Corps participants in various venues. Key personnel from the III Corps staff attended a SJFHQ led joint concept seminar at Fort Hood, TX. Topics of the seminar included SJFHQ Concept of Operations, Rapid Decisive Operations, Effects Based Operations, forming a JTF Headquarters, Operational Net Assessment, Knowledge Management, Inter-Agency CONOPS, Joint Information Operations, Effects Based Planning, Effects Assessment, Joint Fires and Targeting, Hybrid Terrain, Joint Experimentation Operational Environment, and Joint Logistics/Sustainment Planning.

The original JTF headquarters slated for MC02, XVIII Airborne Corps, being replaced by III Corps because of mission requirements, necessitated this four-day seminar. This change was announced in late April 2002 with the seminar conducted only two weeks later. This unplanned situation, and not a formal part of the MC02 assessment strategy, may be the best example of SJFHQ value-added and its ability to maintain continuity from pre-crisis planning through execution to transition.

Additionally, all participants were provided training immediately prior to Spiral 3 and during Spiral 3. All participants were required to complete five modules of web-based training.

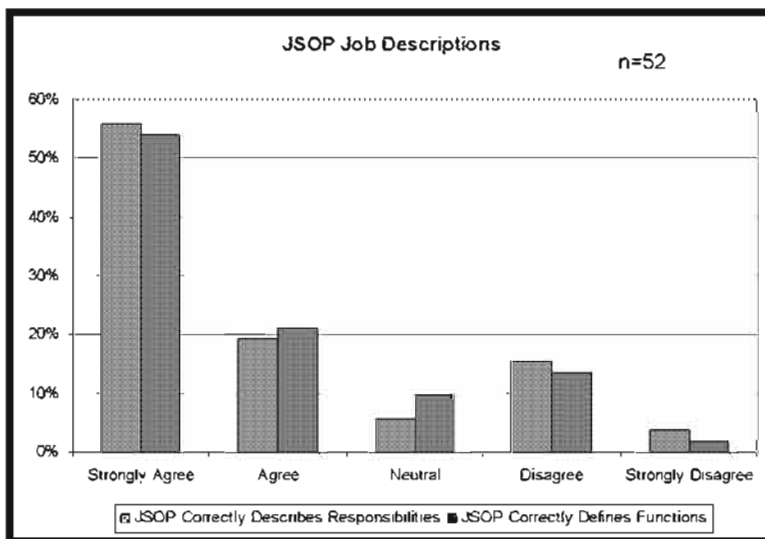


Figure 63: JSOP correctly describes/defines responsibilities and functions

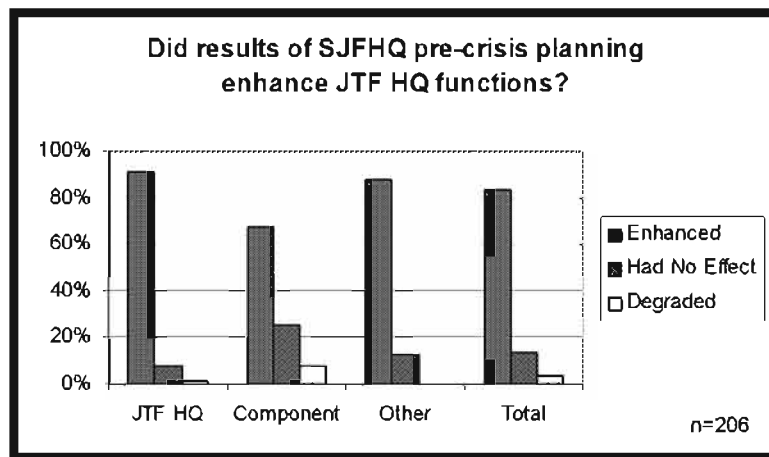
The training topics included Joint Experimentation, Rapid Decisive Operations, SJFHQ, ONA, and EBP. Additional training provided during Spiral 3 included: XC<sup>4</sup>I Systems, ADOCS, IWS, SPPS, JISR, ONA, IO (NA, PSYOP), ATO/MTO, TOP COP, EA, and LOG (LOG Overview, LOG Collaboration, Allocation, Matrix, JFCR, GTN EX System, Sustainment Overview, Reports, AMMO, Fuel, Intra-theater Transportation Operations, Movement Practical Applications, HSV, C-130, Rotary Wing, Casualty Management, Evacuation

Procedures, Medical Reports, MED CROP, Medical Practical Applications, Patient Tracking, and Casualty Evacuation).

In summary, the SJFHQ completed all pre-crisis activities as described in the CONEMP, with the exception of activities that could not be performed due to experiment artificialities. The SJFHQ, aware of these exceptions, would have performed the tasks had actual centers of excellence and a combatant commander's staff been available.

As part of the analysis of the SJFHQ pre-crisis activity, a survey was given to the SJFHQ concerning the job descriptions and billet functions as described in the JSOP. Three fourths of the SJFHQ members surveyed either strongly agree or agree that the JSOP correctly describes their specific job responsibilities and functions that they actually performed. In terms of responsibilities only 19 percent and in terms of functions only 15 percent disagree or strongly disagree that the JSOP is off the mark in these two areas.

Results of responses from exercise participants and SMEs indicate that additional details concerning job descriptions of billets other than those of the SJFHQ are necessary and should be included in the JSOP.



**Fact: The SJFHQ provided the pre-crisis products necessary for the JTF to more rapidly surmount the learning curve.**

In accordance with the CONEMP, the SJFHQ arrives at the JTF with a JSOP, a comprehensive and focused ONA, and a CONPLAN. During pre-MC02 forming, research, and training, the SJFHQ determined that two additional products, a KIMP and a pol/mil plan, were necessary for the rapid standup of

Figure 64: SJFHQ pre-crisis planning enhanced the function of the JTF headquarters

a JTF. All of these products were completed and provided to the JTF at the start of MC02. Interviews with key SJFHQ personnel indicated that the ONA is never finished; it is a continual work in progress and requires constant updating. As stated earlier, some of the key participants stated that there was not enough time to develop a comprehensive ONA, that the ability to provide a detailed ONA was exacerbated by exercise artificialities, and that information access limitations hindered in-depth analysis of the area.

SME responses to five surveys along with participant responses to four surveys regarding SJFHQ-provided pre-crisis products (five in Spiral 3 and four in execution) are the basis for the data used in this sub-finding. The survey respondents were asked to consider the usefulness of the JSOP, whether or not modifications to the JSOP were required, participant adherence to the JSOP, and whether the JTF desired additional pre-crisis products to be provided by the SJFHQ.

Pre-crisis planning is one of the more valuable services SJFHQ has to offer. During Spiral 3, JTF headquarters, component, and other participants with visibility on JTF activity were asked if the results of SJFHQ pre-crisis planning enhanced the function of the JTF headquarters.

Of the 206 respondents, the overall majority, 83 percent, reported the results of SJFHQ pre-crisis planning enhanced the function of the JTF headquarters.

Participants were also asked if the SJFHQ provided the pre-crisis planning products they thought it would provide. By an overall margin of two to one, the 372 respondents indicated the SJFHQ provided the pre-crisis products they expected.

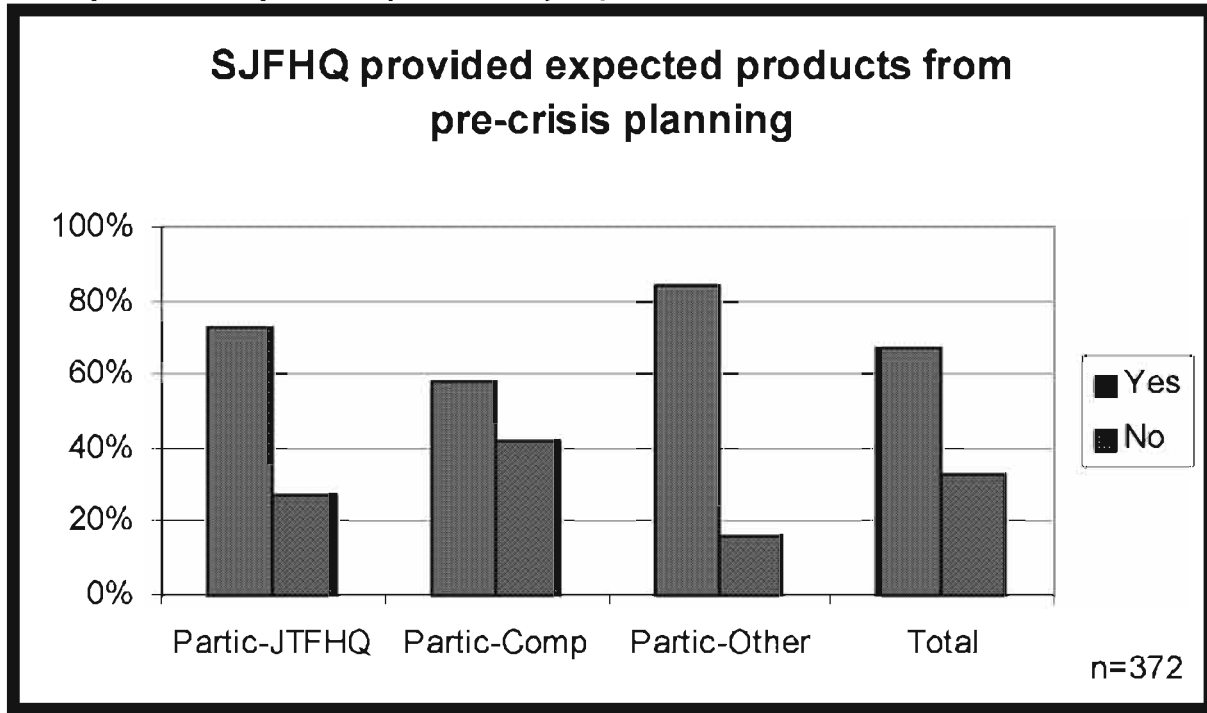


Figure 65: SJFHQ provided expected products from pre-crisis planning

The need for additional skills, knowledge, or products to be brought to JTF activation by the SJFHQ was explored with both SMEs and participants. During Spiral 3 and again in execution, the SMEs were asked if they thought there were additional skills, knowledge, or products the SJFHQ should bring to the activation of a JTF. If they answered yes, they were asked to identify what was needed. Of the 56 SMEs who formulated a position, approximately two-thirds answered that additional skills, knowledge, or products were needed.

Because this question asked about the need for additional skills and knowledge, in addition to products, further examination of the accompanying comments are required to determine the magnitude of the need for additional products, which is the focus of this portion of the analysis. Analysis of the additional skills and knowledge required is presented under the SJFHQ organization and composition finding found later in this report. Thirty-five of 36 respondents complied with the survey directions and provided a comment indicating what additional skill, knowledge, or product needed to be provided by the SJFHQ. Of these 35 comments, only eight dealt with the need for additional products. SMEs confirmed the participant view that the SJFHQ provided the products expected of it.

JTF headquarters participants were asked the same question as the SMEs, however they were not given the choice of a yes or no answer; they were just given the opportunity to comment on what additional skills, knowledge, or products the SJFHQ should bring to the activation of the JTF. One hundred ninety-two participants responded to this question in Spiral 3 and 201 responded during execution. Of these 393 respondents, 69 in Spiral 3, or 36 percent, and

84 in execution, or 42 percent, stated additional skills, knowledge, or products were required from the SJFHQ. Although not as high as the nearly two-thirds of SMEs who said additional items were required, this is a substantial figure. However, as was discussed in the previous paragraph, further examination of the comment data was required to more accurately determine what portion of this perceived need is directed at the requirement for additional products. Of the 153 comments related to a desire for something additional, approximately a fourth, or 39, were focused on the need for additional product from the SJFHQ. The majority of these participant comments called for the SJFHQ to bring a refined SOP and canned formats for recurring briefings and products to the activation of the JTF.

SMEs and JTF headquarters participants were asked during Spiral 3 and execution about the usefulness of the JSOP that was developed by the SJFHQ as part of its pre-event activities.

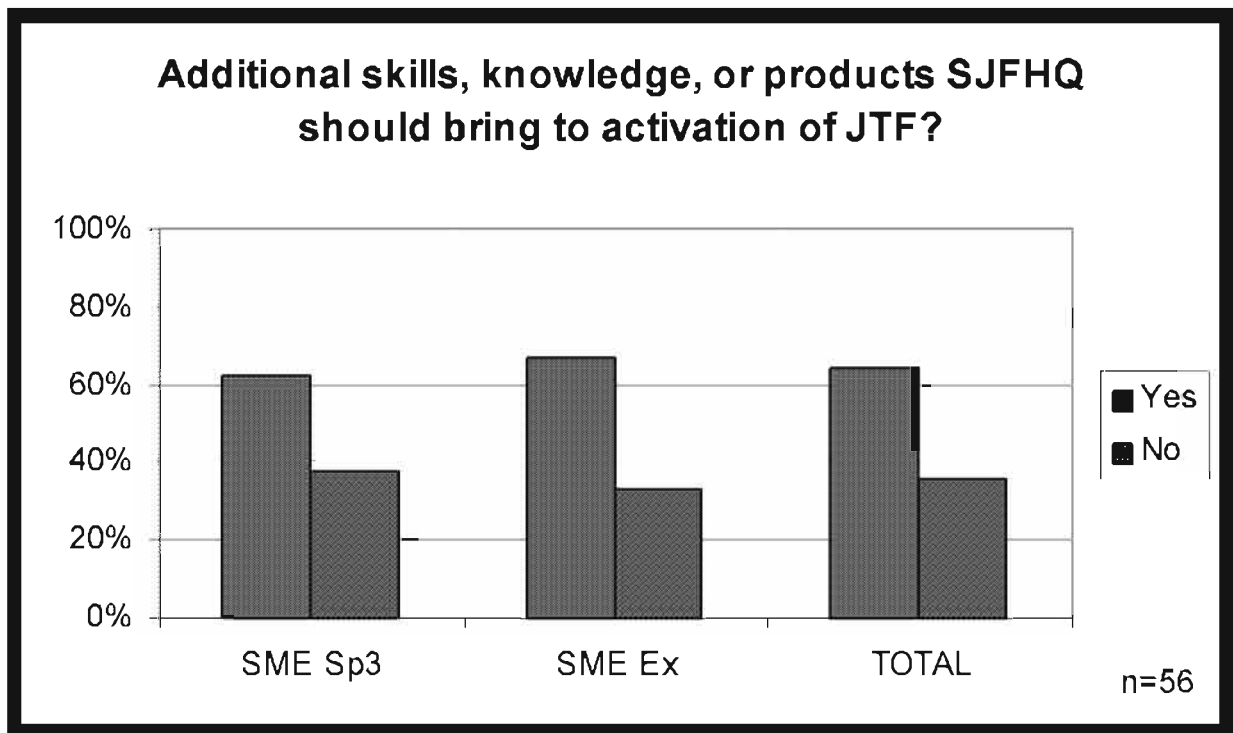


Figure 66: SJFHQ should bring Additional skills, knowledge, or products to JTF activation

Answer choices of ‘Very Useful’, ‘Somewhat Useful’, ‘Of Little Use’, ‘Of No Use’, and ‘Don’t Know/Did Not Use’ were available. Of the 295 respondents who made a ‘usefulness’ determination, over three-fourths said the JSOP was at least somewhat useful (See Figure 67). A slight decrease in the usefulness of the JSOP was detected between Spiral 3 and execution, which can probably be attributed to the fact that the JTF HQ was more mature and familiar with its roles in execution and that the pace of activity in execution was much higher, which provided less opportunity to access the JSOP.

SME and participant comment responses indicated that the JSOP developed for MC02 was a good baseline document from which to get the JTF up to speed and that it provided the detailed information on the processes and procedures that were required to make operations and planning in the collaborative environment possible. The majority of respondents that rated the JSOP as ‘of little use’ or ‘of no use’ indicated that the JSOP was too long of a document (greater than 600 pages) and that they had no time to read it.

Further evidence of the usefulness of the SOP was indicated when SMEs were asked to comment on whether the JTF appeared to adhere to the JSOP. Three fourths (n=81) of the SMEs indicated that the JTF followed and referred to the JSOP on a regular basis.

While the JSOP was rated as useful, a high percentage of the respondents indicated that

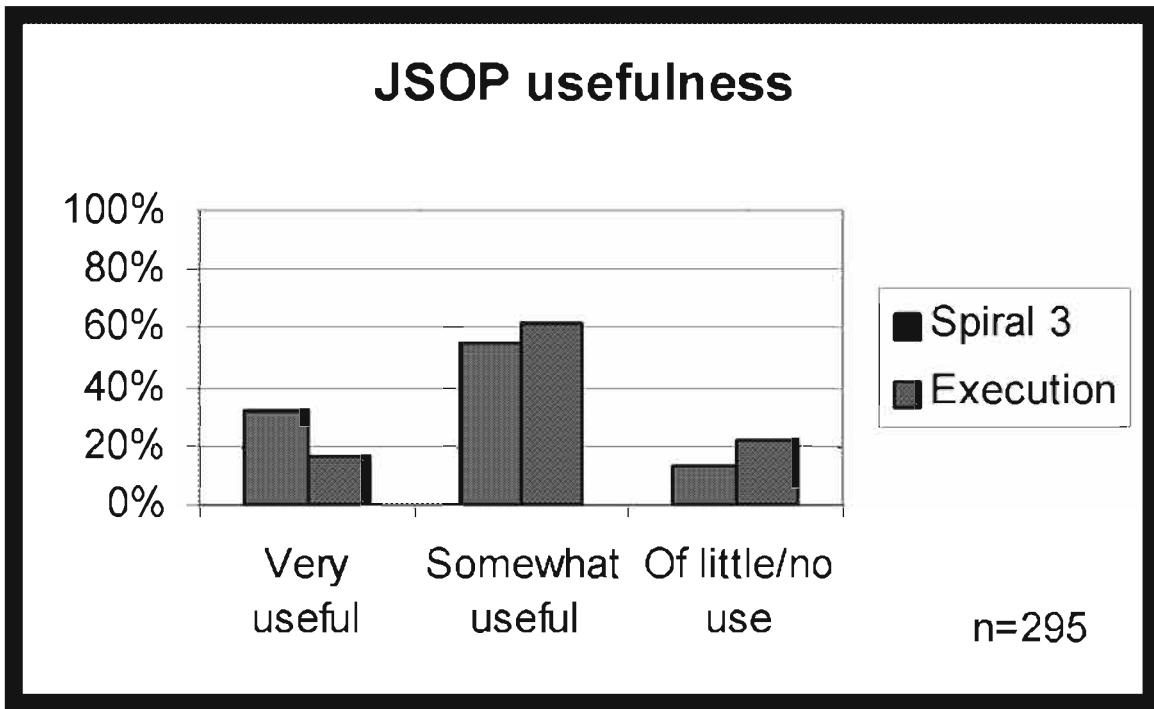


Figure 67: JSOP considered a 'somewhat useful' document

the JSOP needed modification. This was explored by asking SMEs and JTF headquarters participants during Spiral 3 and execution if the JSOP required modification. The high percentage of affirmative responses was particularly pronounced in execution where over 80 percent of SMEs and participants indicated modifications were required. In Spiral 3 over 80 percent of SMEs also stated, the JSOP required modifications, however JTF participants were nearly split.

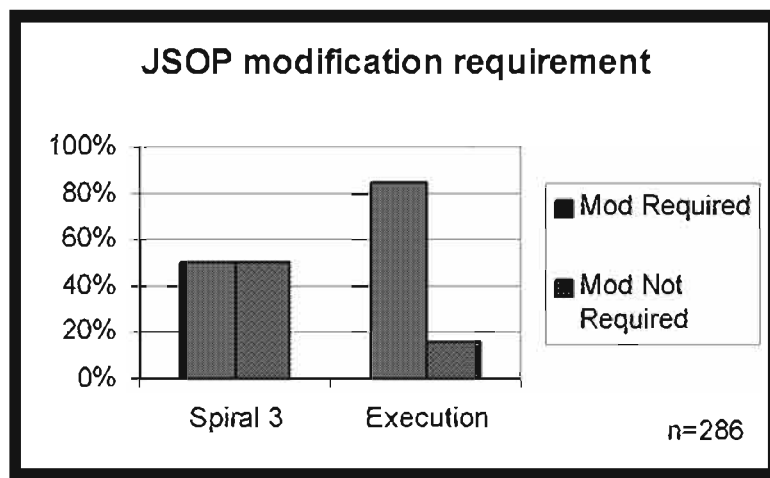


Figure 68: JSOP needed modification

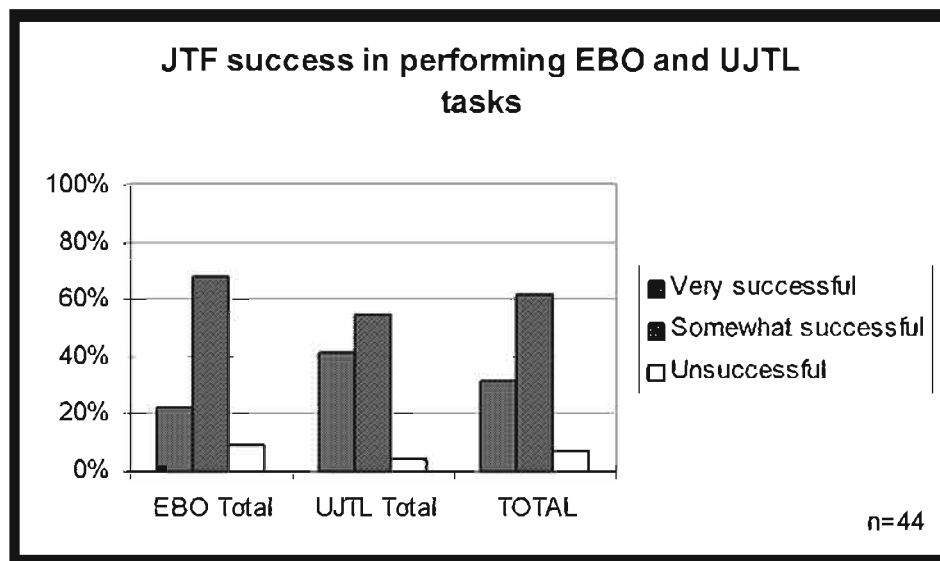
The evenly split JTF participant response in Spiral 3 should be tempered because those participants were given the option of answering yes, no, or don't know in execution, but were only given a yes or no choice in Spiral 3. Since over half of the total number of JTF headquarters respondents answered don't know during execution, it is reasonable to believe many of those who answered 'No' in Spiral 3 would have chosen "Don't Know" if it had been available.

Multiple respondents stated that SOPs are living documents and, as such, modifications should be expected to ensure that the JSOP remains a current and useful document. Most of the calls for modification concerned the lack of detail in the descriptions of duties and responsibilities for various JTF positions. One participant stated, “Duties and responsibilities for each position need to be more clearly defined,” while another participant said, “Very descriptive duties must be outlined.” While a significant number of respondents indicated that the JSOP was too long, a call for more details vice general information was evident, specifically in the areas of the reports annex and the sample briefings.

The analysis regarding the JTF challenge, common Combined/Joint Task Force (C/JTF) SOPs, TTPs, and collaborative tools, provided in the MC02 baseline report, states:

An information management plan that clearly defines guidelines on how information is to be handled is essential... Hardware, software, and processes that solve this problem must be identified. Additionally, the database tells us that the battle rhythm of the JTF must serve the process of delivering products and the information needs of higher and lower headquarters and the timing of product delivery to both. An information manager within every major division of the JTF staff is a requirement for efficient operations.

The SJFHQ and its concept of employment directly address this challenge. As described above, the SJFHQ comes with a JSOP, which includes a KIMP that provides the guidelines for knowledge management, business rules for the CIE, and a battle rhythm to meet the JTF’s needs.



The SJFHQ also brings to the fight TTP and expertise with the collaborative tools. The structure of the SJFHQ includes a knowledge management officer (KMO/IMO) in each group.

**Fact: The MC02 JTF performed expected JTF functions.**

The data for this fact is presented

Figure 69: JTF successful in performing EBO and UJTL task

not as an assessment of the performance of the JTF; instead, it indicates the MC02 experimental JTF was similar to the actual JTFs in the necessity to perform a wide range of tasks related to the command and control of the joint force. This builds context for the finding that the SJFHQ provided value-added to the MC02 JTF; therefore similar value-added could be expected if the SJFHQ were to be used with other JTFs in an experiment, exercise, or real-world situation.



Two survey questions to SMEs during MC02 Spiral 3 and two during execution explored the JTF's accomplishment of a group of EBO tasks and a selected group of operational level UJTL tasks. Five additional questions to SMEs at approximately three-day intervals throughout MC02 explored if the battle rhythm or virtual board, center, cell organization used by this JTF was causing any expected JTF functions to fall through the cracks.

SME responses indicated this JTF achieved a moderate level of success in performing both EBO tasks and operational level UJTL tasks. A higher reported level of success in accomplishing UJTL tasks was noted. The high percentage of SME selection of 'Somewhat' and 'Very Successful' task accomplishment was reported in both Spiral 3 and execution.

A number of the SME comments were associated with the selection of the 'Very Successful' choice on these survey questions. Two of these SME comments were, "The JTF was very successful in performing information operations, joint force targeting, directing operational intel, assessing operational situation, preparing plans and orders, commanding subordinate forces. The use of the CIE and CROP enabled the JTF to rapidly and effectively perform the above tasks," and "Overall the JTF was successful in coordinating munitions, fuel supply, and other support for forces. The logistics watchboard was used very effectively at JTF and

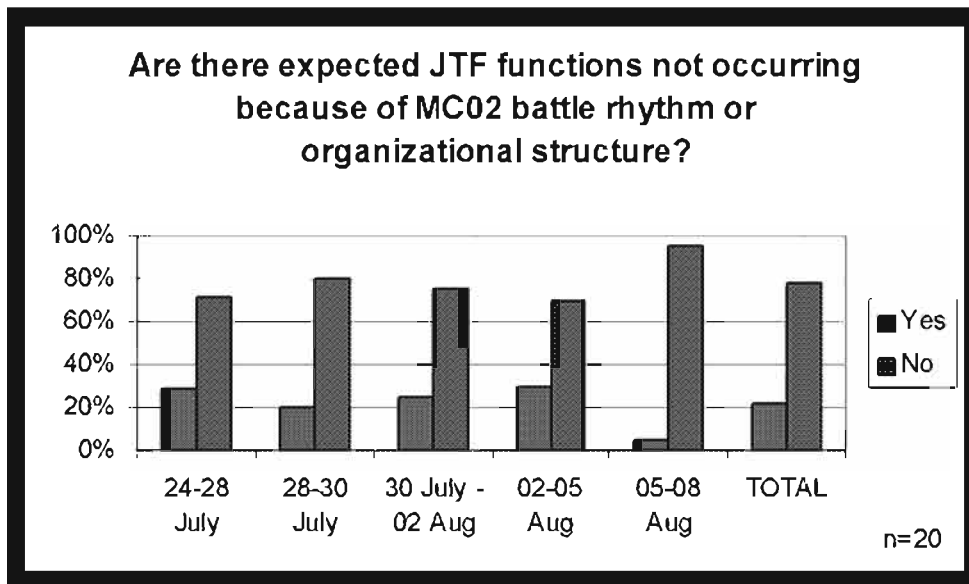


Figure 70: JTF functions not affected by battle rhythm rigor or structure

combatant command JLMC levels to monitor and manage support to the operations.”

The majority of SME comments were associated with the selection of the 'Somewhat Successful' choice on these survey questions. Representative comments were, "In my opinion, the JTF did a fair job in all of these areas [EBO tasks]. I think that progress was initially hindered as they struggled using IWS and knowing which rooms to collaborate in," and "Overall, I think the JTF was successful [in performing UJTL tasks]. I think that getting used to the new organizational structure and concepts initially hampered task performance."

During Spiral 3, one SME who judged UJTL task performance to be 'Somewhat Successful' reported that participant focus on learning and using the collaborative tool might have hampered the accomplishment of normal JTF management processes (e.g. journal keeping). A theme noted by several SMEs dealt with the lack of wargaming and course of action (COA) analysis by this JTF. A SME, knowledgeable in the conduct of the JTF planning function observed, "The JTF executed Effects-Based Planning well. The one area they need work on is COA analysis or wargaming. The joint planning center (JPC) tends to synchronize COAs rather

than war game. There is very little discussion of enemy actions when they synch plans.” Another SME noted, “[Regarding] preparing plans and orders. The JTF in fact produced plans and orders well for the most part. The JTF failed to really understand and employ Effects-Based Operations. Furthermore they never fully understood or demonstrated an ability to plan current ops, future ops and future plans simultaneously.”

The number of SME responses reporting that expected JTF functions were falling through the cracks because of the battle rhythm or virtual board, center, cell organization used by this JTF averaged 26 percent for the four measurements taken over the first 12 days of the MC02 execution. This fell to five percent for the last measurement covering the period August 5-8. Twenty SMEs responded to each occurrence of this survey.

Covering all five applications of this survey, 23 individual functions were described by SMEs ‘as falling through the cracks.’ These seemed to fall into three groups: four occurrences were related to information operations (IO), four were related to deployment planning, and five had to do with JTF planning focus and branch planning. With respect to IO, SME responses indicated the power of this discipline was not being fully realized because of a lack of organizational integration into the JTF; however, another SME indicated the level of IO observed was greater than a traditional JTF. This indicates the need for further experimentation regarding the use and organizational placement of the IO function within the JTF.

Regarding deployment planning two SMEs provided a number of indications the JTF did not conduct sufficient monitoring of the deployment process. Their comments illustrate this point; the first stating, “The current concept does not have a joint movements center, nor a joint transportation board at the JTF level. Rather, these functions are conducted at the combatant commander’s JLMC. Lack of these two functions, in my opinion, contributes to a lack of awareness amongst the JTF as to force flow and closure.”

The second comment reported, “The status of the deployment does not appear to be followed in detail. Effects of enemy actions and other constraints to strategic movements do not appear to be fully considered.” Their comments indicated the lack of delineation of deployment planning responsibilities. Additionally, the 12-13 hour experiment day with limited night-shift activity may have exacerbated this situation.

The comments related to branch planning and the close-in focus of this JTF are similar to those mentioned above concerning wargaming and COA analysis. Several SME comments illustrate this point. The first reported, “No one is doing branch planning for the JTF. Consequently, the JTF is reactive and not proactive.”

Another SME comment stated, “There is no planning for events in the 48-96 hour window,” he said. “This should be branch plans and what ifs. The current ops should be executing the plans and planning 24-48 hours out. The future plans needs to be linked with the combatant commander for plans 96+.”

A third comment stated, “What is falling through the cracks is the long term planning guidance. Focus is on 72 hours.” SMEs thought this was likely due to participant focus on the experimental concepts, and not a disregard or recognition of the importance of branch planning.

***Fact: SJFHQ reduced the ad hoc nature of JTF headquarters activation.***

Data for this fact was developed by a number of surveys that asked participants and SMEs to rate the value added by the SJFHQ in getting the JTF headquarters up to speed, to indicate the contribution of the SJFHQ’s attributes to this, and to indicate how critical the SJFHQ was to the overall JTF operation.

A SME and a participant survey in Spiral 3 and a SME execution survey explored the value provided by the SJFHQ in getting the JTF headquarters up to speed. Of 369 respondents, approximately 90 percent indicated the SJFHQ was either ‘Somewhat’ Valuable or Very Valuable in getting the JTF headquarters up to speed. The responses between Spiral 3 and execution were nearly identical.

Two senior participants said, “There is a lot of value to the SJFHQ. They brought tremendous situational awareness to the fight,” and “It is truly the way to do joint business. It has allowed the staff to focus on the warfighting piece without having to build the database.” Two other participants, key members of the JTF plans group indicated, “The JTF could not be at this level this soon without the plug in of the SJFHQ,” and, “SJFHQ is a great plug to bring an ad-hoc staff together.”

As shown in figure 71, not everyone agreed that SJFHQ was valuable. Approximately 10 percent of respondents concluded there was no value from the SJFHQ because it did not provide an individual to their particular functional area within the JTF. This comment was seen in a number of surveys where little or no SJFHQ value was indicated.

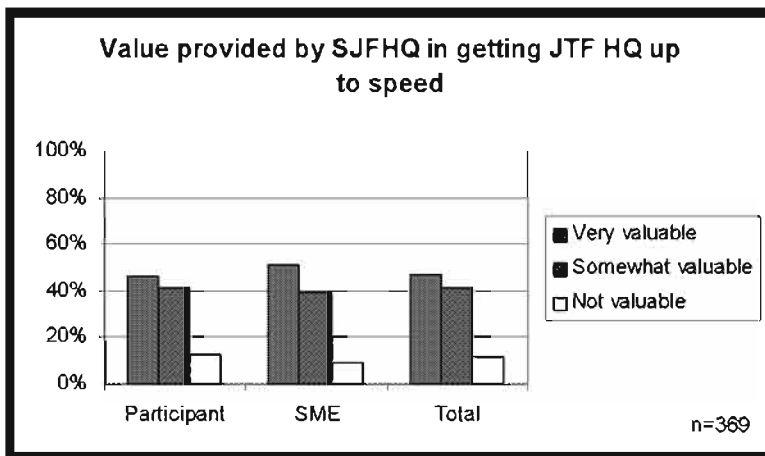


Figure 71: SJFHQ was valuable to standup of JTF HQ

information gathering. If every time you submit an RFI, the SJFHQ folks just tell you to go to the ONA and find the answer, I'm not really sure there is any value added.”

Some of this may have been due to the nature of the experiment where much of the rest of the world was scripted and there was a desire to fully explore the experimental concepts; however, they are important indicators of the personality factor that will influence the amount of value the SJFHQ can provide. Interviews with senior participants illustrated that the members of the SJFHQ must be perceived as experienced by the receiving JTF. They must have the personality and maturity to recognize when they should act as leaders within the JTF HQ and when they should transition to a support and/or mentor role as the JTF headquarters comes up to speed.

Further indication that the SJFHQ quickened the learning curve of the JTF is found in insights developed in the Army Transformation Experiment (ATEX) conducted in parallel with MC02. One of the ATEX focus areas was to explore how a corps commander and his staff took on the role of a JTF commander. The ATEX data collection and analysis effort indicated the knowledge base provided by the SJFHQ staff and the ONA enabled earlier situational awareness in the JOA and facilitated more rapid transition of a Corps into a JTF than previously possible.

Other participant comments where ‘little value’ was seen seemed to center on the exchange of information between the SJFHQ and JTF headquarters staff.

One participant stated, “We were and still are missing a lot of pertinent information and knowledge on some of the databases that we are supposed to use and military issues with regards to specific info in the exercise.”

Another stated, “We still have the same requirements for

Insights developed in ATEX indicated the SJFHQ brought about the situational awareness through the integration of its members into the key JTF cells. While serving as members of the JTF commander's staff, the SJFHQ personnel also trained and mentored other members of the staff and served as the "go to" guys when additional information was required. The time normally used to develop an understanding of the opposition, critical nodes within the AOR, the political, economic, information, infrastructure, military, and social strengths and weaknesses of the opposing forces was greatly reduced when the information was readily available upon activation of the JTF. The knowledge base provided by the SJFHQ was key to achieving this objective.

The JTF commander, during an AAR, said that he was provided an "80 percent" solution going in." The SJFHQ and the ONA concept provided this 80 percent.

During Spiral 3, the SMEs were asked to judge whether the attributes possessed by the SJFHQ quickened the JTF headquarters learning curve (See Figure 72).

Their responses indicated to a high degree that the SJFHQ did quicken the learning curve. This is consistent with the data on the previous graph where over 80 percent of the respondents found there was at least some value provided by the SJFHQ in getting the JTF headquarters up to speed.

SME comments from this survey provided several examples of how the SJFHQ attributes helped the JTF headquarters with the learning curve. One SME stated, "The ability of the JTF headquarters to leverage the corporate knowledge and gain insights from the combatant commander's staff is a significant plus to beginning the planning process. Numerous questions and research which would normally have to be done is already completed."

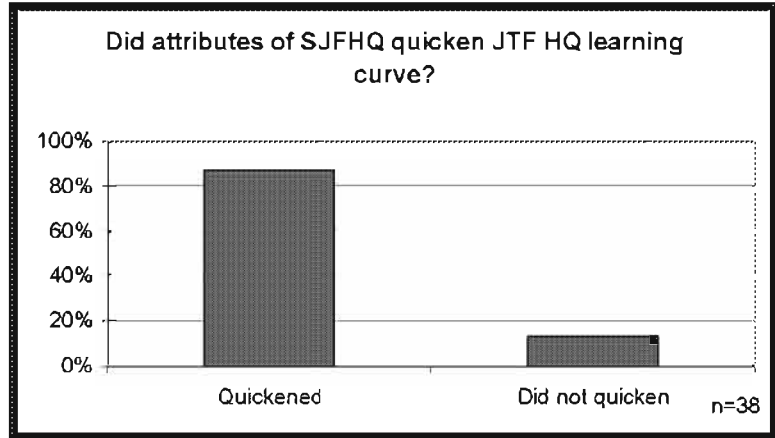


Figure 72: Attributes of SJFHQ quickened the JTF HQ learning curve

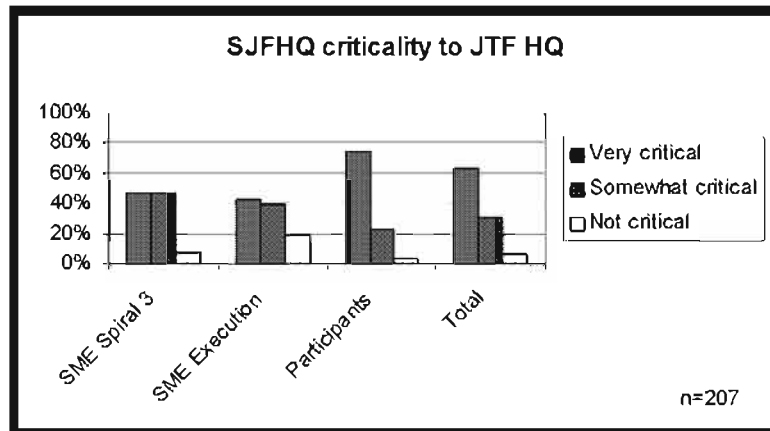


Figure 73: SJFHQ considered critical to JTF HQ

understanding of the EBO processes, and concepts and to some degree joint operations

Another SME said, "In MC02, the SJFHQ's familiarity with the collaborative tool set and their development of the CONPLAN made them a go to asset for the JTF as they rolled into the building and began planning in earnest."

A senior SME concluded the prior experience of the core of the JTF to which the SJFHQ is augmenting would be a factor for perceived SJFHQ value-added. He reported, "The SJFHQ

quicken the learning curve of the core staff and service augmentation; especially in the implementation of the SOP. This is especially the case with a core headquarters that does not normally have or train to a JTF mission.” He concluded his remarks by indicating some resistance to the SJFHQ was seen during MC02 Spiral 2, which was played with an experienced, contingency trained JTF staff. In the few instances where SMEs indicated no value added by the SJFHQ to quicken the JTF learning curve, one reason stated was that the SJFHQ did not contain certain functional specialty representatives, such as combat engineer or medical plans. The SJFHQ concept envisions the expertise in these specialties would come as plugs from or through reach-back to the combatant commander’s staff.

Another indicator of the value provided by the SJFHQ to getting the JTF headquarters up to speed was explored by asking SMEs and participants to rate the criticality of the SJFHQ to the JTF headquarters. This was done with two SME surveys, one in Spiral 3 and one in execution, and one participant survey near the end of the experiment (See Figure 73). Of 207 respondents, approximately 93 percent indicated the SJFHQ was either ‘Somewhat’ or ‘Very Critical’ to the JTF headquarters, with 63 percent of these indicating ‘Very Critical’.

Within the participant respondents, the perception of SJFHQ criticality was stronger than among the SMEs. One respondent who selected ‘Very Critical’ stated, “They are part of the combatant commander staff. They have already worked the plan for the AO and can bring us up to speed far quicker than starting from the beginning to prevent confusion.” Another reinforced his selection of ‘Very Critical’ by stating, “Beyond a doubt. Need a standing force of knowledgeable personnel to incorporate the JTF in the theater.” In a participant response where only ‘Somewhat Critical’ was selected, the relationship of time to SJFHQ criticality was noted.

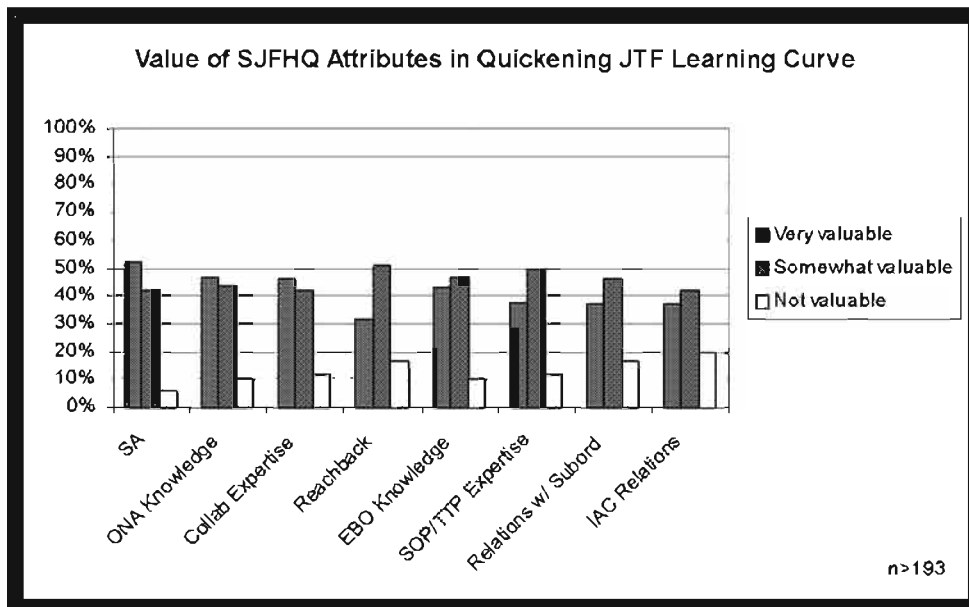


Figure 74: Value of SJFHQ attributes in quickening JTF learning curve

As indicated by this and other comments, SJFHQ criticality was more notable at the outset of the event, “JTF personnel had earned their water wings in Spiral 3, and were able to work without constant direction from SJFHQ during MC02, unlike Spiral 3, where JTF personnel leaned hard on SJFHQ.”

This also influenced the roughly 10 percent increase in the ‘not critical’ response by SMEs during execution. The SJFHQ concept should be further developed to address the continuing role of the SJFHQ with the JTF as a crisis matures. Specific areas for development include greater specificity as to the duration of SJFHQ involvement, the role of the SJFHQ in the

transition to the post-conflict environment, and provisions for the SJFHQ should a second crisis situation erupt within the combatant commander's area of responsibility.

The few participants who indicated the SJFHQ was not critical came from the JTF headquarters operations group. A senior participant who selected "Not Critical" remarked on the time relationship to SJFHQ criticality, but also noted there was a personality dynamic that affected his assessment. He stated, "They were very critical during the spin-up phase of Spiral 3, but became non-critical during execution. In some cases, they were actually counterproductive because as conditions and processes changed, a few held to their opinions and old processes, rather than evolve with the JTF."

This indicates that expertise and situational understanding alone do not determine the value of the SJFHQ, but that maturity and the ability to recognize the transition of the SJFHQ role as the JTF comes up to speed are also important.

A participant survey, near the end of the experiment, further documented SJFHQ attributes. Situational awareness was described by respondents as the most important attribute brought to the headquarters. The attributes dealing with reach-back and habitual relations to the IAC and with subordinate commander staffs scored lower (See Figure 74 above). This can be partially attributed to the fact that SJFHQ was not part of a real combatant commander staff prior to the experiment from which habitual relationships would have been established. Additionally, reach-back was difficult to demonstrate since most of the rest of the world was simulated by the control cell. This is especially pertinent to the IAC relations attribute, which was difficult to demonstrate because interagency participation occurred primarily in execution, with little in Spiral 3. The primary interface with the interagency participants was through the Joint Interagency Coordinating Group, operating in the experiment control cell. Other indicators of SJFHQ criticality, such as the high degree of reliance by the JTF on the SJFHQ for task performance, are described in the next fact.

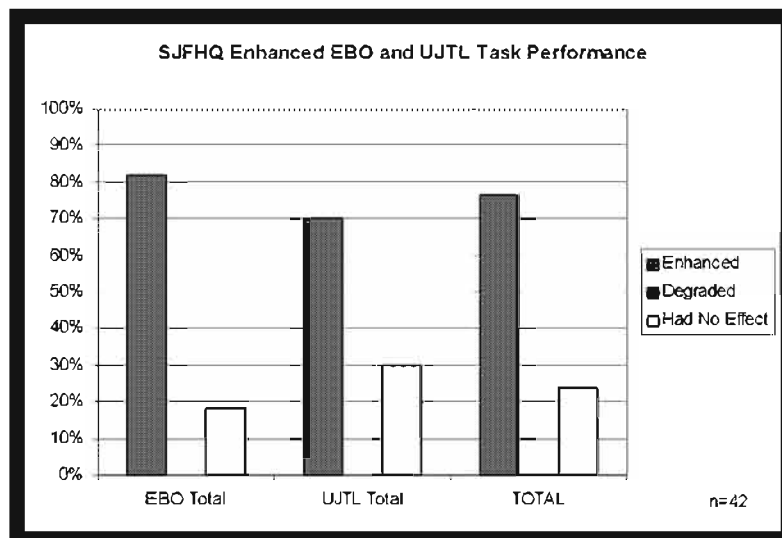


Figure 75: SJFHQ enhanced task performance

The analysis regarding the JTF challenge, Combined/Joint Task Force (C/JTF) headquarters Activation and Augmentation, provided in the MC02 baseline report states, "Most of the challenges we face in training at the JTF headquarters level stem from the "ad hoc" manner in which we organize the headquarters. The lack of a 'center of excellence' for exercising the organizations, processes, and technologies necessary to carry out operational level headquarters functions led to inefficiencies in almost every

aspect of headquarters operations.

Without a truly joint group that trains together with familiar processes, the amount of time, that any augmented headquarters will need to get traction on the myriad tasks that have to be performed, will be relatively long. In order to achieve the efficiencies desired (not to mention

what will be required to carry out Rapid Decisive Operations [RDO] concept), the Standing JTF Headquarters is a required component.” The SJFHQ and its concept of employment directly address this challenge. As described above the SJFHQ is the command and control element that reduced the ad hoc manner in which the JTF was activated and augmented.

**Fact: The SJFHQ enhanced JTF’s performance of EBO and UJTL tasks.**

SME responses to four surveys regarding task accomplishment, two in Spiral 3 and two in execution, provided the data for this fact. The survey respondents were asked to consider SJFHQ enhancement to overall JTF performance of a group of EBO tasks and similarly overall JTF performance of a group of OP level UJTL tasks.

A high degree of SJFHQ enhancement to task performance was reported (See Figure 75 above), with SJFHQ enhancement to the performance of the EBO tasks slightly exceeding the enhancement to the UJTL tasks. The high degree of enhancement was noted in both Spiral 3 and execution.

SME comment responses indicated the SJFHQ enhancement was particularly beneficial in that it brought the JTF up to speed at the early phases of JTF planning and execution. One respondent reported, “I believe the SJFHQ started the EBO tasks moving. Without them, valuable time would have been lost trying to perform these tasks; especially ONA and ETO update, ETO production and employing collaborative tools.” Another indicated the SJFHQ was

invaluable in initially getting the JTF going in the right direction and providing the combatant commander direction and knowledge of the situation. Comment responses indicated that as the JTF headquarters confidence level rose, the SJFHQ became an integral and indistinguishable part of the JTF headquarters.

A high degree of JTF reliance on the SJFHQ for task performance was also reported by the SME survey respondents, with approximately 80 percent reporting some or a great deal of reliance on the SJFHQ. JTF reliance on the

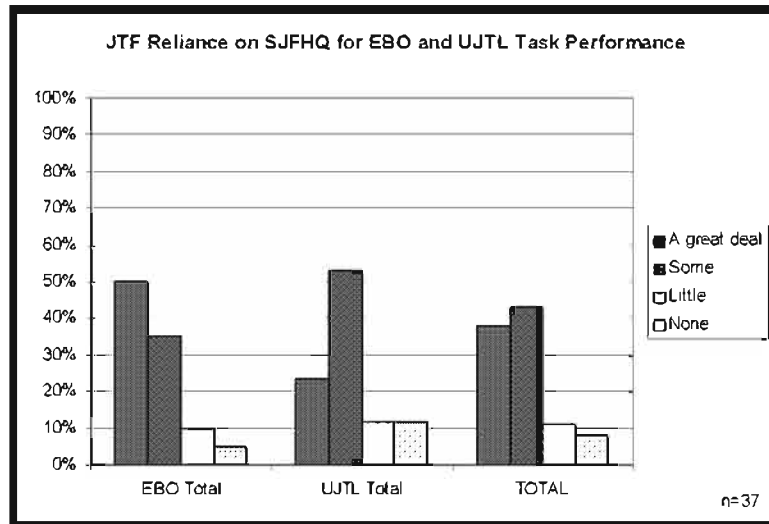


Figure 76: JTF Relied on SJFHQ for Task Performance

SJFHQ for the performance of the EBO tasks was stronger than for the UJTL tasks.

Similar to the responses to the question about SJFHQ enhancement of task performance, reliance on the SJFHQ by the JTF appeared to be strongest at the outset of JTF activity. One SME reported, “I observed that the JTF relied a great deal, initially, on the SJFHQ to get their situational awareness, after about day four to day five, the SJFHQ was more in a supporting role.” Another SME responded, “The JTF relied on the SJFHQ to perform these tasks initially, but quickly gained experience and expertise so that shortly after hostilities commenced, the JTF and the SJFHQ were functioning as a completely integrated team.”

The personality of the JTF headquarters staff may have had a significant impact on the amount of reliance on the SJFHQ. One SME reported, “Frankly, the SJFHQ successfully

integrated into the III Corps JTF organization far more successfully than it had with the XVIII Airborne Corps, who, with more traditional JTF experience than III Corps, had more corporate memory of ‘this is how we handled this before.’”

This point was also evident to analysts who observed MC02 Spiral 2, Spiral 3, and execution. This seems to further demonstrate the importance of the training role with potential JTF headquarters staffs that the SJFHQ could fulfill when in-garrison as an element of the combatant commander’s staff. It also seems to indicate the SJFHQ could enable a larger pool of potential JTF staffs.

**Fact: The SJFHQ contributed to the continuity demonstrated by the MC02 JTF.**

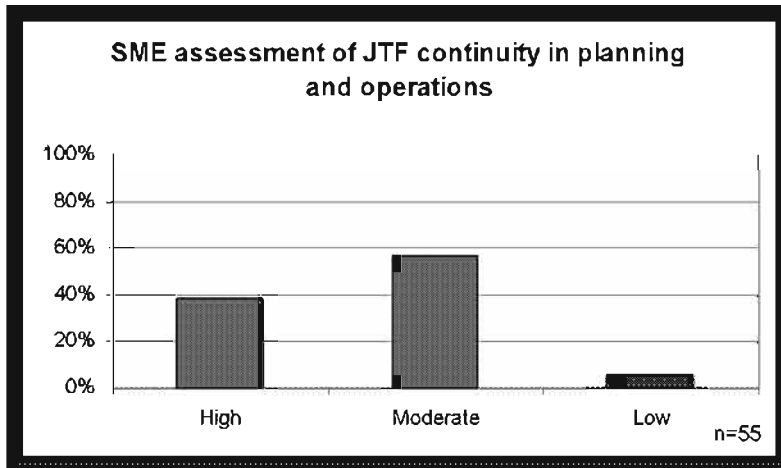


Figure 77: SME observed continuity in JTF planning and operations

77). The vast majority of responses indicated that the SJFHQ provided at least a moderate level of continuity to JTF operations and plans groups.

Of those responses reporting a moderate or high level of continuity in Spiral 3, one-third said they saw a high level of continuity, while two-thirds a moderate level. During execution, the reports of moderate and high levels were nearly even, indicating continuity seemed to improve as the JTF headquarters obtained

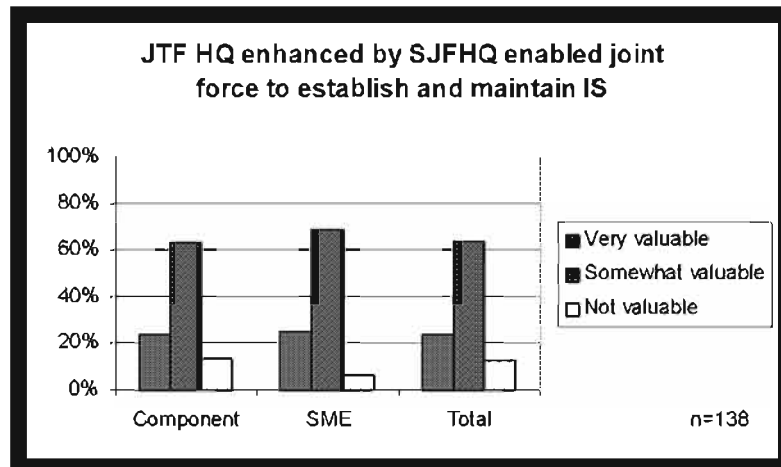


Figure 78: SJFHQ expertise was valuable to JTF establishing and maintaining Information Superiority

Data for this fact was developed by a question concerning the amount of continuity observed in planning and operations posed to SMEs once during MC02 Spiral 3 and once during execution. It was possible to explore continuity because approximately five weeks elapsed between the end of MC02 Spiral 3 and the start of MC02 execution.

The SMEs were also asked to estimate how much the SJFHQ presence contributed to the amount of continuity observed (See Figure

77). The vast majority of responses indicated that the SJFHQ provided at least a moderate level of continuity to JTF operations and plans groups. Of those responses reporting a moderate or high level of continuity in Spiral 3, one-third said they saw a high level of continuity, while two-thirds a moderate level. During execution, the reports of moderate and high levels were nearly even, indicating continuity seemed to improve as the JTF headquarters obtained more experience in the experiment.

SME comment responses to this question indicated the SJFHQ played a significant role for continuity demonstrated by this JTF headquarters. One typical SME observation was, “The SJFHQ was relied on heavily throughout. They were well integrated and were used to provide the continuity. Even when the situational awareness was up on the staff, the SJFHQ experts



were still used as integral staff members.”

Another SME responded, “The SJFHQ provided the backbone.” A key factor was the SJFHQ’s familiarity with the experimental concepts. “Continuity was pretty good because the SJFHQ understood the experimental processes/products and because they were using (as a loose guide) an SOP that they wrote. Therefore, they had an idea of what ‘right looked like’ and continued on the path that would get them there.”

Several comments indicated the SJFHQ contribution to continuity was most beneficial early in the experiment, which tracks with other indicators of SJFHQ value-added to the JTF.

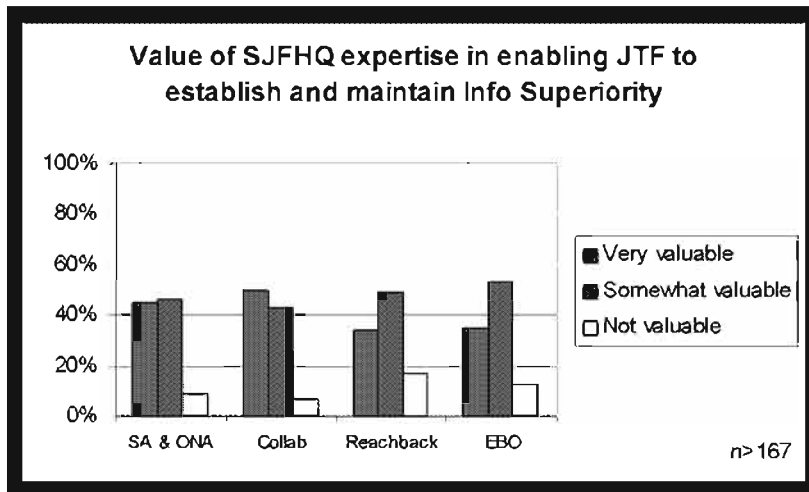


Figure 79: SJFHQ was a force multiplier for the JTF and a valuable tool in establishing and maintaining IS

The amount of SJFHQ contribution to continuity was also likely increased because of the split nature of the MC02 experiment. A senior SME recognized this and reported, “SJFHQ continued to plan ‘keep their head in the game’ during the break between Spiral 3 and execution. III Corps had to go back to their service staff responsibilities. SJFHQ was very effective.”

While this time-split may not be typical in actual JTF operations, it does point to the value of the SJFHQ in bridging

any potential gaps or transitions in JTF command and control activities.

The comment responses indicated there was another factor to the amount of continuity observed in this JTF. Comments concerning the importance to continuity of the use of a CIE appeared in the MC02 execution responses to the continuity question.

Two SME comments in this regard were, “The CIE enhanced the ability of the JTF to ensure continuity of plans. SJFHQ ensured that initial plans were adapted to operational considerations, rather than reinventing the wheel,” and “The CIE allowed for a very high level of continuity.”

There was initially some confusion with regard to exactly who was to receive information, but that was quickly worked out.” It appears that the attributes brought to the JTF by the SJFHQ plus the attributes of the CIE were instrumental to the attainment of a significant degree of continuity in the planning and operations of this JTF.

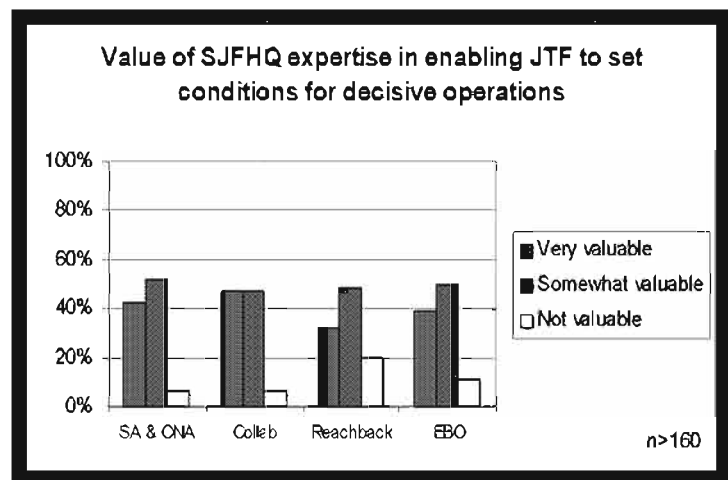


Figure 80: SJFHQ expertise was valuable to JTF setting conditions for decisive operations.

**Fact: The presence of the SJFHQ provided value-added to the JTF's accomplishment of the MC02 experiment objectives.**

The presence of the SJFHQ in the MC02 JTF and the resultant access to the knowledge, expertise and other attributes possessed by the SJFHQ had a beneficial impact on the JTF's ability to accomplish the five MC02 objectives.

These objectives, as related in Chapter 2, were 'Establish and Maintain Information Superiority', 'Rapidly Set Conditions for Decisive Operations', 'Execute Assured Access', 'Conduct EBO', and 'Sustain The Force'. Data for this fact was based on the results of two SME surveys and two

Figure 81: SJFHQ was an enhancement to the JTF for setting conditions for decisive operations

participant surveys conducted during MC02 execution. Two of the surveys asked JTF headquarters participants and SMEs to rate SJFHQ's value-added. They were to measure the worth of each of four primary SJFHQ attributes to each of the five experiment objectives.

The four SJFHQ attributes respondents assessed were situational awareness and knowledge of ONA, expertise in collaborative processes, habitual reach-back relationships, and

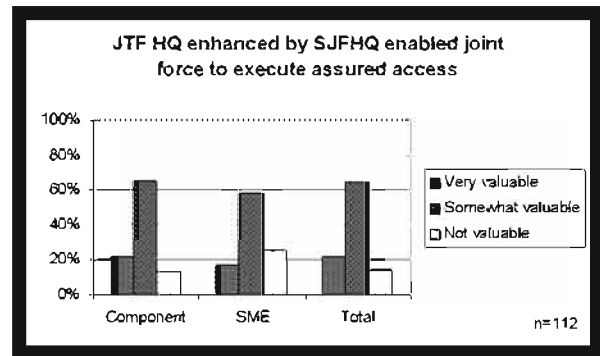
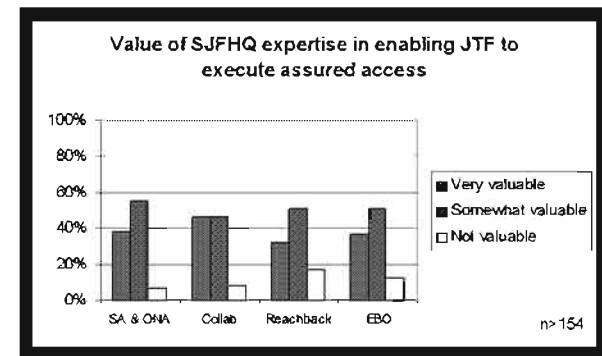
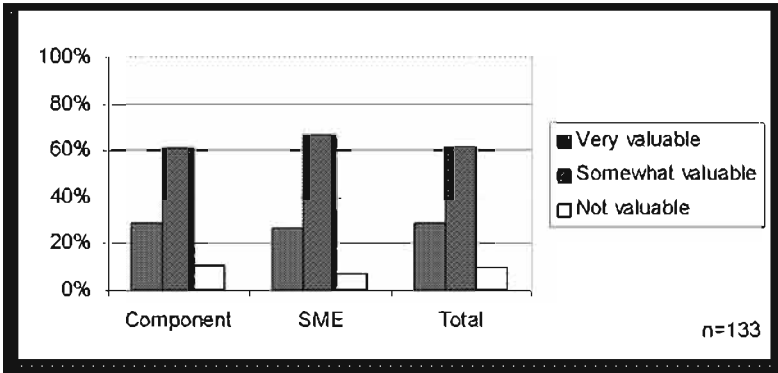


Figure 82: SJFHQ expertise was valuable to the JTF in its requirement to execute "assured access"

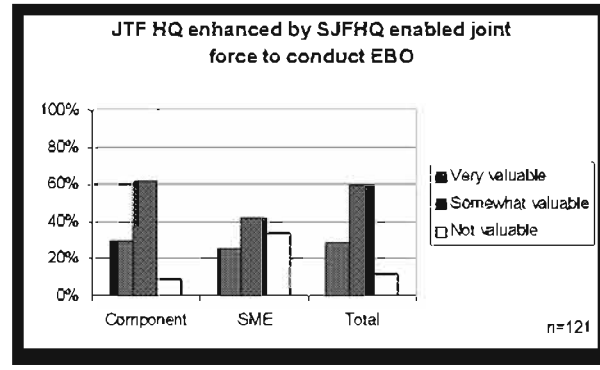
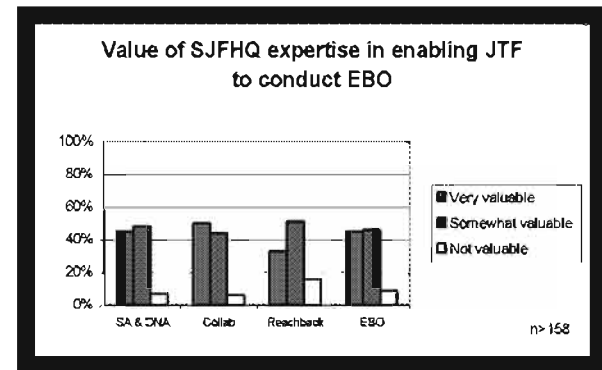


Figure 83: SJFHQ expertise was valuable to the JTF, while conducting EBO

knowledge of effects-based operations. The other two surveys asked component participants and SMEs to rate the value added by the three primary MC02 JTF enhancements, SJFHQ, ONA, and EBO to each of the five experiment objectives.

Moderate to high levels of value-added by the SJFHQ were indicated in all objective areas. Figures 80 thru 85 illustrate the reported value of SJFHQ with regard to the five MC02 objectives.

For each objective, the percentage of respondents who indicated the SJFHQ was not valuable to objective accomplishment was similar between the response group made up of component participants and SMEs, and the group made up of JTF headquarters participants and SMEs.

This indicates value-added by the SJFHQ appeared to be recognized not just within the JTF headquarters, but also throughout the JTF. However, these groups differed somewhat in their assessment of the strength of the value-added provided by the SJFHQ. Of the respondents perceiving value, the percentage indicating the SJFHQ was very valuable to objective accomplishment was consistently higher across the five objectives within the group made up of JTF headquarters participants and SMEs than it was in the group consisting of component

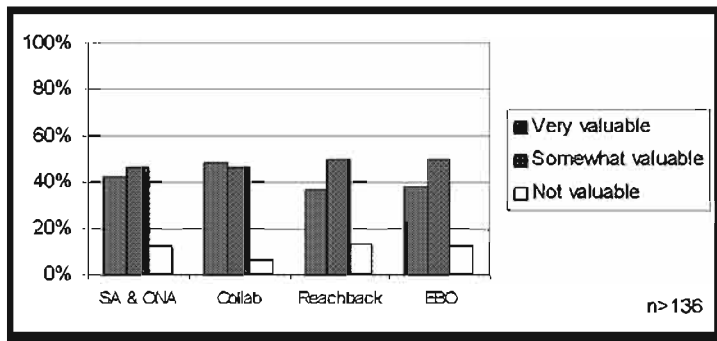


Figure 84: Value of SJFHQ in enabling JTF to sustain the force

participants and SMEs. This can be partially attributed to the fact that the SJFHQ was fully integrated into the JTF headquarters early during Spiral 3 and their presence was often indistinguishable to participants external to the JTF headquarters. This is regarded as “good news” since it indicates the integration of the SJFHQ into the JTF headquarters was complete and transparent to those outside the JTF headquarters.

Considering the four primary SJFHQ attributes in totality across the five experiment objectives revealed that the respondents believed certain SJFHQ attributes were more valuable than others were. The average percentage of response across all objectives for each attribute and each level of value is indicated in table 18, below. The data indicates the SJFHQ expertise with the collaborative process employed in MC02 was most valued, followed closely by the situational awareness and knowledge of ONA the SJFHQ brought to the JTF. On the other hand, the SJFHQ reach-back relationships were deemed to have somewhat less value to overall objective accomplishment. This was likely because there was minimal opportunity for the SJFHQ to demonstrate this

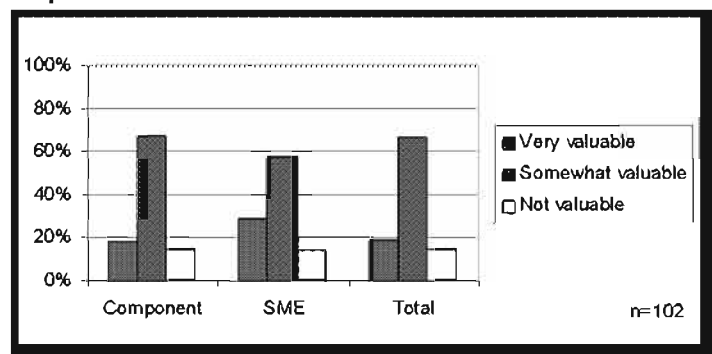


Figure 85: SJFHQ enabled the "Sustain the Force" mission

attribute since the experiment control cell simulated the combatant commander staff and the rest of the external world.

Review of the comments accompanying these survey responses provided numerous examples of SJFHQ value-added to objective accomplishment.

Table 18: SJFHQ value added considerable in all areas by most accounts

|                   | SA and ONA Knowledge | Collaborative Expertise | Reach-back Relationships | EBO Knowledge |
|-------------------|----------------------|-------------------------|--------------------------|---------------|
| Very valuable     | 42%                  | 48%                     | 33%                      | 39%           |
| Somewhat valuable | 50%                  | 45%                     | 50%                      | 50%           |
| Not valuable      | 8%                   | 7%                      | 17%                      | 11%           |

Said one participant, “SJFHQ knowledge of the collaborative process and ONA database was instrumental in rapidly building a JTF team and in keeping them on task and purpose.” From a SME, “SJFHQ were the experts on knowledge and understating of the ONA, EBO.” Said

another, “SJFHQ was very valuable in rapidly bringing the JTF up-to-speed, after which, the SJFHQ functioned as a fully integrated part of the JTF.”

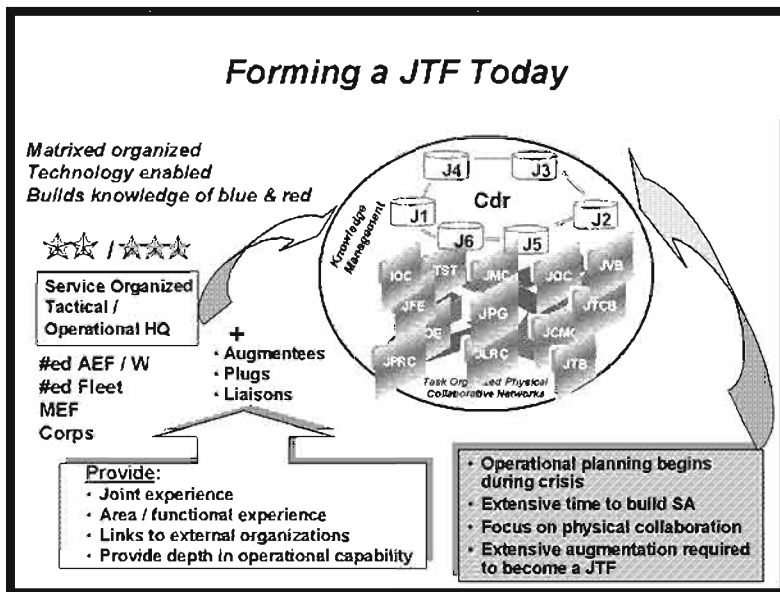


Figure 86: Forming the JTF today

There were a number of comments that indicated the benefit of the examined SJFHQ attributes was most perceived in the earlier stages of the event. Comments such as these appeared in each of the five objective areas, “The usefulness of the SJFHQ diminished as the experiment progressed and the JTF became as familiar with the systems and the adversary as the SJFHQ was,” and “Initial planning was relevant, and provided the backbone of the

eventual operation. However, as the operation progressed, ONA data became dated, and thus situational awareness degraded.”

In cases where “Somewhat Valuable” or “Of No Value” was seen, some of the associated comments seemed to indicate the reason was respondent perception that the JTF did not achieve the objective against which the SJFHQ attribute was examined or the experiment condition did not sufficiently exist to demonstrate the value of the examined SJFHQ attribute. To illustrate this point, one participant in assessing the value of SJFHQ situational awareness and knowledge of ONA in enabling the joint force to conduct EBO, stated, “The value should have been there, but experiment construct and scenario did not allow us to fully explore it! We had the initial piece, but never really got back to it or continued it once action started. We hit all around it, and got some insights, but missed the full mark on this objective.”

As shown previously, the lowest perceived value added of the SJFHQ was in the area of reach-back relationships. This was due in large part to a lack of opportunity to demonstrate this attribute.

A comment that keenly illustrates this was, “The only reason this is not a “Very Valuable” response is that the reach-back organizations were a little thin.” Another comment echoed this by stating, “There was not reach-back to all organizations that could have contributed, probably more due to experiment constraints.”

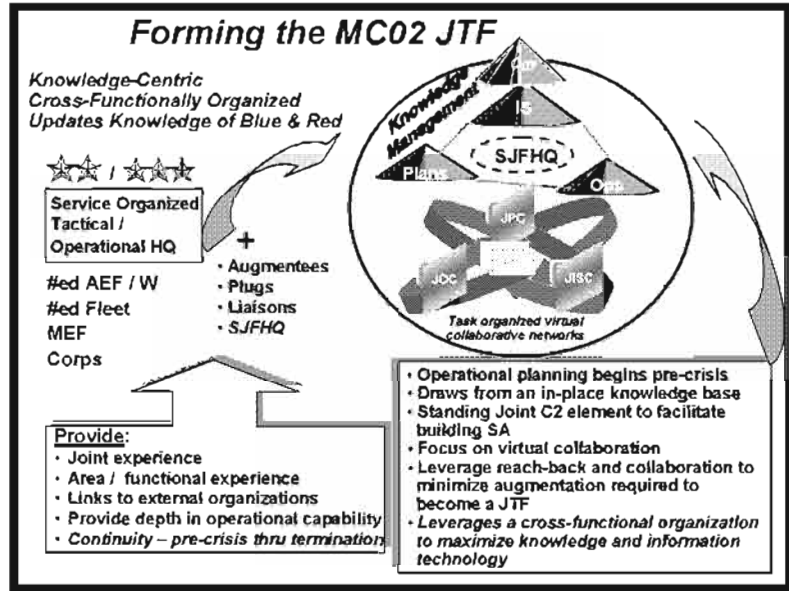


Figure 87: Forming the MC02's JTF

**Fact: The organizational structures described by the SJFHQ concept and used in MC02 enhanced the function of the JTF.**

The SJFHQ concept calls for the SJFHQ to be organized on a functional basis, as opposed to a traditional numbered staff basis such as the J1, J3, and J5. The SJFHQ as used for MC02 was organized into the following five groups: command, operations, plans, information superiority, and knowledge management. Even though the SJFHQ is capable of merging into a traditionally organized JTF headquarters, for MC02, the JTF headquarters was organized using this structure. The only component staff to similarly organize was the JFLCC. The use of the

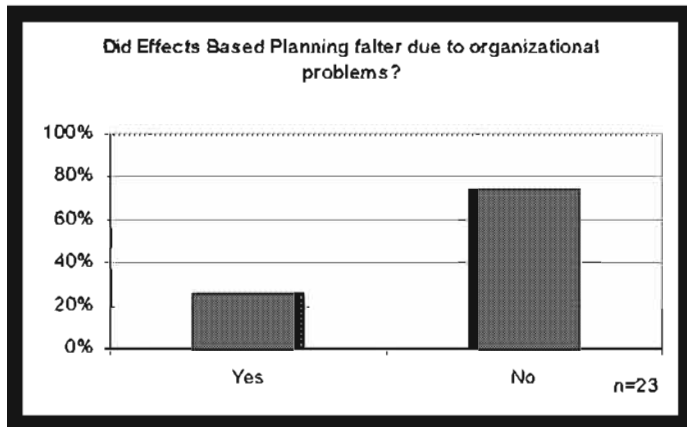


Figure 88: Effects-Based Planning didn't falter due to organizational problems

group-based structure allowed an opportunity to explore if this structure had an effect on the JTF. This also allowed the opportunity to examine what affect this structure had on the function of the JTF. Figures 86 and 87 above illustrate this discussion by comparing the traditional JTF headquarters organizational construct to MC02.

These issues were explored in MC02 Spiral 3 and execution, using survey input gathered from SMEs, who were asked if effects-based planning seemed to falter due to organizational

Similarly, the SJFHQ concept envisions the use of 13 'boards, centers, cells, and working groups' (BCCWG) by which the JTF would conduct its business. Current doctrine describes 35 BCCWG for potential use by a JTF. Even though it is unlikely all 35 would be used, experience indicates somewhat more than 13 are generally convened. The MC02 JTF used the BCCWG structure as described by the SJFHQ concept. This

also allowed the opportunity to examine what affect this structure had on the function of the JTF. Figures 86 and 87 above illustrate this discussion by comparing the traditional JTF headquarters organizational construct to MC02.

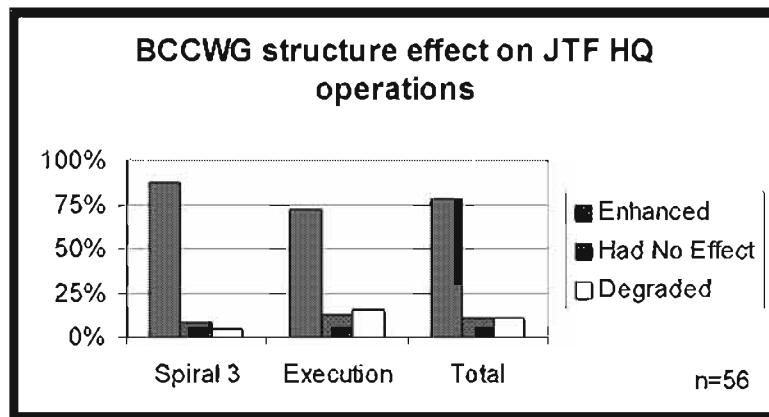
problems and if the group-board-center-cell-work group structure enhanced JTF headquarters operations. Each of these questions is explored in the following paragraphs.

SMEs were asked during Spiral 3 and execution if effects-based planning seemed to falter due to organizational problems. The overall result, by nearly a 3:1 margin, was that Effects-Based Planning did not falter due to organizational problems.

Over half of the responses from the SMEs to this question included comments. Most of these dealt with the impact of the organization on effects-based planning. Two SMEs who indicated the organization did not cause effects-based planning to falter responded, “My perception is that organizational problems have not adversely impacted EBP,” and “I did not observe any real problems based upon the organization. Most difficulties were based on the use of the tools.” A SME who stated the planning faltered said that even though logisticians were imbedded in the plans and operations groups, true synchronization of those efforts was not evident.

Other SME comments on this question seemed to point to higher-level issues impacting on the conduct of effects-based planning. Two examples are, “Problems I observed with EBO were related to the lack of cultural acceptance of IO as a potent warfighting area. IO was not integrated into the planning/execution of EBO until later in the event, when CJTF identified IO as a major focus area,” and “I think the problems came up because the staff was focused in the present, vice in the future. The battle rhythm was brought over from a Napoleonic way of doing things, and no one (me included) realized the impact of doing that was to force a production oriented process on an organization that needed to be knowledge based.”

Another SME reported, “Cultural norms and a rigid component structure inhibited the full spectrum application of EBO. The current component system is designed primarily to



provide deconfliction of tasking and coordinated command and control. The JTF has not yet evolved into a truly synergistic organization capable of integrating all aspects of combat power. EBO promises to bridge this gap, by providing commanders with a framework for cooperation and integration, and a focus for joint efforts. In the early planning stages, most individuals, and cells attempted to use the EBO framework. However, upon

Figure 89: BCCWG structure enhanced JTF HQ operations

execution, the emphasis shifted from experimentation with the new system, to achieving assigned tasks.”

SMEs were also asked during Spiral 3 and execution to assess if the group-board-center-cell-work group (BCCWG) structure used in MC02 enhanced JTF headquarters operations. Of 56 SME responses, an overall 79 percent reported the group-board-center-cell-work group structure enhanced JTF headquarters operations. A senior SME reported that the board-center-cell-work group structure used in MC02 ensured good cross staff integration and helped to prevent stove piping. A number of the SMEs, who thought the structure enhanced JTF headquarters operations, also credited the collaboration and collaborative environment as having

a significant enhancement on the JTF headquarters. Only five comments were associated with the selection of “Had No Effect” and six with the “Degraded” choice. Some of these seemed to indicate that the amount of time spent in the meetings associated with these structural entities degraded JTF headquarters functions, while several other responses indicated the focus on producing products within these entities degraded the attainment of a knowledge-based state within the JTF headquarters.

**Fact: The function of the forward headquarters was enhanced by the presence of a portion of the SJFHQ.**

The JTF forward headquarters during MC02 seemed to be fully engaged in the command and control of the joint force during the entire time of its deployment, which occurred 30 July to 2 August 2002. Data gathered through the administration of SME and participant surveys during MC02 execution indicates the SJFHQ provided benefit to both the function of the forward headquarters and the amount of time needed for its establishment. Since deployment to the forward headquarters site aboard USS *Coronado* only occurred during execution, these surveys were not administered during Spiral 3. From these surveys, two questions formed the basis for this *Fact*. One asked if the presence of SJFHQ members enhanced the function of the forward headquarters, and the second asked if the presence of the SJFHQ helped to reduce the time involved in setting up the forward headquarters.

A total of 31 individuals responded to the question, “Did SJFHQ presence at the JTF headquarters forward enhance the function of the forward headquarters?” A strong majority reported that the presence of the SJFHQ enhanced the function of the forward headquarters while a very small percentage indicated the SJFHQ presence was a detriment. Approximately one-quarter of the respondents believed there was no effect on the forward headquarters function from the SJFHQ. Our two SME responses were split between “Enhanced” and “Had No Effect”; neither reported that the SJFHQ presence degraded the forward headquarters function.

There were 26 comments received in the responses to this question. The majority of these were associated with the response indicating the SJFHQ enhanced the function of the forward headquarters. The reasons indicated by the respondents as to why the SJFHQ enhanced the function of the forward headquarters were similar to those seen elsewhere in this analysis. The amount of knowledge, situational awareness and understanding of the experimental concepts

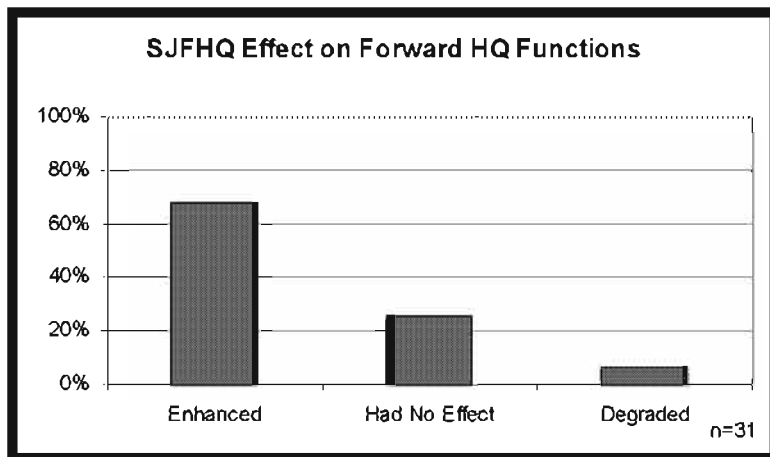


Figure 90: SJFHQ enhanced the function of the forward HQ

possessed by the SJFHQ were cited. The SJFHQ contribution to the resolution of technical reach-back issues and its mentoring were also cited and are consistent with the overall experience possessed by this SJFHQ. Even in the cases where no effect was reported, there did not seem to be a pejorative view of the SJFHQ. Rather, it appeared that SJFHQ contribution was indistinguishable because it was already fully integrated into the JTF headquarters staff, and because the non-SJFHQ members

of the JTF forward headquarters possessed a greater amount of situational awareness by the time the deployment occurred. This too is consistent with other portions of the analysis that indicate the SJFHQ value was most felt in the early stages of JTF headquarters operation. The key comment coming from a respondent who thought the SJFHQ presence degraded the forward headquarters function was that the SJFHQ could have been used to maintain the battle rhythm at the JTF main. Only certain SJFHQ members were part of the forward deployment, which means SJFHQ knowledge and experience was available at the main headquarters. In addition, there was no indication that the battle rhythm at the main headquarters faltered during the forward deployment. Therefore, little emphasis should be placed on this concern.

Responses from 35 participants and two SMEs were recorded when asked if the presence of the SJFHQ members on the deployment team helped to reduce the time involved in setting up the forward headquarters. Respondents indicated SJFHQ reduced by one-half the forward headquarters set-up time. Both SMEs indicated SJFHQ presence helped to reduce the set-up time.

An examination of the comment data associated with this question indicates the amount of benefit to reducing the time to establish the forward headquarters from the SJFHQ may be less than that indicated by considering only the distribution of the Yes/No responses. Thirty-two of the 37 survey respondents provided comments with their selection, 19 associated with the selection of "Yes" and 13 associated with "No." Many of those, who responded that the SJFHQ reduced the time needed, did not credit the usual SJFHQ virtues seen elsewhere in this analysis, instead indicating the SJFHQ value was in helping resolve software and hardware issues and in making the collaborative tool functional. Likewise, the "No" responses were characterized by a number of comments that the contribution was in the technical arena, that the JTF headquarters

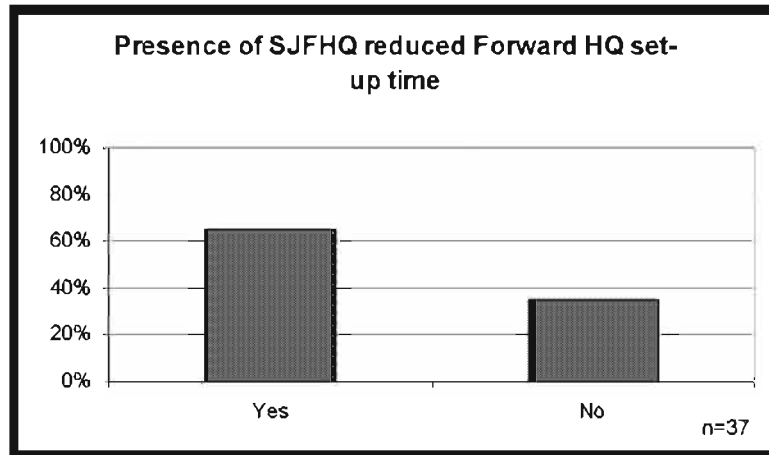


Figure 91: SJFHQ presence reduced Forward HQ set-up time

staff was becoming mature in its ability to function, and that the SJFHQ was fully integrated into the SJFHQ instead of a separate, but accompanying entity.

At the time of deployment to the forward headquarters, the SJFHQ and the JTF headquarters had been together for several weeks, counting Spiral 3 and the first week of execution. The non-SJFHQ members were becoming more accomplished in handling issues and using the experimental processes.

Other data indicates the impact of SJFHQ value softens as the JTF headquarters becomes more established. Additionally, this forward headquarters was established aboard the USS *Coronado* to prepare for the arrival of the forward headquarters element. The forward element also maintained situational awareness and executed joint force command and control during transit to and from the ship with the use of the Joint Enroute Mission Planning and Rehearsal System Near Term (JEMPRS NT). These elements likely had the most impact on the time required to establish the forward headquarters. It is believed that while the presence of SJFHQ



members was of some value, it was not a critical factor to reducing the set-up time of the forward headquarters.

**Finding 2► Although the SJFHQ provided value added to the JTF, continued refinement of its organization and composition is warranted.**

**SJFHQ Organization.** The SJFHQ organization needs refinement, but not a major overhaul, according to analysis of MC02 data collected. MC02 participants were asked, “Are there changes or improvements that should be made to the SJFHQ organization or positions?” The question was intended to specifically address the SJFHQ organization. However, after reviewing the data, some (60 of 461) of the responses were more relevant to the JTF organization, which mirrored that of the SJFHQ, during the experiment. All respondents, who indicated that changes or improvements were needed, provided comments. The responses were mapped to the SJFHQ or to the JTF based on the subject matter. Only the SJFHQ organization is discussed below. The CJTF organizes the JTF based on requirements.

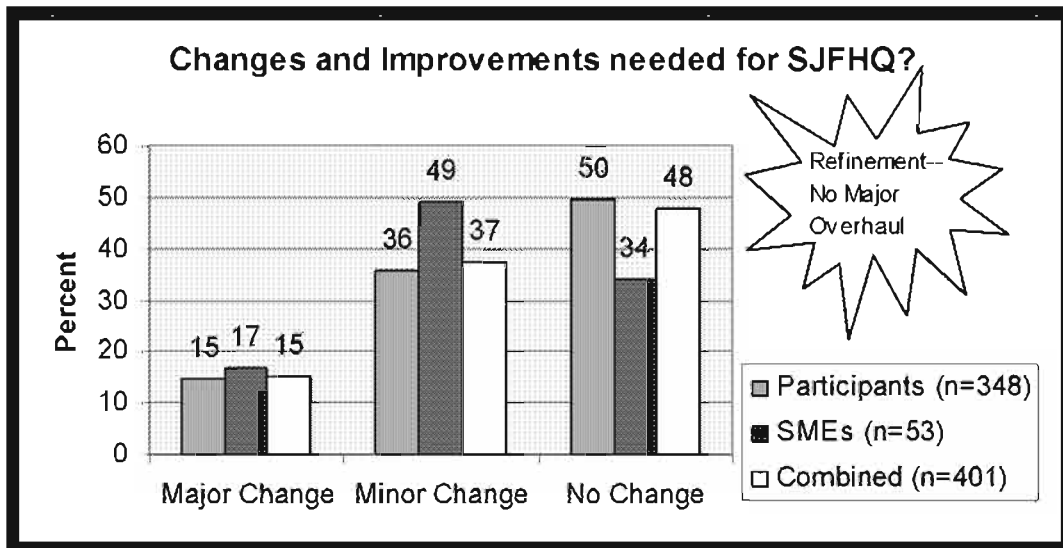


Figure 92: Changes and improvements needed for SJFHQ

The SJFHQ is organized into five groups — command (CmdGrp), plans (PG), operations (OpsGrp), information superiority (ISG), and information/knowledge management (KMG).

Results of analysis indicate that the SJFHQ organization is considered optimum by most observers. Eighty-five percent of respondents indicated that if any changes were needed they would only be minor, suggestions include:

- Adding expertise not currently available
- Adding or deleting some currently available expertise
- Relocating expertise from one group to another
- Changing the mix of military and civilians
- Ensuring SJFHQ members have certain attributes
- Ensuring the SJFHQ come with certain products

The make-up of the SJFHQ as stated in the SJFHQ concept is generalist-centric, while some of the changes suggested in the experiment data are more expertise-centric. Specific minor changes and improvements, by respondent group, are discussed below.

SMEs noted that the SJFHQ needed expertise in additional areas. They also emphasized the importance of habitual relationships and being able to reach-back to the combatant commander's staff and COEs. Forty-nine percent recommended minor changes and improvements, (34 percent indicated that no changes are required) including:

- Add personnel planner
- Add engineer
- Add medical planner
- Add joint fires expertise
- Add SOF expertise
- Add deployment planner
- Add log director and planner

One SME stated, "need a 'joint fires' expert in the SJFHQ and need to clearly identify deployment planning expertise in plans to include JFAST expertise." Another SME remarked, "It looks like it is about right as long as there is good collaboration with the rest of the combatant commander staff during pre-crisis and effective reach-back during the crisis." Finally, a senior SME noted, "The SJFHQ will not be and never should be the be-all, end-all organization. The resources required to achieve an all-capable SJFHQ are too high for the value added. The 80-90 percent solution is the key. Each mission and JTF will be different. There will never be a standard."

Comments from the senior mentor/concept developer indicate that the SJFHQ concept is good and has proven itself. They said that the SJFHQ has become an essential feature of DoD transformation, and that combatant commanders need a SJFHQ. However, they are not sure about the organization. They indicate that the organization needed minor refinement, recommending that the combatant commanders have the latitude to organize the SJFHQ.

The one recurring comment from senior mentors was the need for IAC personnel resident within the SJFHQ. "SJFHQ is good and must be standing — concept proven; not sure about the structure," said one senior mentor. Another senior mentor stated, "SJFHQ needs an interagency person or two. There is too much below combatant commander Blue that needs political-military sensitivity." Another added, "As the JIACG concept is refined, a JIACG staffer should be identified to be part of the SJFHQ, and usually to deploy with it."

The UJTL baseline report information regarding the subtask, "Coordinate and Integrate Joint/Multinational and Interagency Support" (OP 5.7), indicated that identifying the agencies available to support the JTF was difficult. The SJFHQ directly addresses this issue with its habitual relationships with and reach-back to the IAC, COEs, and other external agencies. In addition, respondents and senior mentors noted the need for an IAC representative in the SJFHQ. These relationships and capabilities were not well exercised during MC02 because of the experiment design. As noted previously, the combatant commander's staff intended only to participate with representatives in the JECG. However, if implemented as defined in the SJFHQ concept this will not be an issue.

Approximately 50 percent of participants indicated that no changes were required to the SJFHQ organization, while 36 percent said that the SJFHQ needs only minor changes. Their input included all extremes and everything in between. Participants indicated that the SJFHQ needs to add expertise not currently available, to add more of and to delete some currently-available expertise, to relocate expertise from one group to another, to change the mix of military and civilians, to ensure SJFHQ members have certain attributes, and to ensure the SJFHQ come

with certain products. The recurring comments from participants recommend the following changes:

- Add communications expertise — J6 types
- Add medical planner
- Add personnel planner
- Add engineer expertise
- Add fires expertise
- Add more military — less civilians
- Add KMOs — managers not IT people
- Add a future operations cell — mix of people from plans and operations

Participants emphasized that SJFHQ members should have certain traits, specifically joint experience, experts in functional area, collaboration tools expertise, and coaching and mentoring skills. During Spiral 3, participants needed better definitions of positions and skills required. In addition, there was a noticeable concern about the mix of military and civilians, and who was in charge or directing whom. A participant stated, “The number of personnel should be greatly reduced. Many SJFHQ members had very little to do during the buildup to MC02. Additionally, military SJFHQ should be organized to eliminate situations so military and government personnel are not subordinate to civilian contractors.”

Other comments include, “More military/uniform personnel,” and “Less civilians more military.” Another participant said, “If I had only one additional position, I would add a joint fires person, if I had two additional slots, I would add two joint fires people.” Another remarked, “The concept for the SJFHQ is absolutely right on target. I would definitely add an operations officer to assist the SJFHQ KMO with centers, boards, and cells to include managing the JTF operations page and archives. Stick to the concept and let the SJFHQ perform.” “I don't know if more KMO or better procedures were necessary... I think the SPPS folders and methods should have been set. I would have liked to see standard data reports files set up by the SJFHQ team. For example: items of high interests to the JTF commander should be in clearly identified folders that can be updated by those who have the right knowledge,” said a JTF staff member.

Regarding reducing the SJFHQ, one JTF staff member stated, “Scale down the size of the SJFHQ. There is no need for a RW [rotary wing] planner, and many other planners. If the function is a component function and you do not own the assets at the JTF level, you do not need a planner at this level for it.

Only 15 percent saw the need for major changes. These changes included deleting and adding groups, returning to the Joint Staff organization model, and allowing the combatant commanders to organize the SJFHQ based upon requirements. The preponderance of suggested major changes centered on ISG, KMG, IO, and a logistics/support group.

Questions addressing the ISG and KMG included: “Should these groups remain or be eliminated and group members distributed to the PG and OpsGrp?” “What are the roles and functions of these groups?” and “Who is responsible for the members distributed to other groups?”

Additionally, respondents indicated support for a logistics support group, transfer of IO people to the PG, and an information operations organization, either at group level within the SJFHQ organization or at task force level, such as the joint information operations task force (JIOTF). Each group is addressed separately below.

Those that recommended major SJFHQ organizational changes, suggest elimination of the ISG. The group experienced problems synchronizing and integrating intelligence assets and providing the necessary support for operations and planning. According to these respondents, the ISG did not meet the needs of the JTF or fulfill its roles and responsibilities. The group became two groups, intelligence, and IO when the CJTF pulled out the IO supervisor to be his spokesman. The group split and it never came together again. This adds credence to the suggestions that IO should not be in the ISG, but rather IO should be its own entity. In addition, JTF ISG participants indicated that the limitations of the experiment impacted the group's effectiveness.

One SME suggested the major changes to the ISG, "There are significant problems with the organization of intelligence elements within the SJFHQ/JTF. The change from the original SJFHQ concept to take intelligence support assets from both the operations and plans groups, along with information operations assets, to form a new information superiority group (ISG) was not exactly a resounding success.

"In some ways, it was a real failure," he said and continued, "The lack of a complete SOP that ensured the various ISG entities knew what support they needed to provide to the plans or operations groups created conditions where insufficient information was provided, often in the wrong format or at the wrong time. Even worse, some critical intelligence support was not provided at all. Recommendation — eliminate the ISG.

"All personnel associated with current intelligence support, effects assessment and coordination of collection should be shifted to the operations group. The ONA analysts' positions, if they should be physically located at the JTF level, remains a topic for debate. I would say all ISG personnel associated with planning, such as the ISR planner, and the EA planner, would join the plans group. The ISG personnel would be more effective at the combatant commander's level and thus other current ISG members such as the ONA supervisor, would become unnecessary."

A SJFHQ member in the ISG recommended that the SJFHQ should consist of two groups, operations and plans and that the personnel in the IS and KM groups reintegrate back into plans and operations. He considered that there would be support personnel, such as logistics officers, in each group, place one officer in charge of all similar personnel in both groups. He also believed this would simplify the problems of synchronizing efforts across the groups. Other participants indicated that they were not sure of the value of the ISG because it did not provide the synchronization it was envisioned providing, it failed in the area of IO, and it was out of touch with the needs of the OpsGrp and PG — they recommended disestablishment of the group.

Conversely, participants also supported the ISG. They indicated that the ISG should remain a group with command and control of all ISG assets across the JTF staff. To be effective, the ISG must control its assets and receive information from higher headquarters elements, they said.

One JTF staff member stated, "First of all, resist any attempts to disband the ISG. Initial problems were due to no command and control. The director must have C2 of all ISG members distributed across the staff to ensure situational awareness, integration, and synchronization. This would result in better products, better orchestration, better integration, better synchronization, and reduce duplication. For this to work, the director must have control. Not sure about IO, not sure of the plan to elevate or stay in ISG. The IO lead was an O6; we were pulled apart early and never got back together. CJTF wanted to talk directly with the IO lead and he wanted a spokesman, such as the PAO. If IO stays with ISG, the lead should probably be an O4/O5 billet to

better facilitate C2.” Another JTF staff member remarked, “The ISG is a valid group and should not be disbanded. ISG was hurt by having no C2 of assets and the experiment — lack of products from higher echelons (JECG). The ISG lead must control all assets to synchronize and appropriately integrate throughout the staff, and must receive or be able to acquire info from higher elements. There are no problems with ISG — the problems were with the experiment.”

In summary, the ISG is a viable group that needs tweaking to improve effectiveness. The group leader needs C2 of all assets for situational awareness, integration, and synchronization purposes. In addition, the group needs access to and information feeds from JTF-external sources. Better understanding of the ISG’s roles and functions is also needed.

KMG was another group that, according to those who suggested major SJFHQ changes, had problems and should be eliminated. The focus or understanding from many of the participants and the KMG was on technology—knowledge was not managed. The KIMP stated that knowledge management was the responsibility of each warfighter. That statement assumed warfighters understood knowledge management to include the business rules, knew what knowledge should be managed, and knew how to use the management tools.

This proved to be a bad assumption because warfighters did not understand knowledge management and because the business rules were dynamic. The expertise of the KMOs was in the area of information technology. The group needs more operators who understand the needs of the JTF to manage the knowledge and to ensure knowledge is available to all staffs. Group status is not necessary if KMOs are distributed throughout the staff with a node in the CmdGrp. A SJFHQ KM member stated, “We need better understanding and organization in the KM/IS area, at least better alignment of organizations and expectations. As a KM, nearly everyone had a different expectation of my role. It led to disappointment in many and frustration on my part.”

Another participant remarked, “KM is weak. We had no managed knowledge. Either disband the group and distribute the personnel throughout remaining groups or give the KM lead responsibility for all KM people so he can focus efforts. The KM Lead should probably be an operator with a strong tech person as his deputy.”

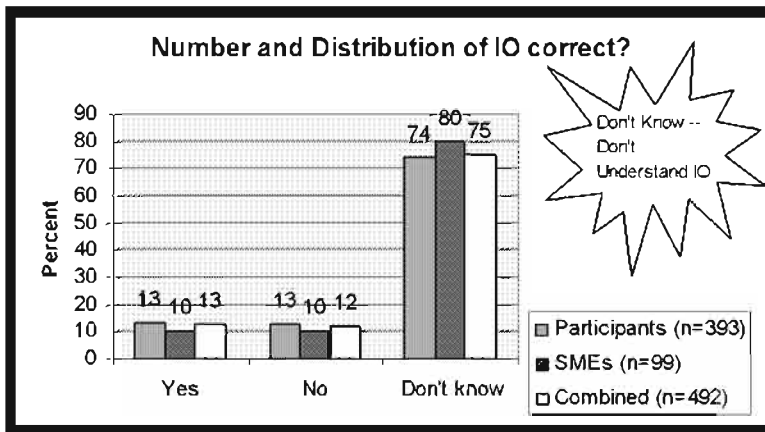
A SME provided the following comments: “... Document control is problematic. The number of broken links and dead subscriptions continues to rise. Document naming conventions and storage locations are slowly shifting. Procedures are changing, sometimes dramatically, and SOPs are not being updated. Without adequate KM embedded in each cell, it is difficult to sustain adherence to the KM plan. Moreover, it is even more difficult to capture and analyze the unique new processes, procedures, and conventions operators are developing to meet their needs. Additional KM should be added to the manning document and embedded in each cell. These individuals would be able to manage personnel, keeping the operators inside the range, but permitting them enough leeway to experiment with processes, procedures, and conventions. More important, these individuals could capture the best of these new ideas and share them across the organization, creating new and improved SOPs.” Another SME stated, “... The KMO needs to be operationally savvy, with the ability to talk to technicians, and must have superb computer skills to translate the needs of the commander into useful web pages, outlook organization, and functional collaboration nets.”

The KMG is a viable group that needs more operators and to focus more efforts toward managing knowledge. The group leader needs C2 of all KM assets for situational awareness, synchronization, and consistency. Better understanding of the KMG’s roles and functions is also needed.

Another said that IO should be separated from the ISG and elevated to group or component level. Comments regarding IO indicate that IO was not well understood by many players and those who did understand, said that IO was misplaced under ISG, and not well integrated throughout the staff, but IO planners were definitely needed in the PG. Respondents stated that to facilitate IO success:

- Define IO and educate DoD and external agencies
- Refine IO responsibilities and provide appropriate authorities and resources
- Establish IO as a group if not a component
- Add IO experts throughout the staff, especially in the PG

There is no agreed upon definition of IO within DoD. The IO spectrum is very broad and inconsistent across military agencies. One SME indicated, “A major USJFCOM recommendation coming out of MC02 should be that the SecDef should commission and approve a DoD-wide definition of IO and fix



responsibility for it within DoD.” Another SME stated, “IO should be its own entity, not part of ISG and it should have the clout to make things happen prior to hostilities.”

The CJTF concurred with that thought, elevating his own information officer to group level, early during the experiment. He also split the ISG group into intelligence and IO cells, which enhanced the effectiveness of IO.

Figure 93: Participants were unsure of the correct number and distribution of IO planners with the SFJHQ

A participant remarked, “If gaining and maintaining info superiority is a primary objective, it will never be reached by burying IO under IS. IO if it is to be successful has to have its responsibilities refined, appropriate authorities, and resources assigned.” A recommendation was provided to separate IO from ISG and elevate it to a group or component level. The SJFHQ chief of staff stated, “We should improve the IO focus by creating a significant functional stand-alone area vice treating IO as a briefing item. It is already almost a functional component.”

On this same subject, a participant indicated that IO integration was inadequate and he recommended creating an IO command with full component status. Senior mentors also supported component status and more IO personnel to effectively leverage the IO spectrum. A JTF staff participant, said, “First, move IO out from under IS. Second, dedicate an IO planner to the plans group. Third clearly identify the skills in IO.”

Figure 93, reiterates the lack of IO understanding. Participants and SMEs were asked during Spiral 3 and execution, “Is the number and distribution of IO planners across the JTF headquarters correct?” Only 25 percent of respondents (Combined) indicated a “Yes” or “No” answer, or understood IO well enough to answer the question. The chart doesn’t depict a need for more or a better distribution of IO. However, comments from “No” respondents, participants and SMEs, indicate a need for more IO, specifically in the PG. Some “Yes” respondents also noted that the PG needs IO planners.

The percentage of “Yes” and “No” responses for both, participants and SMEs, increased from Spiral 3 to execution, by 10 percent and 5 percent, respectively. This indicates some IO understanding was gained as the experiment progressed.

In summary, IO was not well understood and not well integrated throughout the staff. A better understanding of IO is needed, to include the role and functions of IO personnel. Further study is needed also to investigate the establishment of an IO group or task force.

The analysis regarding the JTF challenge, ‘underdeveloped information operations’, provided in the MC02 baseline report stated:

While many JTF staffs attempt to optimize IO, they are confronted with the reality that the high impact IO actions are usually not at the discretion of the JTF commander. Those decisions and actions are at the combatant command level and higher. There is a training issue focused on tactical level IO personnel, who are placed at the operational level and then asked to orchestrate a coherent, operational-level IO plan. Very seldom is that done effectively. Additionally, the lack of simulations that reward IO play makes it difficult to effectively integrate it into training events.

The SJFHQ attempted to address this challenge by including

five IO planners in the ISG and one IO operations member in the

OpsGrp. However, IO had similar problems during MC02 in that not enough knowledge and experience, not well integrated in the right places, and not synchronized across the spectrum, especially in the special access areas. The CJTF elevated IO from under ISG and gave it needed command emphasis, which enhanced effectiveness.

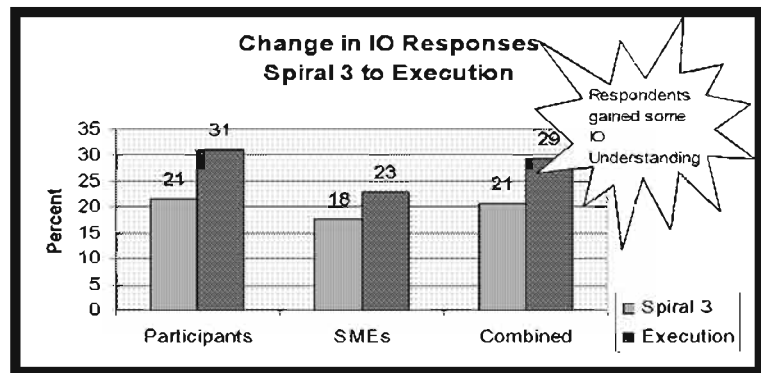


Figure 94: Change in IO responses

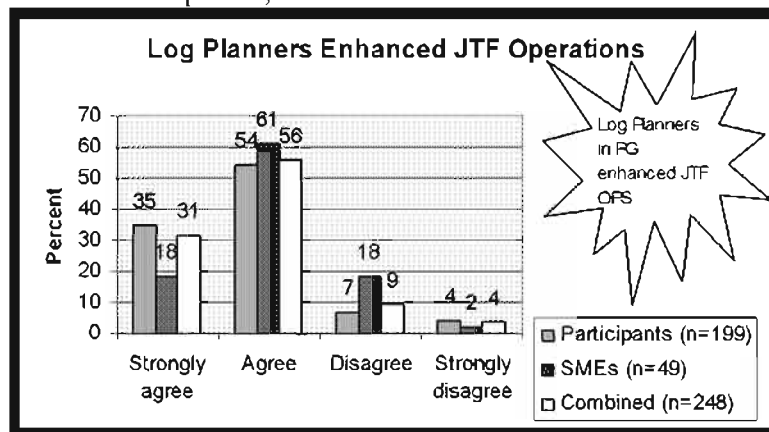


Figure 95: Most agreed that logisticians in plans enhanced JTF

A point noted in the comments of those who suggested major changes, and in the comments and recommendations from other respondents was to add a logistics/support group (LogSptGrp) to the SJFHQ organization. The absence of a LogSptGrp proved to be significant and problematic, as reported by respondents. Participants noticed confusion and duplication of effort between logistic planners and operators.

Logisticians were not in the core/main planning cell and their absence was reflected in COA development. A SME noted some COA development was logistically short; it was

missing an assessment of logistic feasibility. Logisticians were left out and not consulted on some operations; however, this seemed to have minimal impact on the progress of the experiment. Moreover, one participant indicated that some logistic problems did not receive the necessary visibility to get resolved, and that a logistics director was needed. The director would have been able to coordinate, synchronize, and maintain visibility of logistic functions.

A SME stated that a J4 would have helped coordinate/oversee logistical requirements between the OpsGrp and PG. Another SME said, “While the embedding of logisticians in the groups has shown great potential, the logistics operations director (LogOpsDir) in the operations group spent a great deal of time within the plans group’s logistics plans section during Spiral 3. This individual’s ability to provide logistics planning oversight will be greatly diminished once deployment and operations begin and, as his focus shifts.

“To create better oversight of logistics planning and operations as well as more logistics visibility across the JTF staff, recommend creation of an O-6 logistics director position at the special staff level.” A senior mentor stated, “The ETO did not have sufficient granularity and resolution for the logistics problems, so I could not link forces. The G-3/G-4 personalities fit, but personalities should not determine how we operated. For many of the log sustainment things, I’d normally deal with the COSCOM commander. But, I couldn’t because there was no joint logistics commander.”

Another senior mentor indicated that we need more logistics integration. All respondent types supported adding a group to oversee logistics planning and operations, to

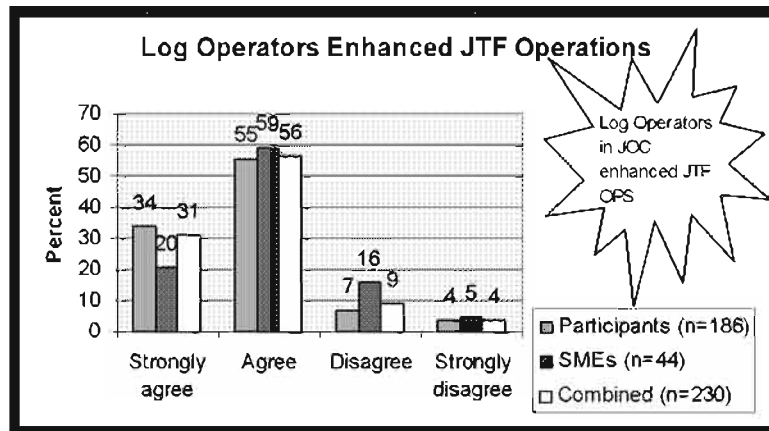


Figure 96: Logisticians in operations enhanced JTF

increase logistics visibility across the JTF, and to house other support functions as required. Many respondents made comments such as bring back the J4, create a separate logistics element, add a log directorate, and, give logistics equal footing with other groups.

A support/logistics group should be developed that has parity with the other groups, but not at the expense of removing all logistics personnel from the OpsGrp and PG. Logistics representatives should remain in

these groups, but maybe in fewer numbers. A participant remarked, “Logistics is too important not to be an entity in itself. There most definitely need to be Logistics participation in planning and operations and it needs to be more than a simple LNO representation.”

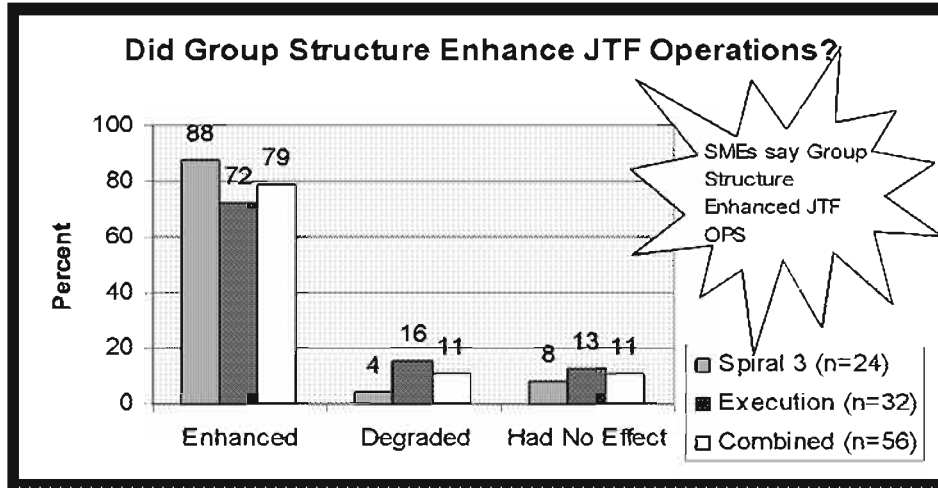
“The vertical staff processes in the logistics arena lacked sufficient definition given that there was no true logistics staff to coordinate with. The JTF needs a dedicated logistics cell, even as logisticians remain embedded in both ops and plans directorates. The ability to flow forces, coordinate sustainment, and manage host nation requirements necessitate an educated logistics cell,” added a combatant commander staff member. If added to the SJFHQ, the support group should include specialists in logistics, personnel, engineers, medical, SJA, PAO, and contracting.

During execution, participants and SMEs were asked if logistic personnel, embedded in the PG and OpsGrp, enhanced JTF operations. Figures 95 and 96, above, indicate that log



planners and log operators enhanced JTF operations. In all cases, over 79 percent of respondents agreed that logistic personnel located in operations and plans enhanced operations. This suggests logistic personnel should remain embedded in the PG and OpsGrp.

The analysis regarding the JTF challenge, contingency contracting and host nation



support (HNS), provided in the MC02 baseline report states that a limited number of events have been conducted, centered on J-4 specific training in this area. The SJFHQ assists with this challenge by providing the situational awareness and understanding of the JOA, the ONA knowledge, and

Figure 97: Group structure effect on JTF operations

habitual relationships and reach-back to COE and other external agencies. During MC02, respondents indicated the need for an IAC representative in the SJFHQ and the need for a support group, including contracting, SJA, and PAO expertise. If the group is added with the recommended expertise, the SJFHQ will provide a means to overcome this challenge.

During Spiral 3 and execution, SMEs were asked if the group structure enhanced JTF operations. Throughout the experiment, SMEs indicated that the SJFHQ group structure enhanced JTF operations—88 percent during Spiral 3 and 72 percent during execution. The cross-functional group structure facilitated good staff integration and helped alleviate stovepipes. It allowed planning to occur rapidly and formed the framework for collaboration.

The MC02 experience showed that CIE and the SJFHQ are inextricably linked and have a synergistic effect to enhance JTF operations. Another important aspect is that the JTF staff embraced the structure, which allowed the benefits to be realized. The difference in SMEs saying “Degraded” during Spiral 3 (4 percent = 1 SME) and those giving the same response during execution (16 percent = 5 SMEs) is noted. Their comments are more relevant to BCCWGs than the group structure and were considered in the BCCWG finding below.

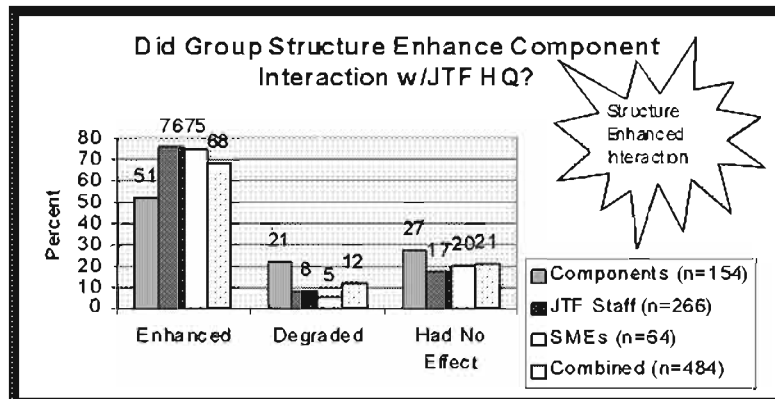


Figure 98: Group structure effect on component interaction

To address structure enhancement from a different perspective, during Spiral 3 and execution SMEs were asked also if Effects-Based Planning/Operations (EBP/O) faltered due to organizational problems. Seventy-four percent of respondents indicated that the organization did not cause the EBP/O to falter. Only two of the six SMEs who responded, "Yes," provided comments regarding the structure. One SME indicated that logistics was not well integrated and

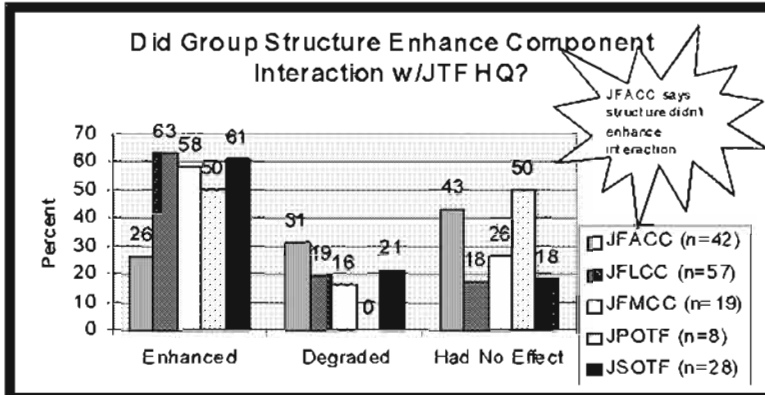


Figure 99: Most thought structure was an enhancement to JTFHQ-component interaction. JFACC/JPOTF mixed.

staffs, and SMEs were asked if the group structure enhanced component interaction with the JTF headquarters. The JTF staff and SMEs, 76 percent and 75 percent respectively, indicated that the organizational structure enhanced component interaction with the JTF headquarters. The component staffs as a whole were not so impressed. Only 51 percent of these respondents indicated that the structure had enhanced component interaction. However, interesting to note is that the JFLCC staff, which was the only component organized similar to the JTF, was most positive. Sixty-three percent of JFLCC staff indicated the structure enhanced component interaction.

JFLCC respondents credited the similar structures as the reason for enhanced effectiveness and interaction. One JFLCC respondent remarked, "The identical structure of the JFLCC and JTF enhanced our effectiveness because there was a clearly identified source that we could coordinate and collaborate with to resolve problems and ensure situational awareness was maintained."

At the other extreme are the JFACC respondents. Over 70 percent of the JFACC staff responded, "Degraded" and "Had No Effect." JFACC respondents noted that the structure was confusing, that the JTF staff was too involved in tactical planning, that the number and length of collaboration sessions were detrimental to component planning, and that the location of

synchronized. He noted also that logisticians were in the PG but not embedded in the core, planning cell. The other SME stated, "There was not adequate representation of information operations in the JPC planning efforts. The JPC core plans cell needs an IO planner." These concerns are a repeat of information presented in the IO and Logistics/Support Group sections above.

The JTF staff including SJFHQ members, component

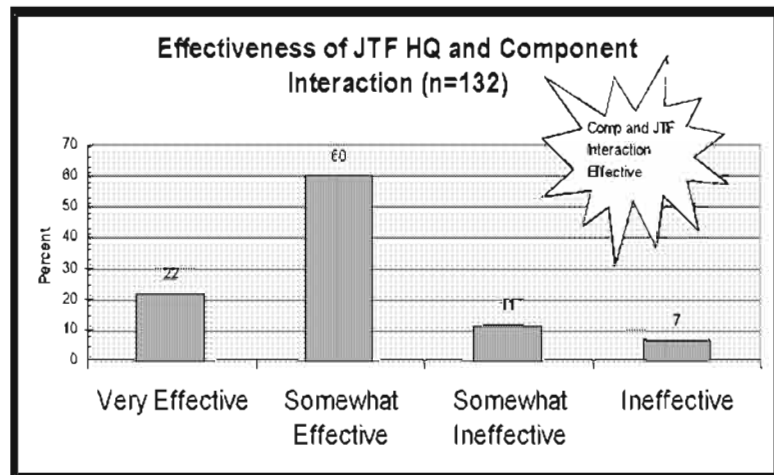


Figure 100: Most thought interaction between JTF HQ and the component staffs was effective

information was not logical based on expectations. A JFACC respondent stated, “RFIs were sent to KM vice IS resulting in answers delayed for days. Structure [is] confusing and cumbersome for those brought up under J1, J2. They did not understand who was doing the traditional J staff roles. Structure did not seem well defined as KM seemed to be tasked with things that IS should be doing. Structure breaks traditional expertise roles and waters them down into functional areas not requiring that expertise or underutilizing it.” A JSOTF staff member indicated that the IS structure just added layers of complexity to the Intel process.

Over 80 percent of component respondents indicated that the interaction between the JTF headquarters and components was effective. Respondents stated that the CIE played a major role, that situational awareness was always high, and that collaboration enabled unfiltered communications—there was immediate access, vertically and horizontally.

Combatant commander staff interaction with JTF headquarters was also enhanced by the organizational structure, according to the JTF staff and SJFHQ. However, three of the six combatant commander staff respondents (See Figure 101 below) indicated that the SJFHQ organization degraded their interaction with the JTF headquarters and one indicated the organization had no effect. The small sample size of combatant commander staff negates significance, but responses and comments are noted and listed below.

Combatant commander comments associated with the selection of the “Degraded” response included, “The combatant commander J3 and J5 did not mirror the SJFHQ structure and at times this caused confusion,” and “Just talked to combatant commander J2 rep; info is taking longer to get to right people because intel folks at JTF have been divested to IS cells.” Another participant commented, “This merits additional research. The experimental staff structure varied by component (i.e. JFLCC mirrored JTF) and this caused some vertigo at the combatant commander and component level. This lack of consistency may just be a training

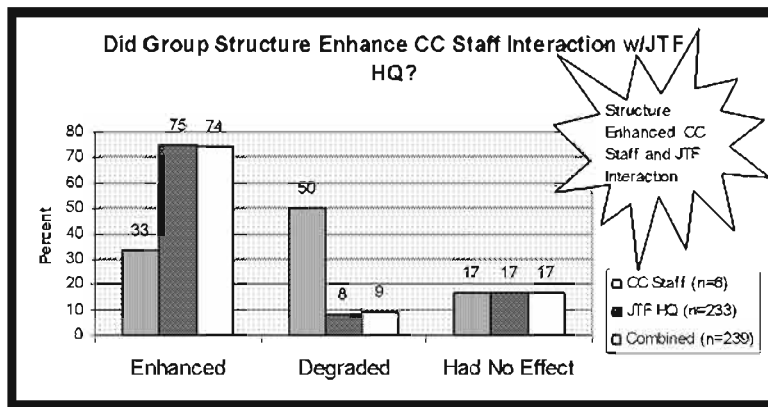


Figure 101: JTF and components thought structure enhanced interaction between the combatant commander's staff and the JTF staff. Combatant commander's staff disagreed.

issue, but I believe that the complexities of staff interactions at the operational and strategic level, mandate simplistic organizations with very defined TTPs.”

A combatant commander staff member, who reported there was “No Effect,” stated, “Because of the combatant commander staff experiment design - J3 one person, J5 one person, etc., the effect was minimal. However, a robust combatant commander staff ready to go to war would have presented a different interaction picture.”

SJFHQ composition is defined as the number of members, mix of skills and knowledge, and products brought to the activation of the JTF. All respondents were asked, “Are there additional skills, knowledge, or products you believe the SJFHQ should bring to the activation of the JTF?” Sixty-four percent of responding SMEs answered, “Yes” and provided comments regarding additional skills, knowledge, and products needed. Only 41 percent of 393 participants (JTF staff and SJFHQ) provided comments. In addition, group directors were interviewed by analysts and asked specific

questions regarding the composition of their group. Key individual attributes and each group will be discussed separately. Additions, which are relevant across all groups are discussed in the “Others” paragraph below.

The name “headquarters” is deceiving because the SJFHQ is a command and control element, not a headquarters. For that reason, many comments are not relevant to the SJFHQ organization and are more pertinent to a headquarters (JTF). The CJTF organizes the JTF based on requirements. The comments below are specific to the SJFHQ full-time organization, not the JTF as a whole. There is some overlap with the “organization” section above, which emphasizes some importance.

A good lead-in comment to this section, as stated by an SJFHQ member is, “We need to be very careful about adding more positions to the SJFHQ. The SJFHQ manning is already a huge bill for the combatant commander to pay for a “peacetime” planning organization. The SJFHQ is part of the combatant commander’s headquarters and derives much assistance from the combatant commander’s staff for skills not resident in the SJFHQ. Remember, the concept calls for augmentees, plugs, and liaisons before we go to war.”

Individual Attributes and Knowledge. People are the key to effectiveness and success. Attributes such as knowledge, and experience of the SJFHQ members were most mentioned by participant survey respondents, who were adamant that the traits were needed to establish credibility. Traits of the SJFHQ model member are listed below:

- Mature, professional — SME in assigned area
- Experience in joint and service operations, and crisis action planning
- Trainer, mentor, coach with interpersonal skills
- Understand group dynamics
- Understand concepts and combatant commander’s Intent and Perspectives
- Knowledge of CONPLANS, CONOPS, SOPs, and TTPs
- Situational awareness and understanding
- Knowledge of the ONA and the adversary
- Knowledge of Effects-based Planning/Operations
- Expertise with collaborative tools
- Habitual relationships with combatant commander’s staff, component staffs, and other external agencies

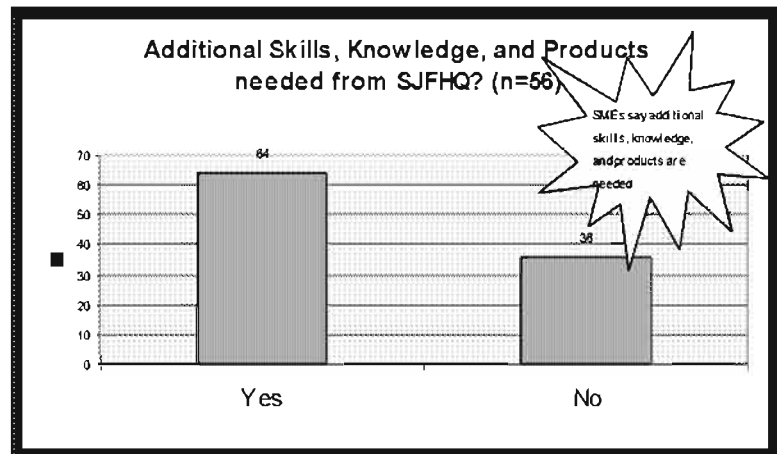


Figure 102: Additional skills, knowledge, and products needed from SJFHQ

One JTF participant stated, “The SJFHQ’s credentials are very important keys to the success of the JTF staff. The SJFHQ billets should be reserved for retirees with substantial joint experience, and very experienced, highly competitive military with some longevity and stability. They must be mature, professionals with human dynamics. The MC02 SJFHQ had situational awareness, expertise in joint operations and the collaborative tools, knowledge of ONA,

knowledge of the theater, knowledge of effects-based planning, relationships with IAC and COE, and understood the combatant commander and his intent. LTCs/MAJs, out of service/joint schools will not work—no experience and no credibility.” Another JTF participant remarked, “The SJFHQ members must bring with them situational awareness and understanding, knowledge of ONA, proficiency with collaborative tools, combatant commander’s intent and perspectives, joint operations experience, and most important maturity and group dynamics.”

SMEs agreed, as noted in the following comment, “For the long-term, for SJFHQ to remain a viable entity, I recommend that the personnel assigned to SJFHQ have operational experience at the combatant command and the JTF level. Contractors need to maintain currency or over-time their operational experience may become dated. There is a lingering perception (right or wrong), that staff-college graduates, in organizations such as this, lack the credibility and experience of working/teaching at the combatant and JTF level. They are going to have a tough time “plugging in” into a HQ without the requisite hands-on time.

“Likewise, you will need quality guys with initiative, who can produce products, and are willing to handle multiple tasks. Currency and credibility will be key. Otherwise, over time, the SJFHQ will be marginalized. Bottom line, you will need quality people that understand how planning is done throughout the JTF – from the HQ to the components to the MSC. Then SJFHQ must have enough hardware to deploy with, to support the entire JTF staff (to include components), a technician staff to support it, and an instruction package with instructors to train the rest of the JTF.”

Finally, a participant provided a relevant comment regarding stabilization of SJFHQ members, “SJFHQ positions should be stabilized for a period of about six years (no less). Nevertheless, we in operations should also have that core staff of members rotate through different combatant commanders so that they get a broadening of experiences and perspectives that will cross-pollinate other combatant commanders. Rotations should be staggered so that we can retain the functions that have been working well.”

The UJTL baseline report information regarding the subtask, Assess Operational Situation (OP 5.2), indicates that assessments completed by the JTF staff tended to be compartmented and were not maintained to incorporate operational updates, which in turn made it difficult for the staff to maintain situational awareness. (This was not a problem during MC02.) The SJFHQ members joined the JTF HQ with situational awareness and situational understanding. They understood the combatant commander’s TEP and all approved plans related to the JTF mission. Integrated throughout the JTF staff, the SJFHQ members passed this knowledge and understanding to other JTF staff members. In addition, the JTF staff continually updated assessments and made them available on the collaborative tools.

**The four full-time Command Group positions:**

- **deputy chief of staff**
- **joint operations center (JOC) chief**
- **SJFHQ administrative support coordinator (2)**

### **Command Group (CmdGrp) Composition**

The CmdGrp provides the JTF with four (4) personnel providing traditional C2 functions. Specific duties assigned to these billets may change depending on whether performing peacetime responsibilities, crisis planning, deployed during hostilities, or transition operations. In addition, resident in this group are the CJTF’s personal staff (staff judge advocate, chaplain, surgeon, and public affairs officer) and support personnel (aide, driver, security, senior enlisted advisor). The

size of the elements comprising the SJFHQ can be expanded through augmentation to match the intensity of operations.

Respondents did not specifically indicate additions or deletions to this group. However, if ISG and/or KMG are eliminated and members are distributed to other groups, POCs for intelligence and knowledge management can reside in this group. Additionally, there are numerous comments regarding the need for a logistics director and an IAC representative. These persons also can be members of this group. The CmdGrp's mix and number of members are adequate and the group met the needs of the JTF.

### **Plans Group (PG) Composition**

The PG consists of seventeen (17) personnel. The purpose of the group is to provide the CJTF with a more integrated approach to the Effects-Based Planning focused in future operations. It also forms the basis for an expanded, interactive joint planning center (JPC), linked through the collaboration network to conduct operational planning. The PG informs and advises the commander, and plans, directs, and integrates intelligence. It extracts meaningful information from the intelligence, leads the collaborative development of operational plans based on that information, and directs the execution of the commander's decision through an Effects Task Order (ETO). The PG can be used as augmentation to a Service or other headquarters designated to perform the JTF functions, during crisis response planning and execution to provide continuity in pre-crisis planning, situational understanding, and Effects-Based Planning.

The mix and number of members in the PG need minor refinement, including the following:

- Add personnel planner [SME/SJFHQ/Participant]
- The group structure is about right; add provost marshal (PM) expertise for EPW planning/movement; add some IO planners; add fires planners [Participant]
- Add medical planner [SME/SJFHQ/Participant]
- Add engineer planner [SME/participant/SJFHQ]
- Add IO (remove from ISG) [SME/SJFHQ/Participant]
- Add ONA and SOSA (delete from ISG) [SJFHQ]
- Add force protection planner or TMD planner (need one of each not one dual-hatted) [SME]
- Add deployment JOPES planner with sealift and airlift expertise [SME/SJFHQ/Participant]
- Add civilian Pol/Mil with IAC experience [SJFHQ/senior mentor]
- Add a coordinated (with national level agencies) Pol/Mil planner [SME]
- Add a virtual (no personnel additions) J35 cell to handle the PG hand-off to OpsGrp [SJFHQ]
- Add more future ops capability [Participant]
- Add STO planner [SJFHQ]
- Add communications planner [SJFHQ]

#### **The 17 full-time plans positions:**

- plans director
- intel analysts (2)
- planners (5)
- logistics coordinator
- logistics deployment planner
- logistics sustainment planner
- Blue/Red planner (2)
- political/military planner
- civil affairs planner
- ops law planner
- force protection planner (TBM/WME)

The analysis regarding the JTF challenge, ‘TPFDD, plan forecasting, and scheduling strategic airlift’, provided in the MC02 baseline report states, “This is a constant theme. Primarily, it is a training and leadership development issue. There is a lack of understanding by senior leaders that the prioritization of the flowing of assets into the JOA must be accomplished by operations personnel to ensure that the right things show up, at the right time. Without the prioritization, accomplishing the commander’s intent and supporting the sequencing of the operation may be impossible. Lack of understanding of JOPES leads senior personnel to shy away from total involvement in the process.”

The SJFHQ attempted to address this challenge by including deployment and sustainment members in the PG and transportation and sustainment members in the operations group. However, deployment had similar problems during MC02—not enough deployment planners with JOPES/TPFDD knowledge and experience; not enough involvement from planners and operators in the deployment process; and not enough integration of deployment planners in the COA development. Also, the UJTL baseline report information regarding the subtask, ‘Project Future Campaigns and Major Operations’ (OP 5.2.3), indicates some past JTFs did not elect to form a J-35 future operations section, and JTF SOPs did not specify how functions associated with future operations were to be accomplished or what staff section was responsible. The MC02 JSOP clarifies the methodology to be used to accomplish these functions and establishes responsibility for future operations. However, the JTF did not establish a future operations cell until late in the experiment, after the noticeable disconnects with the PG’s handoff to the OpsGrp. JTF future operations were identified as a problem during MC02.

### **Operations Group (OpsGrp) Composition**

The OpsGrp consists of 14 assigned personnel, who support current operations activities for the CJTF. Additionally, the OpsGrp assists the ISG, developing the ONA of combatant commander-designated areas, as part of their day-to-day ‘in garrison’ or pre-crisis activities. Once a contingency or crisis begins to develop, the OpsGrp, as part of the SJFHQ, focuses their efforts on the crisis. As an augmentation to an exiting operational headquarters, that forms the JTF; the OpsGrp provides continuity in pre-crisis planning and situational understanding, and EBP. Within the JTF, the OpsGrp’s primary responsibilities in the JOC are to distribute the commander’s guidance and intent, and monitor the execution of the current operations. When necessary, the OpsGrp revises or directs changes to an existing ETO based on the situation, through issuance of changes to that ETO.

The mix and number of members in the OpsGrp are considered optimal by most, but some still see the need minor refinement. Such possibilities include:

- Add fires officer [SME/SJFHQ/Participant]
- Add a virtual (no personnel additions) J35 cell to handle the PG hand-off to OpsGrp [SJFHQ/Participant]
- Add second ISR OPS [SJFHQ]
- Add IO (from ISG) [SME/SJFHQ]
- Add NBC expertise [Participant]
- Add space operations expertise [Participant]

#### **The 14 full-time OPS positions:**

- operations director
- current intel integrator
- intel, surveillance, and reconnaissance (ISR) operations
- land operations (2)
- maritime ops (2)
- aerospace ops (2)
- special ops force (SOF) operations (2)
- info ops officer
- deployment ops
- sustainment ops

- Add METOC officer (Weather Officer) [SME]
- Add SOF LNOs during pre-hostilities [SJFHQ]
- Delete air operations and ground operations officers [SME]

### Information Superiority Group (ISG) Composition

The ISG consists of 13 personnel and is responsible for the coordination of activities that contribute to building information, knowledge, and decision-making superiority within the JTF. The ISG conducts an initial assessment of the information environment and our ability to achieve and maintain IS. Based on this assessment, the ISG designs an IS campaign plan in collaboration with the JTF staff. The desired outcome of the IS campaign is to create an imbalance of knowledge in our favor, in order to understand the adversary while denying him the ability to gather and exploit information on friendly forces. The ISG consists of an intelligence cell and an IO cell.

The intelligence cell maintains situational awareness for the CJTF, conducts effects assessment, prepares and maintains the ONA, and determines collection requirements. The IO cell prepares the overall IO plan and integrates IO capabilities into the ETO process. The ISG will normally be used as a plug into a service or other headquarters designed to form a JTF, as well as, augment the J2 staff with the ISG pre-crisis understanding of the crisis area.

As noted above, there is some support to eliminate the ISG and distribute members to the PG and OpsGrp. However, if the ISG is maintained in the SJFHQ organization respondents offered suggestions for improvement:

- Delete IO — IO should be its own entity, not part of the ISG [SME/Participant/SJFHQ]
- Delete IO (to OpsGrp) [SME]
- Delete EA (to JISE) [SME]
- Add IO expertise in EW, PSYOP, OPSEC and deception [SME]
- Add two for ISR collection, OIC planner, OPS; delete SA analyst; change intel supervisor to ISG executive officer (XO); change IS concept mentor to deputy director ISG; delete 3 of 5 IO planners — only need 2 in ISG [Participant]
- Add one ISR; all IS personnel should be put in ISG [SJFHQ]
- Add EA [SME/SJFHQ]
- Delete EA assessment analyst [Participant]
- Add SOSA billets [SJFHQ]
- Delete ONA and SOSA (add to PG) [SJFHQ]
- Add all of KM (if ISG remains) [SJFHQ]
- Consolidate all intel functions under ISG [Participant]
- Enhance understanding of IO [Participant]

**The 13 full-time ISG positions:**

- info superiority coordinator
- ISR collection planner
- intel supervisor
- situational awareness analyst
- assessment analyst
- assessment planner
- IO supervisor
- IO planner (4)
- ONA network analyst
- ONA effects analyst



### Information/Knowledge Management Group (KMG) Composition

The KMG consists of seven personnel, who provide knowledge management and technical support to JTF planning and execution. Three of the seven are technically oriented and serve as both the network planning/control section and the technical support section, ensuring that the SJFHQ has the connectivity and systems availability necessary to support operations. The remaining four are knowledge management officers, who support the SJFHQ by facilitating the dynamic creation, discovery, manipulation, and provision of the right information, to the right people, at the right time, in the right format. This group may be used either as augmentees or as a plug to an existing operational headquarters.

The mix and number of members in the KMG need refinement. As structured the group did not meet the needs of the JTF in the area of knowledge management — need more KMOs (operator types not IT) to manage knowledge. Noted comments calling for additions and deletions to the SJFHQ are listed below:

- Delete KM and merge with ISG [SJFHQ]
- Add KMOs [SME/SJFHQ]
- Add more technical/communications/automation support positions [SJFHQ/Participant]
- Need in-depth knowledge information management plan (KIMP) in JSOP and KM TTPs [SME]

The UJTL baseline report information regarding the subtask, 'Communicate Operational Information (OP 5.1.1)', indicates the joint forces experienced some difficulty managing information. The SJFHQ's KMOs and support technicians placed across the JTF staff, directly address this issue. In addition, the KIMP, located in the JSOP, should have provided the "who," "what," "when," "where," "why," and "how" to manage information. The keys to this solution are ensuring that the right mix of operators and technicians are available, the number is sufficient for each staff group, and that the KIMP is incorporated in the JSOP with sufficient details.

This paragraph includes noted skills, knowledge, and products that are relevant across all groups or relevant to a LogSptGrp, if a LogSptGrp is added to the SJFHQ organization

- Change name — should not be called a headquarters [Participant]
- Ensure senior SJFHQ member is the joint CoS or deputy CJTF [Participant]
- Ensure SOP clearly defines the roles, functions, membership, leadership and POCs, and relationships of each group and each BCCWG; provides a KIMP and the CIE structure with business rules; and establishes TTPs [SME/Participant]
- Add logistics director (LogSptGrp) [SME/Participant/SJFHQ]
- Ensure all SJFHQ members have reach-back to combatant commander staff, IAC, COE, and other external agencies [SME/Participant/SJFHQ]
- Provide SJFHQ LNOs to components [Participant]
- Create government positions (GS) to provide continuity and to affect habitual relationships [SME]
- Include fewer civilians and more military [Participant]
- Ensure the COP has current Blue and OPFOR ground, air, naval graphics in near real time [Participant]

#### The seven full-time KMG positions:

- KM coordinator
- KM officer (3)
- joint network control officer
- support technicians (2)

- Create format for products, database for managing data, and processes/agenda for BCCWGs — put on CD [Participant]
- Replace or upgrade ADOCS [Participant]
- Include a deployable set of communications equipment [SJFHQ]
- MC02 participant surveys also yielded the following suggestions:
- Change the name of SJFHQ from “Standing Joint Force Headquarters” to “Standing Joint Force Command and Control Element”
- Maintain the current SJFHQ organization — command group, plans group, operations group, information superiority group, and knowledge management group
- Further study to investigate the substantial concerns that suggest dissolving the ISG and KMG into the PG and OpsGrp
- Clearly define IS and KM responsibilities, and refine the SOP/TTP to reflect revisions
- Further study to investigate the establishment of a logistics/support group to coordinate, synchronize, and integrate logistics and other support functions in pre-crisis activities, planning, and operations
- Keep logistics personnel in the PG and OpsGrp
- Further study to investigate the establishment of an IO group or task force — JIOTF at the combatant command level. Clearly define IO in the SOP, and educate DoD and external agencies
- Add fires officer to OpsGrp — officer also provides fires expertise during planning
- Add STRATLIFT, personnel, and engineer expertise to PG. Augmentees or LNOs, with expertise in other functional areas not resident in the SJFHQ, should be available no later than the beginning of the planning process — make extensive use of reach-back capabilities for pre-planning activities
- Add, at least, an IAC LNO to the SJFHQ — the Pol/Mil planner in PG could perform this role if directly linked to JIACG at important
- Identify a virtual J35-like, future operations cell to coordinate and synchronize the PG hand-off to OpsGrp — Assign members from PG and OpsGrp.
- Add senior SJFHQ member, flag officer, to command SJFHQ (CmdGrp) — GO/FO can also fulfill deputy CJTF or JTF CoS billet

#### **SJFHQ Organization and Composition Summary.**

- SJFHQ organization and composition need minor refinement—no major overhaul
- Structure enhanced JTF operations and JTF HQ interaction with components and combatant commander staffs
- 15 percent of respondents recommended major changes to the organization:
  - Dissolve ISG and KMG into PG and OpsGrp
  - Elevate IO to group or task force
  - Establish a logistics/support group
- Composition: See Table 20: SJFHQ Manning, at Appendix A to Assessment Area 6, for a summary of SJFHQ manning
  - SJFHQ members’ attributes and knowledge are key to credibility and success
  - Groups need expertise not currently available—either additions or transfers from other groups

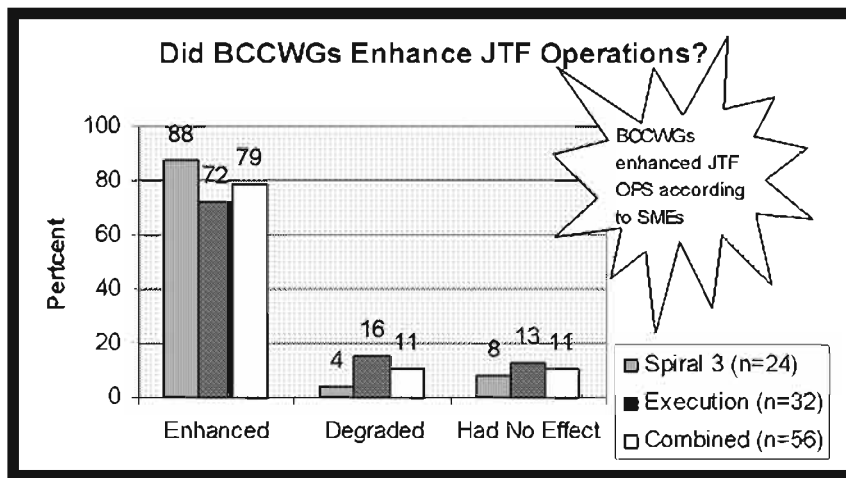
- Change the mix of military and civilians
- Assign PG and OpsGrp handoff responsibility

**Finding 3** ► The SJFHQ concept’s boards, centers, cells, and working groups provided a suitable structure from which the JTF staff could control the joint force.

The SJFHQ concept defines BCCWGs as formal, non-standing organizations with designated membership, meeting as required to conduct their business. Boards provide input to centers and the CJTF. Centers are formal, standing organizations that meet and regularly conduct business (planning or operations) with the JTF headquarters. Once established, centers normally operate on a 24-hour basis. Cells are formal, non-standing, functionally oriented organizations that meet on a regular basis to provide input to boards and centers. Working groups are informal, non-standing, mission-tailored organizations for a specific event or action. Working groups provide input to boards, centers, and cells.

The JTF staff, SJFHQ members, component commanders’ staffs, SMEs, and senior mentors and concept developers provided data that addressed the BCCWGs.

Members of individual BCCWGs and SMEs were provided three questions, rating the effectiveness of BCCWGs and how it met the needs of the JTF—“Adequacy of the Interval at



which that BCCWG convened,” “Adequacy of the Mix of experiences and competencies possessed by the members of that BCCWG,” and “Sufficiency of the Number of persons assigned to that BCCWGs.” Respondents were also asked to suggest any changes to BCCWGs structure, to note if any BCCWGs should be added or deleted, and to rate the effect of BCCWGs on JTF operations and JTF

Figure 103: BCCWG had a positive effect on JTF operations

headquarters interaction with component and combatant commander staffs.

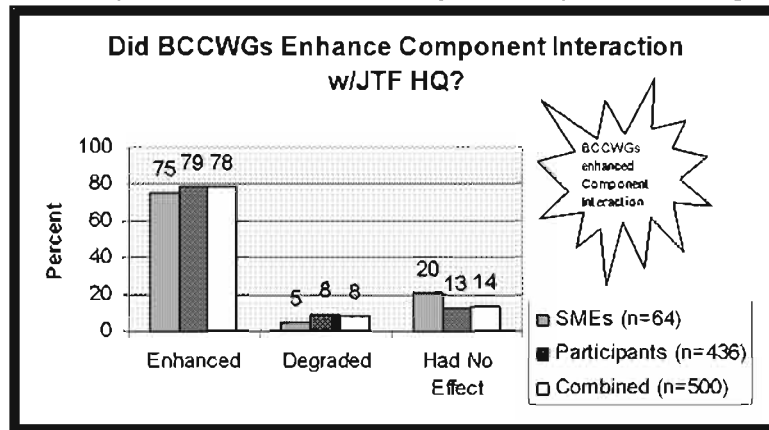
Respondents completed survey questions issued during Spiral 3 and execution, and participated in a post-execution working group session. Analysts interviewed senior mentors and key JTF staff members, to include the group directors, during and after the experiment. Analysts also observed all after-action reviews and in-focus sessions, and reviewed senior mentor notes for relevant comments.

Did BCCWGs enhance JTF operations? According to 79 percent of SMEs, BCCWGs enhanced JTF operations as well as facilitated improved situational awareness and understanding for all participants, helped to prevent staff section stovepipes, and enhanced horizontal and vertical communications for the combatant commander, JTF, and the component staffs. BCCWGs ensured good cross-staff integration.

One SME stated, “Definitely enhanced [JTF OPS], but a majority of the time there were constant meetings that could have taken away from the ability to conduct detailed analysis by

planners (especially in the EAC).” Another SME added, “Much higher situational awareness than normal, faster flow of information and knowledge throughout the force. This of course was greatly aided by the CIE.” However, one SME indicated that the lack of structure and length of time of BCCWG virtual sessions degraded the process.

Did BCCWGs enhance component staff interaction with JTF headquarters? SMEs and participants (78 percent) indicated that the BCCWGs enhanced component interaction with the JTF headquarters. (See Figure 104) Several SMEs stated that the BCCWGs were beneficial and greatly enhanced component situational awareness; however, the many meetings affected the battle rhythm of some of the components by not allowing them enough time to conduct internal



planning. One SME added, “Great horizontal and vertical collaboration. Components were involved in all elements, simultaneously.” Participants stated that the BCCWGs were great, allowing a better understanding of the CJTF’s priorities—no guessing required. One participant said, “Future chiefs of staff will need to regulate who goes to meetings in a more rigid fashion; while it’s all well and good to have 500 guys

Figure 104: BCCWG effect on component interaction

listening to the CO, you have to have somebody minding the store.”

Another participant provided a negative comment saying, “Due to the ability to collaborate and get near real time data to all levels of command (everyone sees the same picture), JTF was repeatedly involved in fighting at the tactical level. As a result, component planning was stifled, to some extent, based on JTF directed COAs.”

The UJTL baseline report information regarding the subtask, ‘Acquire and Communicate Operational Level Information and Maintain Status’ (OP 5.1), indicates that BCCWGs place a heavy time demand on the JTF staff, becoming counterproductive and some cases overwhelming. As described above similar problems were experienced during MC02. The JTF CoS needs to establish control measures and business rules for BCCWG sessions.

Did BCCWGs enhance combatant commander staff interaction with JTF

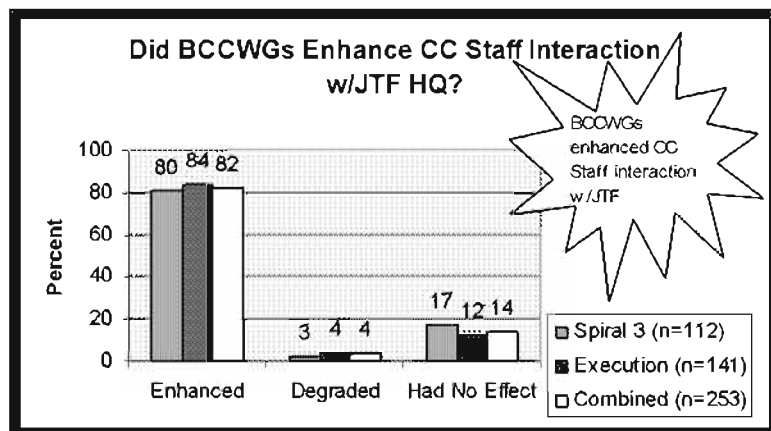


Figure 105: BCCWG effect on combatant commander staff interaction

headquarters? Eighty-two percent of responding participants said that the BCCWGs enhanced

combatant commander staff interaction with the JTF headquarters. Participants did not provide many comments because of the staff experimental design. They noted that the concept had great potential, but it was not fully explored because the experiment lacked full participation from the staff (See Figure 105). Only seven of the 253 respondents were staff members. A participant stated, “[BCCWGs] allowed for concurrent and horizontal planning and rapid decisions.” Another participant added, “Because of the staff design and the number of BCCWGs, some just had to be uncovered. While you can virtually be in multiple sessions, the ability to keep track is degraded.”

The following sections provide analysis for each of the BCCWGs prescribed by the SJFHQ concept. The format is the same for each and begins with a statement of purpose, followed by a statement of the adequacy of the interval at which the BCCWG was convened, the adequacy of the mix of experiences and competencies possessed by the members of the BCCWG. The sufficiency of the number of persons assigned to the BCCWG, and whether the BCCWG met the needs of the JTF follow.

### Blue/Red Cell (BRC)

**Purpose.** The BRC provides insight into the adversary’s political and military objectives, and his potential COA in response to real or perceived Blue actions or intentions. During execution of Blue COAs and effects, the cell helps assess the adversary’s response to applied effects and tasks. Additionally, it helps identify possible Blue vulnerabilities and potential operational miscues that an adversary may exploit, and thus, use to ultimately frustrate the objectives and tenets of RDO.

**Interval.** The interval at which the cell convened was adequate. The BRC convened often internally and participated in numerous daily collaboration sessions. Participants and SMEs stated that the BRC met as required and because of the JTF OPTEMPO, several members were continuously working inside larger boards, cells, and centers.

**Mix.** The mix of experiences and competencies was also considered inadequate. The cell consisted of two SJFHQ members and two augmentees. The augmentees were an Army captain and a Marine lieutenant with no experience. A SME stated, “The SJFHQ folks were OK, the two augmentees were not — junior officers with no experience — not the right folks.” Two of the three participants, who said, “Adequate,”

remarked that the augmentees had no experience and that more experience is better.

**Number.** There were questions regarding the number of people assigned to the cell. Four of the six respondents indicated that the number of BRC members was sufficient. One participant stated that the four members performed well and were able to cover the working groups, but only four might become a problem during 24-hour operations. Another participant remarked, “Four might be enough for short term, assuming the two augmentees have broad and significant

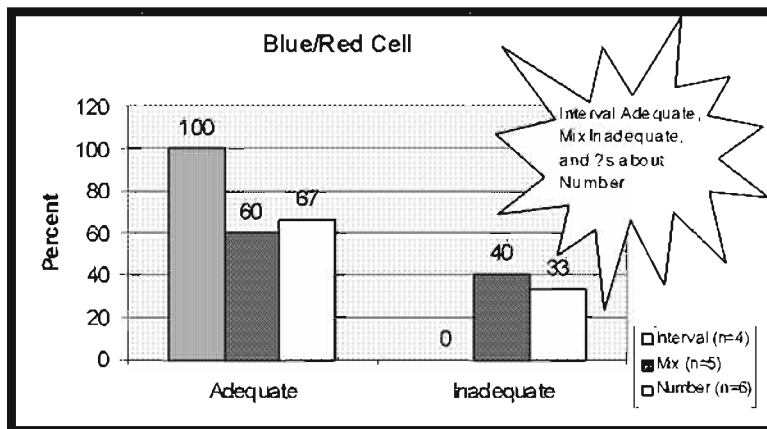


Figure 106: Blue/Red cell interval, mix and numbers were considered adequate

experiences. Two company grade officers, no matter how well motivated, are a limiter to the potential this cell could have brought to this experiment.”

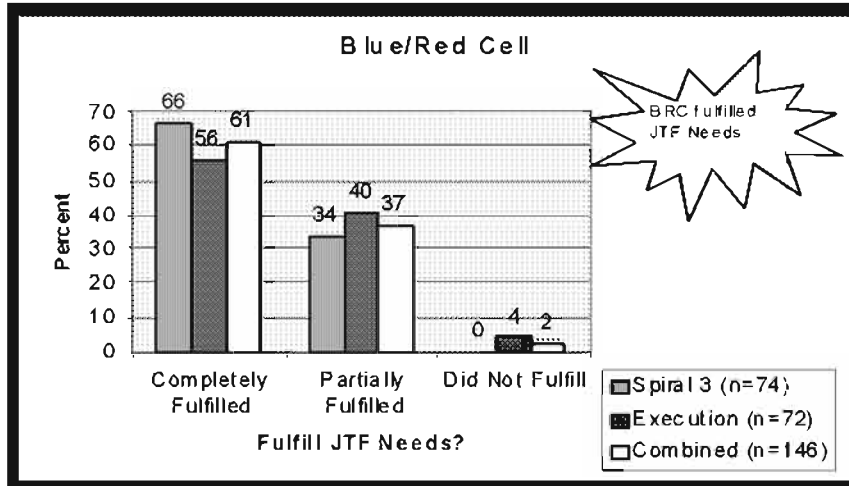


Figure 107: Blue/Red cell fulfillment of JTF needs

Fulfilled JTF needs? Respondents indicated that the BRC fulfilled the JTF’s needs better during Spiral 3 than during execution. Four percent of responses during execution were “Did Not Fulfill,” whereas during Spiral 3 there were zero “Did Not Fulfill” responses. JTF OPTEMPO and the number and length of collaboration sessions are potential causes for the difference. Comments

made during Spiral 3 include, “This is a critical cell and they did a great job,” “Great job of representing an alternative view and making all think,” and “One of the best things about the SJFHQ.” During execution, one participant stated, “This group seems to be duplicating the traditional intelligence function of providing possible enemy courses of action. They may have fulfilled their mission, but I’m not sure that is a good thing.” Another participant remarked, “This cell (or the portion that relates to intel) needs to be under ISG. The dissection of this organization from the ISG caused disconnects.” The right mix of experiences and competencies will improve the effectiveness of the BRC.

**Effects Assessment Cell (EAC)**

Purpose. The EAC conducts a fully integrated assessment process to effectively and in a timely manner assess critical effects at the strategic, operational, and tactical levels. The cell conducts an on-going assessment to determine if the desired effects occurred, their overall impact to the joint effort, and why the tactical action and/or applied capabilities fully achieved, partially achieved, or failed to achieve the desired effect.

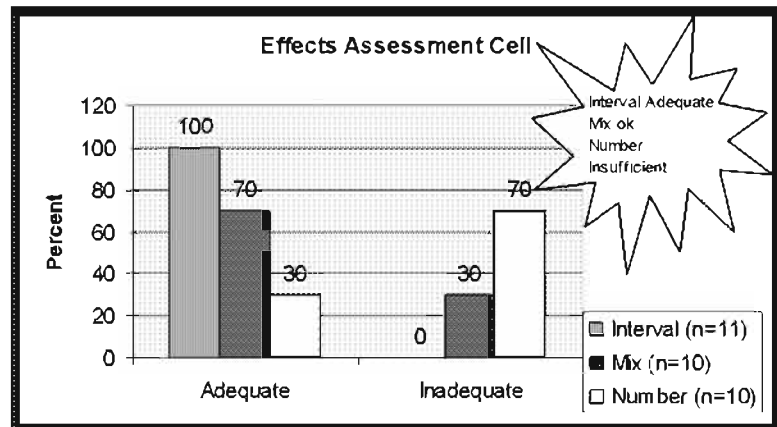


Figure 108: Effects assessment cell attributes

Interval. The interval at which the cell convened was adequate. The EAC met formally twice a day—morning and afternoon sessions. All respondents indicated that the interval at which the cell convened was adequate.

Mix. The mix of experiences and competencies was adequate, but not the best. The two SMEs and five of the eight participants indicated that there was a good mix of experiences and competencies. However, the SJFHQ members of the EAC indicated that the mix was inadequate. One SJFHQ member stated, “Need more ops/plans representation. Current cell membership is composed almost entirely of intel personnel, which limits the ability to determine operational impacts of assessment.”

Another SJFHQ member remarked, “We knew that this was going to be a problem. Component selection of EAC representatives was driven in part by their perspective that the EAC was an “intel thing.” This perspective was in part because the EAC was buried within the intelligence structure. In addition, given the complexities and operational significance associated with EAC decision-making and recommendations, the experience level of EAC representatives from the components and JTF JISE were frequently unable to provide operationally relevant perspectives within the construct of the EAC formal sessions. Efforts to improve this situation were basically unsuccessful.”

Number. The number of EAC members was insufficient. Seven of the 10 respondents indicated that the five members assigned to the EAC were insufficient to do the job correctly. Their comments include, “Double,” “Probably could use two more personnel,” and “Needed two to three more bodies — did not have time to coordinate much.” A SME stated, “EAC’s five members are insufficient in relation to the amount of situational awareness needed and all the meetings they take part in. The two main players were from SJFHQ and they, non stop, attended one meeting after another on EA.”

Fulfilled JTF needs? The EAC fulfilled the JTF needs. Over 94 percent of respondents indicated that the EAC at least partially fulfilled the needs of the JTF (See Figure 109). A SME stated, “Excellent job given the information they have to deal with. Components have passed little information during the EAC WG meetings... Lack of timely BDA inputs was a weak link in the EAC process. Never the less the EAC has been very proactive in pulling assessment from components, SOSA cell, and JISE. EAC has been very open to different perspectives and have held their ground even if their assessment would lead to a no-go for major operations.” A participant remarked, “EAC was able to assess effects each day prior to the kickoff of the JPG and long before the JCB. This allowed daily planning efforts to reflect current assessments. The process was only hindered by the inaccuracy of combatant commander DISUM [Daily Intel Summary], which was necessary for assessment purposes.”

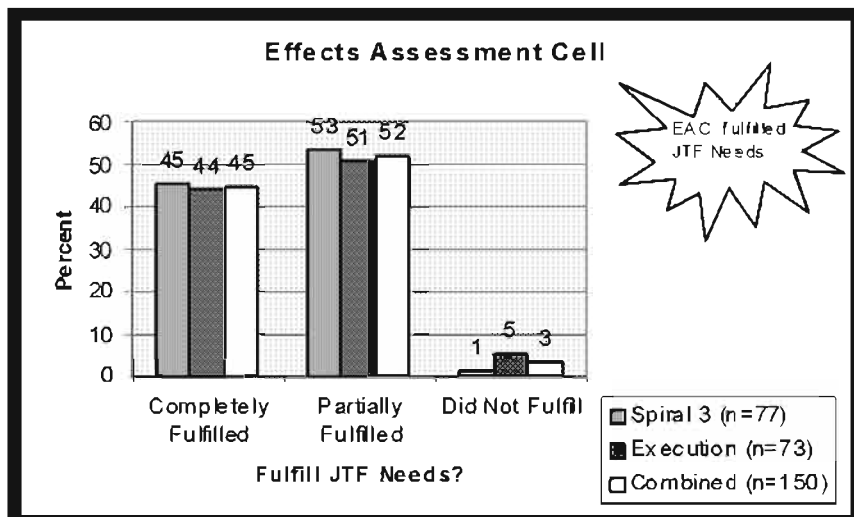


Figure 109: Effects assessment cell fulfilled JTF’s needs

The EAC was not without problems, as noted by two participants. “My responsibilities as future planner was to look out 96 hours and beyond — effects assessment never got out that far,” and “EAC needs better BDA or we needlessly re-shoot targets.” Additional people, more participation from operators and planners, and better BDA will improve the effectiveness of the EAC.

### Information Operations Cell (IOC)

**Purpose.** The IOC is primarily responsible for the development of an IO plan and associated IO synchronization matrix, IO inputs to the ETO, and execution monitoring.

**Interval.** The interval at which the cell convened was adequate. Meeting once a day, 83 percent of respondents indicated that the interval at which the IOC convened was adequate. It was constantly manned and provided immediate coverage.

**Mix.** The mix of experiences and competencies was inadequate, however. Over 40 percent of respondents indicated that the mix was inadequate and only “Inadequate” comments were provided. The requested mix of people was not provided, but the cell needed more specialists and generalists, according to a SJFHQ member of the cell. A participant stated, “We had one EW expert and one PSYOP expert, one junior Navy crypto type. The two SJFHQ personnel had a good mixture of background, but the rest of the team had little experience in the general field of IO—a larger problem than the experiment.” Another SJFHQ member of the cell

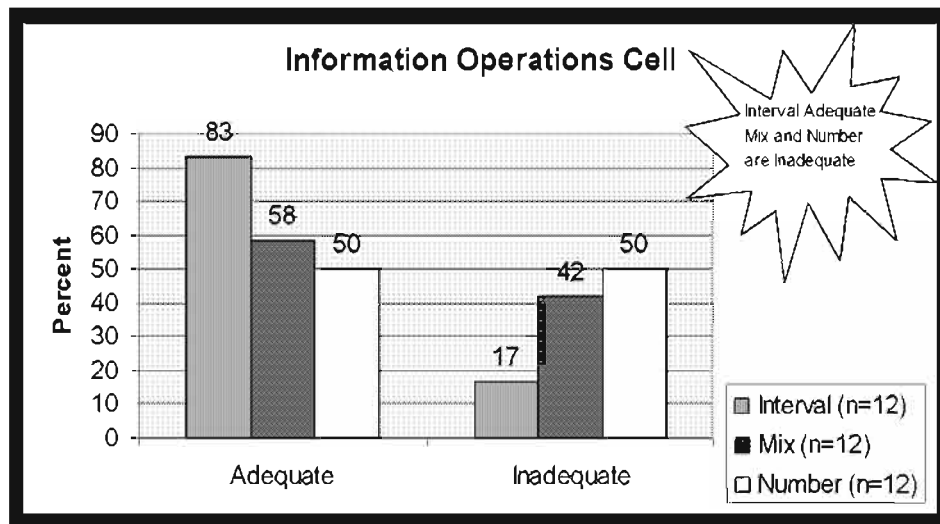


Figure 110: Information operations cell considered adequate by most

remarked, “Mix is good. Unfortunately, the people providing OPS personnel did not provide the mix. Most people placed into the IO cell had no, I say again, no IO experience.”

**Number.** The number of members in the IOC was insufficient. Fifty percent of the respondents indicated that the number of members in the cell was inadequate. The IOC needs more people with IO expertise to meet the demands of the cell. A SME stated, “Due to the heavy tasking of this cell, I recommend increasing its size. Key areas needed are MMIC team leader (now filled by PSYOP planner), PA (now on loan from PAO), deception, and an additional IW planner. Also suggest an imbedded intel analyst and a KM person with IO experience.”

The IOC partially fulfilled the JTF’s needs during Spiral 3. Problem areas identified:

- IO was not well integrated in planning
- IO was not integrated with special technical operations



- IO lacked the necessary tools to track component actions
- IO needed more trained and experienced IO planners
- IO was not able to determine assessment of IO effects on nodes due to limitations.

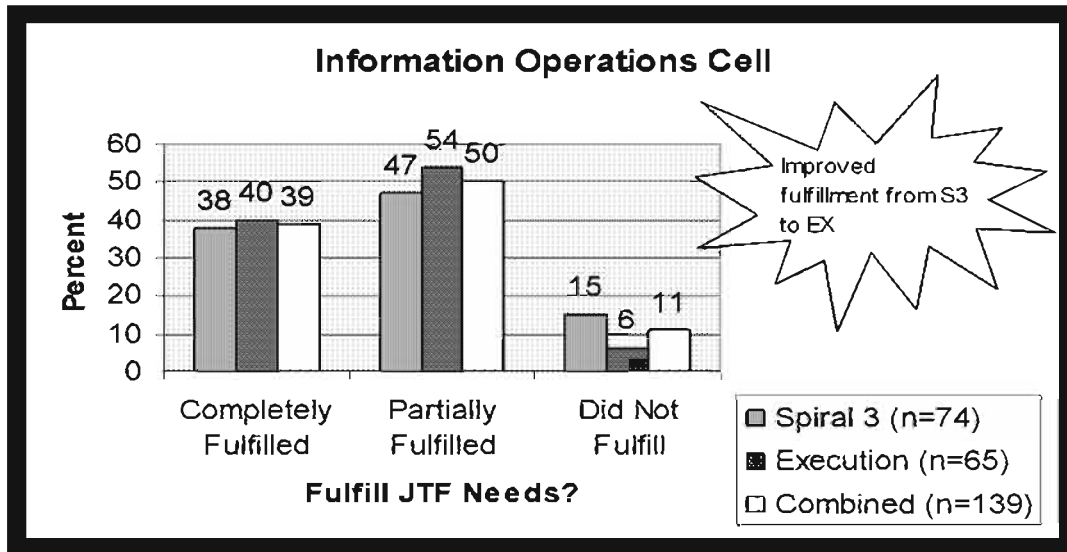


Figure 111: Information Operations Cell fulfilled of JTF needs

A participant said, “A cell that worked unto itself and did not have visibility with the JPC where it should be integrating their process, a particular area that needs to continue to be integrated into the planning process. It’s not there yet.” There was noticeable improvement as the experiment progressed from Spiral 3 through execution. Fulfillment of JTF needs (combined completely and partially) increased from 85 percent during Spiral 3 to 94 percent during execution.

The UJTL baseline report information regarding the subtask, ‘Coordinate Operational Information Operations’ (OP 5.6), indicates the ability of the JTF IOC to support operational planning is impaired. There were not enough trained and experienced IO personnel. As described above the IOC had similar problems plus others during MC02. IO needs more definition, refinement, resources, and command emphasis to enhance effectiveness.

**Joint Coordination Board (JCB)**

**Purpose.** The JCB is established at the discretion of the commander using internal assets and is tasked to perform broad oversight functions. It is a joint virtual decision support network composed of subordinate commanders and principal staff from the JTF headquarters, combatant commander’s staff, IAC/COE, components, and other agencies designated by the commander. The board ensures that the commander’s intent is accurately translated into desired effects to meet the commander’s concept of operations. It links effects to the overall objectives.

The JCB’s oversight encompasses all component operations and on-going joint operations. The board provides the commander’s guidance and priorities to the JPC for future operations planning and to the JOC for current operations execution. Products include COA recommendations, JPEL, guidance, and apportionment priorities, and battlespace coordination measures as required.

**Interval.** Ninety-five percent of respondents said that the interval at which the JCB convened was adequate. The board met once daily and additionally at the direction of the CJTF.

Mix. According to respondents, the mix of experiences and competencies was adequate. A participant noted that in fact the mix and number are unlimited when the board is conducted on IWS and most staff members are listening. Expertise can be added for any session from any location if IWS is available.

Number. Eighty-nine percent (89 percent) of respondents indicated that the number of JCB members was sufficient. Again, on IWS the number is unlimited. The number of members can increase or decrease as the situation dictates. A SME offered that the number of component members was insufficient.

Fulfilled JTF needs? The JCB fulfilled the needs of the JTF. Fulfillment of JTF needs increased from Spiral 3 through execution. Ninety-eight percent of execution respondents indicated that the JCB at least “Partially Fulfilled” the JTF needs, up from 92 percent during Spiral 3. “Completely Fulfilled” responses jumped 20 percent from Spiral 3 through execution. Most comments were attached to “Partially Fulfilled” responses. Recurring comments from respondents were that the JCB was useful, but too long and that it never seemed to proceed as designed — most often turned into a second commander’s update. A participant stated, “The JCB was an evolving process and was directly related to the comfort level of the Operation. As the JTF commander became more comfortable with the different aspects of the operations the JCB began to become much more effects focused.

“The JCB was definitely necessary, serving as both a great collaborative tool, as well as, a course check for the JTF.” Another participant noted, “I never saw the synchronization of JISR assets with attack assets as they related to the effects and effects assessment.” A SJFHQ member indicated that it seemed to satisfy the commander; however, it did not accomplish the intended purpose regarding the fires and targeting portions of the operation.

And finally, a SME remarked, “The JCB could have been better if they had some predictive analysis of what the enemy would be doing beyond 72 hours. I am not sure cutting out the J2 and J4 is a good thing. IWS is great.” The JCB was effective and met the needs of the JTF.

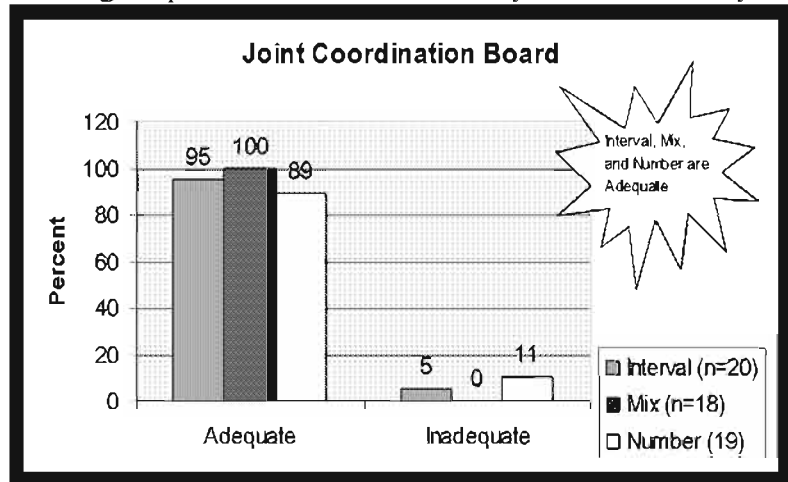


Figure 112: Joint Coordination Board met everyone’s expectations

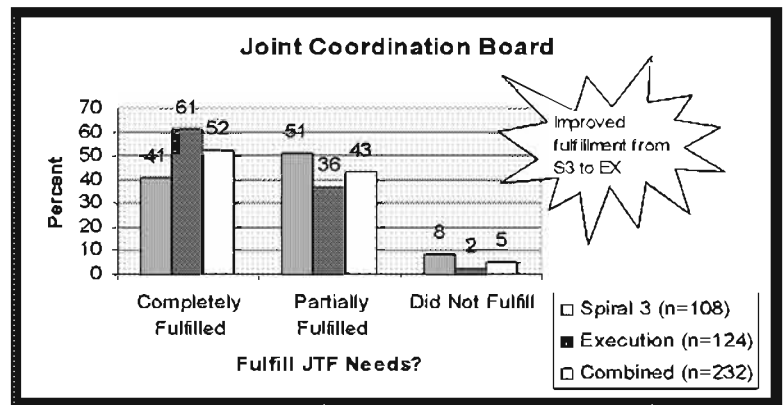
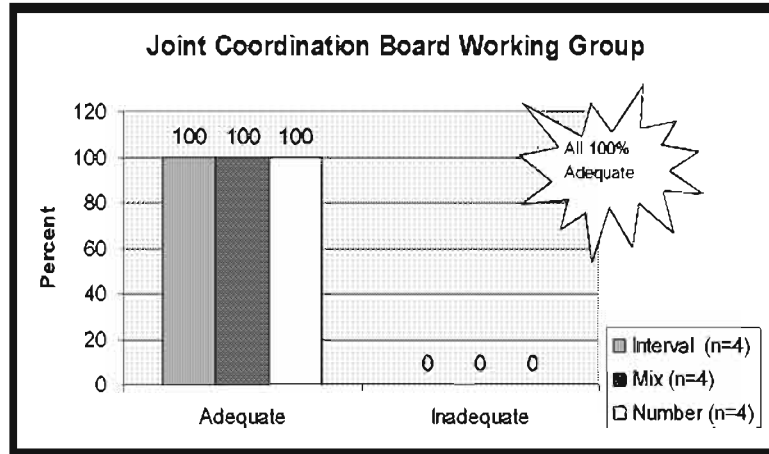


Figure 113: Joint Coordination Board’s performance improved between Spiral 3 and MC02 execution

### Joint Coordination Board Working Group (JCBWG)

**Purpose.** The JCBWG provided the input to support the JCB. It coordinated activities of JTF cells and working groups, and reviewed staff and component products and presentations for integration. This working group resolved or documented conflicts for JCB presentation.

**Interval.** All respondents indicated that the interval at which the JCBWG convened was adequate (See Figure 114 above). The working group met once daily to prepare for the JCB



during which the group was able to synchronize products and react to emerging issues before they reached the CJTF level.

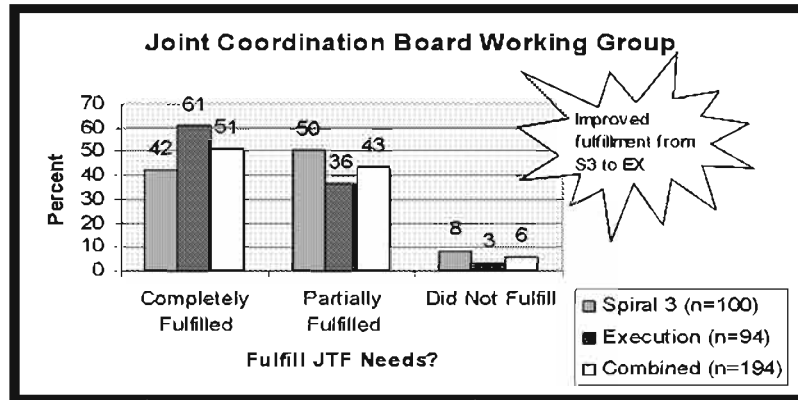
**Mix.** All respondents indicated that the JCBWG’s mix of experiences and competencies was adequate. The core and supporting members provided the necessary expertise for the group to fulfill its responsibilities. IWS allowed the group director to tailor the mix as the situation required.

**Number.** One hundred percent of responses are

Figure 114: The JCB Working Group received wide acclaim

“Sufficient.” The number of core and supporting members was sufficient to meet JTF’s needs.

**Fulfilled JTF’s needs?** The JCBWG fulfilled the needs of the JTF. Fulfillment of JTF needs increased from Spiral 3 to execution. There was a significant improvement in “Completely Fulfilled” responses from Spiral 3 through execution, from 42 percent to 61 percent. Only three percent of the respondents, during execution, indicated that the JCBWG “Did Not Fulfill” the



JTF’s needs — down from eight percent during Spiral 3 (See Figure 115).

The prevalent comment regarding the JCBWG was that it was a slide rehearsal for the JCB and a huge time drain for many people—not really a working group. One participant noted, “The JCBWG spent too many sessions fine-tuning presentation format and not synchronizing the combat power being discussed. We need to get into warfighting issues here to

Figure 115: Joint Coordination Board Working Group saw effectiveness ratings rise between Spiral 3 and MC02 execution

better prepare for the JCB.” Another participant stated, “This group needs greater authority to make decisions and streamline the extremely long briefs to the CG. Too many people watch the JCB to permit the tremendous amount of excess time spent on less than essential issues in the JCB.” The JCBWG was effective and met the needs of the JTF.

### Joint Collection Management Cell (JCMC)

**Purpose.** The JCMC identified, prioritized, and coordinated collection requirements to support ONA, effects assessment and Effects-Based Planning and Operations. The JCMC assigns responsibilities and synchronizes collection tasking to efficiently and effectively support all aspects of Effects-Based Planning and Operations, including the ETO.

**Interval.** All respondents indicated that the interval at which the JCMC convened was adequate. The cell met formally once per 12-hour shift and the staff met internally three times per shift.

**Mix.** The mix of experiences and competencies was adequate. Eighty-three percent of respondents indicated that the JCMC's mix of experiences and competencies was adequate. The cell had a good mix of Army and Air Force skill sets and required full-time collection managers. A participant noted, "Good range of experiences. I think an argument could be made to have the cell headed by an O-5. This would be generally senior to most component ISR reps (and ensure cooperation, responsiveness), but junior to their "2" rep to the ISG.

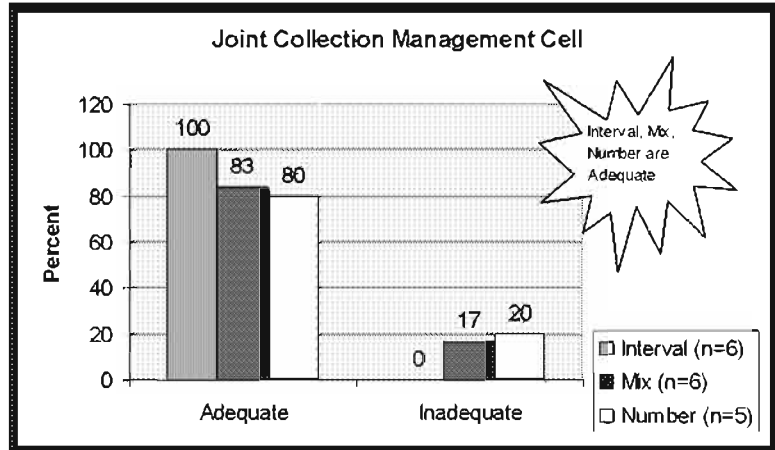


Figure 116: Joint Collection Management cell attributes

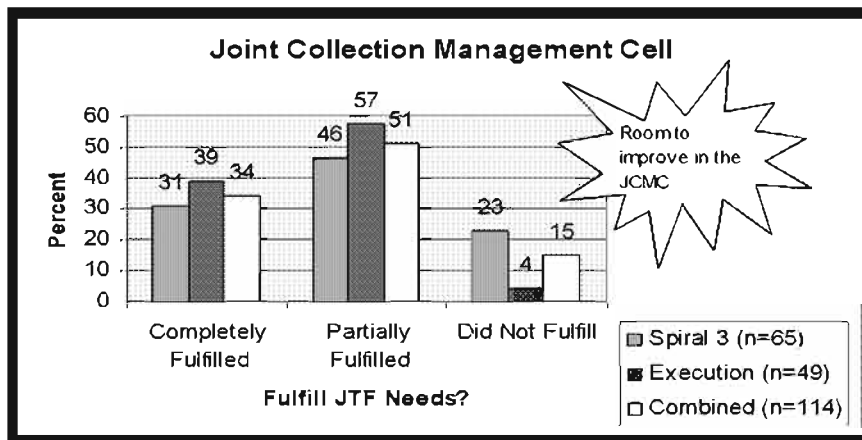


Figure 117: Respondents considered some cell shortcomings

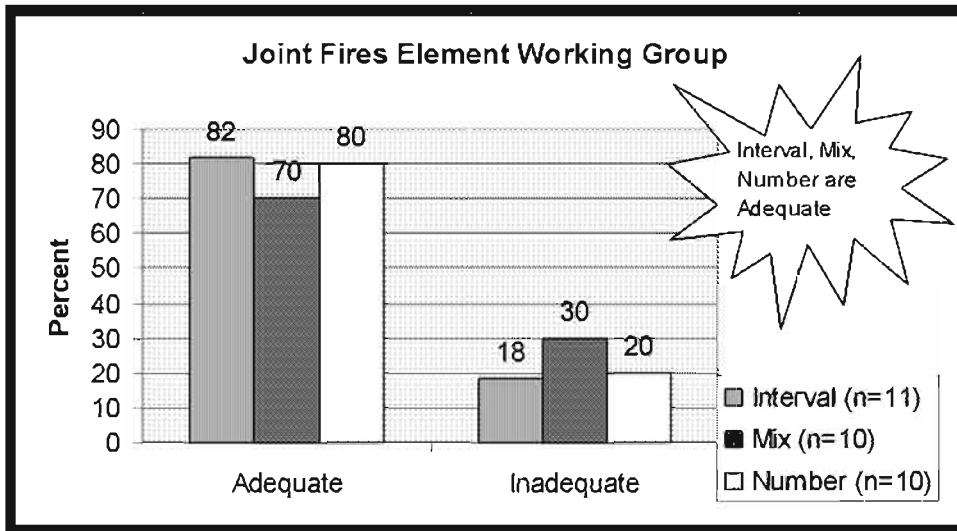
lead/supervisor, a planner (w/plans) and a JTF collection manager fielding collection management issues are absolutely required.”

**Number.** According to 80 percent of respondents, the numbers of members in the JCMC was sufficient. Again, respondents emphasized the requirement for full-time collection managers to ensure sufficient people are available to fulfill the cell's responsibilities.

**Fulfilled JTF needs?** The JCMC fulfilled the JTF needs much better during execution than during Spiral 3. There was a significant increase in the percent of "Completely Fulfilled" and "Partially Fulfilled" responses from Spiral 3 through execution, from 77 to 96 percent.

“Additionally, provide an O-4 rep from each service to help inform/guide the JCMC and its JTF leadership regarding JTF collection planning efforts.” A SME stated that some of the component collection managers were not full-time collection managers but were assisted by the JISE and other members of the cell. Another participant indicated, “A

A SME stated, “The JTF was provided with continuous, timely intelligence collection that met the standing requirements and quickly adjusted to emergent requirements levied by the CJTF.” However, participants noted integration problems. One participant remarked, “Not



completely integrated into what JTF and components needed based on the ETO.” In addition, another participant stated that the cell was not integrated well with plans. After a rough start the JCMC improved effectiveness to meet the needs of the JTF.

Figure 118: Joint Fires Element Working Group attributes

**Joint Fires Element Working Group (JFEWG)**

**Purpose.** The JFEWG provided the input to support the Joint Fires Element. It was a virtual network of JTF, component, and reach-back SMEs responsible for developing PEL targeting guidance, selecting ONA-derived critical nodes and vulnerabilities, and providing priority target list oversight.

**Interval.** Eighty-two percent of respondents indicated that the interval at which the JFEWG convened was adequate (See Figure 118 above). The JFEWG convened twice a day, after the commander’s update and after the JCB. The interval was adequate, but the timing affected

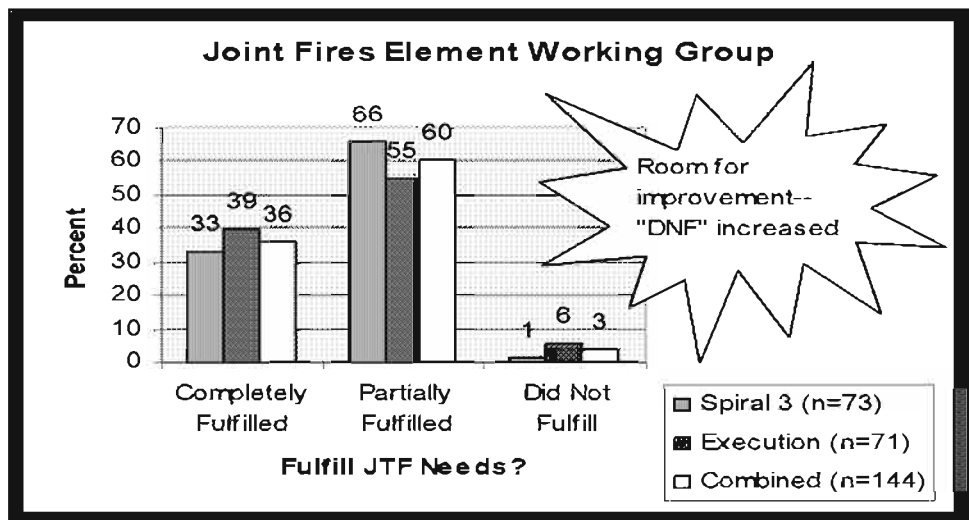


Figure 119: Joint Fires Element WG met JTF needs

participation by the components. Because of lengthy commander’s updates and JCBs, the JFEWG rarely started on time. A SME stated that the JFEWG could be conducted once a day, which will allow more time for staff to work.

Mix. The mix of experiences and competencies was adequate, but not the best. Seventy percent of respondents indicated that the mix of experiences and competencies was adequate. The requested mix was about right, but the JFEWG experienced attendance problems and lacked adequate representation from components. One participant stated, “The mix of experiences was about right, unfortunately ensuring all those folks showed up for the session was hit and miss.” Another participant remarked, “The JFEWG often did not have the proper representation from the components. Members from the components must be able to discuss strategy, targeting, and ops issues. If a single element from a component cannot provide views and positions for the component, then other reps must also participate in all sessions.”

Number. The number of members was sufficient. Eighty percent of respondents indicated that the number of JFEWG members was sufficient. The number of participants was sufficient despite competing requirements. It also was dependent on the issues being worked and how many people the components could afford to attend. A participant noted that the number was not as important as the ability to contribute and represent Component or organization.

Fulfilled JTF needs? Fulfillment of JTF needs decreased from Spiral 3 to execution. Six percent of the respondents, during execution, indicated that the JFEWG “Did Not Fulfill” the JTF needs — up from one percent during Spiral 3. The recurring comment was that the JFEWG spent too much time collaborating and not enough time on products. A SJFHQ member stated, “JFEWG was supposed to reorganize nodes based on changes in effects priorities and nodes that had been hit and issue a new three-paragraph PEL daily. The WG turned into a target organizer and never issued another PEL that updated node priorities.” Component representation also hindered the effectiveness of the JFEWG. Another participant noted, “The JFE at the JTF

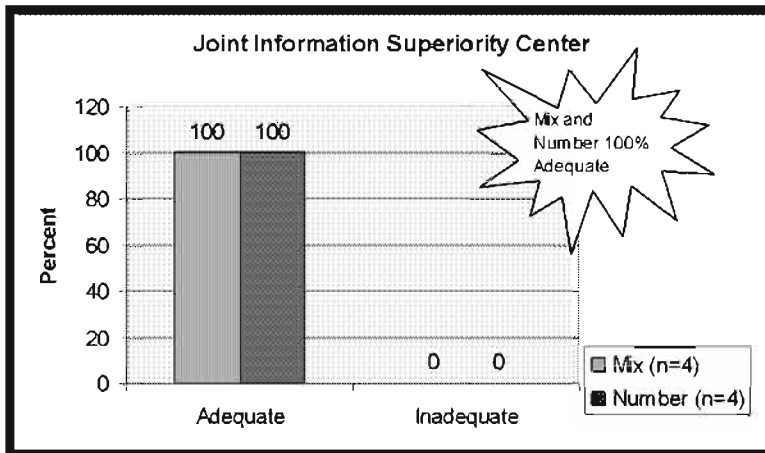


Figure 120: Joint Info Superiority Center attributes adequate

there was a lead representative present who could either work the issues or quickly bring in the person who could.” With the right mix of participants from components and better synchronization of sessions, the JFEWG could improve its ability to meet the needs of the JTF.

**Joint Information Superiority Center (JISC)**

Purpose. The JISC integrated intelligence, information operations, and information systems activities and deconflicted competing requirements. It identified and synchronized IS tasks for the ETO.

headquarters was well balanced with the right mix of military experience. However, component membership in the JFE working group was inadequate. JFACC was represented primarily by targeteers. JFACC strategists eventually began to sit in periodically, but not every session. In addition, they rarely had an operations rep. This frequently prevented the group from coordinating or resolving a variety of issues. We repeatedly requested that the components ensured that

Interval. The JISC operated around the clock; therefore, there is no reference to the convening interval.

Mix. The mix of experiences and competencies was adequate according to four respondents.

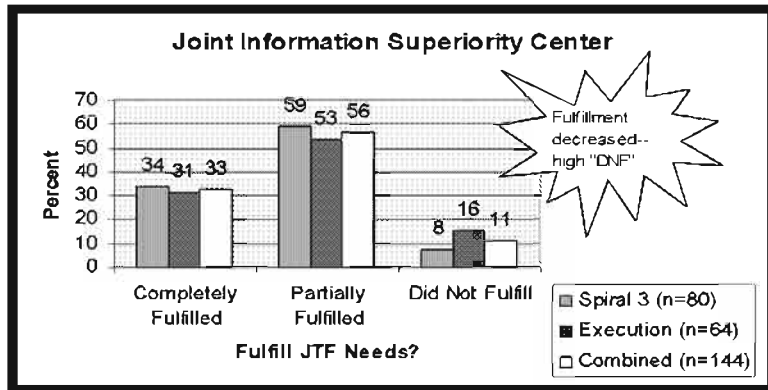


Figure 121: Joint Info Superiority Center met JTF needs

3 (93 percent) to execution (84 percent), 16 percent of respondents indicated that the JISC “Did Not Fulfill” JTF needs (See Figure 121). This is the highest “Did Not Fulfill” rating, during execution, across all BCCWGs.

There were problems with IO issues, synchronization, integration, and unity of effort for the intelligence functional area. One participant stated, “This venue was wholly inadequate for IO. In general, IO RFIs were ignored, not understood and never actioned in my experience until I prodded the JISC for action. This venue was almost exclusively ISR focused.” Another participant noted, “JISC was not integrated with IO and intel. Maybe these shouldn't be grouped together. They really have enough different in their basic functions to require IO and intelligence as separate groups, or work to find a way to better integrate all of IO and intelligence into the same group.” “This group failed to ensure unity of command/effort for the intelligence functional area vice the J2,” remarked another participant.

The one positive comment, regarding the JISC, provided by respondents during execution states, “The intelligence watch was created to fulfill the operations-intelligence function, and it was a huge success story. The JISC became the detailed research and analysis forum. Our experience strongly suggests you need to separate these two functions based on the volume of information being shared and the differences in timeliness of the information.”

No “Completely Fulfilled” comments were provided. The synthesis of the responses and comments is similar to that of the ISG — respondents suggest that the JISC should be eliminated. A good summary provided by a participant concludes that the JISC was sub par, and

Number. The four respondents — three participants and one SME — indicated that the number of JISC members was sufficient. The core and supporting members provide a sufficient number of members to meet the needs of the JTF.

Fulfilled JTF needs? The JISC did not fulfill the needs of the JTF. Not only did the fulfillment of JTF needs decrease from Spiral

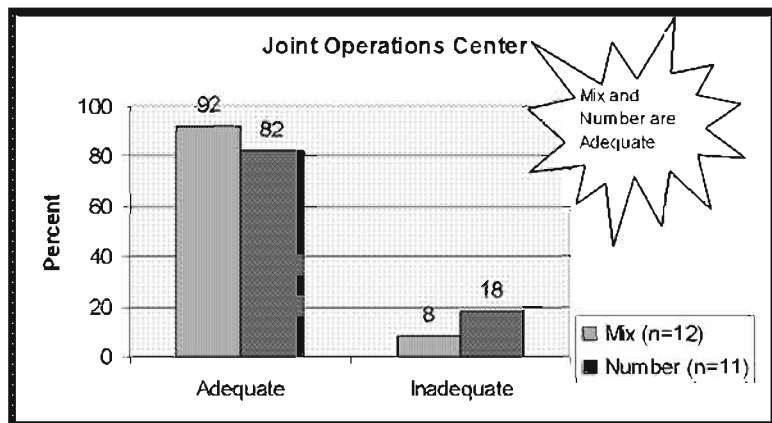


Figure 122: Joint Operations Center personnel mix and number considered adequate

needed work. “The JISC was a poorly executed concept,” he said. “It never pulled in all the various pieces or spoke with one voice — needs to be reworked.”

### Joint Operations Center (JOC)

**Purpose.** The JOC monitored the operations of the JTF. The JOC was the focal point for coordination and synchronization of the current operational matters, to include intelligence, assessment, execution, integration, and logistics. It was responsible for status updates, dissemination of CJTF’s guidance, assessments, ROE, and AARs. The JOC released all ETOs for the JTF and monitored and synchronized the execution of all ETOs. The JOC was both a physical and virtual collaborative organization composed of operations representatives from the JTF headquarters, combatant commander’s staff, component staffs, and other agencies functionally oriented to the JTF mission.

**Interval.** The JOC operated around the clock, therefore, there is no reference to the convening interval.

**Mix.** Ninety-two percent of respondents indicated that the mix of experiences and competencies of the JOC was adequate. One participant suggested that a medical logistician and preventive medicine officer be assigned to the medical section of the JOC. The mix of core and supporting members is adequate to fulfill the JOC’s responsibilities.

**Number.** Eighty-two percent of respondents indicated that the number of JOC members was sufficient. Several respondents noted that there were too many members in some areas — watch officers, ops officers, LNOs, lawyers. One participant stated, “Actually, functions should be handled by 50 percent fewer people — exploiting collaborative tools and reach-back should be able to achieve the same result.” Considering 24-hour operations, the number of core and supporting members is about right. The JTF will add and delete based on requirements.

**Fulfilled JTF needs?** There was a significant improvement in fulfillment of JTF needs (“Completely Fulfilled”) from Spiral 3 (39 percent) to execution (62 percent). Only four percent of the respondents, during execution, indicated that the JOC did not fulfill the JTF needs, which was down from 11 percent during Spiral 3. The JOC executed well. It synchronized, maintained visibility, and provided good situational awareness on current operations across the area of operations. A SME stated, “JOC is doing a good job providing current awareness but is not providing the “so what” analysis.” In addition, a participant noted, “I think the JOC often became a TOC demanding almost instantaneous information from the components This was very counterproductive because the information was almost never refined and it made it very difficult to paint an accurate picture.” The JOC was effective and its effectiveness will improve with the addition of a future operations section between the operations group and PG.

The UJTL baseline report information regarding the subtask, ‘Synchronize and Integrate Operations’ (OP 5.4.4), indicates JTF JOCs have difficulty planning for requirements associated with integrating and synchronizing JTF operations. As described above the JOC did not have this

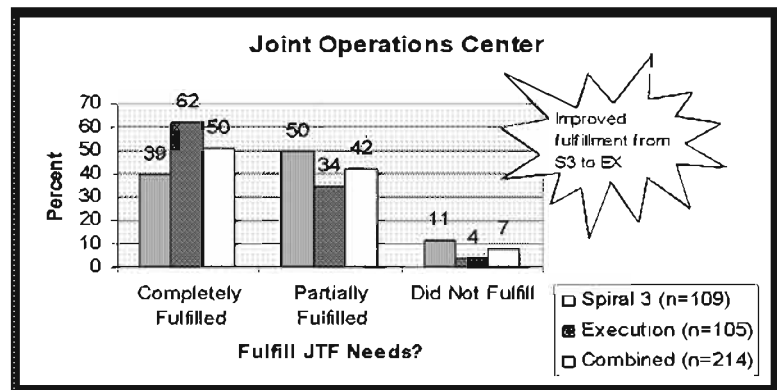


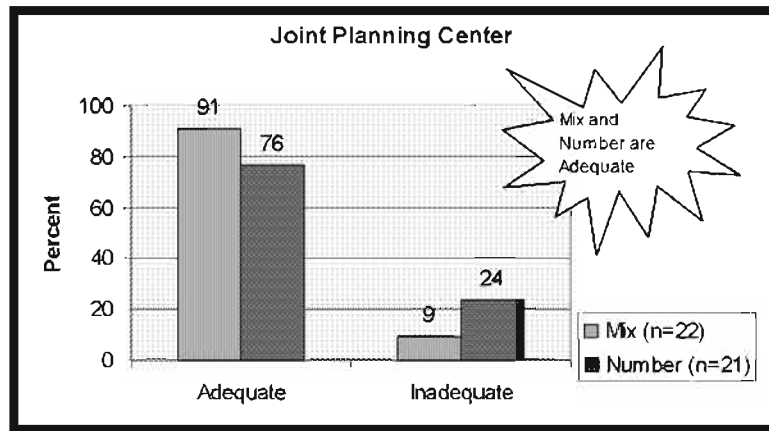
Figure 123: Joint Operations Center met the JTF needs



problem during MC02. The JOC met the needs of the JTF and was quite effective. Its ability to gain knowledge of, integrate, and synchronize component operations was enhanced by the collaborative tools. In addition, the UJTL baseline report information regarding the subtask, 'Establish, Organize, and Operate a Joint Force headquarters' (OP 5.5), indicates that JOCs have difficulty maintaining situational awareness. This was not a problem during MC02. As described above the JOC synchronized, maintained visibility, and provided situational awareness on operations across the area of operations. Again, the JOC met the needs of the JTF and was effective.

**Joint Planning Center (JPC)**

**Purpose.** The JPC conducted JTF crisis action planning (CAP) and performed future operations planning. During pre-crisis and contingency operations, the JPC supported the



development of CONPLANs. It was the focal point for ETO development, mission refinement, planning guidance, COA development/analysis, and ETO/OPORD coordination. The JPC made recommendations to JCB and provided input to the CROP. It was composed of planning representatives from the JTF headquarters, combatant commander's staff, component staffs, and other agencies functionally oriented to the JTF

Figure 124: Joint Planning Center attributes

mission. The JPC employed a collaborative network on a continuous basis to develop ETOs as required to meet the CJTF's desired effects and objectives.

**Interval.** The JPC operated around the clock, therefore, there is no reference to the convening interval.

**Mix.** Ninety-one percent of respondents indicated that the mix of experiences and competencies of JPC members was adequate. However, some members lacked joint operations and planning experience. A participant stated, "We had all of the correct competencies except too few people with experience in joint operations, staff operations, and collaborative skills." A SME remarked, "Core planners were outstanding. We were a little light in the log, TPFDD, IO, and intelligence expertise. I know they were available, but not being embedded."

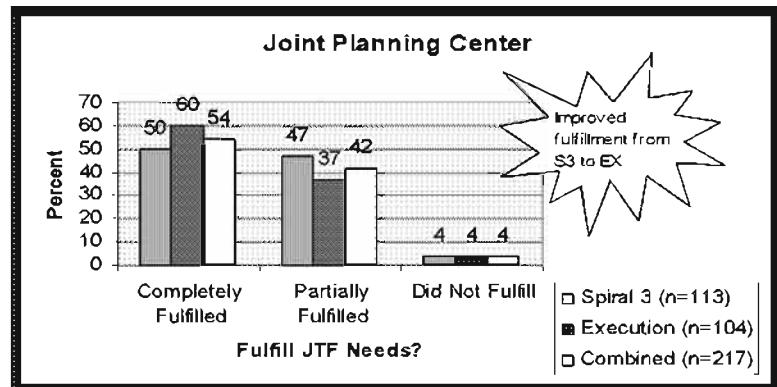


Figure 125: Joint Planning Center met JTF needs

Number. The number of members was sufficient, but not the best. Seventy-six percent of respondents indicated that the number of JPC members was sufficient. In fact, some respondents noted that the JPC had more people than needed and could scale back. Others indicated that the JPC members could not sustain in a more robust 24-hour operation, including a future operation cell and more involvement from the combatant commander's staff.

A participant noted, "As the exercise progressed and we became more competent with the tools we needed fewer people and could do more. We learned whom it was that got things done and made things happen and others were marginalized, as in real life. Clearly, there are economies of personnel as a beneficial side effect of these processes and technologies."

A SJFHQ member of the JPC stated, "More staff is needed to attend all of the planning groups and cells. Sessions meeting simultaneously stretches the limits."

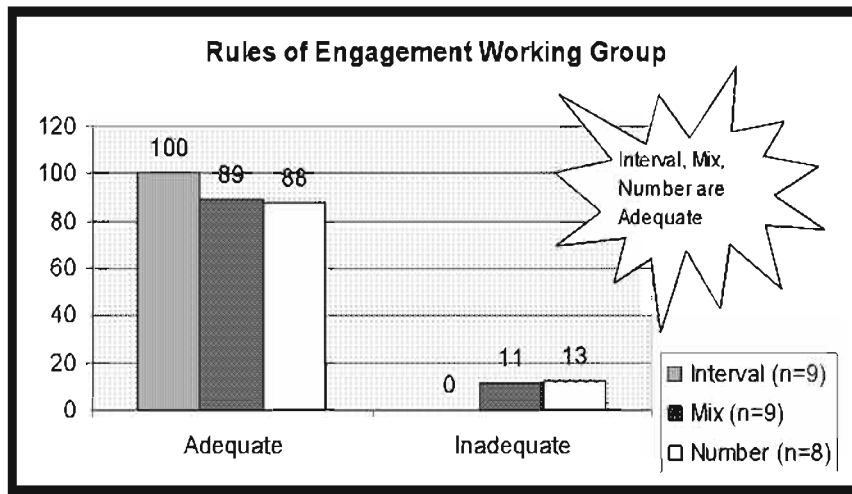


Figure 126: ROE Working Group attributes

matured and became more skilled with the tools, its effectiveness improved. "Early in the experiment the JPC seemed outdistanced by the CJTF and mired in ways and means of decade old methodology," noted one participant. The plans to OPS handover was weak and the JPC needs to more effectively integrate other members, especially IS and IO. Another participant stated that the IO and IS relationship with plans was dysfunctional. The JPC's effectiveness will improve with the addition of a future operations cell and better integration of other staff members.

The UJTL baseline report information regarding the subtask, Prepare plans and Orders (OP 5.3), indicates JTF branch planning did not completely meet the needs of the JTF, specifically parallel planning was degraded and planning sessions were conducted without representation from other key staff entities. During MC02 the CIE and LNOs facilitated parallel planning — not a problem.

However, as described above, the JPC needed to integrate other staff members more effectively in the planning process. In addition, the UJTL baseline report information regarding the subtask, 'Compare Courses of Action' (OP 5.3.6), indicates also that COA teams lacked the capability to develop COAs because they did not possess requisite expertise in such functions as Fires, IO, and CMO. Again, during MC02 similar problems were evident. Respondents identified the need for fires, IO, logistics, deployment, medical, personnel, engineer, and Pol/Mil expertise.

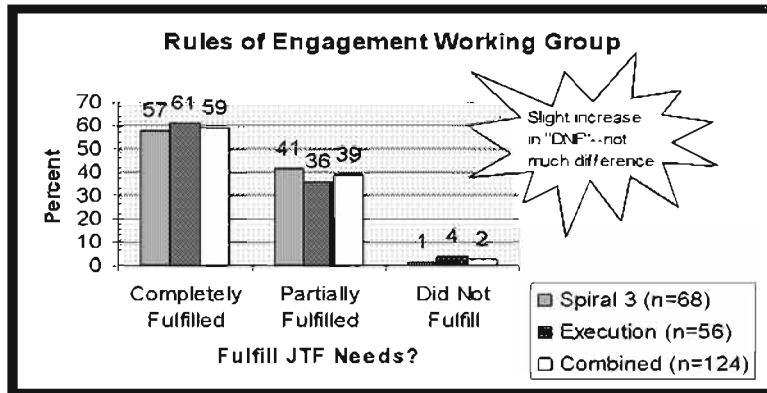
Fulfilled JTF needs? Fulfillment of JTF needs ("Completely Fulfilled") increased from Spiral 3 to execution. During execution, 60 percent of respondents indicated that the JPC "Completely Fulfilled" JTF needs, while only 50 percent gave that response during Spiral 3.

As the JPC

### Rules of Engagement Working Group (ROEWG)

**Purpose.** The ROEWG is a virtual, web-based network of SMEs responsible for developing ROE recommendations as input to the ETO to support current and future operations/plans.

**Interval.** The interval at which the working group convened was adequate (See Figure 126). All respondents indicated that the interval at which the ROEWG convened was adequate. The group met only once during the experiment. Most ROE issues were coordinated and resolved by the legal working group, which met daily. The legal working group consisted of legal planners from each of the components and the combatant commander staffs, Pol/Mil planners, and representatives from CJCS legal office and DoD Office of General Counsel. In



addition, ROE issues were common topics in the JPCs.

**Mix.** Eighty-nine percent of respondents indicated that the ROEWG's mix of experiences and competencies was adequate. The mix of core and supporting members was adequate to fulfill the ROEWG's responsibilities.

**Number.** Eighty-eight percent of respondents indicated that the number of ROEWG members was sufficient. The

Figure 127: ROE group judged a big success

number of core and supporting members was sufficient to meet the needs of the JTF.

**Fulfilled JTF needs?** The ROEWG at least "Partially Fulfilled" the JTF needs according to over 95 percent of respondents. There was a small increase, one to four percent, in "Did Not Fulfill" from Spiral 3 to

execution. One participant noted, "This was an excellent tool and I thought ROE development and implementation was a strong point during this experiment." Another participant stated, "This is a great group!" Conversely, another participant said, "The group's leadership style prevented discussion of issues by all members, and resulted in lack of consideration of civil military operations." Finally, a SME remarked, "Especially impressive is the ownership of this organ by the operators vice the judge advocates. The deputy JOC chief ran this pup from beginning to end, with a clear agenda, and input from all appropriate players." The ROEWG was effective and met the needs of the JTF.

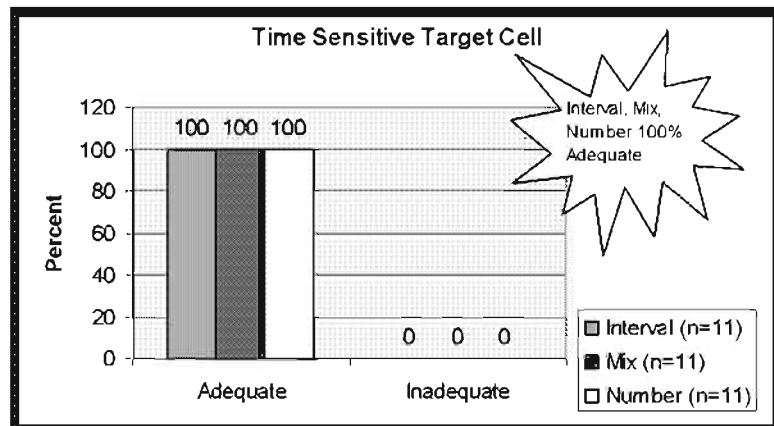


Figure 128: All were satisfied with the mix and number of personnel working in the time sensitive targeting cell

The UJTL baseline report information regarding the subtask, 'Provide Rules of Engagement' (OP 5.4.3), indicates the ROE process did not adequately support JTF operations. It states also that mission specific ROE were developed by the SJA staff that did not include

operational expertise. This was not a problem during MC02. The SJFHQ BCCWGs include a ROEWG, which is responsible for developing ROE recommendations as input to the ETO to support current and future operations and plans. As described above, the MC02 ROEWG, led by the operations director, was effective, and met the needs of the JTF.

### Time Sensitive Targeting Cell

**Purpose.** The TST cell was a virtual network linking the JTF, components, and appropriate reach-back departments/agencies. Time sensitive targets are those that pose a present or near-future danger to friendly forces, or are highly lucrative, fleeting “targets of opportunity.” The cell recommended engagement planning guidance and priorities to the JCB. It is activated when the JTF was notified of the existence of a TST.

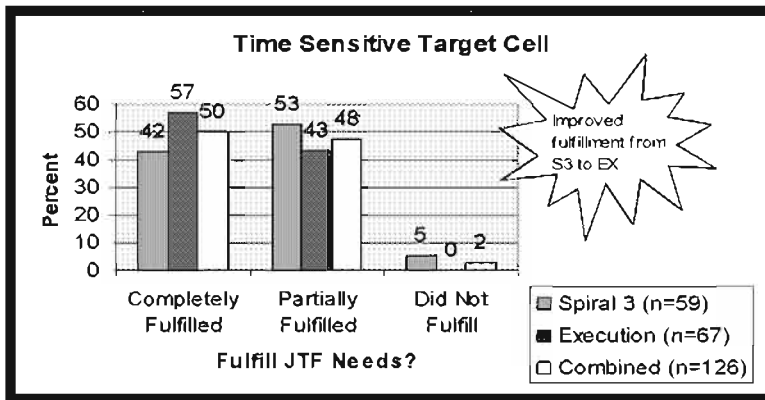


Figure 129: time sensitive target cell met JTF needs

**Interval.** All respondents indicated that the interval at which the TST cell convened was adequate (See Figure 128). The TST cell met as needed to address issues and changes to the TST list. A participant stated, “The cell was ‘up’ all the time, working TSTs. If a special need for a session occurred, the fires watch would convene a meeting.”

**Mix.** One hundred percent of respondents indicated that the

TST cell’s mix of experiences and competencies was adequate. The cell had the correct mix to fulfill its responsibilities. A participant noted that the JTF SOP should be refined to include all participants.

**Number.** Again, all respondents indicated that the number of TST cell members was sufficient. A participant noted that the number was more than sufficient and that supporting members and others should be invited as required.

**Fulfilled JTF needs?** The TST cell fulfilled the needs of the JTF. Fulfillment of JTF needs increased from Spiral 3 to execution. The TST cell at least “Partially Fulfilled” the JTF needs, according to survey respondents. The cell effectively identified and nominated new targets, confirmed old targets, and reorganized the priorities of targets on the list (See Figure 129). However, one participant stated, “The TST cell did not react well to targets identified by the JTF staff. It essentially required components to nominate targets.” The TST cell was effective and met the needs of the JTF.

### Logistics Action Response Board (LARB)

**Purpose.** The LARB coordinated all logistics, transportation, and deployment-related requirements at the operational level. The LARB acts as the log action clearinghouse and information hub in support of joint forces. It matched logistics support requirements with capabilities; identified and coordinated action for medical, civil engineering, and host nation support issues; and provided advice and recommendations to the joint theater logistics manager.

**Interval.** The interval at which the LARB convened was inadequate, according to a SME and other participants. They indicated that the board needed a second session or a working group

to handle routine staff work and to allow more time to manage, integrate, and synchronize logistics.

Mix. The mix of experiences and competencies was adequate, but not the best. The LARB needed more participation from the OpsGrp. A SME stated, “The board was attended primarily by logisticians and transporters. The board was looking at changes to the deployment flow, which had direct impact on current and future operations. There were virtually no operators in attendance at these meetings.” Another participant remarked, “More membership from the ops side would have provided a good ongoing check and balance to keep the LARB decisions optimal.”

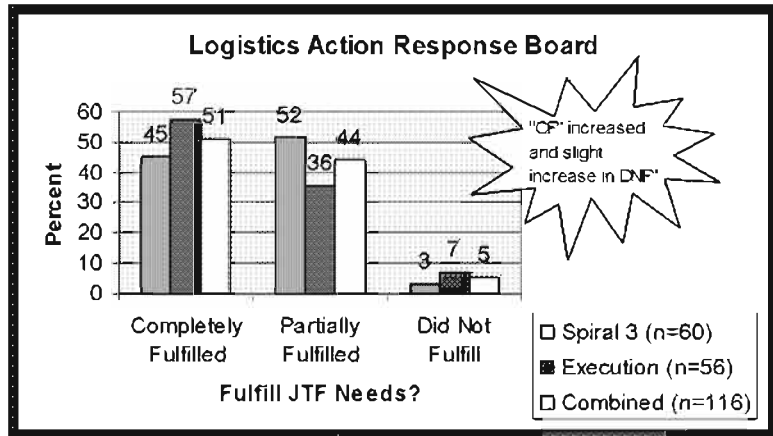


Figure 130: Logistics Action Response Board met JTF needs

Number. The number of core and supporting members was sufficient to meet the needs of the JTF. A SME indicated that while the core and supporting membership equaled approximately 20 people, 60-80 routinely attended the sessions.

Fulfilled JTF needs? More than 90 percent of respondents (See Figure 130) indicated that the LARB at least “Partially Fulfilled” the JTF needs — “Completely Fulfilled” increased from 45 percent during Spiral 3 to 57 percent during execution. There was a small increase, three to seven percent, in “Did Not Fulfill” from Spiral 3 to execution. According to respondents the

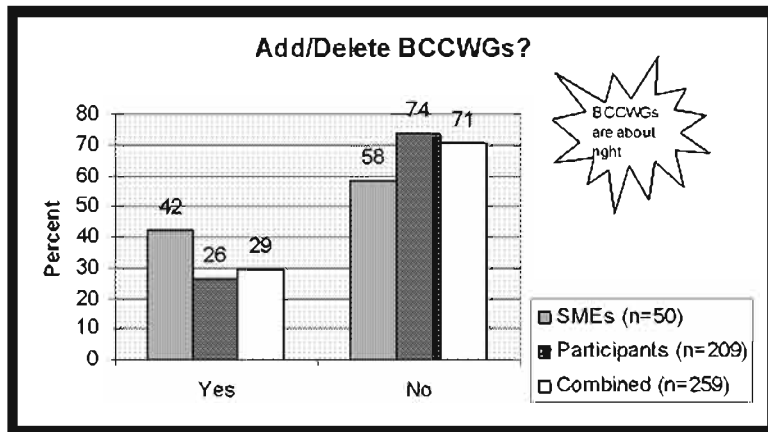


Figure 131: Participants were satisfied with the mix of boards, centers, cells, or working groups and wouldn't delete any

operations group participation.

A participant said, “The only reason the logistics planning and coordination worked was because of the personal capabilities of the III Corps G4 and not the organizational setup. In fact,” he went on, “it does not appear the logistics planner (LogOPS coordinator) actually conducted

LARB concept was validated. The board was informative and a great vehicle to exchange logistical information. Again, SMEs noted that the LARB spent valuable time on routine staff work. They (SMEs) indicated that a working group should be established for action officers to work these actions and to allow the LARB to focus on critical and complex issues as designed. The LARB was effective and could improve with the establishment of a LogSptGrp or logistics director, and more

any logistical planning. Instead, he was immediately identified to reassume his role as the J4.” The LARB was effective and met the needs of the JTF.

BCCWG Additions and Deletions. The BCCWGs, formed during MC02 and discussed above, are the same organizations, which the SJFHQ uses when it operates as a JTF. They are only a starting point for the JTF. The CJTF and his staff add and delete BCCWGs based on requirements.

Survey respondents recommended additions and deletions to the SJFHQ working group structure below. The list indicates those BCCWGs, which were added by the JTF during the experiment. Less than 30 percent of respondents recommended additions and or deletions.

Additions:

- Deployment /strategic lift working group (was added) [SME/Participant]
- Engineer working group (was added) [SME/Participant]
- Force protection working group (was added) [SME/Participant]
- Civil/military cell [SME]
- Transition cell [SME]
- Host nation support working group [SME]
- Medical working group [SME]
- Joint personnel reception center [SME]
- Joint intelligence support element (was added) [SME]
- Military media information cell (was added) [Participant]
- Weapons of mass effects working group (was added) [Participant]
- Joint knowledge information management board (was added) [Participant]

Deletions:

- Delete JISC [Participant]
- Delete BRC (integrate into JISE) [SME]
- Delete EAC (integrate into JISE) [SME]

In summary, the SJFHQ working structure used in MC02 is optimal, according to analyses of survey responses. Most met the needs of the JTF, however, there is room for improvement. CIE was essential to the effectiveness of the BCCWGs. JTF will make minor refinements, and add and delete as required. BCCWGs enhanced JTF OPS and JTF HQ interaction with the combatant commander and component staffs. The UJTL baseline report information regarding the subtask, ‘Acquire and Communicate Operational Level Information and Maintain Status’ (OP 5.1), indicates there is confusion within the JTF staff as to what information should be communicated between staff sections.

The SJFHQ groups and BCCWGs structure ensures activation of the organizations required to effectively control JTF operations. Each organization has a designated purpose, members, and products. The SJFHQ organizations use collaborative tools, with virtual communication capabilities, to communicate across the JTF, component, and combatant commander staffs. As described above the SJFHQ organizations met the needs of the JTF during MC02, enhanced JTF operations, and enhanced the JTF’s staff interaction with component and combatant commander staffs.

Table 19: Summary of boards, centers, cells, and working groups

| BCCWG | Interval | Mix | Number | Met JTF Needs |
|-------|----------|-----|--------|---------------|
| BRC   | A        | IA  | S-     | Y             |
| EAC   | A        | A-  | IS     | Y             |
| IOC   | A        | IA  | IS     | Y             |
| JCB   | A        | A   | S      | Y             |
| JCBWG | A        | A   | S      | Y             |
| JCMC  | A        | A   | S      | Y             |
| JFEWG | A        | A-  | S      | Y             |
| JISC  | N/A      | A   | S      | N             |
| JOC   | N/A      | A   | S      | Y             |
| JPC   | N/A      | A   | S-     | Y             |
| ROE   | A        | A   | S      | Y             |
| TST   | A        | A   | S      | Y             |
| LARB  | IA       | A-  | S      | Y             |

A = Adequate  
 A- = Adequate w/concerns  
 IA = Inadequate  
 S = Sufficient  
 S- = Sufficient w/concerns  
 IS = Inadequate  
 Y = Yes  
 N = No  
 N/A = Not Applicable

**Finding 4► The SJFHQ presence and effectiveness altered the role of component command LNOs at the JTF.**

Traditionally, liaison officers (LNO) facilitate the communication maintained between elements of a JTF, ensuring mutual understanding and unity of purpose and action. LNOs doctrinally perform several critical functions that are consistent across the full range of military operations.

The LNO has four traditional functions: monitor, coordinate, advise, and assist. The SJFHQ presence, using the CIE, alleviated the need for LNOs to continuously establish and maintain close, continuous, physical communications between component commands.

SME and participant responses to survey questions regarding roles and value-added of LNOs provided the data for this sub-finding. The survey respondents were asked to contrast the use of LNOs in MC02 to previous exercises and experiments and similarly, LNO impact on JTF performance.

Respondents reported two primary differences in LNO roles in MC02 as compared to previous exercises and experiments. These differences were LNO facilitation of JTF and component command members attending collaborative sessions and LNO readiness to revert to the traditional liaison role only as a backup in the event the CIE failed. One SME described the new LNO functionality, “He was the traditional representative of subordinate or higher command, but [now] diminished activity due to immediate vertical and horizontal access through collaboration.”

Another SME responded, “LNOs have been used to act as the conduit between the JTF and the component commanders in the absence of, or as a result of a failure in the CIE.” Regarding the collaborative environment facilitation role, one SME stated, “Far from being

redundant, I would argue the LNO is even more critical, although not as often as in a traditional JTF, where he is the 'go to' for JTF component collaboration."

The high degree of change in the traditional roles of the LNO was noted in both Spiral 3 and execution. The traditional role of component command LNOs at the JTF was altered to some degree by the presence of the SJFHQ. It is clear from comments that other factors, including the CIE and CROP, also contributed to the change in LNO roles. SME comment responses indicated the "back-up" role was particularly necessary to synchronize the actions of their commands with those of the entire force and improving staff-to-staff communication channels during times of CIE outage/failure. Comment responses indicated that with the SJFHQ present and as the reliability of the CIE rose, the LNOs became less essential as part of the JTF HQ. Most of those commenting on enhancement of JTF operations mentioned or inferred a new backup and CIE facilitation role. Similar to the responses to the question about roles of the LNO, reliance on the LNOs by the JTF appeared to be strongest at the times when the CIE was not operational. One SME reported, "LNO duties became less and less important as the staff stood up and were linked with the JAOC staff in IWS." Another SME responded, "They provided the face-to-face coordination that will always be required. They provided physical back-up when servers went down, which is critical to their duties and responsibilities for parent organization to JTF."

Unlike previous exercises, liaison activities did not enhance the JTF commander's ability to orchestrate the activities of the JTF. Effective physical liaison was not needed to facilitate the synchronization of the warfighting functions within the JTF. The CIE itself enabled the coordination of efforts with adjacent units, the component, or Joint Force headquarters. Liaison normally needed to provide situational awareness to focus combat power, ensuring cooperation and understanding between echelons of command, became less important. However, when the CIE failed, LNOs enabled detailed planning, information management, and understanding of implied or inferred coordination measures. During MC02, rather than liaison officers, it was principally the SJFHQ involvement, CIE, and CROP that insured that commanders remained aware of the tactical situation. Commanders were provided with information, verification of information, standing operating procedures, TTPs, and clarification of operational questions. Additionally, the personality of the LNO was no longer cited as a key factor in his/her value-added to the joint force commander.

MC02 LNOs were needed less frequently than in past experiments and exercises to provide the critical link to effectively coordinate and execute JTF operations. The MC02 LNO, empowered with the CIE, was able to keep informed of the situation of his own unit and make that information available to the commander and staff of the unit to which he was sent. The LNO was able to use the CIE to find out the JTF mission, unit locations, future locations, and commander's intent. The unobtrusive CIE allowed the MC02 LNO to accomplish his mission without interfering with the operations of the headquarters to which he was sent. The LNOs used the CIE to report to their parent commands on those matters within the scope of their mission. They were able to inform the appropriate supported JTF staff officer or commander about significant problems being experienced by their parent unit that could affect operations of other commands and they were able to make suggestions to enhance the effective employment of their parent unit.

During MC02, the SJFHQ and use of the CIE facilitated a reduction in the workload of the traditional LNO. The CIE served as a substitute for face-to-face communications and the SJFHQ provided an in-place understanding and experience in joint operations. However, the demands of working within the CIE generated process-related work and demanded



unprecedented amounts of time for the LNO. LNOs had to attend battle updates, decision briefings, and mission analysis and then participate in BCCWG meetings to gather and provide information. The use of LNOs in MC02 was clearly different from past exercises, experiments or operations. Unlike previous exercises with sequential physical meetings one at a time and the use of secure phone or face-to-face coordination, the MC02 collaboration tools required LNOs to be in planning sessions, monitor current operations, and push/pull data from the SharePoint Portal Server (SPPS) near simultaneously. When the CIE was down, component LNOs were used in their traditional roles as the primary conduit for RFIs and as the direct representative of their commander and became a critical piece of the planning process when communications to components went down. This on-off role for the LNO made it even more important that the LNOs were experienced with the full confidence of his commander and a solid understanding of their command's plan.

During MC02, LNOs acted as CIE facilitators to ensure functional staff members were in the right virtual meeting place at the right time. In this new role, LNOs were expected to run collaborative meetings and get them into the appropriate CIE building and room. LNOs routed e-mails from JTF staff members that could not collaborate with their functional component, worked tool problems, and made sure all key briefings, meetings, and calendar events had component representation. The CIE and presence of the SJFHQ enabled the LNOs to perform tasks more quickly, speeding up the planning and execution process. One example being that LNOs were able to provide detailed weapons system capabilities during JTF planning sessions allowing the JTF planners to quickly rule out use of certain systems for a particular target set. Assimilation of the complex collaborative cyber-information environment placed a premium on the LNO's capability to obtain, correlate, and discriminate relevant data.

In conclusion, the increased tempo, brought on by faster, better, and more accurate data validated the importance of well-trained LNOs with analytical skills necessary to process the data and discern what was important and when actions needed to be taken. This coupled with the necessity for the LNO to perform his traditional roles when the CIE went down, showed a potential increase in the importance of the LNO and the absolute necessity of the LNO being the commander's representative with his full trust and confidence.

The UJTL baseline report information regarding the subtask, 'Develop Joint Force Liaison Structure' (OP 5.5.2), indicates LNO personnel within the JTF were not effectively used. During MC02 respondents noted, that the activity level of the LNO was reduced by the CIE, but the role of the LNO was more critical. LNOs were engaged throughout the JTF staff and ensured their respective headquarters maintained situational awareness outside of the CIE. It is imperative that LNOs are properly resourced — adequate number with the right credentials to represent and speak for their commands.

### **Other Observations**

None

### **Relationship to Other Objectives**

The SJFHQ concept interacts with and impacts all other concepts and objectives. SJFHQ members were directly involved with each concept and objective. Initially, the SJFHQ members were considered the SMEs and were the "go to" people. In many areas, the SJFHQ maintained this title throughout the exercise.

Operational Net Assessment (ONA)

- SJFHQ develops, maintains, and updates the ONA

Conduct Decisive Effects-Based Operations (EBO)

- SJFHQ enables EBO by rapidly integrating situational awareness and understanding, knowledge, ONA, effects assessment, IS, and ETO development; by exploiting CIE tools and reach-back; and by providing continuity in planning and operations—pre-crisis through response and termination

Collaborative Information Environment (CIE)

- SJFHQ and CIE are inextricably linked. SJFHQ members are the CIE experts. They have the knowledge of and ability to exploit the tools and processes. SJFHQ uses the CIE to facilitate building situational awareness and understanding across the RCC, JTF, and component staffs, and external agencies; to facilitate simultaneous planning; to maximize knowledge and information technology; to leverage reach-back and minimize augmentation; and to link to external organizations

Joint Inter-Agency Community Group (JIACG)

- SJFHQ develops and maintains relationships with JIACG members that provide expertise in specific areas and specialties. SJFHQ uses a robust reach-back system to link the headquarters to the JIACG to provide needed expertise for a knowledge-centric, precise response to each contingency

Sustain the Force (SF) and Joint Theater Logistics System (JTLS)

- SJFHQ logisticians, embedded in the PG and OpsGrp, provided the two groups with organic sustainment and deployment planning and operations capability, to include knowledge of logistic systems. The SJFHQ personnel on the LARB enhanced the board's ability to synchronize, prioritize, direct, integrate, and coordinate logistics functions, optimizing support to the joint force

Joint Intelligence, Surveillance, Reconnaissance (JISR)

- SJFHQ personnel and relationships in the OpsGrp and ISG manage collection requirements; integrates and coordinates intelligence functions; ensures effects have desired/planned impact on adversary—determines need to reengage, readjust, or terminate; and manage employment of ISR assets

Establish and Maintain Information Superiority (IS)

- SJFHQ is a knowledge-centric element, which leverages information-based technology—CIE tools and processes—to obtain IS and to counter adversary actions

Set Conditions for Decisive Operations (DO)

- SJFHQ is a key component of DO. Successful rapid response requires a headquarters that has a detailed understanding of the area of operations and is immediately responsive to the RCC for crisis response planning and execution. The SJFHQ provides an ability to rapidly integrate precise knowledge and understanding of the adversary and effects-based orientation into early

planning and operations of the JTF headquarters, providing the degree of continuity in planning and operations that enables execution of DO

#### Assured Access (AA)

- SJFHQ, with situational awareness and understanding, ONA, CIE, reach-back relationships, and knowledge of EBO, enhances the ability of the JTF to set and sustain the battle space conditions necessary to provide sufficient freedom of action to achieve desired effects

#### Relationship to Baseline Analysis

- The relationship to baseline analysis information related to this assessment area is contained with the Findings above

#### DOTMLPF Linkage

An overall observation based on MC02 is the development of SJFHQ and CIE capabilities must coincide. The CIE and the SJFHQ are inextricably linked and together they enhanced JTF operations; the benefit of one without the other is unclear. In addition, participation in SJFHQ training and education programs by the interagency community external to DoD is critical. An on-going relationship is required to foster, encourage, and coordinate participation, and ensure policies do not inhibit IAC participation. Specific DOTMLPF recommendations include:

##### Doctrine

- Develop SJFHQ doctrine — establish SOPs for the organization and all employment options, which clearly define the roles, functions, membership, leadership and POCs, and relationships of each group, each BCCWG, and each SJFHQ member; provide a CIE structure with business rules; define the relationship and integration with IAC; define the SJFHQ's role in ONA development; establish TTPs; and include document formats
- Develop joint doctrine and SOPs/TTPs for employment of new systems to support SJFHQ and JTF, specifically ONA, JIACG, and CIE systems and tools
- Revise joint doctrine to incorporate SJFHQ concept

##### Organization

- Adjust the organization of important staffs to include SJFHQ structure, tailored to regional requirements
- Adjust the organization of important staffs to include a JIACG
- Adjust the organization of important staffs to include an element responsible for the ONA
- Incorporate the linkage with IAC, COE, and other external agencies to facilitate SJFHQ reach-back to/habitual relationships with these agencies

##### Training

- Develop and conduct periodic joint training at important, JTF, and component Command level in order to exercise employment of SJFHQ and enabling concepts (CIE, ONA, EBO, JISR, JIACG)
- Develop/conduct development training necessary to prepare leaders for joint duty, particularly as a member of a combatant command SJFHQ — leaders must be SMEs on the enabling concepts (CIE, EBO, ONA, JISR, JIACG)

## U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

- Establish SJFHQ Mobile Training Teams — conduct periodic training at JTF and component levels
- Facilitate integration of IAC, COE, ONA Developers, and other appropriate external agencies in SJFHQ training with all levels
- Develop an Individual and Collective training curriculum for SJFHQ to develop and maintain proficiency with concepts and tools

### Material

- Provide the necessary materiel and resources to establish, and sustain a SJFHQ and enabling concepts (CIE, EBO, ONA, JISR, JIACG)
- Provide the necessary materiel and resources to employ all use options of a SJFHQ
  - Noteworthy is the self-contained SJFHQ employment option because of its materiel requirements
- Provide designated components Commands — land, air, and sea — the necessary materiel and resources to receive, integrate, and sustain a SJFHQ on all respective platforms

### Leadership and Education

- Assign GO/FO (O-8) for each SJFHQ
- Establish Leadership Development Programs, which will provide the necessary experience, training, knowledge and understanding, and expertise for leaders to feed the SJFHQ organization
- Revise joint and service school curricula to include SJFHQ, CIE, EBO, ONA, JISR, and JIACG concepts
- Educate DoD and non-DoD communities on the key elements of the SJFHQ, CIE, EBO, ONA, JISR, and JIACG concepts

### Personnel

- Add 55 (+/-) personnel (military, civilians, contractors) to important staffs

### Adhere to the SJFHQ member model listed below:

- Mature, professional — SME in assigned area
- Experience in joint and service operations, and crisis action planning
- Trainer, mentor, or coach with interpersonal skills
- Understand group dynamics
- Understand concepts and Combatant Cdr's Intent and Perspectives
- Knowledge of CONPLANS, CONOPS, SOPs, and TTPs
- Situational awareness and understanding
- Knowledge of the ONA and the adversary
- Knowledge of Effects-based Planning/Operations
- Expertise with collaborative tools
- Habitual relationships with combatant commander's staff, component staffs, and other external agencies
- Conduct a manpower study to validate skills, to identify sourcing (military — Officers, NCOs, Reservist; civilian; contractor) and to identify unique requirements for each designated combatant command
- Examine current joint personnel policies that impact SJFHQ manning, including those governing minimum tour lengths for SJFHQ assignments

### Facilities

- Attempt to use existing facilities at important locations. If not available combatant commanders should determine requirements for military construction. The SJFHQ personnel and equipment must be collocated as a unit and if feasible physically separated from the important HQ elements to focus efforts on developing crisis areas
- The SJFHQ facility must be a SCI environment

### Recommendations

1. DoD, field prototype SJFHQ to each combatant commander using MC02 model as base. ►
2. JFCOM/SJFHQ, update SJFHQ concept of employment (CONEMP) to include KIMP and integrated Pol/Mil plan as pre-crisis products to be provided by SJFHQ prior to activation of the JTF. ►
3. JFCOM/SJFHQ, update JSOP to clearly define the qualifications, duties, and responsibilities for each position. ►
4. JFCOM, investigate the continuing role of the SJFHQ with the JTF as the crisis matures, to include duration of SJFHQ involvement, role of the SJFHQ in transition to post-conflict, and provisions for the SJFHQ should a second crisis erupt. ►
5. JFCOM, change the name of SJFHQ from “Standing Joint Force Headquarters” to “Standing Joint Force Command and Control Element” to clarify its role. ►
6. JFCOM, maintain the current SJFHQ organization—command group, plans group, operations group, information superiority group, and knowledge management group. ►
7. JFCOM/SJFHQ, investigate dissolving the IS group and KM group into the plans and operations groups to provide better support to planning and operations functions. ►
8. JFCOM/SJFHQ, investigate the establishment of a logistics/support group to coordinate, synchronize, and integrate logistics and other support functions in pre-crisis activities, planning, and operations, but keep logistics personnel in the plans group and operations group. ►
9. JFCOM, investigate the establishment of an IO group or task force—JIOTF. Clearly, define IO and educate DoD and external agencies. ►
10. JFCOM/SJFHQ, add fires person to operations group—person also provides fires expertise during planning. ►
11. JFCOM/SJFHQ, add STRATLIFT, personnel, and engineer expertise to plans group. ►
12. DoS, DoD, and JFCOM, ensure Pol/Mil planner in plans group is a civilian with regional expertise and IAC experience, and is directly linked to JIACG at important. ►
13. JFCOM/SJFHQ, assign responsibilities to several SJFHQ members in plans group and operations group to coordinate and synchronize the plans group hand-off to operations group. ►
14. DoD and JFCOM/SJFHQ, add a flag or general officer, to command SJFHQ (command group). Upon integration of the SJFHQ into the JTF, the GO/FO can fulfill Deputy CJTF or JTF CoS duties. ►

15. JFCOM/SJFHQ, maintain SJFHQ BCCWG structure, but let JTF add and delete BCCWGs as required. ►
16. JFCOM/SJFHQ, rework the JISC to improve effectiveness. ►

Appendix A to Assessment Area 6

Table 20: SJFHQ Manning. The table below provides a summary of SJFHQ Manning.

| Group    | Concept (Baseline)            | MC02                                 | Report Recommendation         |
|----------|-------------------------------|--------------------------------------|-------------------------------|
| Command  | Deputy Chief of Staff         | Deputy Chief of Staff                | Deputy Chief of Staff         |
| (CmdGrp) | Joint Operations Center Chief | <i>As Asst Deputy of Staff below</i> | Joint Operations Center Chief |
|          | Admin Support Coordinator     | Admin Support Coordinator            | Admin Support Coordinator     |
|          | Admin Support Coordinator     | Admin Support Coordinator            | Admin Support Coordinator     |
|          |                               | <i>Asst Deputy of Staff **</i>       | Commander *                   |
|          | 4                             | 4                                    | 5                             |
| Plans    | Plans Director                | <i>As Plan Concept Mentor below</i>  | Plans Director                |
| (PG)     | Intel Analyst                 | Intel Analyst                        | <i>In ISG</i>                 |
|          | Intel Analyst                 | Intel Analyst                        | <i>In ISG</i>                 |
|          | Planner                       | Planner                              | Planner                       |
|          | Planner                       | Planner                              | Planner                       |
|          | Planner                       | Planner                              | Planner                       |
|          | Planner                       | Planner                              | Planner                       |
|          | Planner                       | Planner                              | Planner                       |
|          | Log Coordinator               | Log Coordinator                      | Log Coordinator               |
|          | Log Deployment Planner        | Log Deployment Planner               | Log Deployment Planner        |
|          | Log Sustainment Planner       | Log Sustainment Planner              | Log Sustainment Planner       |
|          | Blue/Red Planner              | Blue/Red Planner                     | Blue/Red Planner              |
|          | Blue/Red Planner              | Blue/Red Planner                     | Blue/Red Planner              |
|          | Pol/Mil Planner               | Pol/Mil Planner                      | Pol/Mil Planner               |
|          | Civil Affairs Planner         | Civil Affairs Planner                | Civil Affairs Planner         |
|          | Ops Law Planner               | Ops Law Planner                      | Ops Law Planner               |
|          | Force Protection Planner      | Force Protection Planner             | Force Protection Planner      |
|          |                               | Future Planner *                     | STRATLIFT Planner *           |
|          |                               | STO Plans Officer *                  | Personnel Planner *           |
|          |                               | <i>Plan Concept Mentor **</i>        | Engineer Planner *            |
|          | 17                            | 19                                   | 18                            |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Group                          | Concept (Baseline)       | MC02                               | Report Recommendation                   |
|--------------------------------|--------------------------|------------------------------------|-----------------------------------------|
| Operations                     | Ops Director             | <i>As OPS Concept Mentor below</i> | Ops Director                            |
| (OpsGrp)                       | Current Intel Integrator | Current Intel Integrator           | <i>In ISG</i>                           |
|                                | ISR Ops                  | ISR Ops                            | <i>In ISG</i>                           |
|                                | Land Ops                 | Land Ops                           | Land Ops                                |
|                                | Land Ops                 | Land Ops                           | Land Ops                                |
|                                | Maritime Ops             | Maritime Ops                       | Maritime Ops                            |
|                                | Maritime Ops             | Maritime Ops                       | Maritime Ops                            |
|                                | Aerospace Ops            | Aerospace Ops                      | Aerospace Ops                           |
|                                | Aerospace Ops            | Aerospace Ops                      | Aerospace Ops                           |
|                                | SOF Ops                  | SOF Ops                            | SOF Ops                                 |
|                                | SOF Ops                  | SOF Ops                            | SOF Ops                                 |
|                                | IO Officer               | IO Officer                         | <i>In ISG</i>                           |
|                                | Deployment Ops           | Transportation Ops                 | Deployment Ops                          |
|                                | Sustainment Ops          | Sustainment Ops                    | Sustainment Ops                         |
|                                |                          | Planner *                          | Fires Ops Officer *                     |
|                                |                          | <i>OPS Concept Mentor **</i>       |                                         |
|                                | 14                       | 15                                 | 12                                      |
|                                |                          |                                    |                                         |
| <b>Information Superiority</b> | IS Coordinator           | <i>As IS Concept Mentor below</i>  | IS Coordinator                          |
| <b>(ISG)</b>                   | ISR Collection Planner   | ISR Collection Planner             | ISR Collection Planner                  |
|                                | Intel Supervisor         | Intel Supervisor                   | Intel Supervisor                        |
|                                | SA Analyst               | SA Analyst                         | SA Analyst                              |
|                                | Assessment Analyst       | Assessment Analyst                 | Assessment Analyst                      |
|                                | Assessment Planner       | Assessment Planner                 | Assessment Planner                      |
|                                | IO Supervisor            | IO Plans Chief                     | IO Supervisor                           |
|                                | IO Planner               | IO Planner                         | IO Planner                              |
|                                | IO Planner               | IO Planner                         | IO Planner                              |
|                                | IO Planner               | IO Planner                         | IO Planner                              |
|                                | IO Planner               | IO Planner                         | IO Planner                              |
|                                | ONA Network Analyst      | ONA Network Analyst                | ONA Network Analyst                     |
|                                | ONA Effects Analyst      | ONA Effects Analyst                | ONA Effects Analyst                     |
|                                |                          | ONA Supervisor *                   | Intel Analyst (from PG)                 |
|                                |                          | <i>IS Concept Mentor **</i>        | Intel Analyst (from PG)                 |
|                                |                          |                                    | Current Intel Integrator (from Ops Grp) |



U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Group                       | Concept (Baseline)            | MC02                          | Report Recommendation         |
|-----------------------------|-------------------------------|-------------------------------|-------------------------------|
|                             |                               |                               | ISR Ops (from Ops Grp)        |
|                             |                               |                               | IO Officer (from Ops Grp)     |
|                             | 13                            | 14                            | 18                            |
|                             |                               |                               |                               |
| <b>Knowledge Management</b> | KM Coordinator                | <i>As Deputy KMO below</i>    | KM Coordinator                |
| <b>(KMG)</b>                | KMO                           | KMO                           | KMO                           |
|                             | KMO                           | KMO                           | KMO                           |
|                             | KMO                           | KMO                           | KMO                           |
|                             | Joint Network Control Officer | Joint Network Control Officer | Joint Network Control Officer |
|                             | Support Technician            | Support Technician            | Support Technician            |
|                             | Support Technician            | Support Technician            | Support Technician            |
|                             |                               | <i>Deputy KMO **</i>          |                               |
|                             | 7                             | 7                             | 7                             |
|                             |                               |                               |                               |
|                             | <b>Concept (Baseline)</b>     | <b>MC02</b>                   | <b>Report Recommendation</b>  |
|                             | 55                            | 59                            | 60                            |
|                             |                               | 59 = 55 + 4***                | 60 = 55 + 5****               |

\* New position and not accounted for elsewhere

\*\* Position name change from Concept

\*\*\* Accounts for 55 in Concept

\*\*\*\* Accounts for 55 in Concept w/o bill payers--potential bill payers shaded/highlighted in

**green**

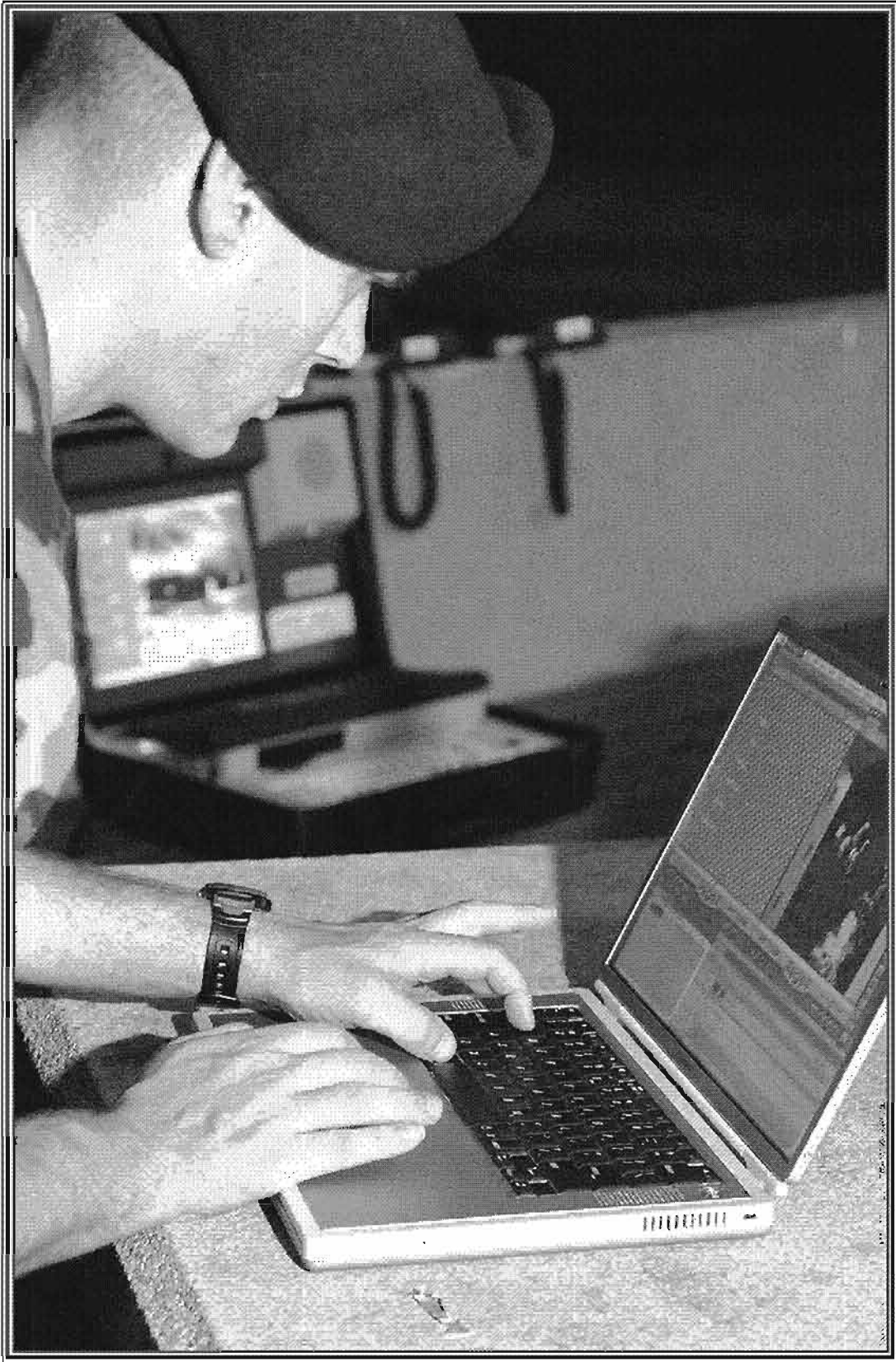


Figure 132: Command and Control is the emphasis in MC02

## Assessment Area 7 — Operational Net Assessment (ONA)

### Overall Assessment Results

ONA has the potential to be the knowledge foundation underlying EBO and a concept-supporting pillar that doctrine developers are looking for. ONA showed a spark and demonstrated to participants and observers in MC02 that it was beneficial for military operations. By providing a more thorough understanding of the adversary, ONA made a positive contribution to the Blue force and demonstrated that with further refinement and development of critical enablers, it could be the knowledge foundation underlying EBO.

ONA is shaped to provide the foundation of knowledge and understanding about an adversary needed by a commander to successfully execute RDO. It provides knowledge in sufficient detail to apply integrated diplomatic, information, military, and economic (DIME) friendly actions decisively against an adversary's political, military, economic, social, infrastructure, and information (PMESII) systems. This knowledge base includes systems analyses that identify critical adversary vulnerabilities and potential friendly DIME actions with the goal of causing desired effects. It is a product of collaboration among a wide variety of organizations, which informs decision makers from strategic to tactical levels. The ONA reveals the effects-to-task linkages supporting EBO.

However, ONA is not well known outside of transformation circles and many operators came to the experiment with differing understandings of what ONA meant and what it could do. The ONA concept embodied both a process and a product. Together they were a valuable resource, accessed with tools, to be used as a planning and operational reference point. Finally, to facilitate development of ONA for the experiment there was an organizational aspect of the concept; a system of systems headquarters cell (SOSA cell) that designed, built, and updated the ONA knowledge base.

The process for development and update of ONA described a persistent interaction between many military and civilian centers of excellence. The expectation was that the interaction, as well as the data collected, would expand user knowledge. The product was the knowledge base of assembled ONA data amassed from process activity. Product also could include relationships or plans derived from the ONA knowledge base. For planners, the ONA knowledge base was a resource that could be used to assist plan development. It had tools needed to facilitate access to the knowledge base information, but these posed a serious challenge for experiment participants to use.

As there was not a common understanding of ONA among experiment participants, there was a varying degree of expectation from participants with regard to ONA's intent, its scope, its content, and utility. Training conducted before the event failed to bridge this gap of unrealistic expectation of what ONA was to provide for the experiment and the result was somewhat inhibited use of ONA data and information. Based on limited understanding of the concept and

### Overall Assessment Results

- ONA made a positive contribution to the Blue force...
- Valuable component of EBO...
- There was not a common understanding of, or expectation for, ONA among experiment participants...
- ONA concept did not lend itself to direct comparison with current military plans and operations activities...
- ONA concept's two warfighting challenges were met...

limited exposure, the use of complex ONA tools was also problematic. This was further exacerbated by integral ONA databases that were not fully populated.

The tools developed to access the ONA database and to use the planning features were not intuitive and proved difficult for most participants to use. Intended to be relevant and useful from strategic to tactical levels, the experiment confirmed there were different perceptions of ONA utility for each level and community of interest. Compounded with inadequate understanding of the ONA concept, perceptions ranged from a near view that the ONA needed to be focused and narrowed in scope to a far view that the ONA scope should be expanded to include current intelligence and targeting information.

The term *visualization* was used frequently during the experiment with regard to understanding ONA. The need for a user to visualize the ONA knowledge base analysis was identified prior to the event and was substantiated by experiment observations and analysis. There was general agreement among experiment participants with the requirement for ONA visualization; there wasn't general agreement, however, on what that image ought to be.

The ONA user community was not uniformly aware that the ONA knowledge base was being updated regularly. Updates to the database were, in fact, continuous; the ONA executive summary was updated daily, and adversary systems summaries were updated only when significant changes to the adversary system were evident. Survey question responses and comments confirmed the clear requirement for an up-to-date knowledge base and an ability to be notified of updates. Participant feedback was that ONA's database up-date rate did not meet their needs.

Blue forces recognized ONA's benefits in supporting the conduct of Rapid Decisive Operations during MC02. Survey responses indicated ONA was useful in preparing for board, center, and cell sessions; PMESII was understood and was useful; ONA provided good situational awareness; and enabled by ONA, the JTF acted faster and with better knowledge.

The ONA concept did not lend itself to direct comparison with current military plans and operations activities. A concentrated ONA repository of analyzed and raw data, focused on a specific topic or geographical area, did not exist. Cost benefit trade-offs between the way planning and operations are conducted versus the way they could be conducted with an ONA available could not be done. Instead, measured value judgments, made by senior concept developers, and experienced SMEs provided perspective for the level of decision support ONA might offer. These judgments and estimates, as well as experiment participant survey responses provided the measure of improvement.

Based on review of task accomplishments that supported the concept's two warfighting challenges, analysis found the challenges were met. The first challenge was to construct and use an ONA knowledge base to develop an effect-based strategy; the second challenge was to use ONA to enhance decision-making. An ONA knowledge base was constructed and used to support development of an effects-based strategy. ONA was used and it enhanced decision-making.

## **Methodology**

A dendritic dissection of the two ONA warfighting challenges was made based on concept development documents. (The ONA dendritic matrix is included at Appendix A – ONA Data Collection Matrix) The resulting matrix (data collection outline) was used as the data generator for ONA analysis. This layered depiction of the tasks, measures of these tasks, data requirements needed to examine the measures, and the individual data elements that were part of

the measures served as the map for consideration and analysis of the ONA concept. Review and analysis of this data produced ONA findings.

The experiment offered three sources for data. They were: 1) Likert scale response results and supporting comments from web based surveys presented to participants during the experiment 2) discussion and comment from structured senior concept developer (SCD; retired senior military officers) In-Focus (morning), Azimuth Check (afternoon) and three After Action Review sessions and 3) access counts and activity levels from participant use of the ONA knowledge base.

Participant surveys and review of ONA database access were the primary sources of data. Individuals from the experiment's JTF headquarters, its air, land and sea components and a governmental interagency group were selected for survey receipt based on their expected involvement with ONA during the experiment. SMEs were also presented surveys. Generally, all surveys included questions with Likert scale answer options. They also offered the opportunity for follow-up comments. Some questions asked only for comment response (no Likert range). The Likert responses were reviewed using graphed depiction of the replies. Comment responses were grouped by topic for consideration of their impact on ONA. Of the data collected, only survey Likert scale responses and knowledge base access count and time intervals had statistical analysis potential. Comments and observations offered by the SCDs, SMEs, and JTF participants were anecdotal and stood alone. Both execution and Spiral 3 survey results were analyzed. Spiral 3 was primarily a JTF planning event and ONA was used in support of that phase.

Survey questions were built for analysis of the warfighting challenge matrix. Questions were developed and targeted against the warfighting challenge tasks. To ensure thorough consideration, all survey question results were reviewed in relation to each challenge for assessment of task accomplishment. If a question applied to more than one task, it was aligned with each of them. This process provided a pool of data to assess tasks and identify findings.

When support for a task was not unanimous, conflicting question results were used to present the dissenting view and the differences weighed. Histogram charts were used for better understanding and perspective. For some questions, extreme and moderate Likert scale replies were grouped and the "Don't Know" or "N/A" replies dropped from the chart. This was done to show the focus of the response when accompanying comments supported this approach.

The second source of data was the ONA knowledge base activity recorders. An audit log of the structured query language (SQL) server that housed the ONA database was used to collect participant access of the stand-alone ONA relational database. This log identified who used the database and, if changes (updates) were made, what parts of the database were changed. Web Trends software was used to review participant access of the other ONA knowledge base components: ONA Today, database login, ONA Matrix, ONA References, and ONA products. This capability revealed who accessed what and for how long. Detailed analysis of this data source is included at Appendix F — ONA knowledge base Access and Use.

All of these collected data were matched against the tasks that supported the warfighting challenges to see if the challenges were achieved. They were also used to clarify findings as they emerged.

Additional supporting data that emerged from discussions conducted during daily In-Focus and Azimuth Check sessions were the primary instigators for findings not closely connected with the warfighting challenge matrix. These facilitated discussion sessions were monitored and the SCD as well as other participant observations and comments captured. The

three facilitated after action reviews held during the experiment were also sources of supporting data and were used to collect SCD and participant ONA concept perspective.

MC02 provided a venue for proving the ONA concept. However, the experiment also included the SJFHQ, EBO, and other concepts. The SJFHQ and EBO concepts were closely tied to ONA. Despite the conceptual interrelationship of ONA and SJFHQ, the ONA knowledge base was not developed exactly as detailed in concept support documents. Training and manning challenges for the headquarters did not allow the entire SJFHQ to participate in ONA development; there wasn't really a "pre-crisis" period where persistent collaborative relationships between SJFHQ ONA developers and centers of excellence could be developed. The concept tasked the SJFHQ for ONA development during a pre-hostility period. This was to afford headquarters personnel the chance to develop and build person-to-person collaborative regimens with reference centers.

There wasn't a national fusion center of information as depicted in the ONA concept available for reference that could offer the combined expertise of our national government. Current government department and agency policies did not facilitate exchange of data and information; limited knowledge base information was obtained from diplomatic (D), information (I), and economic (E) national capability. Appropriate tools were not available to support database development, use, and update.

None-the-less, the ONA knowledge base that was developed for the experiment did offer sufficient substance to evaluate ONA's potential contribution to conflict resolution. The ONA "product" produced for the experiment had some flat spots and they were considered in analysis methodology.

Training too was a consideration for ONA analysis methodology. It impacted each of the findings. The mobile training teams sent to support III Corps and components did not have the ability to offer students keyboard "hands-on" instruction. The ONA and EBO concepts were new and not known by the students. They had no experience base to build on or to fall back to. On-line instruction introduced the concepts, but not the depth of learning needed to master concept use neither was the participant training robust enough to overcome the operators inexperience.

**Critical Enablers.** A number of ONA critical enablers were identified through limited objective experiments and ONA development experience. The enablers were briefed prior to MC02 Spiral and execution events. Some of these critical enablers were recognized as being beyond the capability of USJFCOM to actualize prior to execution. Consequently, they were emulated by the experiment's White cell to facilitate assessment of the basic concept.

Two enablers were notionally employed. They were the SJFHQ and the JIACG. The SJFHQ provided the focal point for conducting ONA at the theater commander level, during pre-hostilities, and formed the core of the rapidly forming JTF. The interagency community was supported with a JIACG in the theater commander's headquarters during execution, but it was not a part of a continuous ONA process leading up to execution.

The following critical enablers were not present during the event and impacted the fidelity and utility of ONA in MC02:

- Full cooperation of the interagency community in sharing, common, interoperable database elements of information required by the operational commander
- Establishment of a network of centers of excellence to conduct detailed analysis in each operational domain (ONA required a collaborative environment promoting a culture of sharing information across all levels)

- A national information fusion/assessment capability to prioritize, process, and integrate collaborative analysis into a shared, common, understanding
- Advanced analytical tools to deal with the volume of information and to understand potential cause and effect linkages
- A set of models, simulations, and intelligent software agents to support effects-based analysis and course-of-action evaluation
- Leadership, education, and training that foster an effects-based thinking mindset and would apply that mindset to a complex and collaborative analytical process

#### Warfighting Challenges

The ONA concept depicted two discrete challenges for ONA. They were: 1) the ability to build and use an ONA database to support development of an effects-based strategy and 2) the ability to use the database to enhance decision-making. Simply, the concept said, construct a knowledge base and use it to support EBO and make improved decisions.

The first warfighting challenge dealt with developmental struggles. Structure of the MC02 experiment caused Spiral 3 to be the primary opportunity to collect data on this ONA challenge. A summary of the database development process, as it evolved for MC02, is included at Appendix D — ONA Database Development for MC02. Experiment execution did offer some opportunities for the developmental challenge but it was better suited for collecting data on the second challenge.

ONA viewed an adversary as a system of systems; that is, a number of related systems that together formed potential capability that an adversary could use. These systems of systems were represented by PMESII categories. Capabilities to counter these systems were identified as DIME national power potential. Analysis of both PMESII and DIME and their interrelationships were depicted in the database. Once included, this analyzed information had to be kept current. In addition, automated tools were needed as a part of the database capability to manipulate and use the extensive information. Tasks that accomplished these developmental actions were evaluated during analysis of warfighting challenge one.

The ONA process represented the complex nature of the 21<sup>st</sup> century security environment by portraying a potential adversary as a complex adaptive system. It also attempted to gain a unique perspective on ourselves by institutionalizing a “Red versus Blue” war-gaming process to assess how we might be viewed through the eyes of an adversary. It created a shared information space in which our national capabilities in the DIME areas could be networked and synchronized. The ONA process also was intended to provide:

- Actionable knowledge that enabled faster planning, better decisions, and decisive effects
- A product produced by persistent, habitual collaboration among subject matter experts from a wide variety of centers of expertise
- A system of systems analysis, serving as the centerpiece for understanding the adversary, this system methodology was to generate understanding of the systems and linkages that gave the adversary its capacity to act against Blue interests. It was to allow identification of key relationships, dependencies, and vulnerabilities both within and across systems. Using a holistic approach, it would then enable understanding of how the environment could be manipulated to decisively affect the behavior of an adversary and the potential outcome of actions
- Wargaming intended to attain decision advantage (Fundamental to the ONA process is anticipating the adversary’s actions, reactions, and counteractions)

- Information and knowledge that would assist an operational-level planner/decision maker with shaping operations to influence, deter, coerce, or compel the adversary by identifying actions that could change adversary behavior.
- Collective intellectual power and advanced technologies that could allow users to make better decisions faster than an adversary.

According to warfighting challenge two, use of the ONA database should have complimented the JTF staff's normal functions; identified adversary vulnerabilities; pointed out primary, secondary, tertiary, and potential unintended effects that could result from proposed actions; supported course of action prioritization and selection; and allowed operation within the adversary's decision cycle. Data associated with these tasks were collected primarily during experiment execution.

All four tasks of warfighting challenge one were completed. However, ONA update was not uniformly recognized by experiment participants as having been accomplished. All of the warfighting challenge two tasks were accomplished. The preponderance of data supported the finding that both ONA warfighting challenges were successfully accomplished.

#### Findings and Observations

The six ONA findings and three observations that emerged from analysis of MC02 collected data are listed below. Each is discussed, analyzed, and supported in the sections that follow. The sequence generally presents perceived order of importance.

1. There is not a common understanding of what to expect of ONA; its capability and use need to be clearly articulated.
2. ONA was useful during the experiment and shows great potential for military operations.
3. Visualization is a major consideration for the ONA concept and its components.
4. Better tools are needed to develop, manage, and convey ONA data and information.
5. Requirements for the ONA are different at each command level.
6. Lack of understanding of the philosophical intent, relationship, and application of the ONA concept impacted its use.

#### Observation

1. Users were not uniformly aware that ONA was being updated, which led to an unwarranted decrease in confidence in ONA information.
2. Both ONA warfighting challenges were met.
3. It was observed that the experiment's ONA Knowledge Base did not include Blue force logistics data or information.

#### Recommendations

Review of the Findings produced proposed recommendations for action designed to address the noted deficiencies. The ONA Recommendations are listed below; expanded explanation is included in the Discussion of Recommendations section.

1. JFCOM, define the intended use of ONA.
2. JFCOM, establish a section within joint experimentation that designs visualization models for its concepts.
3. JFCOM, focus ONA development on the command level for which it was designed.



4. JFCOM, develop a PME template that guides development of joint and service ONA concept education and training.
5. JFCOM, design ONA knowledge base tools that are intuitive to use and dynamically support developers and users.
6. JFCOM, in conjunction with a combatant commander, develop a prototype ONA.

**Finding 1► There is not a common understanding of the capability and use of the ONA.**

The ONA concept came into MC02 with, possibly, more expected of it than any of the other concepts addressed in the experiment. It wasn't necessarily known by all, but for those who had heard about it, there were great expectations.

At the conclusion of Spiral 2 when XVIII Airborne Corps was serving as the JTF, their J2 stated that he needed to rethink his understanding of ONA. He found that it did not present the intelligence planning answers that he had expected. When III Corps was named as the JTF for the experiment, they completed the self-training modules available via the web and received briefings and training sessions from USJFCOM. Their expectations for ONA were part of the decision process that determined a JIPB wasn't needed for the event. The ONA was expected to supplant it. Components as well as III Corps "understood" what the concept was to do; unfortunately, not many really understood the concept.

All knew what it was and no one knew what it was. In addition, they were not aware of what ONA would be able to offer in the experiment. There were almost as many understandings as there were participants. A common thread among them seemed to be that there would be a database of information just a keystroke away that would provide whatever specific information was needed. Spiral 3 and execution survey results and comments reflected these perceptions. There were no significant changes made to the knowledge base between Spiral 3 and execution. A detailed description of the ONA knowledge base used for MC02 is available at Appendix E — ONA knowledge base information.

This lack of common understanding; for some, ignorance of the concept altogether; and the "freshman" version of ONA all contributed to mixed MC02 ONA concept appreciation. However, the lack of a common understanding of what the concept was to provide was the pacing issue that mandated better articulation of the ONA concept's capability and use.

If the ONA concept is to be implemented near to mid-term, then there must be clear understanding of what ONA has to offer and how it is to be used. Survey results and participant comments reflected inconsistent understanding of the concept. ONA's menu of advertised capability needs to be understood.

The concept of pre-conflict analysis of an adversary as a system of PMESII systems, countered by friendly DIME capabilities, was embraced by the exercise participants. It was the factors bearing on these relationships that the various specialties expected to have available that caused misunderstanding and allowed expectations to exceed reality.

- ONA was criticized for being a planning tool and not an employment tool (the concept considers ONA useful for planning and operations)
- ONA was criticized for not having current intelligence information available (the concept does not suggest ONA be a source for current intel)
- ONA was criticized for not having data available for targeting specific nodes (targeting information is not a part of the ONA concept)
- ONA was criticized for not having data on current effect results (inclusion of BDA is not part of the ONA concept)

- ONA was criticized for containing “old” information (the concept envisions ONA be continuously updated)

At some point in the future, technology and organizational relationships may permit inclusion of some or all of the ideas presented above, but in the near to mid-term, the concept’s design of a database with focused and pre-analyzed adversary information that looks to an area of combatant commander concern, offers tremendous military potential. The ONA concept needs to be solidified, presented, and understood. The ONA concept needs an “advertising” campaign that presents its “what’s and how’s.”

Shown in figure 133, are multiple execution participant survey replies that identified participant thoughts on a primary focus for ONA. The focus areas were presented as statements and the respondents asked to agree or disagree with them.

Looking at results of the two graphed questions, participants said ONA was useful for the defeat phase of conflict and for “non-combat” phases. Together, they said it was useful for the entire conflict spectrum. Results showed respondents thought ONA should be a source for current BDA status as well as intelligence information. There was almost unanimous support (92 percent to eight percent) for ONA to be used as a planning tool shown by the results of the fifth question in the graph. Together these replies exposed the broad range of MC02 participant understanding and expectation for ONA.

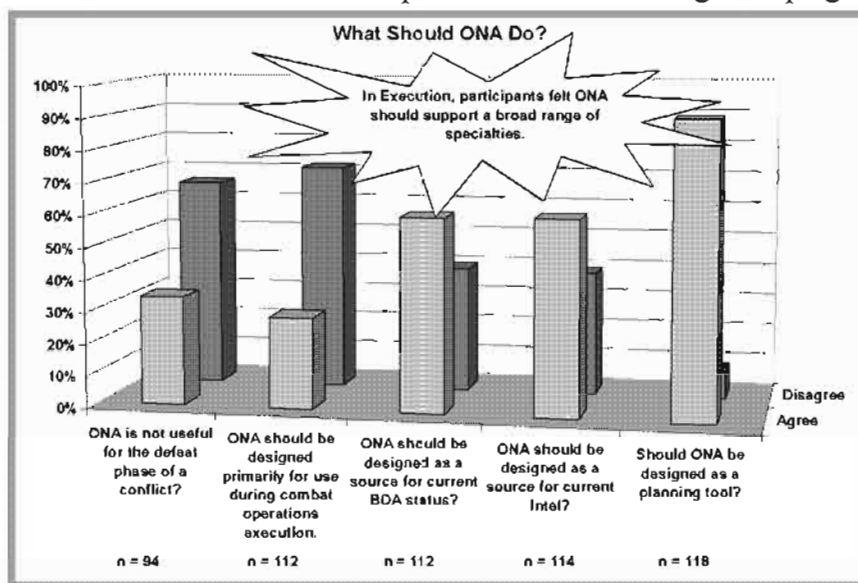


Figure 133: Majority feels ONA should be designed to support a broad range of specialties.

Figure 134 depicts additional participant-desired ONA characteristics and categories. These “characteristics” might be based on the respondents’ desired improvements and/or, possibly, a lack of concept understanding. During the final week of the experiment, participants were asked what they would like ONA to provide. The question did not specify a selection; rather it was open-ended. Their replies were grouped into these “buckets.” Again, when respondents selected a characteristic it could be inferred they believed it was missing from the current ONA version. In fact, other than visualization, all of the characteristics were included in the existing ONA concept.

Information currency was the leading characteristic desired; respondents placed high importance on it. As with many of the experiment survey responses, the “Don’t know” replies were a major response category. For these responses, those with comments included usually referenced some level of training inadequacy as the reason for the response. This training issue is addressed in Finding 6. The “Visualization” column is addressed in Finding 3. Update currency comments are included with Observation 1.

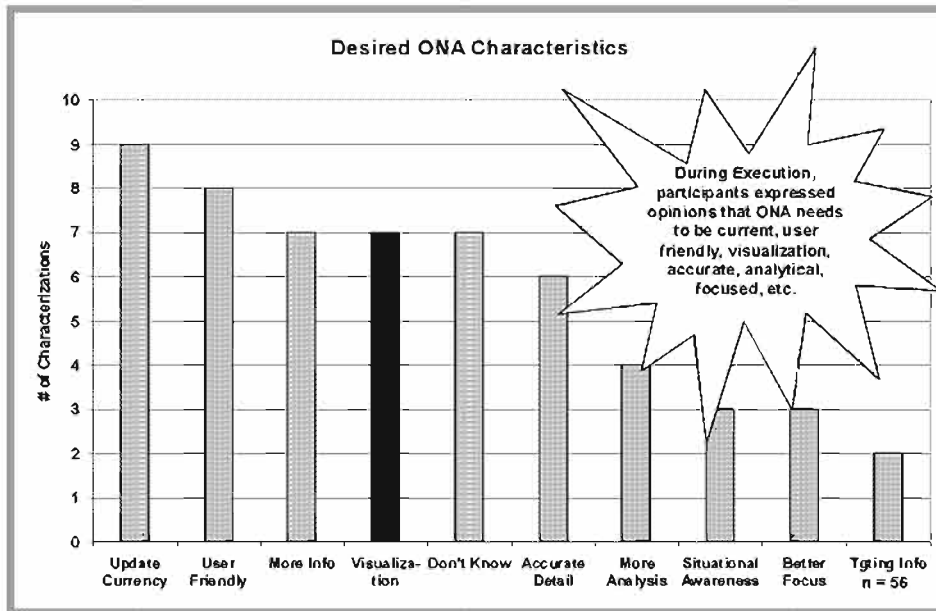
Participant comments from Spiral 3 and execution surveys provided a variety of expectations for ONA. Sometimes the words pointed out limitations of the MC02 ONA. At other times, they offered new variations for ONA concept development. The comments that follow present the wide range of participant thoughts and understanding. They highlight the need for better depiction of the concept. Their tone convincingly supported the chorus that ONA needed to be succinctly defined and articulated. The first observation quickly frames Finding 1. There are further comments supporting the finding at Appendix C — Additional Observations and Comments.

*SCD Observation:* “Make a deliberate decision whether ONA is designed only to support planning or whether it is intended as an execution tool as well.”

*SCD Comment:* “I believe ONA to be a “tool” to be used by the commanders and their staffs to aid in the decision making process. As such, it requires a great deal more development.”

*Participant Comment:* “ONA needs to be everything. It needs to include all the critical nodes for the enemy, the predicted enemy COAs, etc. It needs to be updated continuously so asking a question about whether or not I should be informed when the ONA is updated is very wrong. BDA and combat assessment should change the ONA in that it changes the COAs still open to the enemy and changes his perception of the battlespace.”

*Participant Comment:* “The ONA provides great situational awareness during the early phases of a crisis when planners interact to create the effects, node and action linkages. It helps



in the ETO build to develop plans to accomplish effects. Without prior knowledge of the ONA however, the learning curve is very steep and it would certainly help, but it would be a blind help without good situational awareness of what you are doing. Once hostilities commence, the ONA usefulness decreases.”

Figure 134: Desired ONA Characteristics

*Participant*

*Comment:* “The ONA concept should be redesigned in accordance with some organizing principle which is less grand than a desire to know everything about the world.”

*Participant Comment:* “ONA should not, repeat not, be used as a source for current intelligence. You could not possibly plan (as proven here) for the possibilities for current intelligence. As an intel guy, this is a bad idea.”

**Finding 2► ONA was useful during the experiment and shows great potential for military operations.**

Participants and senior mentors made comment of the potential benefit ONA offered. Support was not unanimous, but it was pervasive. The results of survey questions displayed the positive impact ONA had for Blue during the experiment. In its initial experiment, ONA, while not fully developed, demonstrated utility by enhancing JTF capabilities and mission execution as well as supporting EBO. Although the ONA process could not be executed as envisioned due to the lack of critical enablers, the MC02 JTF used it to enhance their activity. The concept of

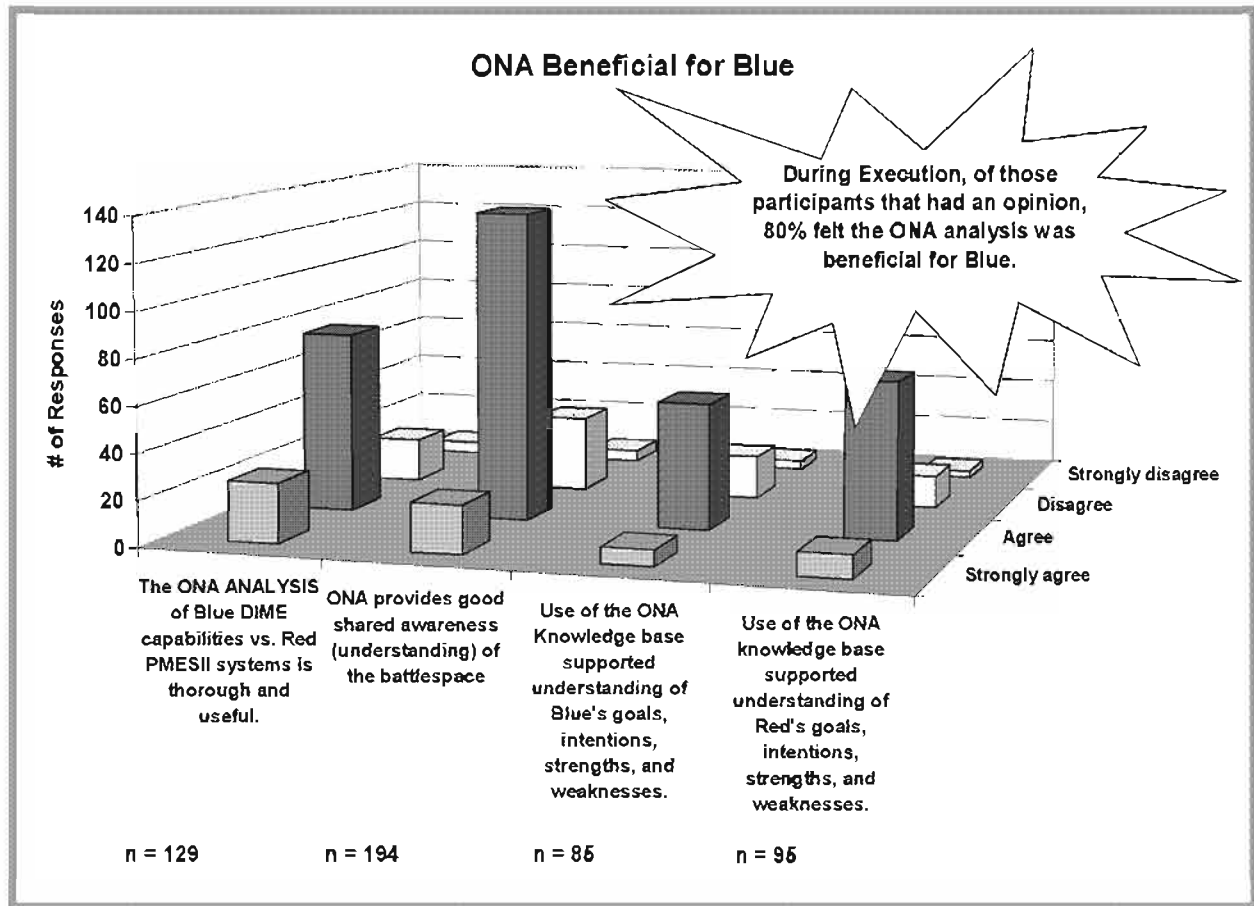


Figure 135: ONA Beneficial for Blue

having a repository of relevant information readily available for all levels involved in a national defense challenge was very appealing for experiment participants. Supported with existing and the promise of new information management technology, participant comments indicated the concept was ripe for exploitation. The “how,” “what,” and “when” still required resolution, but the potential benefits were believed to be enormous.

The survey questions results combined in figure 135 were used elsewhere in this assessment area. They were presented together here to emphasize the positive impact ONA had on Blue and its efforts during the experiment. The survey questions were presented to different experiment participant groups on different dates and resulted in different survey response populations. As noted in figure 135, 80 percent (401 of 503) of the respondents with an opinion stated ONA and its analyses had a beneficial impact on Blue; it was useful for Blue.

There were several survey questions in the ONA warfighting challenge and in the task accomplishment matrix analysis (ONA Data Collection Matrix), which dealt with ONA's use and its potential. Shown in figure 136 are the results of two very specific ONA-use questions that also indicate ONA potential (effectiveness). The relatively high percentage of respondents without an opinion on the questions was consistent with many of the replies to other survey questions presented during the experiment. It was probably indicative of participant unfamiliarity with the new concepts and associated reluctance to make a decision. As shown, 47 percent (80 of 172) of respondents indicated ONA offered effectiveness for planning action against facilities and leaders.

Only eight percent (14 of 172) indicated ONA would be ineffective. Forty five percent (78 of 172) did not have an opinion. When the segment of respondents was parsed to those having an opinion, as displayed in figure 136, 85 percent (80 of 94) stated ONA would be effective; 15 percent (14 of 94) believed ONA would be ineffective. The "Effective" percentage indicated significant potential for ONA.

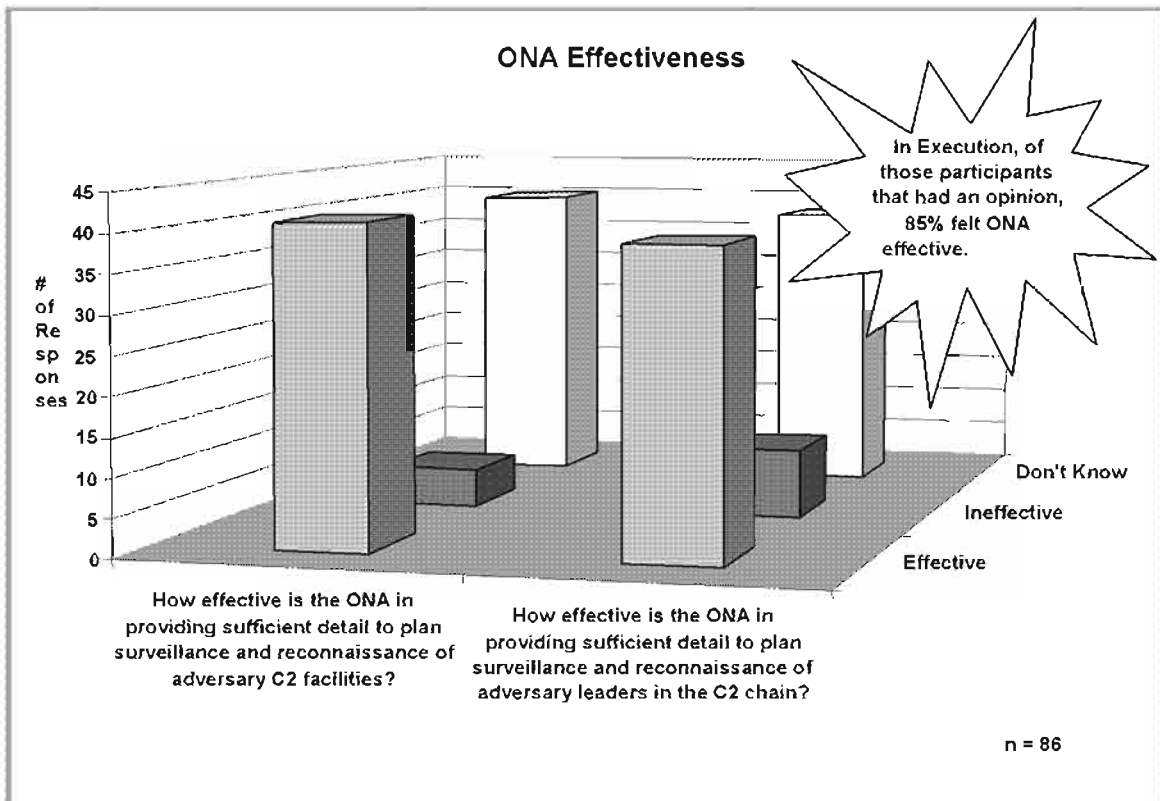


Figure 136: ONA Effectiveness

A particular event took place during the experiment that showcased ONA's potential. It involved the Special Operations Force component commander and the JTF commander. Based on information derived from ONA, the JSOTF proposed a SOF mission against a current intelligence-based node that could obviate the need for a force assault against that node. ONA information was used to convince the commander of the economies and benefits for using the SOF force vice the invasion force. The incident also "sold" the JTF commander on ONA's potential; it made him a believer in the concept. (JTF CC: "I was making a bad decision by

attempting to apply conventional combat power over a period of days rather than select a one night raid that had high potential to change the way....”).

Listed below are some of the senior concept developer, subject matter expert data collector, and senior participant comments and observations that dealt with ONA’s utility for Blue during the experiment and its future potential. They support the successful proof of concept consideration for ONA during MC02. Additional comments are available at Appendix C - Additional Observations and Comments.

*JFCOM CC Comment:* “I believe we validated the concept, although the tool might not be perfect.”

*SCD Observation:* “The ONA concept shows great promise. In MC02, it added significant value during the planning phase. It enabled commanders to develop a more comprehensive mission analysis, to establish a pertinent set of desired effects, and to define effects.

*SCD Comment:* “Enabled by the ONA and collaboration, the JTF conducted rapid decisive planning. The ability of the JTF to execute rapidly and decisively was not confirmed.”

*SCD Observation:* “The CJTF selection of desired effects to achieve the combatant commander’s campaign objectives derived exclusively from the ONA.”

*SCD Comment:* “There is an art to understanding ourselves and the enemy, to ‘how we perceive the enemy and perceive ourselves.’ Commanders fall along a bell-shaped curve. ONA can move the whole curve to the right, make a commander more artful, if the commander can inquire and get better answers.”

*SME Comment:* “Ref: AAR on 31 July 02 where JSOTF CDR commented on using ONA to assist him in a targeting proposal. My interview with one of the persons present yielded this short summary: ‘JSOTF commander approached JTF CDR for permission to launch a SOF DA mission. From the ONA, JSOTF found a target of opportunity that would have second and possibly third order effects.’ JTF commander had difficulty understanding the value of such a mission until JSOTF presented the evidence drawn from the ONA. The JTF commander not only approved the SOF mission, but finally grasped the value of ONA.”

*Participant Comment:* “The ONA contributed to the overall success of components and the JTF throughout the experiment because it provided a basis for almost every collaborative session. The greatest benefit of the ONA is that it allows commanders and staffs to quickly focus on the problem and gain immediate situational awareness leading into mission planning and ...”

### **Finding 3► Visualization of information is key to use of the ONA concept and its components.**

As the experiment progressed, the word “visualization” was voiced more frequently. Its use in relation to the concepts was not surprising.

Because of the limited understanding of the concepts and their implementation SCDs, SMEs, and participants suggested visualization as a solution for the frustration of expressing exactly what was occurring or what was needed.

The dictionary definition of “visualize” offers several statement variations for the word. They all support the need of grasping or understanding and using the ONA concept. The Webster Dictionary defines visualize as, to recall or form mental images or pictures, to form a mental image of, or make perceptible to the mind or imagination.

Before any of these three mental events can take place for ONA, an initial depiction of the concept is necessary. There were slides that graphed input, output, and process, but there was not a common depiction. There wasn't a model that displayed ONA's use and operation.

ONA is a complex concept; visualization would simplify this complexity by aggregating the disparate views that exist and bring them into a more common focus. Words can paint a picture for a group of readers, who tend to interpret the concepts individually; if the same group were shown a picture, the commonality of interpretation would tend to be much greater.

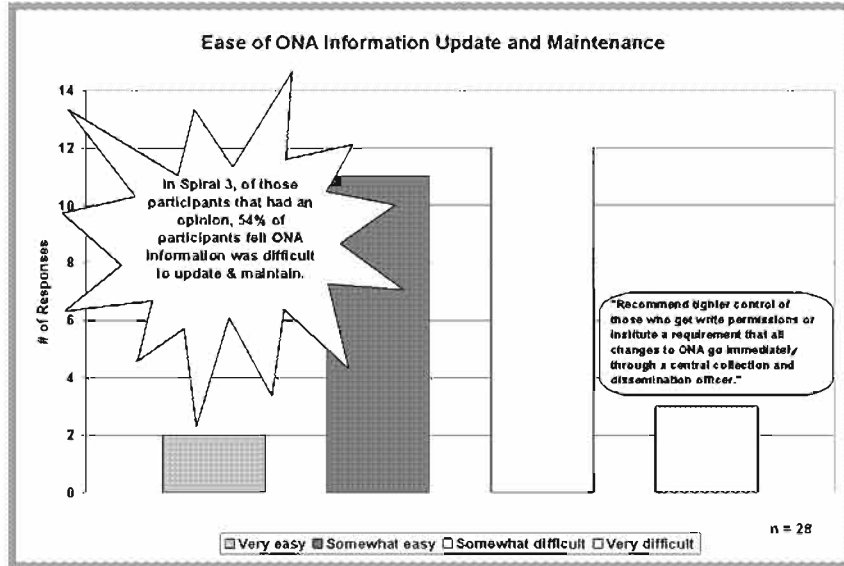


Figure 137: Ease of Information Update and Maintenance

However, an easily understood model is needed before visualization can occur. It is needed before changes or modifications can be made to the concept. ONA can't be changed if there isn't a clear understanding of what it was and what it is being changed into.

When senior mentors spoke of ONA, each added their slight "bend" to the pathway for ONA use and cautioned about the importance of visualizing the course.

During an IS group after-action discussion of the ONA database, it was agreed there was a problem with database visualization. Discussion group members also said they had difficulty understanding how the tools functioned. Relationship of second and third order effects and unintended effects were identified as particular problems. During the same session, the remark was made that a diagram system showing the relationship between ONA, the SOSA cell, and the Blue/Red cell was needed: a visualization of these organizational relationships was necessary. The same comment could have applied to all these concerns.

There was general agreement among experiment participants with the requirement for ONA visualization; there wasn't general agreement on what its image was.

The comments listed below provide an indication of what the MC02 audience thought about visualization.

*SCD Comment:* "We are conscious of the need to visualize effects but we cannot do that today."

*SCD Comment:* "... visualization can't be normalized; it needs to be personalized."

*SCD Comment:* "What visualization we provide needs to be tailored for the individual so he or she can set filters and make better decisions without being overwhelmed with data."

*SCD Comment:* "... (We) need more tools that help you visualize ...?"

*SCD Comment:* "It is all about visualization. We have to visualize effects achieved."

*SME Comment:* "There needs to be a way to visualize the ONA nodes. It is difficult to comprehend how a series of nodes relates to one another and effect."

*SME Comment:* "ONA needs a better way to visualize all the links between the nodes."

*Participant Comment:* “The ONA tool does not communicate the information it contains. It needs a graphic visualization of nodal analysis. But it at least needs to contain a complete nodal analysis of the information systems and it must show how the system will morph when nodes are affected or removed.”

**Finding 4** Better tools are needed to develop, manage, and convey ONA data and information.

Even for the small-scale contingency played out in MC02, the ONA knowledge base contained extensive information. For this information to be accessed, updated, and used, tools that accommodated these actions were needed. An “ONA” tab displayed on SharePoint Portal Server (SPPS) web pages took users to the ONA Current Summary (ONA Today) page. From there, additional tabs permitted access to the ONA Matrix, ONA References, and Related Products pages. All information included on these pages was located on the SPPS.

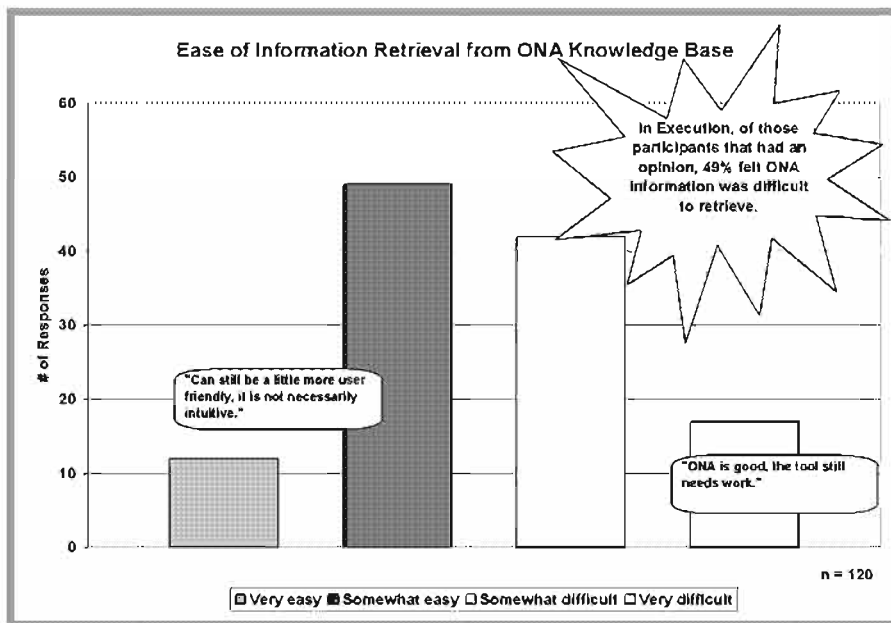


Figure 138: Ease of ONA information retrieval

A tab transferred users to the stand-alone ONA database. Manipulation of the SPPS pages was straightforward. Links within these pages to supporting documents supplied additional background and reference; the operation was essentially “typical” and intuitive. The ONA database was the primary source for effects-based plan development support. It contained linkages to provide a range of options to achieve an effect; nodes;

actions; resources; references; PMESII systems; secondary effects; and conflict phases. Users could select these components to support development and modification of plans as well as decision-making. However, the actions required to do the mixing and matching were not obvious. Even using the attached user’s guide did not help smooth operations for many experiment participants. Their survey comments indicated it took too long to review the help information and even when they did, use of the database was still confusing.

Figures 137, 138 and 139 detail the experiment participants’ thoughts during Spiral 3 and execution on manipulation of the ONA database. Participant responses to a survey question concerning the ease of information retrieval from the ONA is depicted first, followed by the ease of filtering and sorting, and, finally, responses to ONA database maintenance and update. Although the easy/difficult responses are about evenly divided in all three situations, the 50 percent (or so) of participants, who found the database tool relationship difficult to use, were at a disadvantage.



Figure 138 displays the ease or difficulty experiment participants had using the ONA knowledge base during MC02 execution. They were asked to rate their estimate of the ease of information retrieval from the ONA knowledge base. Forty nine percent of the survey responses stated it was difficult (59 of 120) and 51 percent stated it was easy (61 of 120). The results were essentially divided evenly, but the 59 participants who reported it was difficult could not contribute as productively to the JTF's effort because of their challenge with ONA.

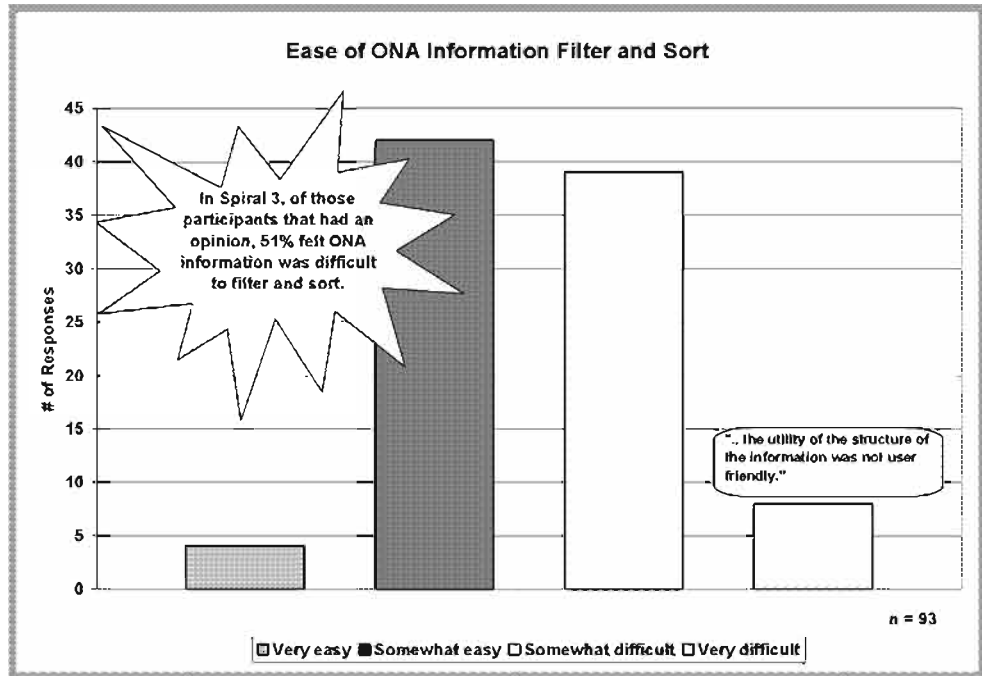


Figure 139: Ease of ONA Information Filter and Sort

During Spiral 3, a survey asked recipients to respond to the statement, "rate the ease of ONA information filter and sort." Shown in figure 139, 49 percent of the survey responses stated, that it was difficult (46 of 93) and 51 percent stated it was easy (47 of 93); the opinions were essentially evenly divided. Half of the respondents said the tools were difficult to use for filtering and sorting database data. Relating figure 138 to figure 139, there was no change of opinion percentages about the tool design between Spiral 3 and execution. Whether filtering and sorting or retrieving information, the percentages were the same between events.

During Spiral 3 survey, recipients were asked to respond to the statement, "Rate the ease of ONA information update and maintenance." Depicted in figure 137, 54 percent of the survey responses stated it was difficult (15 of 28) and 46 percent stated it was easy (13 of 28).

This survey question was really asking about the support offered by the ONA tools. Almost half of the respondents found the tools difficult to use for ONA database update and maintenance.

Listed below are comments that emphasize the challenge participants had with ONA tools.

*Participant Comment:* "I do not really know how to use the ONA tool so I am not sure of the analysis that it provides."

*Participant Comment:* "ONA tools are very time consuming."

*Participant Comment:* "The ONA tool does not communicate the information it contains."

*Participant Comment:* "ONA tool needs more database input and more refinement in terms of data relationships. The ONA process has potential but needs significant refinement to be

useful, including a change in institutionalized processes which disregarded the ONA in favor of more familiar methods.”

Clearly, the tools designed to use the MC02 ONA Knowledge Base presented a challenge for some of the participants. As noted earlier, experiment designers acknowledged the tools were less than desired going into the experiment but they also were considered workable. In fact they were; the ONA was used enough for participants see it’s potential. However, the experiment did demonstrate how important tool support was for ONA. It is an aspect of the concept that deserves considerable attention.

**Finding 5► Requirements for the ONA are different at each command level.**

The ONA concept was described in development documents as being applicable from strategic to tactical levels of command. A positive consideration for this broad relevancy was the opportunity to have a common reference source for all. Experiment participants indicated a desire for specific ONA capabilities at the operational level and tactical levels. Inadequate training and lack of concept understanding probably supported the perception. Although not specifically spelled out, the ONA concept documents suggested ONA was a theater capability. The perceived different ONA requirements would create multilevel ONA information needs that had to be created and satisfied.

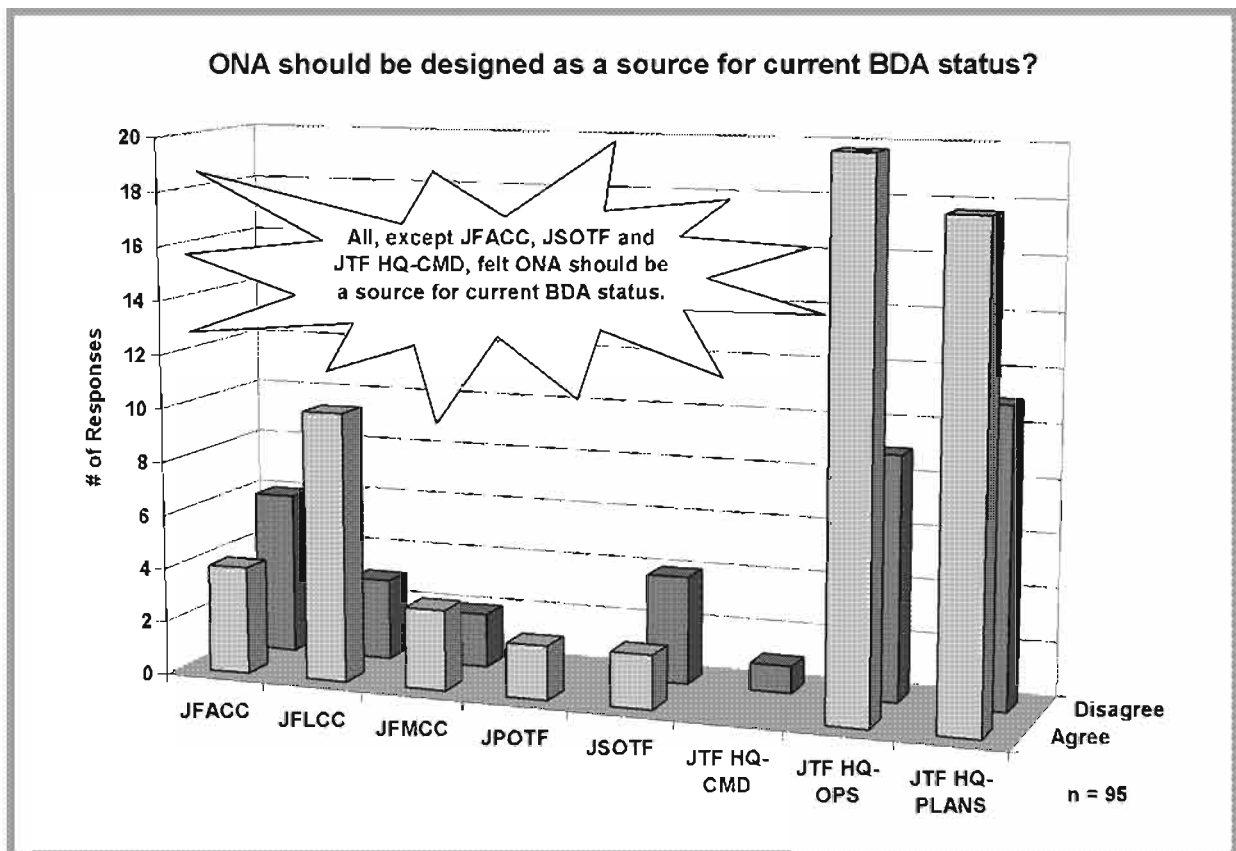


Figure 140: Should ONA be a source for current BDA?

Senior concept developer comments and participant survey comments suggested a single ONA from strategic to tactical command levels was inappropriate. Results from two survey questions also took exception to a “one size fits all” conceptual approach. The chart below and

the one that follows provide an indication of the difference of opinion on information requirements between the JTF and component command levels. The replies show there are differing views for unique requirements at these two levels. The experiment did not offer an opportunity for data collection above the JTF level or down to the tactical level.

Shown in figure 140 are results of an execution survey question that asked if ONA should be a source for current BDA status. At the component level the JFACC and JSOTF had more respondents who indicated ONA should not be a source for BDA status. The majority of JTF headquarters respondents said ONA should be a source of BDA status. Overall, 62 per cent (59 of 95) agreed that ONA should be designed as a source for current BDA status; 38 percent (36 of 95) disagreed. The significance of this chart is the difference of opinion on ONA design (the ONA requirements for the command level) between just two levels of command.

In response to the execution survey question as to whether or not ONA should be a source for current intelligence information, figure 141 shows that at the component level JFACC, JFMCC, and JSOTF did not believe current intelligence should be included within ONA. The JTF headquarters respondents reported it was appropriate for their level.

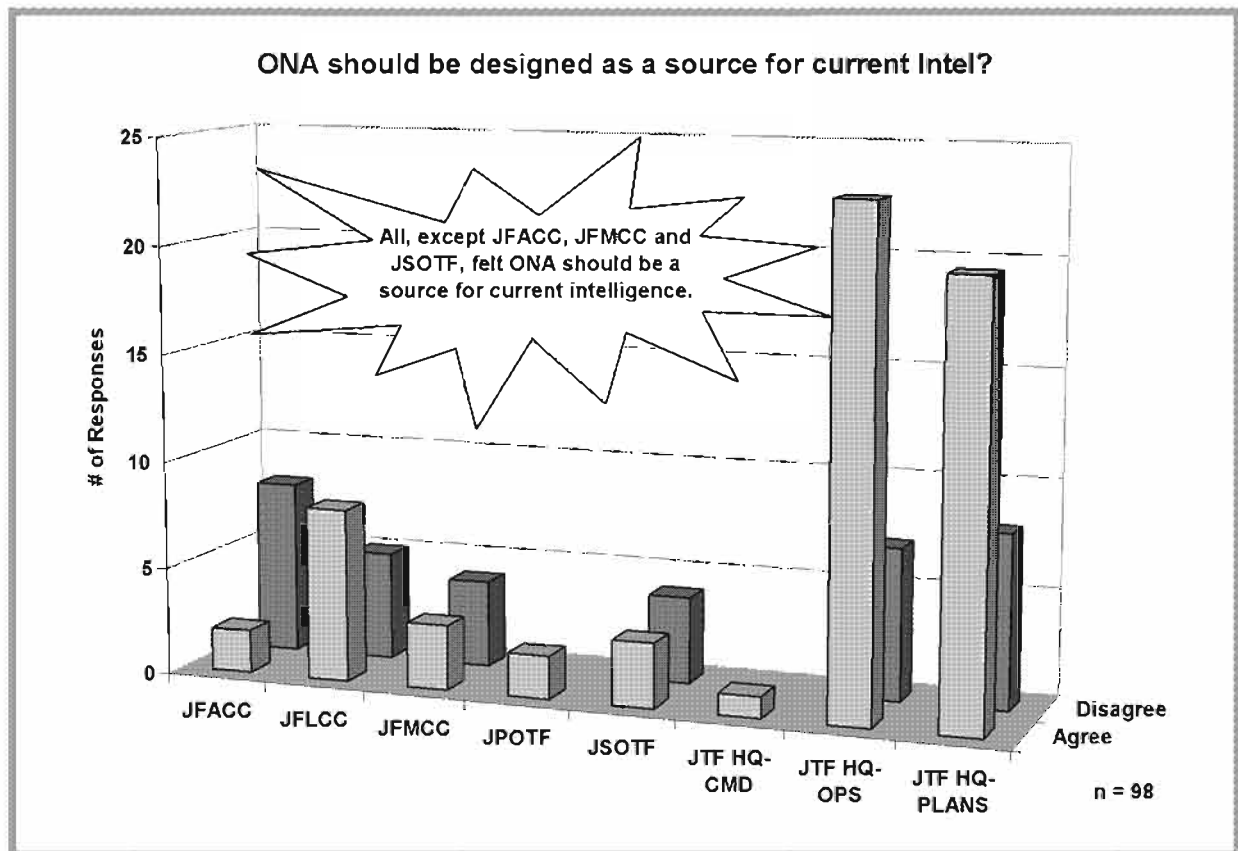


Figure 141: Should ONA be designed as a source for current intelligence information

Again, the message of figures 140 and 141 is not so much the response to the specific survey question, but rather that the JTF staff and the component command level respondents said they had different information requirements. Concept understanding and training may have influenced these replies.

The following observations and comments address ONA concept design that depicts a single ONA for all levels of command; that is, that a single ONA accommodates all command levels. The preponderance of comments supported the finding that users perceived different ONA requirements for different command levels. Additional comments are available at Appendix C — Additional Observations and Comments.

*SCD Observation:* “One limitation of the experiment ONA, even during planning phase, was that it was more useful to the JTF staff than it was to the components.”

*SCD Observation:* “Continue to refine the concept in future exercises and experiments. In particular, improve its pertinence to component commanders.”

*SCD Observation:* “The JTF HQ consumer (ONA) requirements are different than the JIACG requirements.”

*Component Comment:* “ONA was not very useful at the component levels. We need hot links to target folders. We also need better visualization and diagrams to help us interpret data and information.”

*SME Comment:* “A component will want more fidelity in the ONA than a regional commander.”

*Participant Comment:* “If you refer to ‘ownership’ of the database, believe ONA management is better suited at the ‘combatant commander’ level.”

*Participant Comment:* “The only concern with this (*the same version of an ONA*) is that certain information is more important to one level than it is to another. The intent of the ONA is to provide information to the Common Relevant Operational Picture development. Each level will glean from the data, that which is important to it. Therefore, more emphasis must be placed on correctly populating a database where a ‘one size fits all’.”

**Finding 6► Lack of understanding of the philosophical intent, relationship to traditional staff actions, and application of the ONA concept impacted its use.**

Understanding the philosophical intent of ONA, its interrelationship with EBO, and how the JTF could use ONA to accomplish its mission was an experiment breakdown that first emerged during Spiral 3, but became most apparent during MC02 execution. Concept education (vice training) wasn’t considered a factor bearing on ONA during development of the data collection matrix, but it should have been.

Senior mentors addressed the education issue during In-Focus and Azimuth Check sessions. Their comments stressed the need for future leader development, education, and training on the use of the experiment’s new concepts. In their view, a different manor of ‘leader thinking’ would be needed and the onus would be on the professional military education system to pick up the torch. In their view, future leaders would have to be educated to ask the right questions within the context of EBO and ONA; their questions would need to be couched within the context of the new concepts. Essentially a changed culture would “underpin” their thinking.

In addition to senior leaders becoming comfortable with the concepts, junior (staff) officers also would also need to be proficient with the philosophically, new capabilities. They would need to mature with an understanding of the new warfighting culture and know what was needed and where to find it. The new language for prosecuting a conflict would have to be understood by all. An educational effort would be needed to develop language and culture and thus equip these military members with a new basis of operation. Likewise, training programs on the application of tools supporting the concepts would be needed.

The challenge of training participants in the concepts and use of the many new tools first became evident during Spiral 3 as training programs clashed with other experiment and non-experiment duties. Time management conflicts frequently were resolved at the expense of thorough training particularly when conflicts involved senior people. Then not all personnel, who were trained during Spiral 3, returned for the main experiment a month later. (Details of the MC02 training program are included at Appendix B — ONA Training). Many participants indicated in survey comments during Spiral 3 that they were not prepared to use ONA. Day-to-day activities, late notification for participation, and incomplete training were some of the causes cited for their not being prepared. These training difficulties were not surprising or unique to MC02

As noted in Finding 1, many participants had inflated expectations for ONA; it was thought to offer “solutions for all problems.” Referring to the first finding’s figure 133, pre-

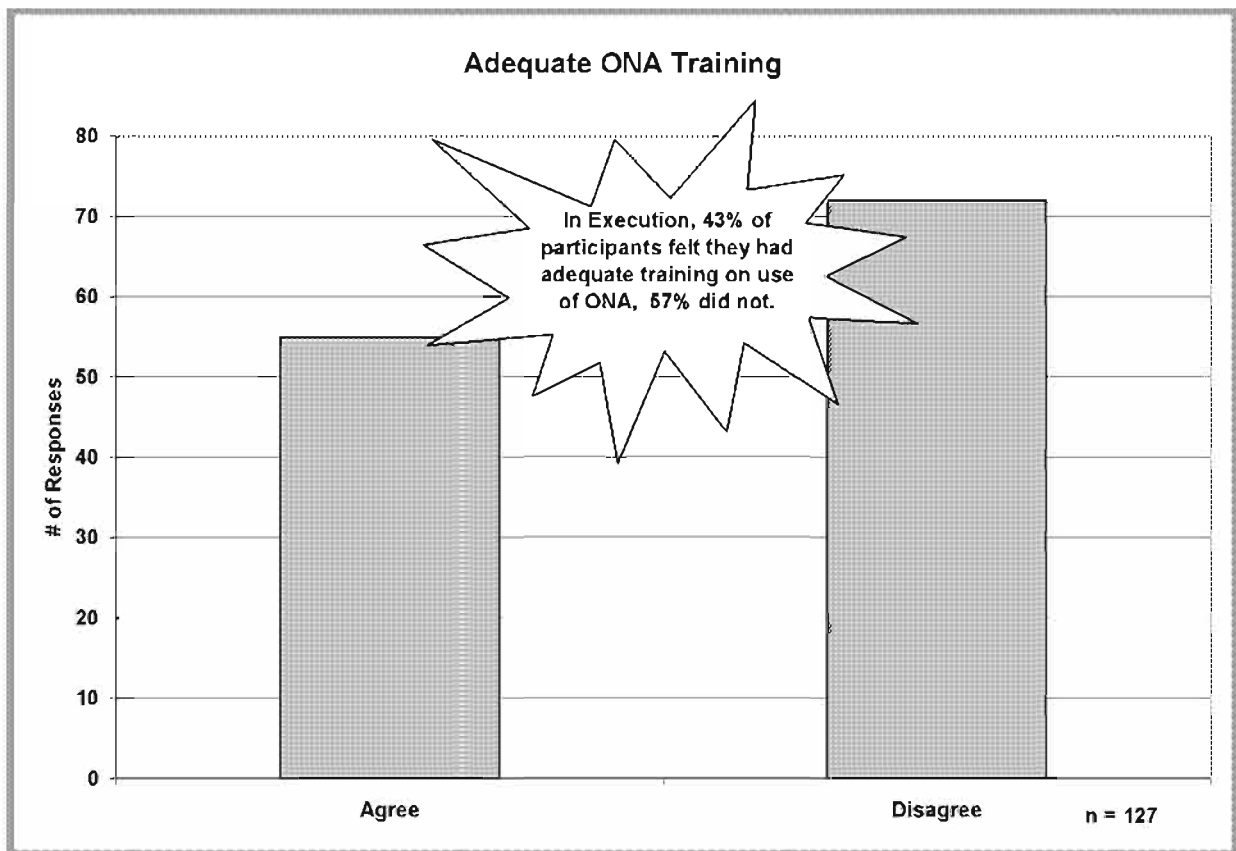


Figure 142: Less than half of MC02 participants thought they were adequately trained on ONA

experiment training failed to match participant expectations with ONA capabilities. Another indicator of training shortcomings impacting MC02 was the number of ‘Don’t Know’ responses. A good example can be found depicted in Finding 1, figure 134. ‘Don’t Know’ was the response selection of choice in that particular survey question, highlighting the fact that respondents weren’t adequately trained. If they had been trained, they would have had an opinion.

Tools for using the ONA database were not as simple, effective, or intuitive as desired. Mentioned in the Methodology and Critical Enablers sections, this was acknowledged prior to experiment start. Experiment participant comments indicated effective tool training should have

included “hands-on” opportunities. Again, the training enabler was known to be less than desired going into the experiment. Difficulty using these tools engendered an intimidation factor that probably tended to steer some participants away from ONA and this too could have impacted data collection. None-the-less, for those who were trained and exposed to them, ONA tools did allow productive application of database information.

The overarching education topic of “new think” was not included in the MC02 training program. Therefore, participants didn’t have the level of understanding or an ingrained ONA or EBO concept operations experience base to draw upon. The frustration of trying to use and apply the new concepts—that really weren’t understood—was woven through participant comments.

Even if the need was recognized, the relationship and philosophical application education for just the ONA and EBO concepts probably could not have been accomplished in the pre-experiment time available. Realistically this level of education was probably needed for all concepts that were included in the experiment. In general, participants did not have the necessary education, training, or experience needed to properly use (get the most out of) the new concepts they were asked to employ in MC02.

Shown in Figure 142 are the results of an execution survey question about ONA training. It asked for agreement or disagreement with the statement, “I was trained adequately to use ONA for this experiment.” The Likert scale options offered for response to the statement included two levels of agreement and two for disagreement; there was also a ‘Don’t know’ option. For this depiction, the 10 ‘Don’t Know’ responses were included with the ‘Disagree’ replies as it was assumed, that if respondents were adequately trained, they would have known it. As shown, more participants indicated that they were not adequately trained than those who responded that they were adequately trained.

Spiral 3 participant survey comments concerning training presented a similar view of the training challenge. A JTF plans participant provided the following comments that generally summarize the common thrust of them all. He offered, “Having not been trained, or informed properly about the ONA system or even understanding the premise upon which it is based, I am not qualified to answer this.”

Previously, figures 138 and 139 presented the difficulty ONA tools offered experiment participants. As discussed with the critical enablers and also mentioned in Finding 4, these tools were acknowledged to be less than desired before the experiment began, but a thorough training program could have compensated for many of their weaknesses. Based on survey results, training was not sufficient to solve the problem.

During execution, participants were asked to rate the ease of information retrieval from the ONA database. That was, “How well did the ONA tools allow you to obtain information from the database?” or, stated another way, “Did your command of the ONA tools allow you to obtain desired information from the ONA database?” Negative replies would tend to indicate a lack of tool command that in turn was probably tied to inadequate tool training. Shown in Figure 143, the respondents with an opinion were about evenly divided between “Easy” and “Difficult.” Even so, the 49 percent responding with “Difficult” translated into 59 of the 120 survey-group respondents, who possibly lost the use of ONA and the perspective it presented. Lack of training prevented them from participating at the same level as the others.

In a Spiral 3 survey, participants were asked to rate the ease of ONA information update and maintenance if they had “write permission” (See Figure 144). There were constraints as to who initially had ONA database modification authority (write permission) to control the information accuracy. Of the 28 who responded, 54 percent (15 of 28) indicated it was difficult.

To add further context to this response, participants with authorized write permission in this phase of the experiment had been using the ONA database prior to Spiral 3. Probably more of a statement about tool use difficulty, the replies still provided evidence of a shortcoming that training was not able to overcome.

The following observations and comments discuss SCD, SME, and senior participant

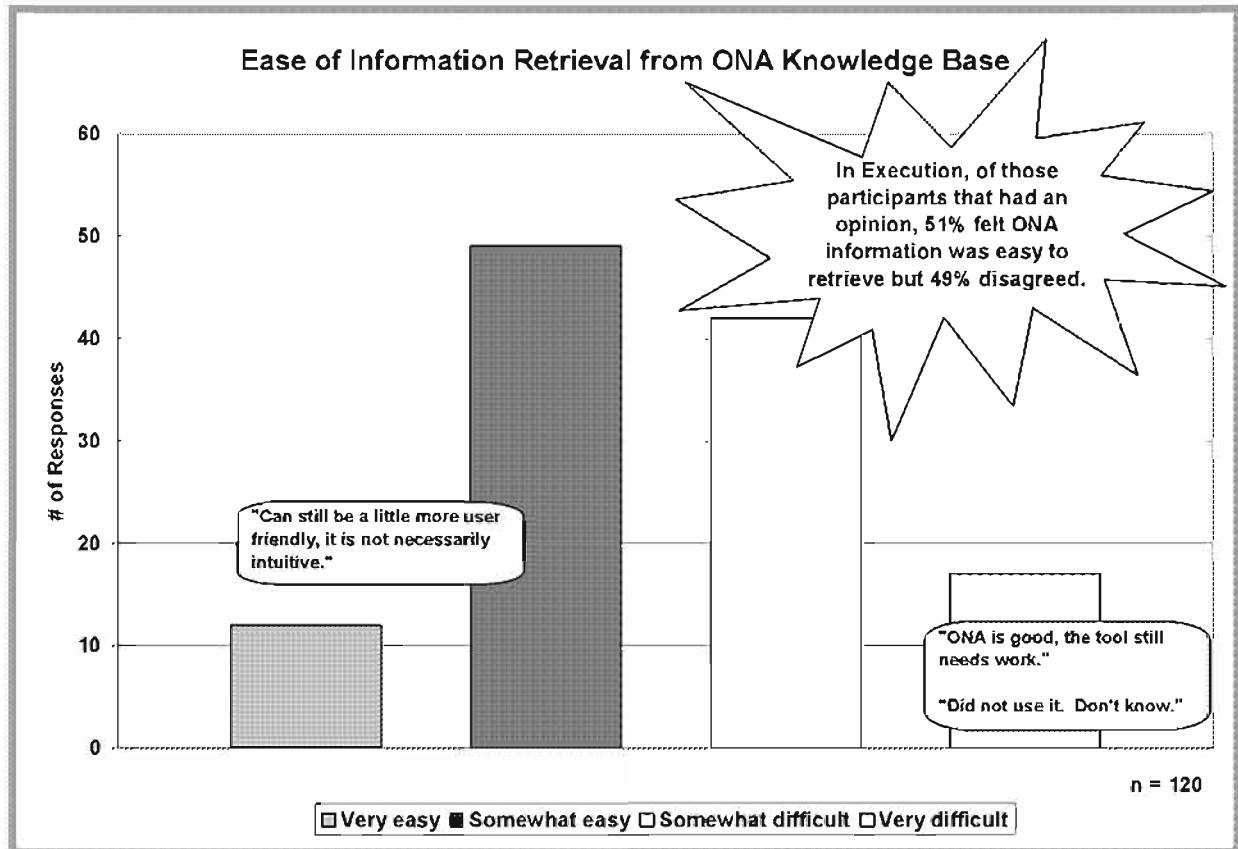


Figure 143: Information retrieval received mixed grades

thoughts’ about participant ONA education and training. The discussion above about education, a new “culture,” and a requirement for military members to develop a new way to think when using MC02 type concepts and tools was needed when reviewing the comments. Between the lines of the comments was respondent frustration of not being culturally prepared to employ the concepts. Additional observations and comments concerning training and education are included at Appendix C — Additional Observations and Comments.

*SCD Comment:* “These knowledge workers (ONA analysts) must be inquisitive, they must have holistic perspectives, and they must be “paranoid” about the opponent tricking or deceiving them. We need a balance between analytic thinkers and some people who rely more on synthesis for their thinking. We must prepare these mental skills in our Service and joint school systems.”

*SCD Comment:* “Future leaders will have to learn to think differently than we do today, more relationally than we do today. ONA is promising because it is relational. We will no longer have to break information into piece parts and analyze the information for trends. Today we analyze information. In the future, we will have to synthesize disparate data, and build

combinations, relationships and to do that we'll have to start earlier and teach commanders and key staff to think relationally. The education will be a long-term challenge. Training will take place later, but it will be equally important to teach people to use the relational tools."

*Participant Comment:* "I wasn't really 'trained' to use ONA. Someone showed me where

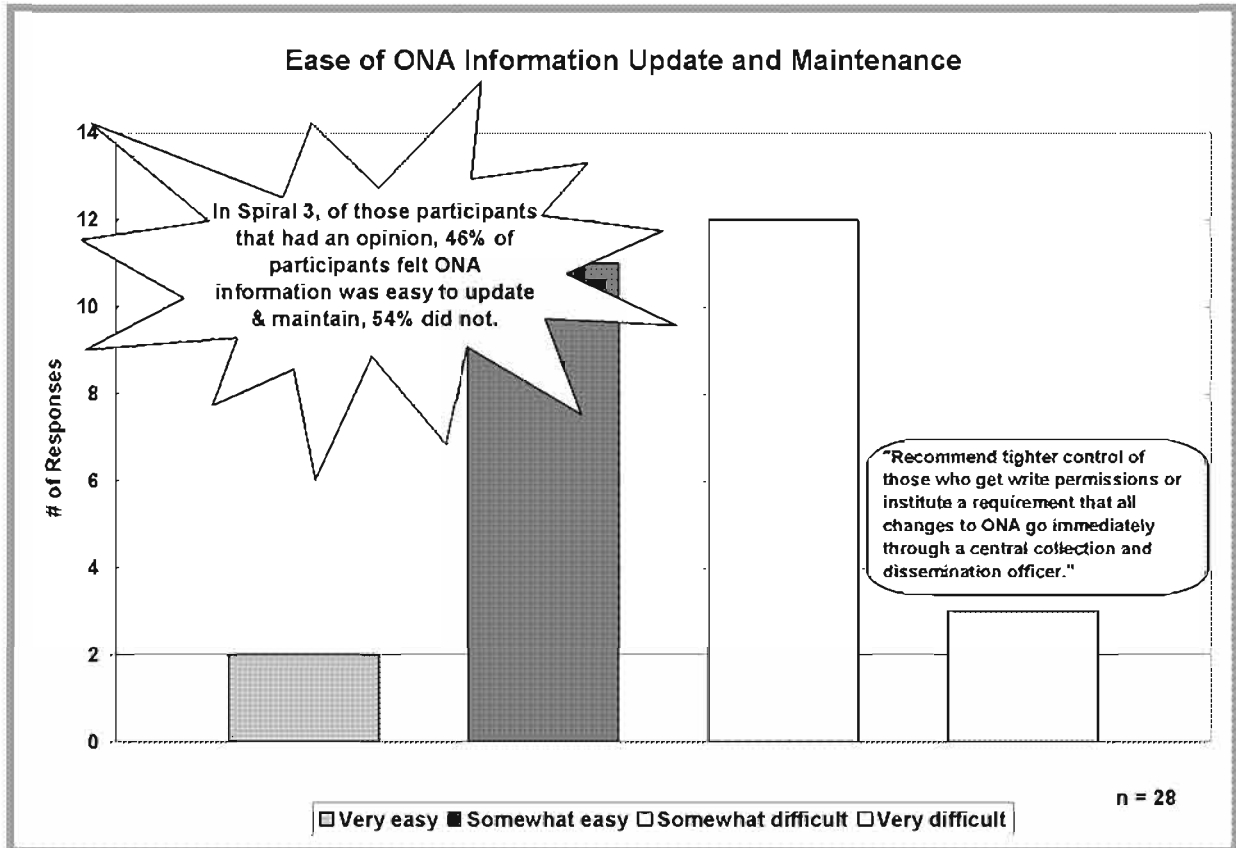


Figure 144: Ease of Information Update and Maintenance in ONA Knowledge Base

to find the database and I figured it out from there. Maybe I don't know all it can do?"

*Participant Comment:* "If you don't know what u (you) want it is a little daunting as a database to learn and find what u (you) want out of it."

The predominant symptoms of inadequate training were participant ONA tool criticism and inhibited use of the ONA knowledge base and its database (See Appendix F: ONA Knowledge Base Access and Use Details Participant Use Of ONA). Survey comments from Spiral 3 and execution spoke to the lack of inadequate tool training. The concept education issue was not as obvious. The requirement existed, but most participants simply didn't notice it. They didn't know what they didn't know.

A senior concept developer summarized the education and training challenge finding for MC02, "It is also clear that we do not yet have the training competency to understand how to get into, update, and employ the ONA. Today we don't come at stuff that way. There is benefit when people can employ ONA. However, there is no benefit when people are using the system they grew up with instead of ONA because they can't reach intuitive conclusions. In the future, we will require an entirely different way to train. We don't yet understand the power of the ONA."



**Other Observations**

**Observation 1: Users were not uniformly aware that ONA was being updated, which led to an unwarranted decrease in confidence in ONA information.**

Maintaining information update and currency would be a challenging effort for any system that supports a dynamic situation. For ONA to provide the support described in the concept papers, its data and analysis had to be continuously updated. This was expected to be a difficult challenge for ONA. In addition to effecting the changes, notification of update was an additional challenge for the ONA during the experiment. As noted in the analysis methodology

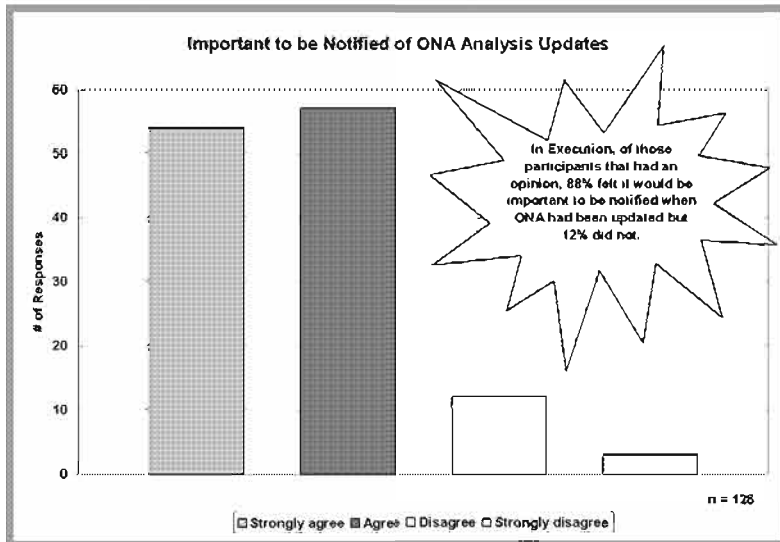


Figure 145: Important to be notified of ONA analysis updates

relational database was tedious, that was how the tools provided change notification to the operator.

A process for ONA change and update was included in SJFHQ TTPs; individuals were identified to make the changes. During Spiral 3, ONA update was not noted as a problem, but during execution, user comments reflected decreasing confidence in ONA when information was

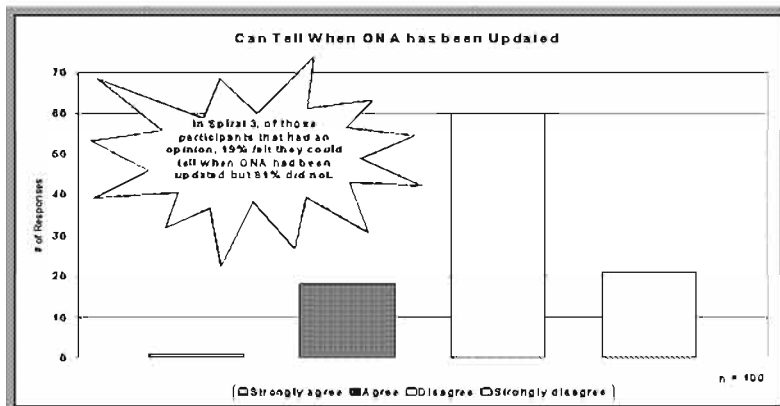


Figure 146: Can tell when ONA has been updated

section, tools that would complement ONA were not as sophisticated as desired. Experiment participants could “subscribe” for notification when context information was changed (ONA Today; matrix; etc.) and they could scroll to the bottom of database pages to check currency of that page (who changed; when changed; what changed).

Using the first tool generally meant a steady stream of screen alerts as updates were made and participants did not long tolerate the ensuing interruptions. Nevertheless, even though reviewing each page in the ONA

was thought to be outdated. Review of ONA database access and change activity indicated that changes (update) actually were made during execution, but most users were not aware they had been made. ONA information currency did not satisfy the users.

Inadequate training might have been part of the reason participants failed to take advantage of these notification capabilities

The charts here and that

follow indicate the importance ONA users placed on database currency and update. ONA users endorsed the currency requirement. Survey responses suggested the ONA knowledge base (including the database) was not continually updated to reflect battlespace change. The update process seemed to operate correctly from the view of those involved with the process, but because of the notification tool challenges, the currency actions taken (updates) were not seen by participants. The result, participants did not see ONA update as adequate.

Execution participant responses to the statement, "It is important to be notified of ONA analysis updates," were definitely supportive. In figure 145, 88 percent (111 of 126) of respondents with an opinion agreed; 12 percent (15 of 126) disagreed. Of those who disagreed (15 survey recipients) seven provided comments. Five of these seven respondents based their disagreement on the assumption ONA would be continuously updated and therefore notification was not needed. Essentially, they were in agreement with the statement and their position increased the percentage of actual agreement from 88 to 92 percent.

During Spiral 3, as shown in Figure 146, 81 percent (81 of 100) of survey respondents

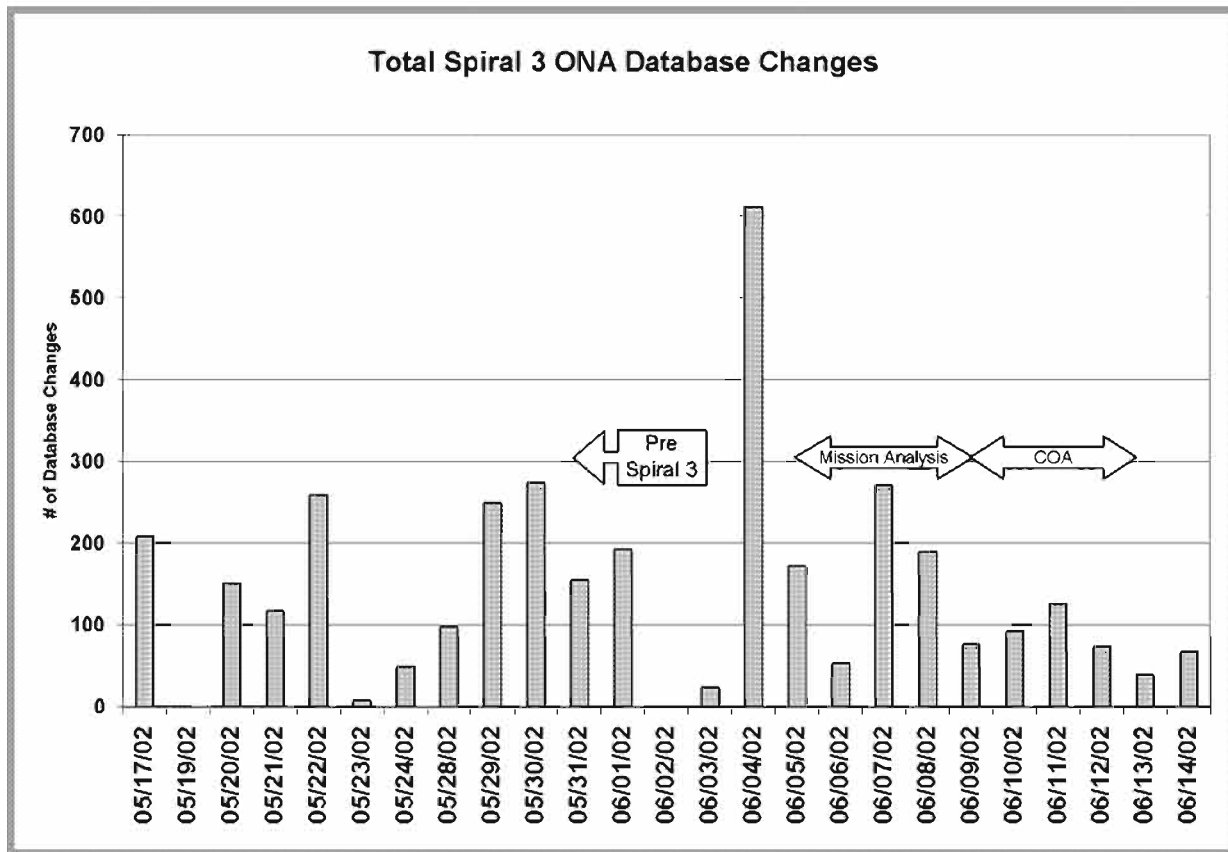


Figure 147: ONA database changes

with an opinion stated they could not tell when the ONA had been changed or updated ("Can you tell when ONA has been updated?"); 19 percent reported they could tell when changes or updates were made. As previously discussed there was no built-in update notification feature associated with the ONA database; if users wanted to see currency status they had to initiate notification action. Pre-experiment training may have contributed to the situation.

These results combined with those of figure 145 showed the importance experiment participants placed on ONA update and notification.

Figure 147 indicates a gradual increase in the ONA database daily cumulative data changes as Spiral 3 approached but a gradual decrease in the cumulative data changes in the ONA database as Spiral 3 progressed. This decreasing data change trend occurred because the SOSA cell was tasked for information by the plans group and did not have time to maintain their pre-Spiral 3 data change tempo. It should also be mentioned that the gross number of changes may have decreased during this period but, after checking with SJFHQ members who made changes, those that were made had high impact and relevance for the users.

Figure 148, below, displays a gradual increase in the number of changes to the ONA database as the start of the experiment approached, but a gradual decrease in the cumulative data changes in the ONA database as execution progressed. Once again, the changes made were to nodes, actions, and links that were of great interest to the users. As planning events (shown in the text boxes at the top of the graph in Figure 148) lead to operations, effect-node-action relationships were impacted and changed.

Changes were made to the ONA and the participants placed high importance on that, but they could not tell when it had been changed.

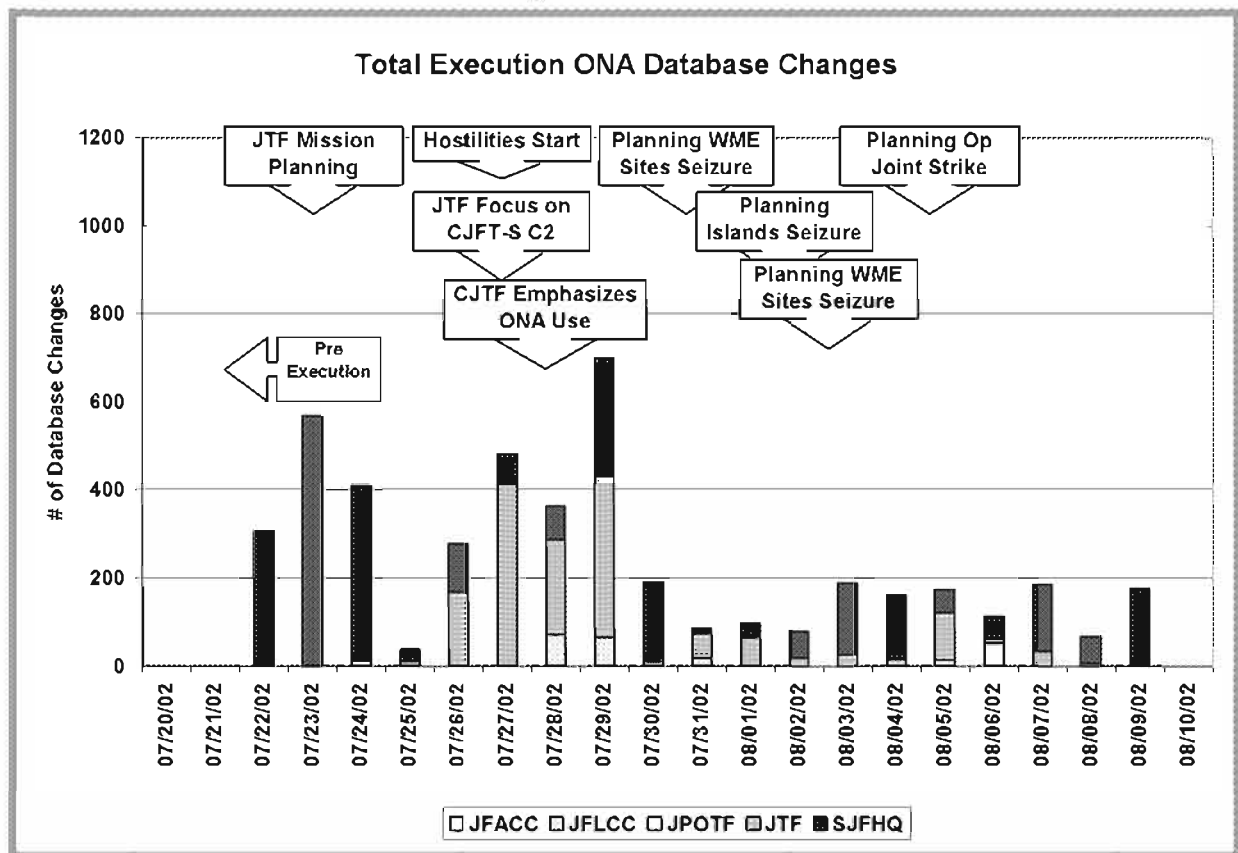


Figure 148: Total execution ONA database changes

**Observation 2: Both ONA warfighting challenges were met.**

Analysis of the challenge, task, measure, data requirement, and data element ONA matrix, which is included at Appendix A - ONA Data Collection Matrix Analysis, determined that these warfighting challenges were met.

**Observation 3: It was observed that the experiment's ONA knowledge base did not include Blue force logistics data or information.**

All of the Blue logistical support data and planning information was available from the Log CROP, but the Log CROP could not be accessed through the ONA knowledge base because the Log CROP had a separate portal page on the common experiment server. This architecture was contrary to the ONA concept's depiction of an integrated intelligence, operational, and logistics information warehouse that supported effects-based planning and ultimately produced an ETO. The suggested relationship was intended to create routine interaction between the three specialties that would also produce more efficient and effective use of resources. Implementation of the logistic portion of the ONA knowledge base requires further definition.

**Relationship to Other Objectives**

Within the context of MC02, ONA directly impacted experiment objectives one and four. Indirectly the concept impacted and was impacted by each of the objectives.

- Experiment objective 1, 'Establish Information/Knowledge Superiority', contained two warfighting challenges; ONA knowledge was needed for successful accomplishment of both
- Experiment objective 4, 'Conduct Decisive, Effects Based Operations', had three objectives and all used ONA information. In fact, there were SCD statements that said EBO was not possible without an ONA and they must be discussed together

**Relationship to Baseline Analysis**

- There was no baseline data available with which to compare ONA. SMEs offered some comments on their estimate of ONA impact on JTF performance. These were founded on their personal experience and perception from the training environment and were not made in relation to a historical baseline

**DOTMLPF Linkage**

The ONA DOTMLPF package included five training related recommendations. They were:

- Development of ONA Training Plan
- Evaluate Training Strategies
- Development of PME Strategies
- Evaluate and Implement Methods to Incorporate ONA Education Programs into Existing Intelligence Training Programs
- Services Incorporate ONA Education Strategies

- MC02 Final Report, ONA Finding 6 (Lack of understanding impacted ONA use), links with each of these DOTMLPF training recommendations. However, before moving too far along with them, response to MC02 Final Report ONA Finding 1 is needed. Without a clear definition and understanding of what ONA is to do; what it includes; and how it is to be used, training programs cannot be developed. The ONA concept needs clear articulation
- Another ONA DOTMLPF package recommendation was to, "Continue SJFHQ Experimentation Efforts to Determine Requirements for ONA Development " That

recommendation links easily with ONA Findings 1, 2, and 5. Once again, the considerations of ONA Finding 1 need to precede this DOTMLPF recommendation

- Finally the DOTMLPF recommendation for, "DARPA 'ONA for EBO' Tool Development" tracks with ONA Finding 4. The ONA Finding stresses the importance that tools supporting ONA need to enhance a "mind's eye" view of the information in the knowledge base

## **Recommendations**

1. JFCOM, define the intended use of ONA. ►

- ONA's warfighting contribution must be detailed and "packaged" for universal understanding. The concept currently presents ONA as having a range of options for all conflict and command levels. Technology can or will support many variations of a knowledge base but until the military's intended use for the ONA process and product is understood, implementation will be disrupted. The ONA message needs to be articulated; USJFCOM must design and implement a campaign that does it. ONA is "very young" and can generate more questions than answers at this point; it needs a trace that connects its dots. USJFCOM must specifically define what ONA is to be used for; the command level it is to serve; how it is developed and maintained; and the type of information it will offer. These decisions need to be made before ONA development can move forward and supporting elements like tools and training can be shaped. Based on the results of an internal development effort, USJFCOM can shape understanding of ONA and sponsor further experimentation. The process can prepare the command for other questions critics of the concept will have waiting.

2. JFCOM, establish a section within joint experimentation that designs visualization models for its concepts. ►

- Participants voiced frustration with not having common understanding of the ONA concept. A visual depiction of ONA needs to be built that provides a clear unambiguous mental picture for all. This same approach needs to be used for the other joint experimentation concepts.

3. JFCOM, focus ONA development on the command level for which it was designed. ►

- There may be aspects of ONA that can have relevancy for several command levels without particular specialization. If so and ONA is available to them, these aspects should be exploited by the various levels. However, if ONA is to be implemented it must be focused on the level specified in the concept (operational). Current technology may permit distribution of ONA from strategic to tactical command levels, but the information (the "programming") will still have to be designed and broadcast for the primary level. Other levels will have particular interests that are pertinent for them. The information can be used as needed for perspective. However, at this point in its development, ONA needs to be focused; its applicability can be expanded as training and technology mature with the concept

4. JFCOM, develop a PME template that guides development of joint and service ONA concept education and training. ►

- This template should describe the concept and then propose the new manner of leader thinking that will be needed to employ it. For all future experimentation with ONA, participants must be prepared as much as possible for the different way of thinking these concepts will require. They

must be trained and proficient with them. They will need the training background to use the ONA concept correctly. USJFCOM needs to identify training building blocks and present them so other joint organizations and the services can build unambiguous PME training courses that place ONA in context.

5. JFCOM, design ONA knowledge base tools that are intuitive to use and dynamically support developers and users. ►

- Complaints about the tools supporting ONA most often cited them as not being intuitive to use. Access and manipulation tools must be straightforward and simple to employ. Additionally, artificial intelligence process tools will be needed to identify pertinent information from the bundles of data that are reviewed. They will need the ability to continually read, categorize (taxonomy), and organize (index) large quantities of documents across file systems, web sites and databases using artificial intelligence data/web crawlers. The tools will also need the ability to notify users via various avenues when content or concepts are changed according to predefined rules. Once the significant pieces of information are developed, they will need to be pushed to the appropriate users. Developmental tools that perform these functions as well as decision support tools need to be built and incorporated with the concept. They will need "push" from USJFCOM. Relationship of the elements included within the ONA database-planning tool was another concern. They asked for a process that would permit visualization of how these ONA elements related to each other. To address the need for Effect-Node-Action visualization requirements, the tool needs a graphical application that could visually portray interrelationships and linkages of the relevant concept information being categorized and indexed. This visual capability needs to be built into ONA support tools. JFCOM needs to oversee a coordinated process that causes all of these tool capabilities to be developed. Until ONA is fielded, USJFCOM must keep the ONA tool development and integration effort moving.

6. JFCOM, in conjunction with a combatant commander, develop a prototype ONA. ►

- An ONA knowledge base prototype must be cast. A defined group that would be expected to develop an ONA should construct this prototype. It should address a real world circumstance and be available for real world use when completed. Development and update tools, employment procedures, and other knowledge base components can be refined and improved by using it as a test-bed. Technology and experience will shape changes but the prototype will be the common starting point.

## Appendix A — ONA Data Collection Matrix Analysis

The context of the exercise/experiment did influence both of the ONA warfighting challenges. For the first challenge, combatant commander Blue's strategy for the experiment was developed outside of scenario play but within the bounds of the experiment's ONA. JTF Blue employed this strategy. The experiment developed ONA was used for reference and support. Tasks associated with the second challenge were successfully completed using ONA during the experiment. ONA supported enhanced decision-making.

### ONA Warfighting Challenge 7.1: Ability to construct and use ONA knowledge base to support development of an effects-based strategy

#### Challenge 1 Supporting Tasks:

- Develop an ONA knowledge base
- Analyze Red's PMESII systems (for tangible and intangible strengths and weaknesses)
- Continually update the ONA to reflect battlefield change
- Employ automated tools to virtually and collaboratively access, manipulate, and maintain the ONA knowledge base

#### Task 7.1.1: Develop an ONA knowledge base

An ONA knowledge base was developed by JFCOM J9 for the MC02 experiment. It was not as robust as the product included in concept description documents, but was complete enough to effectively stimulate experiment activity. The ONA knowledge base was defined to include all ONA related data and information presentations (ONA Today; ONA Matrix; ONA References; ONA Products; ONA Database) available to experiment participants. The ONA database provided support for effects-based plan development and revision.

Review of database development and change was conducted by using a Structured Query Language (SQL) database audit log. SQL triggers made entries to the audit log when certain events occurred in the ONA database tables. The audit log essentially recorded or "counted" user activity. The ONA database contained detailed data tables on nodes, effects, actions, resources, references and Effects Based Operations (EBO) plans. Manipulation of these tables could be made relative to the conflict phase (Influence, Deter, Coerce, Compel, Defeat, and Transition), national power capability (DIME), and adversary systems (PMESII). When a change was made to an EBO based plan, the activity was added to another table titled Selected NAE (Node-Action-Effect) Link. This provided indication of plan change activity. When a document was linked to an Effect, Node, Action or Resource it too was noted and recorded within the Reference table. Review of the count totals provided insight as to how the database was used and by whom.

Spiral 3 and execution

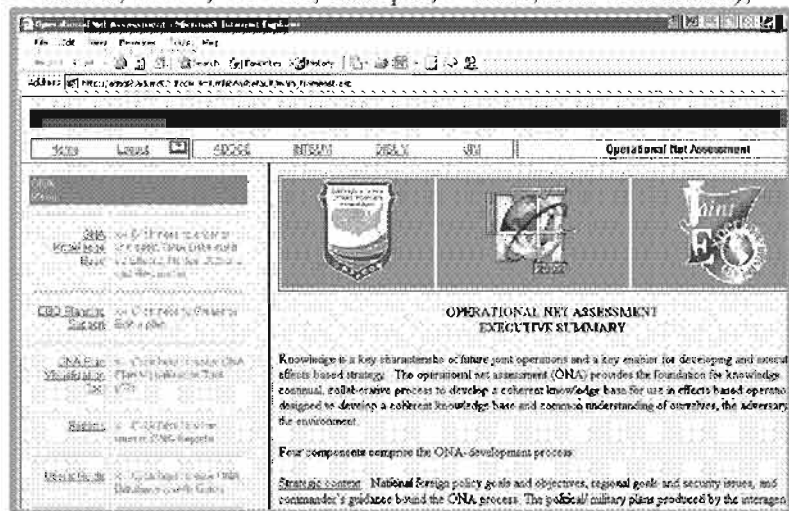


Figure 149: ONA desktop snapshot

count and survey results indicated task 7.1.1 was completed. The several charts that follow detail this finding. Database change activity and survey result information were used to support the conclusion that an ONA knowledge base was developed. Figure 149 is a screen capture of the browser-based user access page to the ONA database from which the audit log (mentioned above) derived its data.

The following four figures depict the browser-based ONA database *data changes* (additions, deletions, corrections, updates, etc.) and database *viewings* that were made during development of the ONA database. While all participants had “viewing” privileges, some participants had “write” privileges to the ONA database. The pre Spiral 3 activity levels starting 17 May are included to show a relative level of effort before the experiment start. Unfortunately, not all of the knowledge base development in March and April was captured because the audit log had not been created.

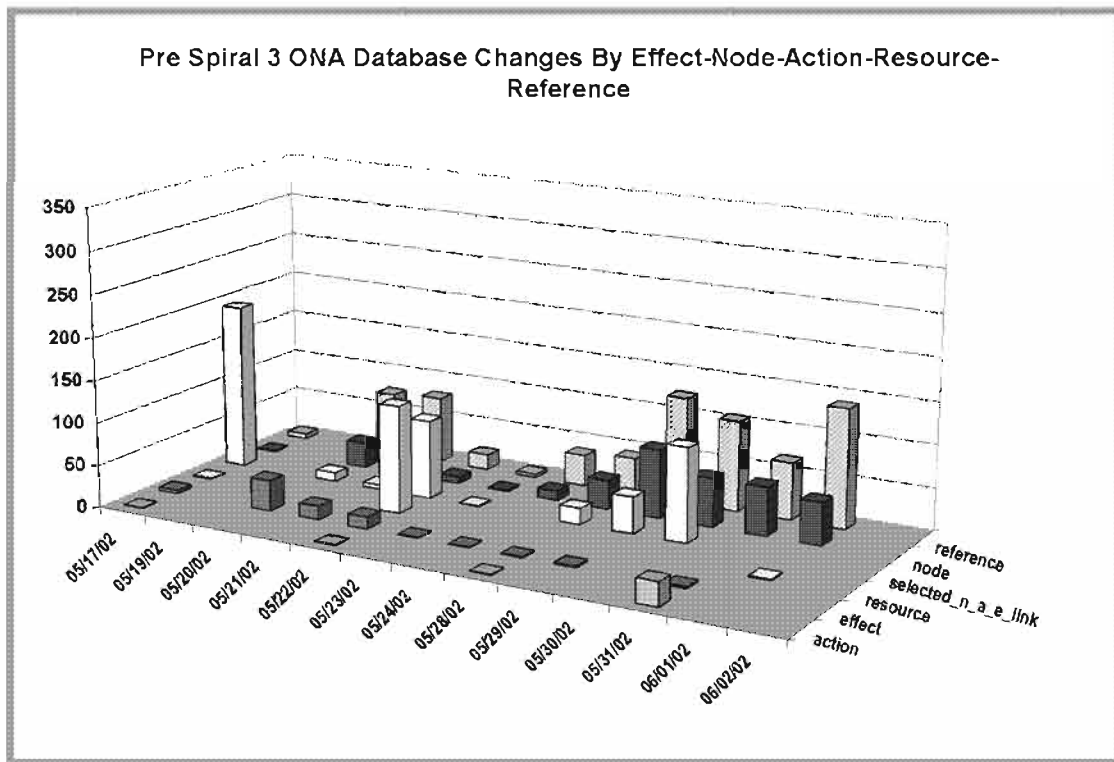


Figure 150: Pre Spiral 3 ONA Database Changes

Information in the ONA database was linked to the categories Effects, Nodes, Actions, Resources, and References. The category titled “Selected N-A-E (Node-Action-Effect) link” shows the level of change activity in the Effects Based Operations (EBO) plans area of the ONA database. These database categories could be changed. Whenever an addition, deletion, correction, update, or other plan modification action was made, the database audit log received a count. Figure 150 breaks out the categories and their amount of *data change* activity from 17 May to 2 June. Nodes and Selected N-A-E links were the predominant areas where data was being changed. Changes to Effects, Actions, and Resources data were minimal.

Figure 151 displays ONA database change actions prior to and during Spiral 3 that was principally a planning evolution. During the 17 May to 2 June period, the System of Systems Analysis (SOSA) cell conducted *data change activity* (additions, deletions, corrections, updates,



etc.) within the ONA database. This modification and development action presented database development just prior to Spiral 3. Discussion with members of the SOSA cell confirmed this pattern of database development was typical for their entire build process.

It was not a smooth straight-line development effort. As information was developed and matured, it was added to the database. Some days seemed more productive than others did, but this productivity wasn't necessarily related to the effort expended for the day. The bar graph depicts a gradual increase in the cumulative data changes (development) in the ONA database as Spiral 3 approached and a modest, but decreasing level of data change activity during the mission analysis and course of action (COA) phases of Spiral 3 planning development process. One contributing factor to the "apparent decline" in activity was that the SOSA analysts were heavily engaged in creating thousands of links between the various effects, nodes and actions and, unfortunately, this linking activity had not been programmed for capture by the audit log during Spiral 3 or execution. The collection requirement is being programmed for future experiments.

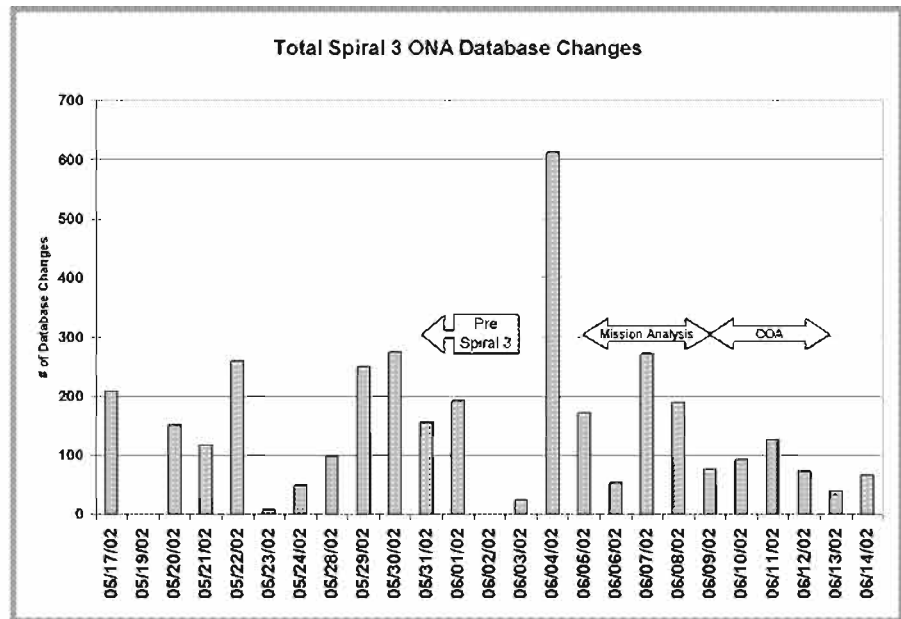


Figure 151: Pre Spiral 3 ONA Database Changes

Figure 152 also presents perspective on database development. All participants had "viewing" privileges, but some participants had "write" privileges to the ONA database as well. Due to the constructs of the ONA audit log, participants making changes to the data were also counted as viewers since access was browser based. Figure 152 depicts the cumulative viewing of the ONA database by all experiment participants via their web browser before and during the Spiral 3 periods. The May 17 – June 2 period activity represented SOSA cell viewing activity for the continued ONA database population just prior to Spiral 3.

All viewing activity by experiment participants and SOSA analysts' during Spiral 3 (June 3-14) was as shown by the vertical bars. Potentially, each time the database was viewed a change could have been made and additional database development conducted. As with the database change chart, figure 152 shows a gradual increase in the cumulative participant viewing (and potential development) of the ONA database as Spiral 3 progressed through the mission analysis and COA phases of the JTF planning development process.

Figure 153, on the next page, depicts the cumulative viewing of the ONA database by all experiment participants via their web browser just prior to and during MC02 execution. This chart is included with this first challenge task (7.1.1) to support the challenge requirement of not only constructing an ONA database, but also "using" it.

The figure displays two increase and decrease cycles in the cumulative viewing of the ONA database as the execution scenario progressed. During the first cycle, there did seem to be some correlation between planning and the level of viewing activity. Although the viewing peaked after planning had begun, it may have been used to confirm courses of action presented in the plans or to follow-up on guidance received from the commander during the planning review process.

After the CJTF emphasized to the staff (and components) during collaborative

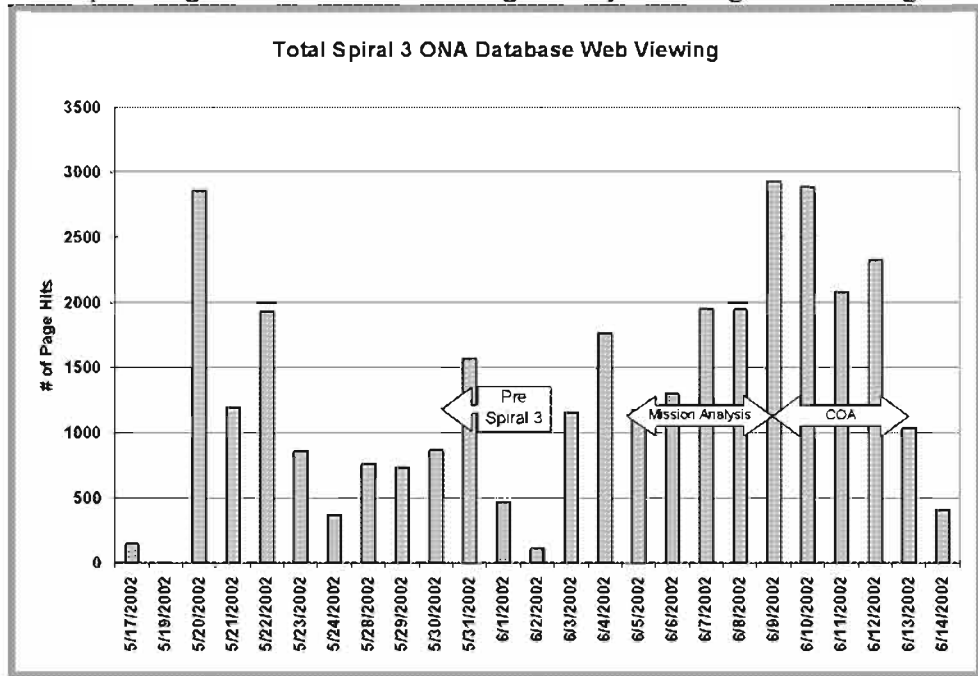


Figure 152: ONA Database Viewing

review sessions the need to use ONA, there does appear to have been a direct correlation in the second cycle between planning activity and ONA database viewing activity.

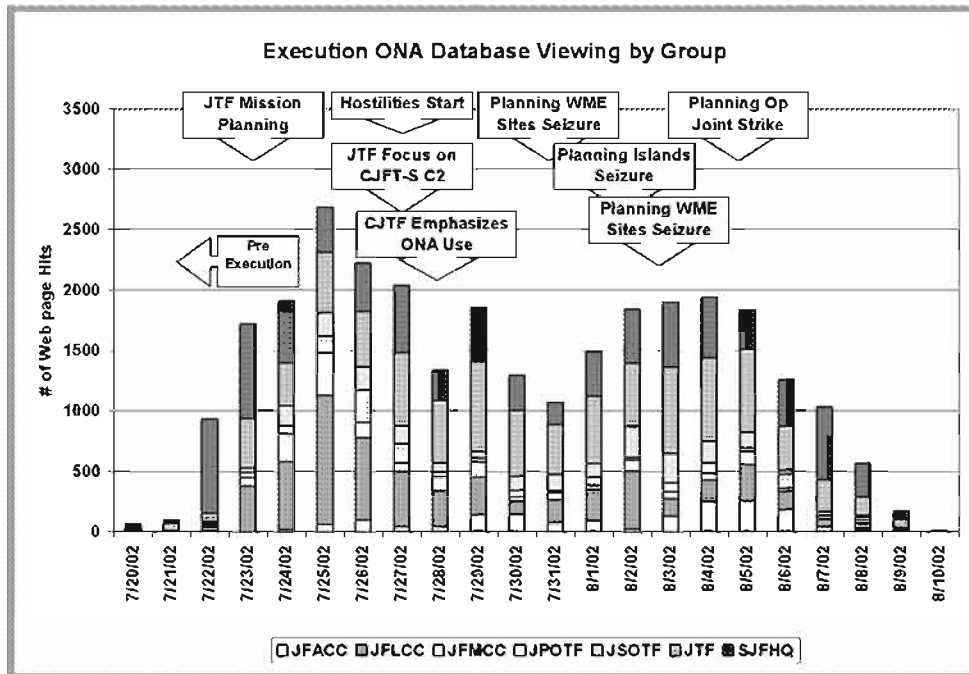


Figure 153: execution ONA Database Viewing by Group

Note the SJFHQ and JTF viewing activity remained fairly constant during execution; so the changes in viewing amplitude was generally attributable to the viewing activity of the components. In addition, a portion of this viewing activity was due to changes made to the ONA database. These changes also resulted in viewing "counts or hits."

Key to ONA knowledge base development was pre-analyzed PMESII and DIME data. Figure 154 shows that development was thorough enough that the analysis was understood by 84 percent (76 of 91) of survey respondents.

Execution survey group members were asked to consider the statement, "ONA analysis of Blue DIME vs. Red PMESII is understood."

Figure 154 shows that respondents with an opinion indicated the MC02 knowledge base presented the DIME and PMESII analysis well enough that it was understood by more than 84 percent of them. Some 16 percent reported they did not understand the analysis.

Another indicator of database development adequacy was the database's utility. In

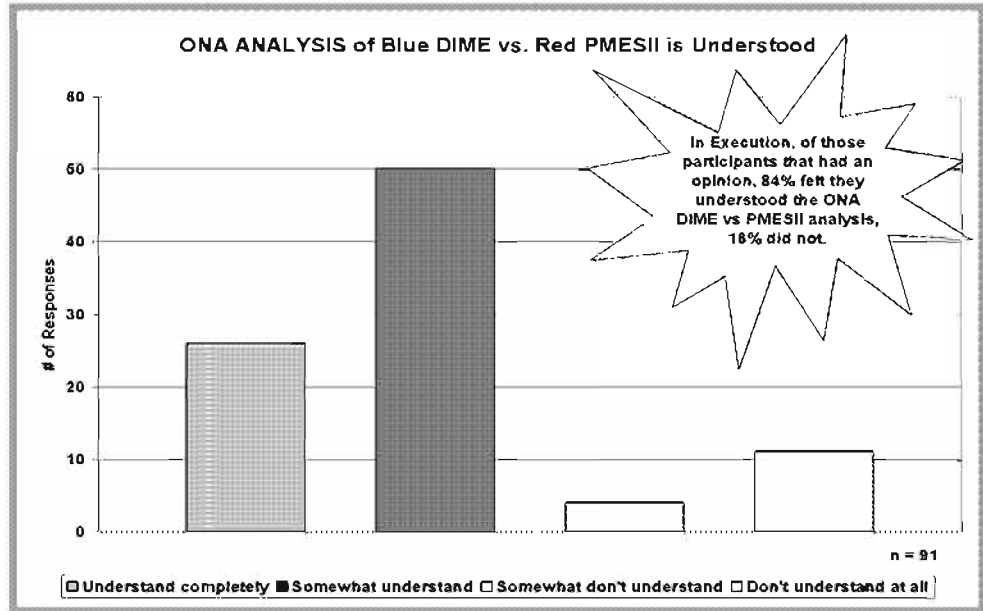


Figure 154: ONA analysis is generally understood

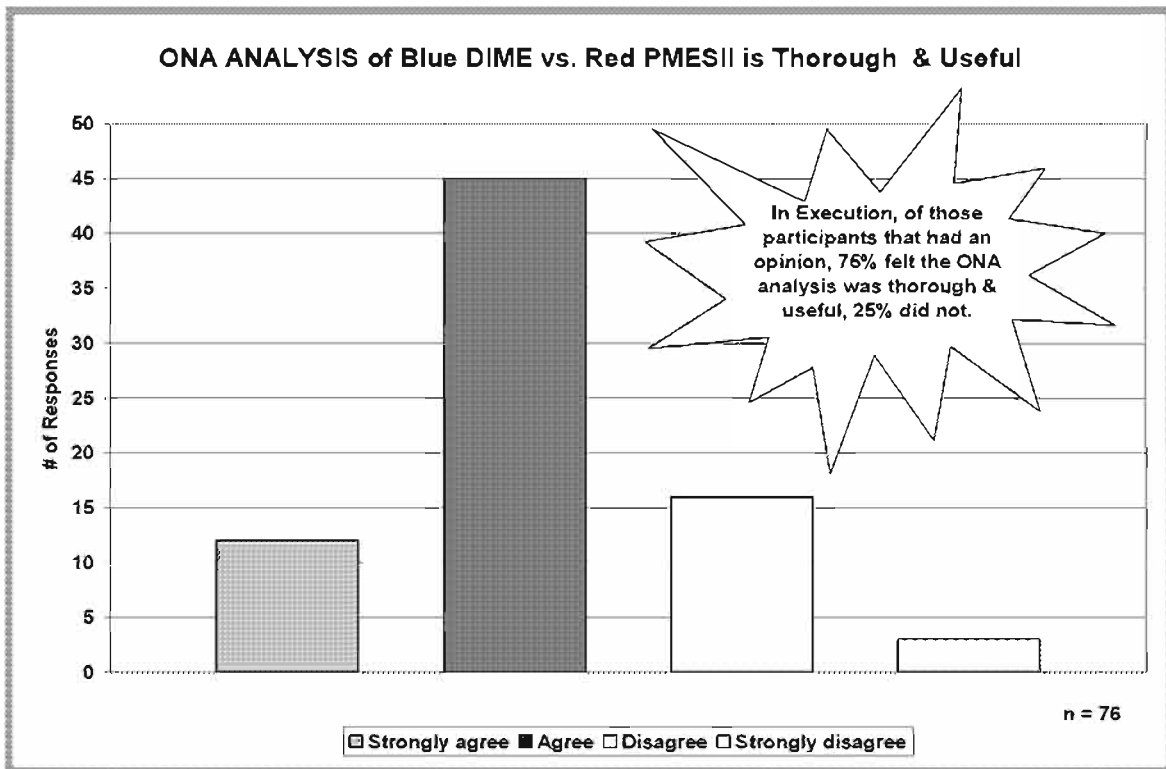


Figure 155: ONA analysis is thorough and useful according to majority

addition to being understood, figure 155 shows that during MC02 execution the pre-analyzed PMESII and DIME data were thorough and useful for 75 percent (57 of 76) of the respondents, who agreed or disagreed, 25 percent (19 of 76) of this group disagreed. Twenty-five percent of the total population surveyed indicated they did not know how to respond to the statement. Those who included comments with the “Don’t know” said insufficient training was the reason for their response.

Shown in figure 156 is another measure of ONA database development adequacy. The ONA concept portrays a knowledge base that contains analysis of both Blue and Red data. Results of a Spiral 3 survey question asking for response to the statement, “ONA analysis of Blue information is useful,” indicated the majority of respondents from the population with an opinion (51) agreed the analyzed Blue information was useful; but almost as many from the population (49) didn’t know (weren’t sure) about the statement. At this point in the experiment (Spiral 3), the uncertainty of so many respondents probably reflected their initial exposure to the ONA concept and associated inadequate training. Of those who agreed or disagreed, 51 percent agreed with the statement. The results say there was an operative ONA developed.

Finally, development of ONA (among its other contributions) was to provide situational awareness. Presentation of shared battlespace awareness was a desired ONA attribute and an indicator of knowledge base development adequacy. In figure 157, three times as many survey respondents (66) agreed that the ONA knowledge base presented a shared awareness of the battlespace as those who disagreed (21). These numbers said 76 percent (66 of 87) agreed and 24 percent (21 of 87) disagreed. Fifteen percent (15 of 102) of all respondents said they did not know.

Review of database change activity, total viewing of the database, viewing of the database by participant organization in relation to on-going scenario activity, and participant responses to database understandability and utility questions all support the assessment that task 7.1.1 was developed (and use) of an ONA information database, was successfully completed.

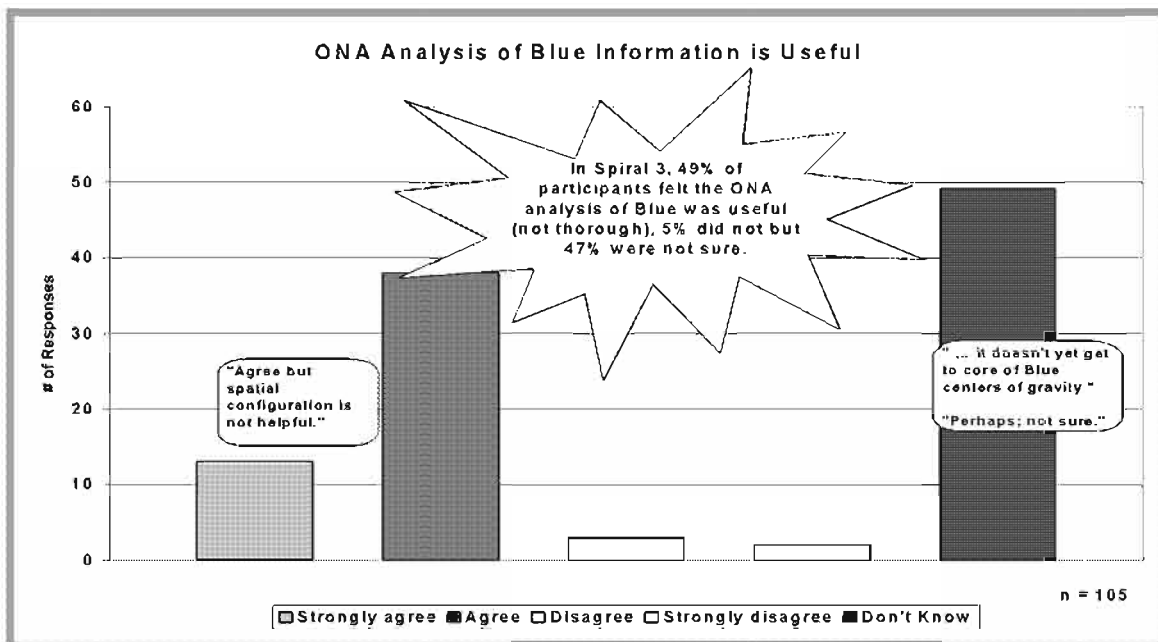


Figure 156: ONA analysis of Blue is useful

**Task 7.1.2 Analyzes Red’s PMESII systems for tangible and intangible strengths and weaknesses.**

Central to the ONA concept is available, understandable, and useful analyzed adversary data. Because of the pre-experiment real world circumstances, the ONA knowledge base

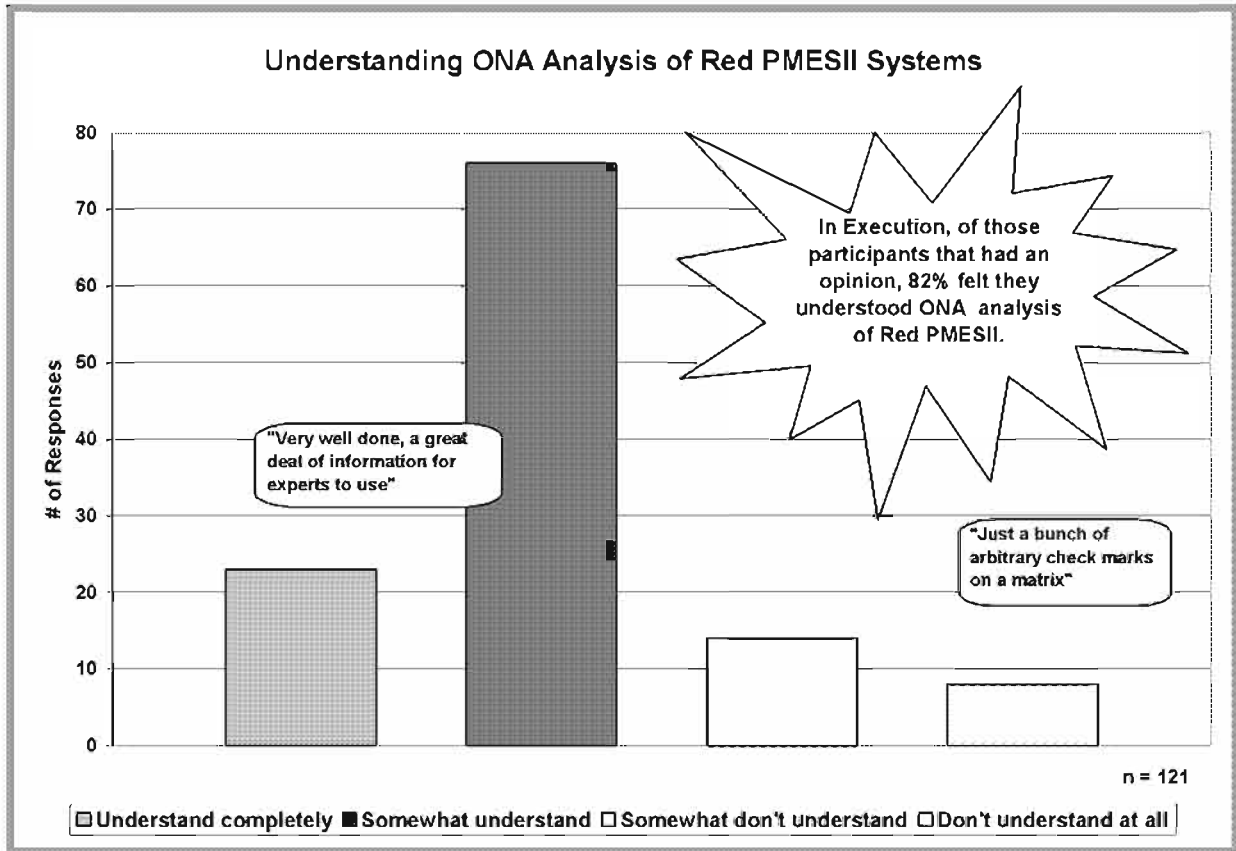


Figure 157: Eighty-two percent of respondents said they understood ONA analysis of Red PMESII

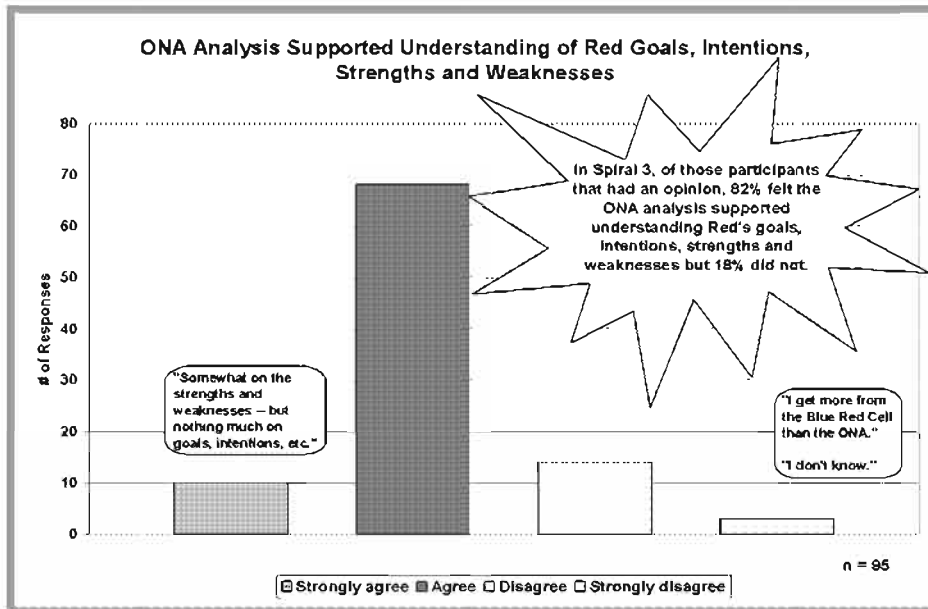
developed by JFCOM tended to be militarily flavored. However, there was sufficient cross culture breadth and depth of the Red PMESII spectrum included, that a sense of interagency involvement was established within the database. Survey results for questions that addressed task 7.1.2 indicated it was accomplished successfully. The three charts that follow detail the measures that supported completion of this task.

Figure 157 depicts execution respondent understanding of the ONA Red PMESII analysis. Eighty-two percent (99 of 121) of the survey respondents with an opinion indicated they understood the analysis; the response comments said the analysis was comprehensive enough for their purposes. Twenty-two respondents (18 percent) reported they ‘somewhat’ or ‘completely’ did not understand the Red PMESII analysis.

Utility of the Red PMESII analysis for experiment participants was also an indication of how well the Red PMESII systems were analyzed. Spiral 3 (when contingency planning was conducted) participants were presented with the statement, “ONA analysis of Red PMESII is useful.” In figure 159, on the next page, 90 percent (91 of 101) of the respondents who agreed or disagreed reported the Red PMESII analysis was useful and 10 percent (10 of 101) indicated it

wasn't useful. Nineteen percent (23 of 124) of the total population surveyed did not have an opinion.

Successful analysis of Red PMESII systems within the ONA was largely measured by its



identification of Red goals, intentions, strengths, and weaknesses. Spiral 3 survey recipients were asked to agree or disagree with the statement, "ONA analysis supported understanding of OPFOR goals, intentions, and weaknesses."

Shown in figure 158 there was strong respondent agreement (82

Figure 158: ONA analysis of OPFOR goals, intentions, strengths, and weaknesses

agreeing or disagreeing that the ONA analysis did provide the noted OPFOR information; 12 percent (17 of 95) disagreed. The 38 respondents who answered N/A to this survey question represented 29 percent (38 of 133) of the total survey population. There were only two of these

N/A responses with comment and they indicated ONA was not used. This was normal for N/A question responses provided to other survey questions and for other surveys. Again, these responses probably reflect Spiral 3's initial exposure to the concept and the participants training. Participants were asked if they understood the ONA analysis of Red PMESII; if the analysis of Red PMESII was useful; and if the ONA

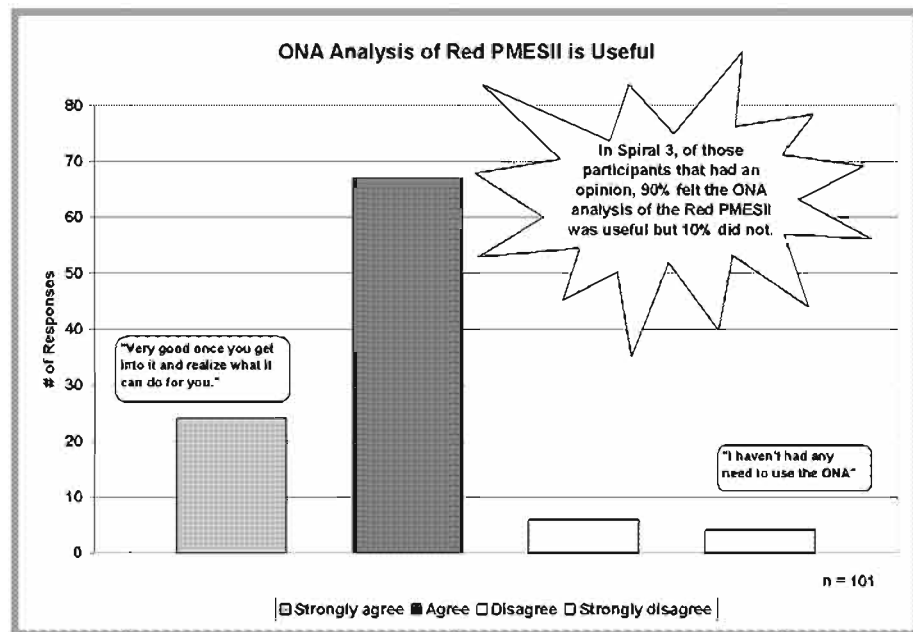
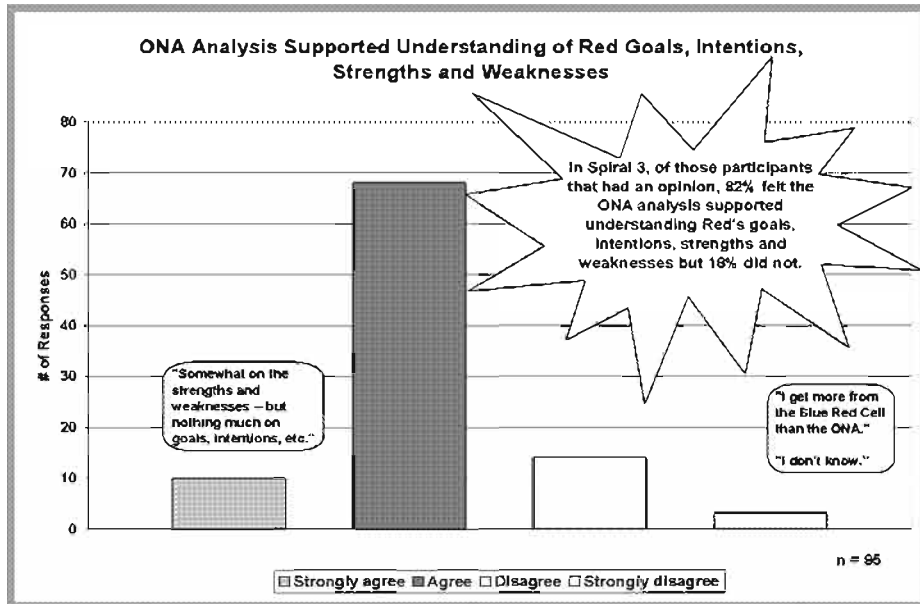


Figure 159: ONA Analysis of Red is Useful

analysis identified OPFOR's goals, intentions, strengths, and weaknesses. Their replies were positive for each. Based on the responses, task 7.1.2 was assessed as accomplished.

**Tasks 7.1.3 Continually update the ONA to reflect battlespace change**

Maintaining information update and currency would be a challenging effort for any system that supports a dynamic situation. For ONA to provide the support as described in the



concept papers, its data and analysis would have to be continuously updated. Update was expected to be a difficult challenge for ONA. During Spiral 3, ONA update was not noted as a problem. During execution, user comments reflected decreasing confidence in ONA when information was found to be outdated. Review of ONA database access and change activity indicated that changes (update) were

Figure 160: ONA Analysis of OPFOR Goals, Intentions, Strengths, and Weaknesses

actually made during execution, but it seems that they were not readily apparent to the participants and did not keep pace with participant expectations for the scenario activities.

A process for ONA change and update was included in SJFHQ TTPs; individuals were identified to make the changes. None-the-less, currency response that satisfied the users was not achieved. For instance, the ONA did not provide a site for review of impacts on the opposition because of Blue attacks. There were model/simulation environment realities that contributed to the update challenge.

As noted in the following quote of a JFMCC participant, ONA currency did not always "trickle-down" to the component level;

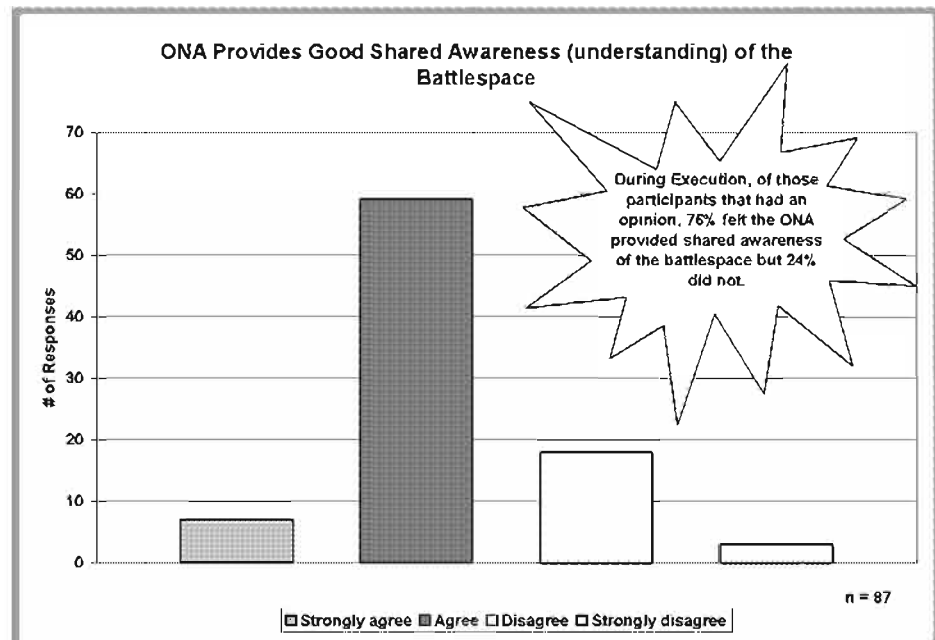
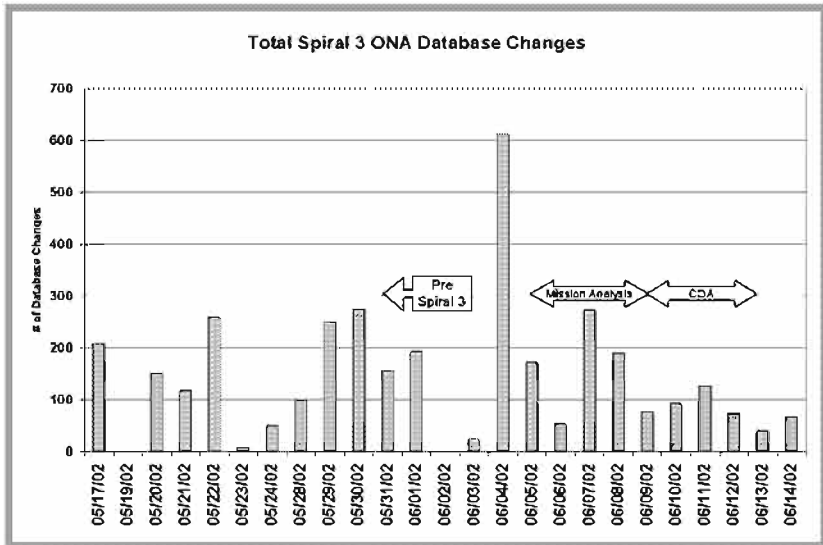


Figure 161: ONA Provides Awareness of Battlespace

“At the component level it (ONA) wasn't dynamically updated causing a static planning environment.”

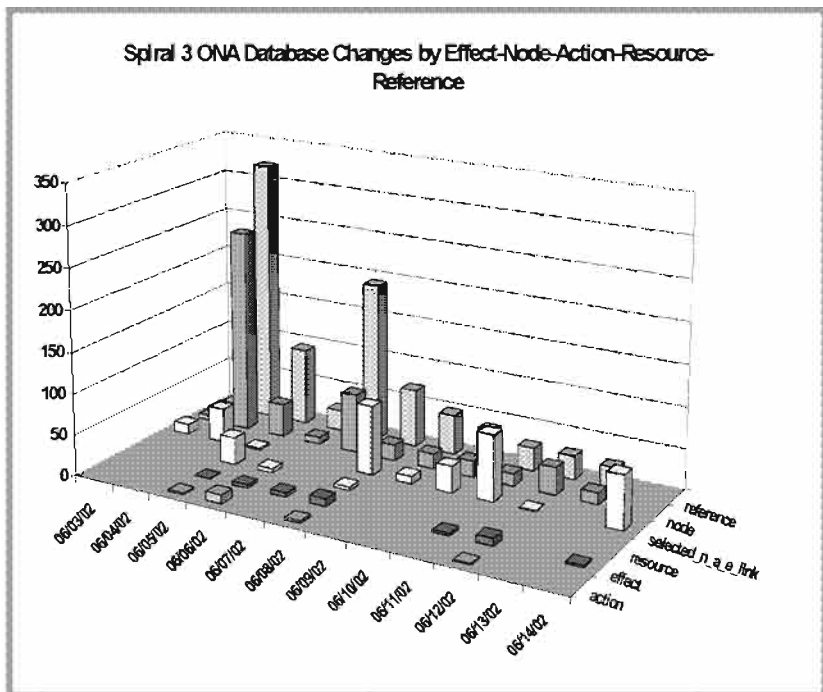
The charts that follow indicate the importance ONA users placed on database currency and update. Database access information and participant survey responses suggested the ONA knowledge base (including the database) was updated to reflect battlespace change but not to the degree of participants' expectations or ability to recognize the changes. For this reason, ONA update was found to be marginal.

Figure 162: The number of ONA changes depicted during the June 3-14 period represents all of the Spiral 3 data change activities by participants and SOSA analysts. The figure indicates a gradual increase in the ONA database cumulative data changes as Spiral 3 approached and a gradual decrease in the cumulative data changes in the ONA database as Spiral 3 progressed. One contributing factor to the “apparent decline” in activity was that the SOSA analysts were heavily engaged in creating thousands of links between the various effects, nodes and actions and, unfortunately, this linking activity had not been programmed for capture by the audit log during Spiral 3 or execution.



References, Nodes, and selected N-A-E links continued to be the predominant data items that were changed. The peak activity on June 4 reflects “last minute” additions to the database by the SOSA cell.

Figure 163: The figure displays the pre-execution (July 8-24) data change activity in the ONA database. Nodes and Selected N-A-E Links (indicative of plan change) categories saw moderate levels of data being changed. Effect and action items were described in very broad terms within the database. As a result, they generally did not need to be changed. Changes to effects and actions data were minimal during this period Spiral 3 ONA Database Changes.





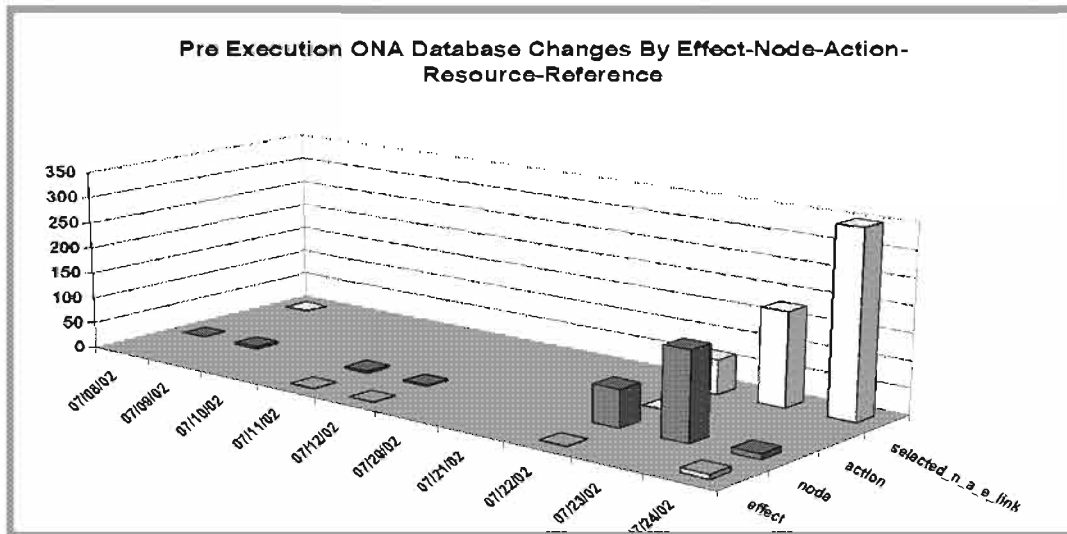
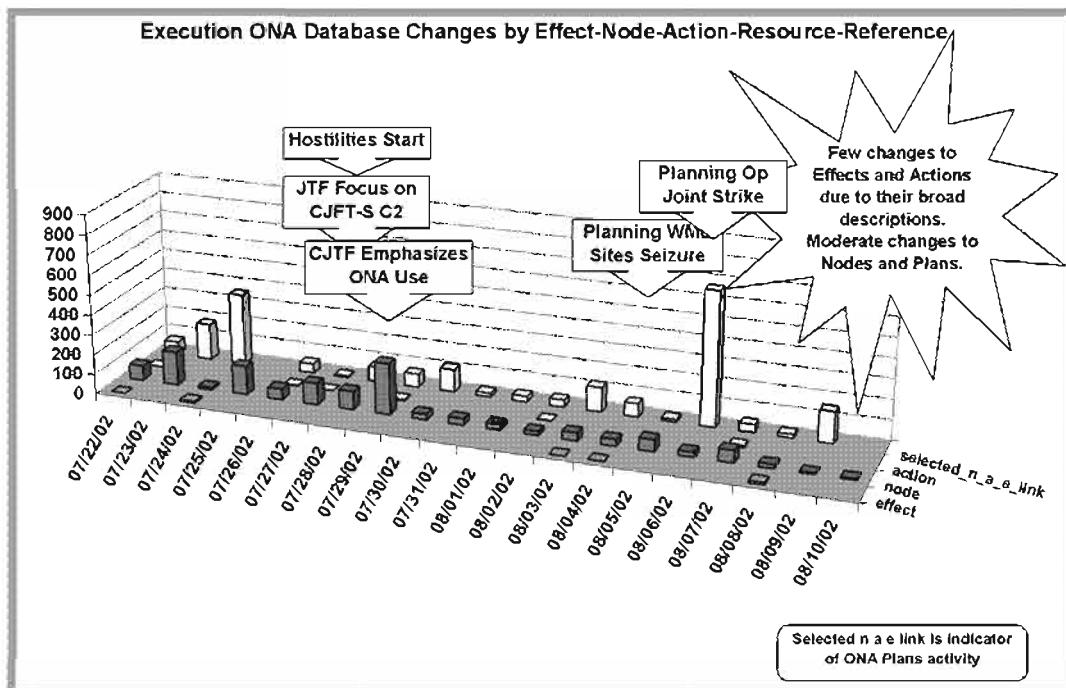


Figure 164 above: Depicts the pre-execution database and Figure 165 below depicts the execution database changes. The execution data change activity in the ONA database from July 22 to August 10 is shown in Figure 164. Again, nodes and selected N-A-E links (plans activity) saw a moderate level of data being changed. Changes to effects and actions data were also minimal during this period; they were written in broad language that needed little modification as execution progressed. The plans activity change spike on Aug 6 may be explained by the joint operation strike planning that was occurring at the time. Average planning (selected N-A-E links) changes increased from 27 changes per day during Spiral 3 to 103 changes per day during execution. Average node changes increased from 41 changes per day during Spiral 3 to 62 changes per day during execution. This change activity, modest as it is, supports the task to continually update the ONA.



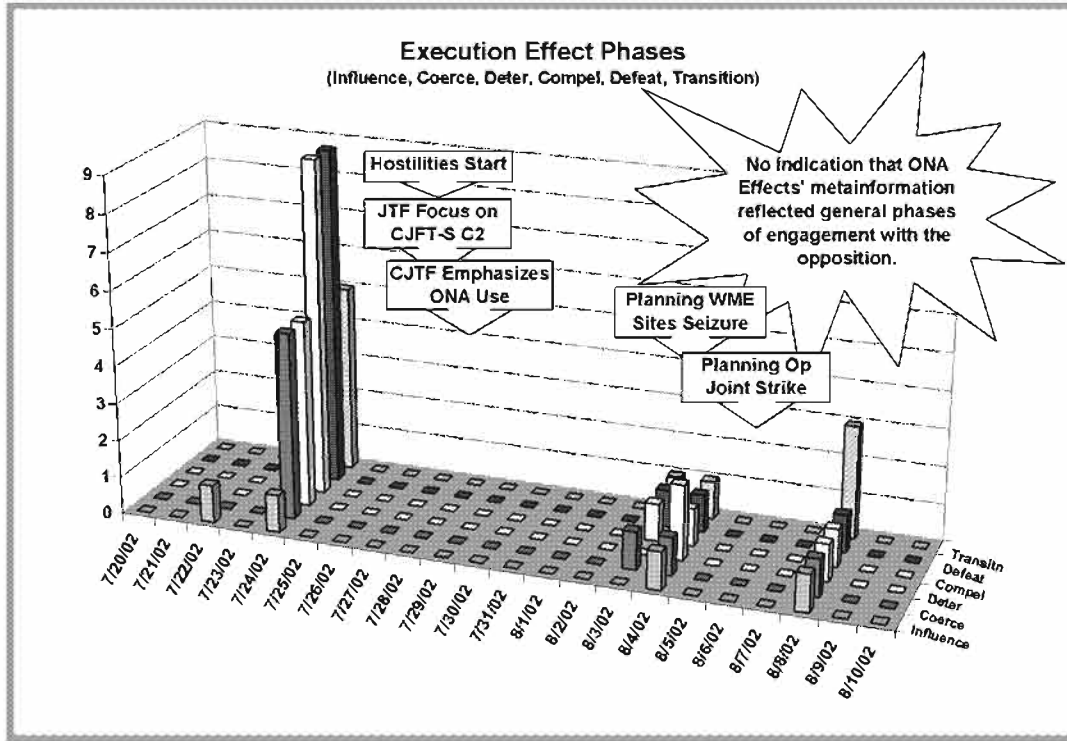


Figure 166: All effects in the ONA database were also tagged with “phase of engagement” meta-information (influence, coerce, deter, compel, defeat and transition). The figure breaks out the amount of phase-related data change activity for effects during execution.

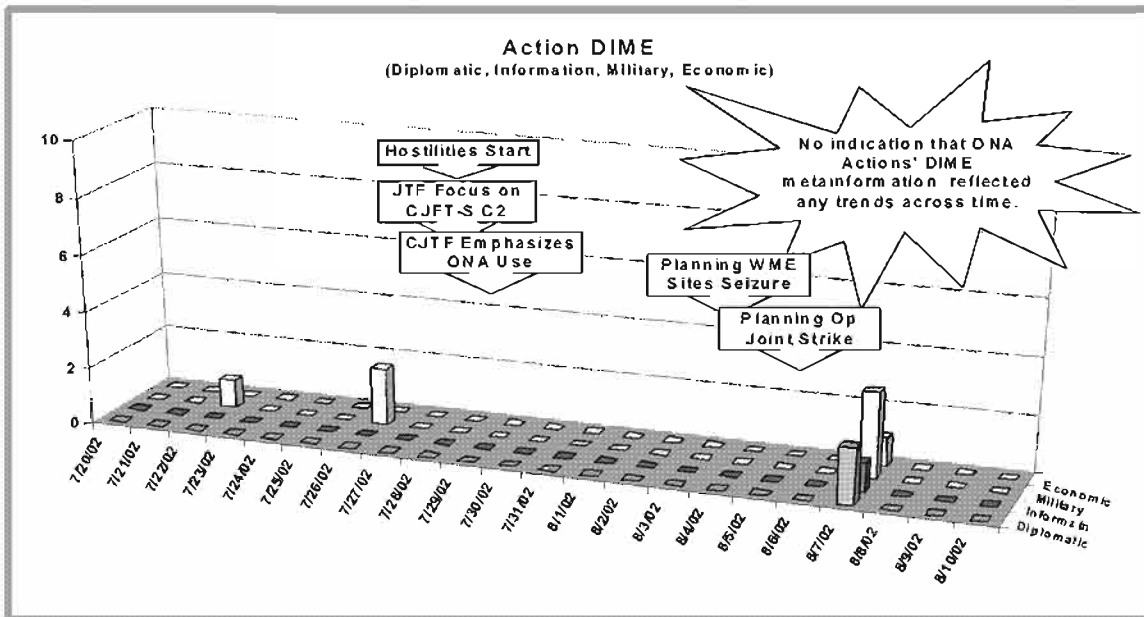
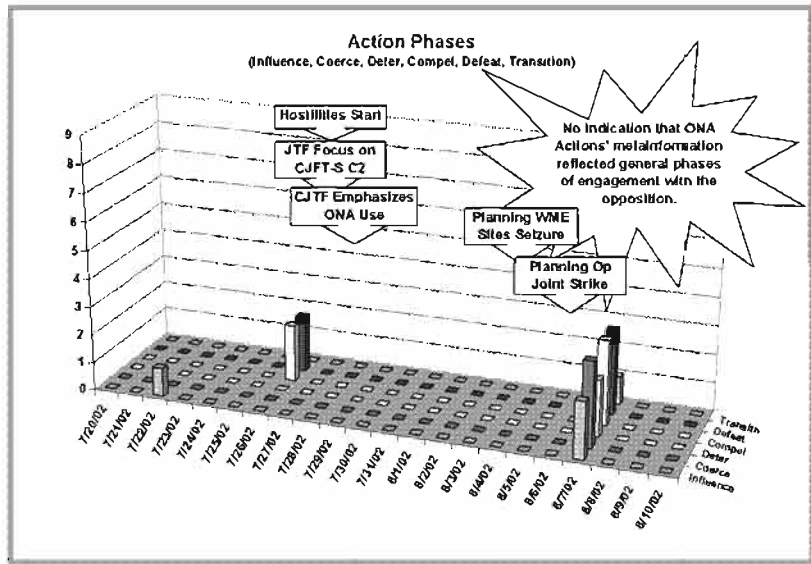


Figure 167: Execution ONA action DIME changes. All actions in the ONA database are also tagged with DIME meta-information. This graph breaks out the amount of actions DIME-related data change activity during execution. Changes to actions were minimal, sporadic and no trends were noted.

Figure 168: Execution ONA action phase changes. All Actions in the ONA database are also tagged with phase meta-information. The graphs breaks out the amount of actions phase-related data change activity during execution. Changes to actions were minimal, sporadic and no trends were noted.



While figures 162-169, all show there were changes made to the ONA database, participants generally believed the database was not presenting current information.

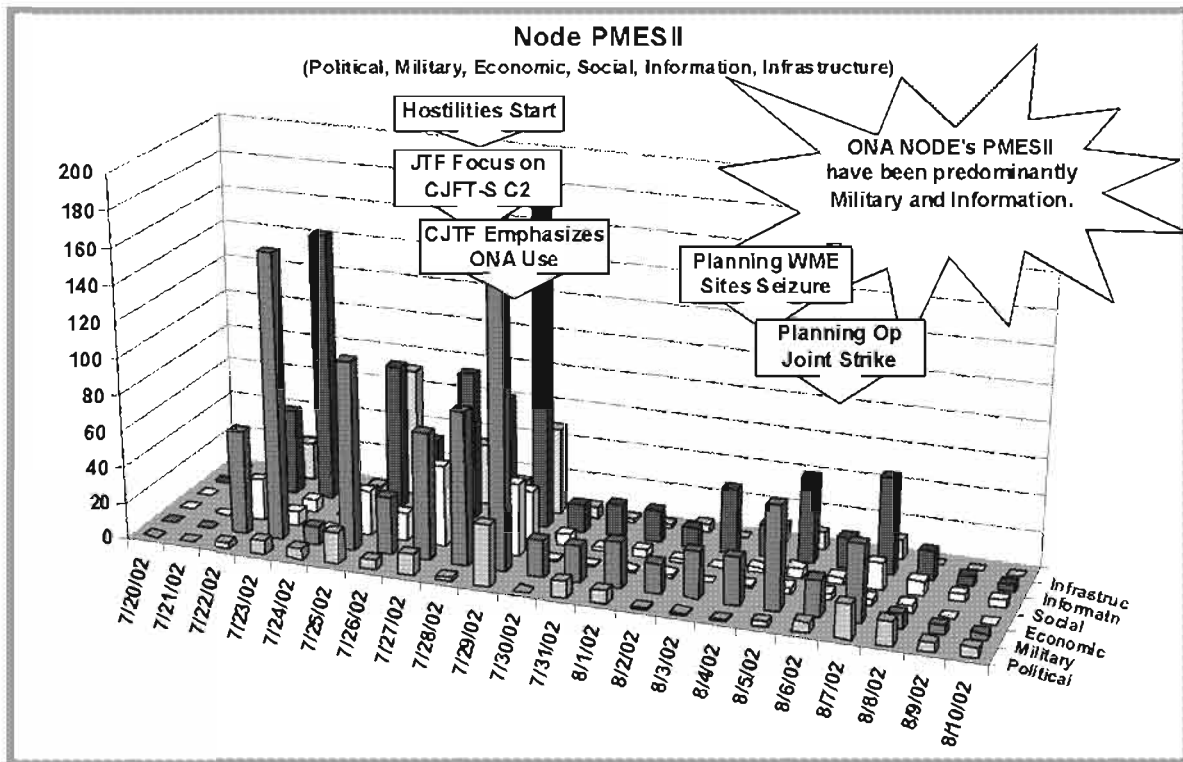


Figure 169: Execution ONA node PMESII changes. All nodes in the ONA database were also tagged with "PMESII" meta-information. This graph breaks out the amount of nodes PMESII-related data change activity during execution. It was anticipated that the nature of data changed in the database might reflect the phases of engagement with OPFOR. Changes to the nodes were extensive, but predominantly military and information in nature. A minor change increase trend noted across all the PMESII meta-information, especially political, economic, social and infrastructure, around 7 August could have been caused by the transition to peace planning.

Execution participant response to the statement, 'It is important to be notified of ONA analysis updates,' was definitely supportive. As shown in figure 170, 88 percent (111 of 126) of respondents with an opinion agreed; 12 percent (15 of 126) disagreed; and seven percent of all participants replying to the survey (9 of 135) did not know about the correctness of the statement.

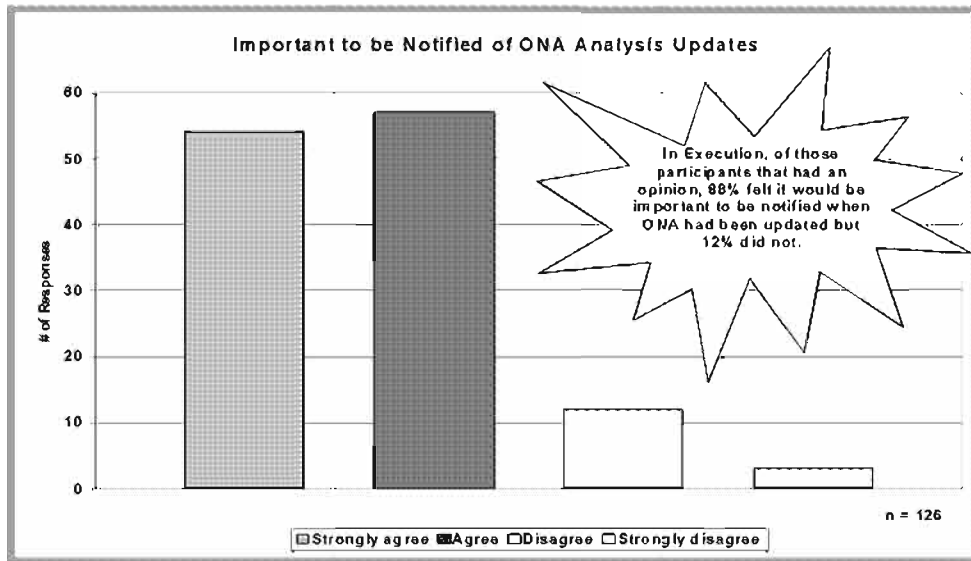


Figure 170: Majority thought notification of ONA analysis updates important

Of those who disagreed (15 survey recipients) seven provided comments. Five of these seven respondents based their disagreement on the assumption ONA would be continuously updated and therefore notification was not needed. Essentially, they were in agreement with the statement and their position increased the percentage of actual agreement from 88 to 92 percent.

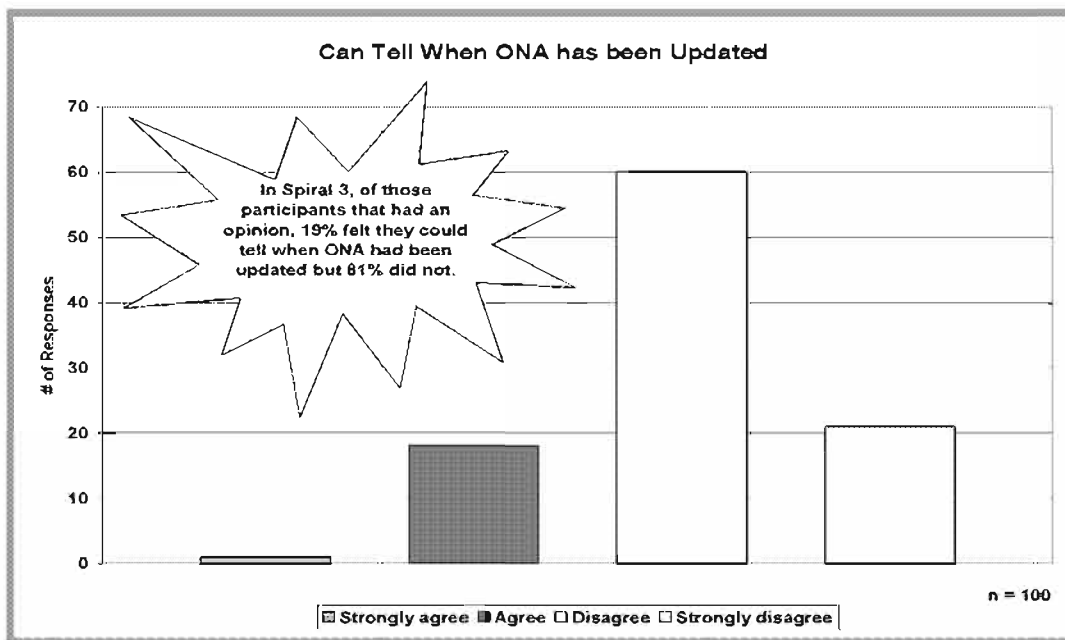


Figure 171: Most participants could not tell when ONA was updated

During Spiral 3, as shown in figure 171 above, 81 percent (81 of 100) of survey respondents, with an opinion, indicated they could not tell when the ONA had been changed or updated; 19 percent reported they could tell when changes or updates were made. There were built-in update notification features associated with the ONA database, but users had to subscribe to each page of interest. Fifteen percent of all respondents, who replied, were unable to agree or disagree (no opinion).

Did ONA training improve the participants' ability to recognize ONA updates? Figure

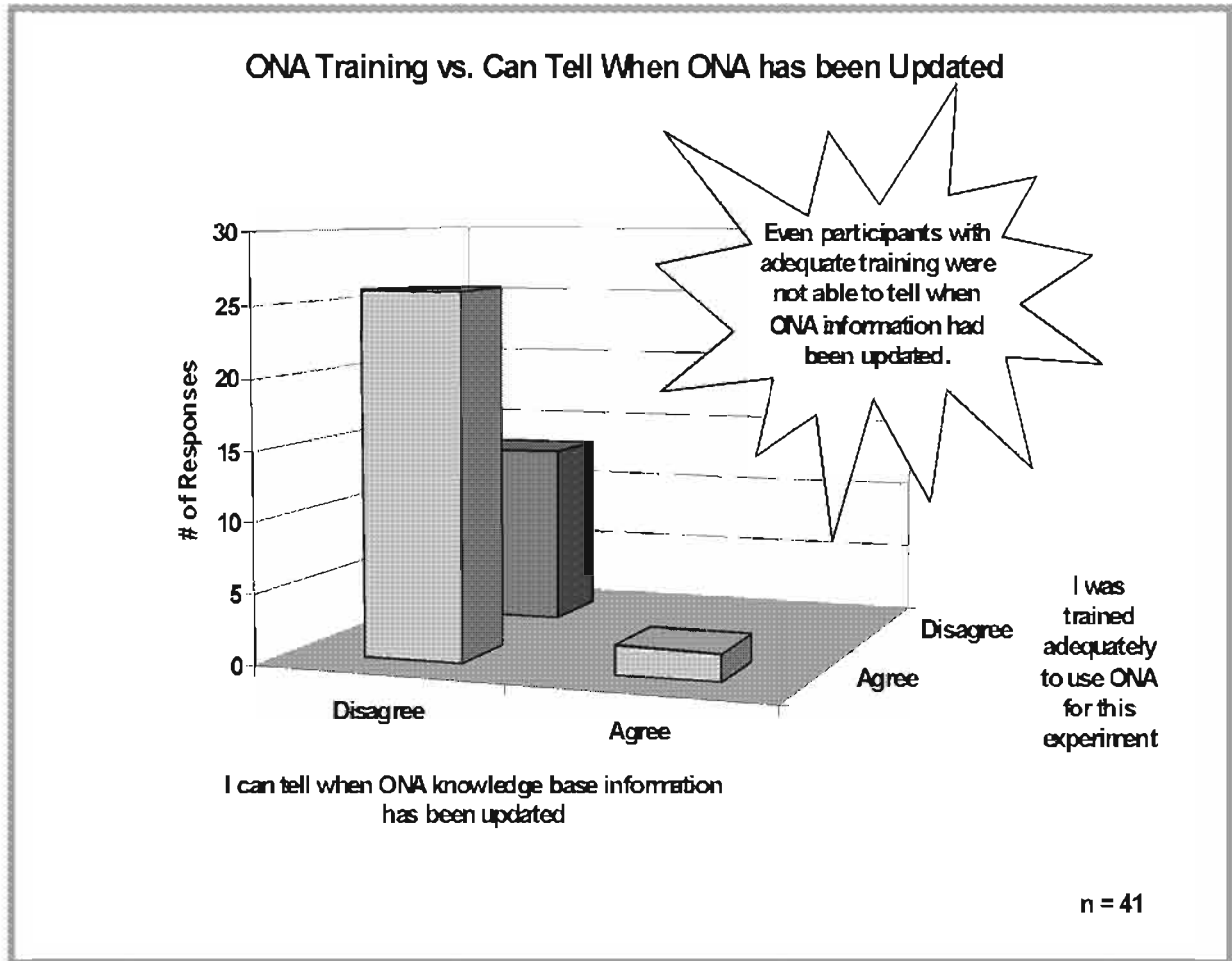


Figure 172: ONA training vs. recognizing ONA updates

172 shows that those participants who believed they had adequate training still could not tell when information in the ONA had been updated. These results, combined with those of figures 170 and 171, showed the importance experiment participants placed on update and notification.

The results of database change activity and consideration of two very specific survey questions indicate that the participants placed high importance on database currency, but could not tell when it had been changed. Task 7.1.3 was accomplished from the SOSA analysts' perspective, but not from the participants' perspective.

**Task 7.1.4 Employ automated tools to virtually and collaboratively access, manipulate, and maintain the ONA database**

Even for the limited contingency environment of MC02, the ONA knowledge base contained extensive information. To allow this information to be accessed, updated, and used, tools that accommodated these actions were needed. An ONA tab displayed on SPPS web pages took users to the ONA Current Summary (ONA Today) page. From there, additional tabs permitted access to the ONA Matrix, ONA References, and Related Products pages. All information included on these pages was located on the SPPS. There also was a tab that transferred users to the stand alone ONA Database. Manipulation of the SPPS pages was straightforward.

Links within these pages to supporting documents supplied additional background and reference; the operation was essentially “typical” and intuitive. The ONA database was primarily intended to support effects-based plan development. It contained listings of effects; nodes; actions; resources; references; PMESII systems and conflict phases. Users could select these components to support development and modification of plans as well as decision-making. However, the actions required to do the mixing and matching were not obvious, even using the included User’s Guide. Their survey comments indicated it took too long to review the help information and even when they did, use of the database was still confusing. Manipulation of the database was not intuitive for many experiment participants.

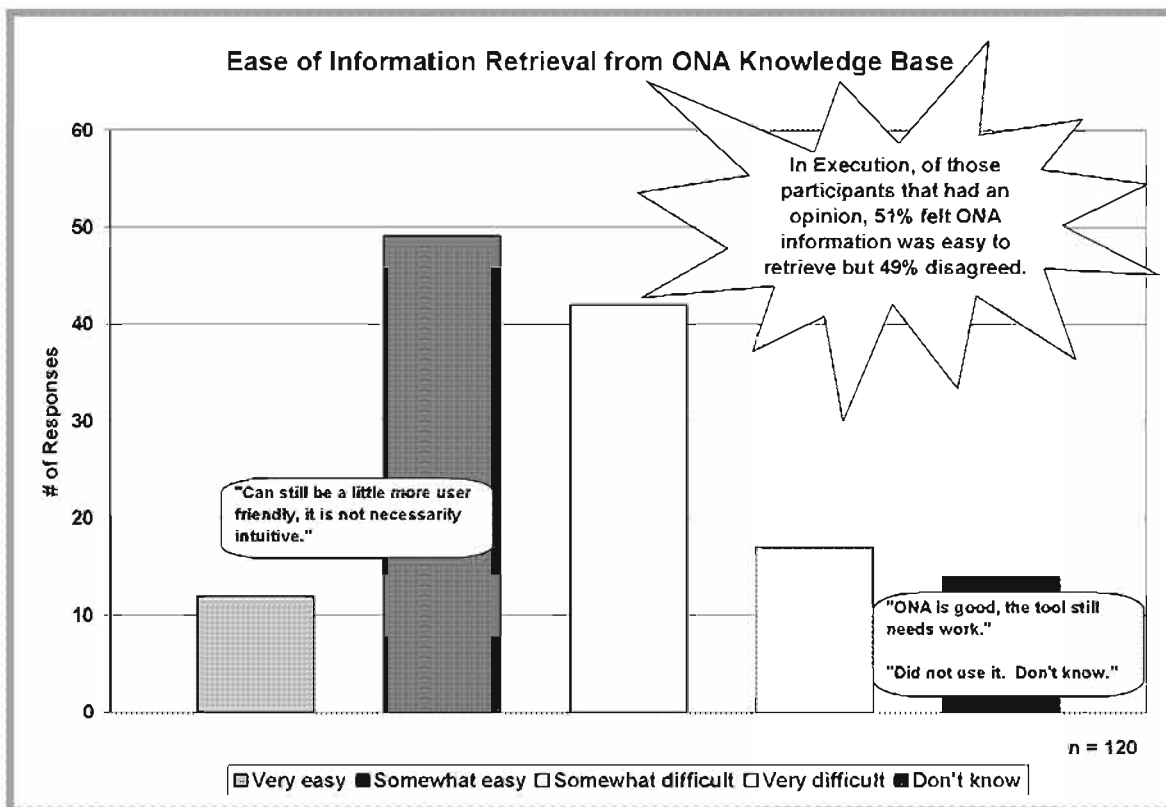


Figure 173: Ease of information retrieval from ONA knowledge base

Training on use of the database seemed to be an equalizer for ease of ONA tool use. Comparison of training received with understanding of PMESII vs. DIME relationships

suggested the more training; the more this aspect of ONA was understood. However, when the training received was compared with information retrieval and information filter and sort, the same correlation was not there. Survey respondent comments stated hands-on training and practice allowed them to effectively use the database. Participants indicated ONA's use enhanced Spiral 3 plan development; therefore, the tools must have provided some level of ONA access and database manipulation.

Even though the tools developed for ONA received less than complimentary comments, they did do what was intended. Pre-experiment training did influence use of the tools. The charts that follow detail the challenge experiment participants had with ONA tools.

Figure 173, above, displays the difficulty experiment participants had using the ONA knowledge base during MC02 execution. They were asked to rate their estimate of information retrieval ease from the ONA knowledge base. Easy (51 percent; 61 of 120) and difficult (44 percent; 59 of 120) survey replies from those with an opinion essentially divided evenly; 10 percent (14 of 134) of all respondents indicated they did not know what to say about the statement, "Rate the ease of retrieval from the ONA knowledge base" during execution. The same survey question was offered during Spiral 3. The response then was 45 percent chose easy (vs. 51 percent) and 41 percent (vs. 44 percent) said information retrieval was difficult, while 14 percent (vs. 10 percent) did not know. Instead of Spiral 3 experience increasing the number of easy replies during execution, there was a three percent movement from not knowing to the difficult category (41 to 44 percent). Both sets of numbers point to the challenge experiment participants had during Spiral 3 and execution using the tools developed for the ONA database.

Shown in Figure 174 are Spiral 3 results when survey recipients were asked to respond to

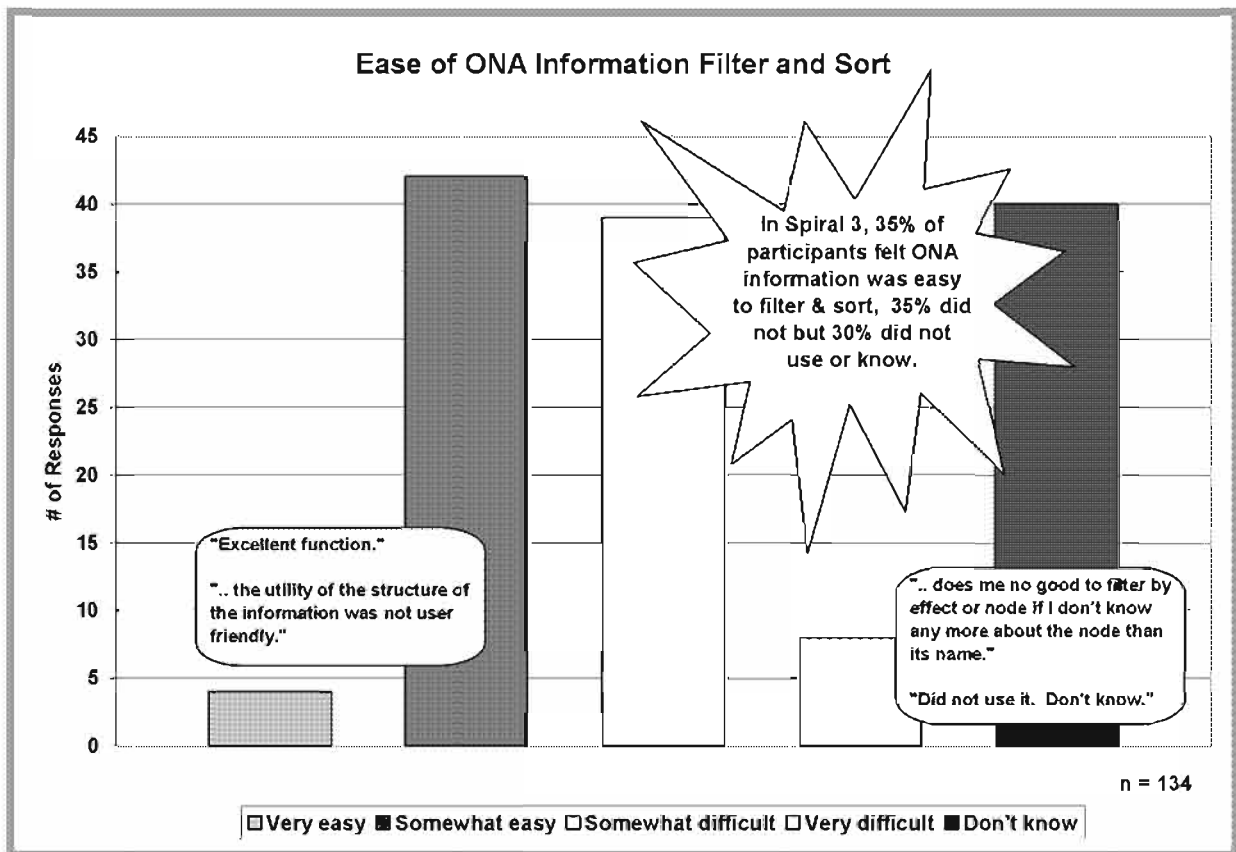


Figure 174: Participants split on the ease of retrieving ONA information via filter and sort functions

the statement, "Rate the ease of ONA information filter and sort." The easy and difficult categories were essentially equal (35 percent; 46 and 47 responses of 134); 30 percent (40 of 134) had no opinion. Based on comments associated with other survey questions, training and familiarity were identified as important reasons for ease of ONA exploitation. The structured pre-experiment training was not specialized for individual groups. Many of the SJFHQ members who augmented the JTF headquarters were familiar with the ONA tools and incidentally helped JTF headquarters members with them. This ad hoc training was considered as a possible fix for training deficiencies and thus produced the even distribution of easy and difficult responses for this and the previous question. However, as depicted in the next chart, further examination of the pre-experiment training seemed to say this training possibly was *not* the pacing factor for information retrieval, filter, and sort difficulty.

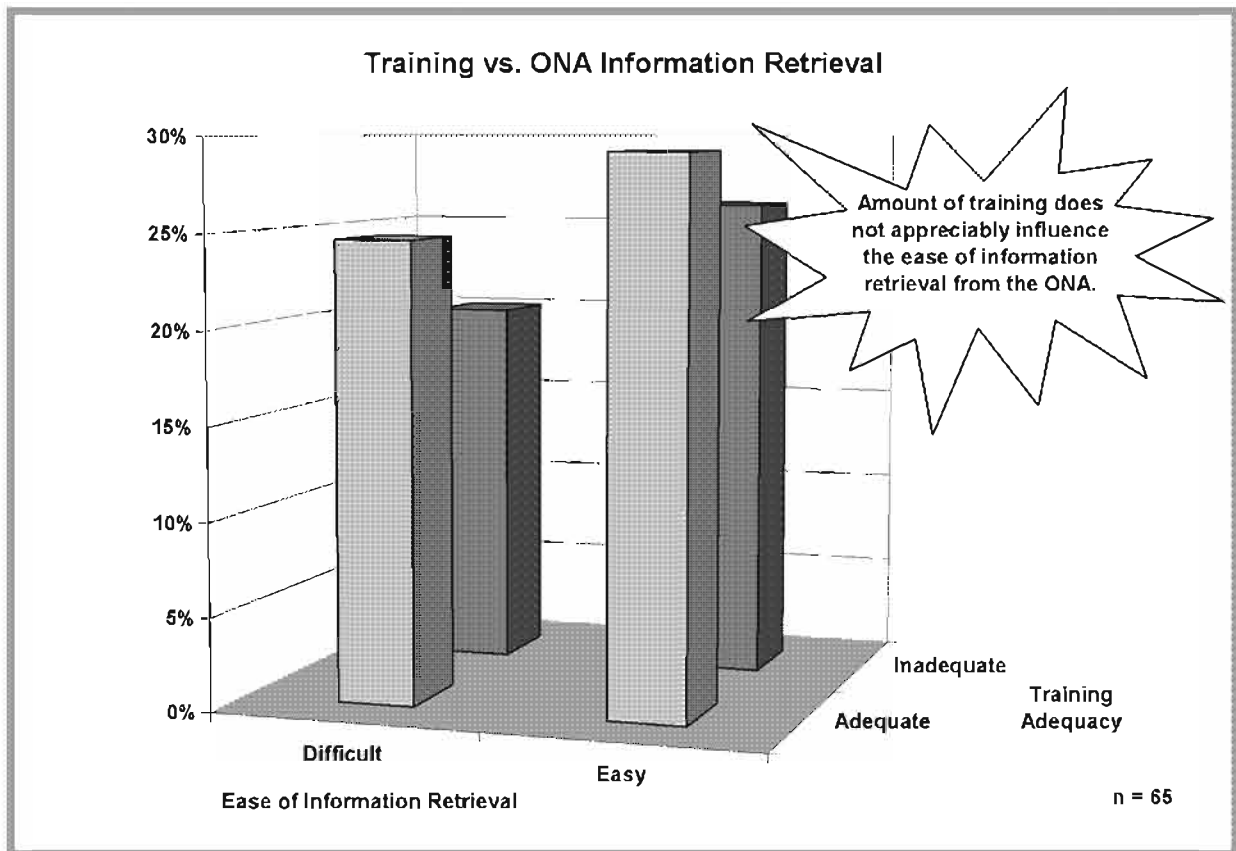


Figure 175: Training vs. ONA Information Retrieval

Responses from the execution information retrieval question (previously discussed) were matched against those of a second survey question that was answered by the same respondents. The objective was to see how participants estimated their pre-experiment training impacted their use of ONA. The second question asked for a response (adequate; inadequate) to the statement, "I was trained adequately to use ONA for this experiment." The first question essentially was asking if the respondents could use the ONA tools. The results shown in figure 175 show that of those who reported retrieval was easy, 29 percent indicated they had received adequate training and 26 percent responded their training was inadequate and that was only a three percent difference. The same puzzling relationship existed with those who stated information retrieval



was difficult. Twenty-five percent said they were adequately trained yet retrieval was difficult and 20 percent said it was difficult and had received what they thought was inadequate training, only a five percent improvement.

These results do show that, for a segment of the experiment population, the ONA tools were difficult to use and training did not seem to make a difference. On the positive side, the tools did function and the ONA information was retrieved and used.

Ease of ONA filter and sort survey question responses were also matched against the adequately trained survey question. Here too the formal training did not appear to be the discriminator for easy and difficult replies. As shown in figure 176, of the easy replies, 30 percent indicated they had been adequately trained and 25 percent reported their training was inadequate. Twenty seven percent of the difficult respondents said they were adequately trained

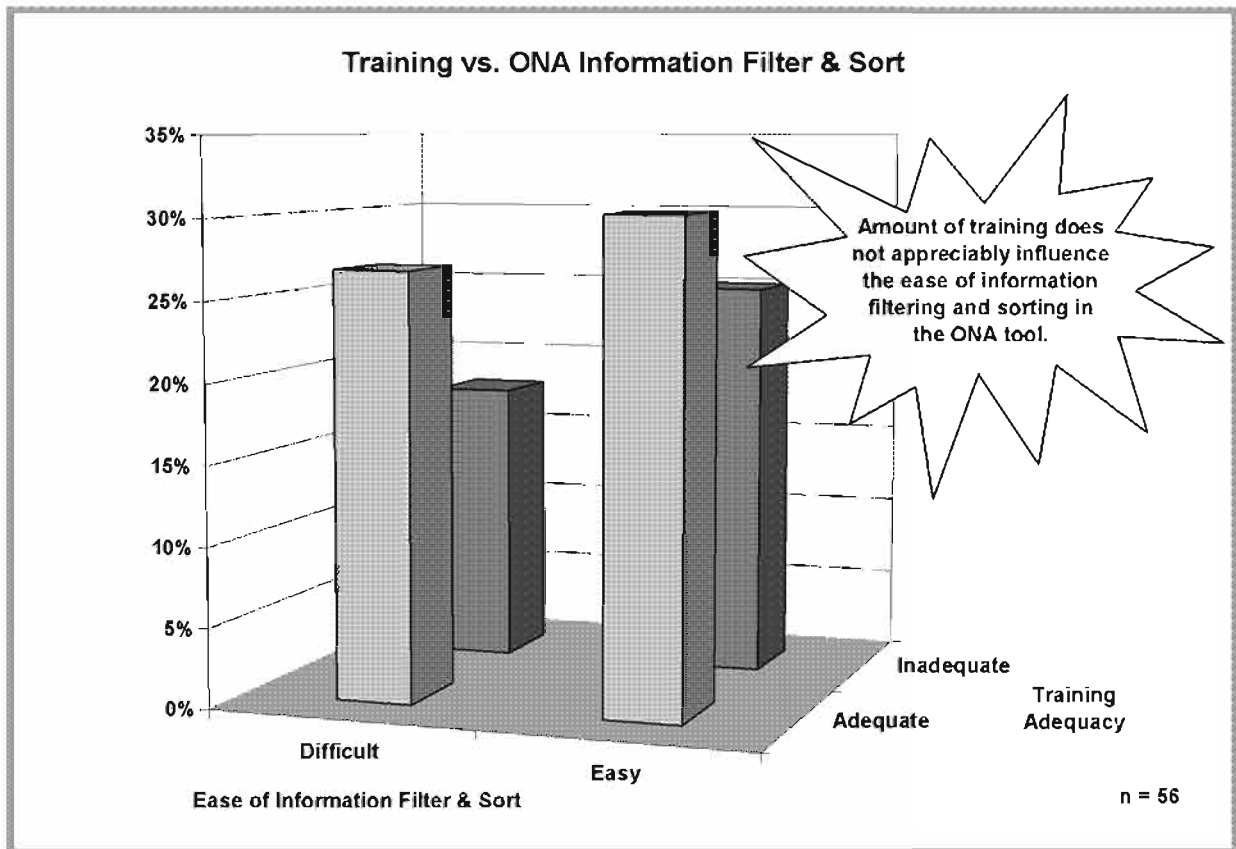


Figure 176: Training vs. ONA Information Filter & Sort

and 18 percent indicated their training was inadequate.

In spite of the training challenges, approximately half the respondents still indicated retrieval and manipulation of ONA knowledge base information was not easy. Whether it was in fact a training problem or not was not determined. However, the MC02 participants did use automated tools to virtually and collaboratively access, manipulate, and maintain the ONA database. Assessment of task 7.1.4 indicated it was completed successfully.

With the possible exception of task 7.1.3, (continually update ONA to reflect battlespace change) assessment indicated all tasks supporting ONA warfighting challenge one were

successfully completed. Although currency/update is important, it is still assessed that in spite of this shortcoming discussed earlier, challenge one of the ONA concept was met.

**ONA Warfighting Challenge 7.2: Ability to use ONA to enhance decision-making.**

If ONA was to enhance decision-making, it had to be used. This aspect of the concept was confirmed in challenge 1 analysis. In the circumstance of a Joint Task Force (JTF) operating with ONA, use of the ONA database should have complimented the JTF staff's other functions.

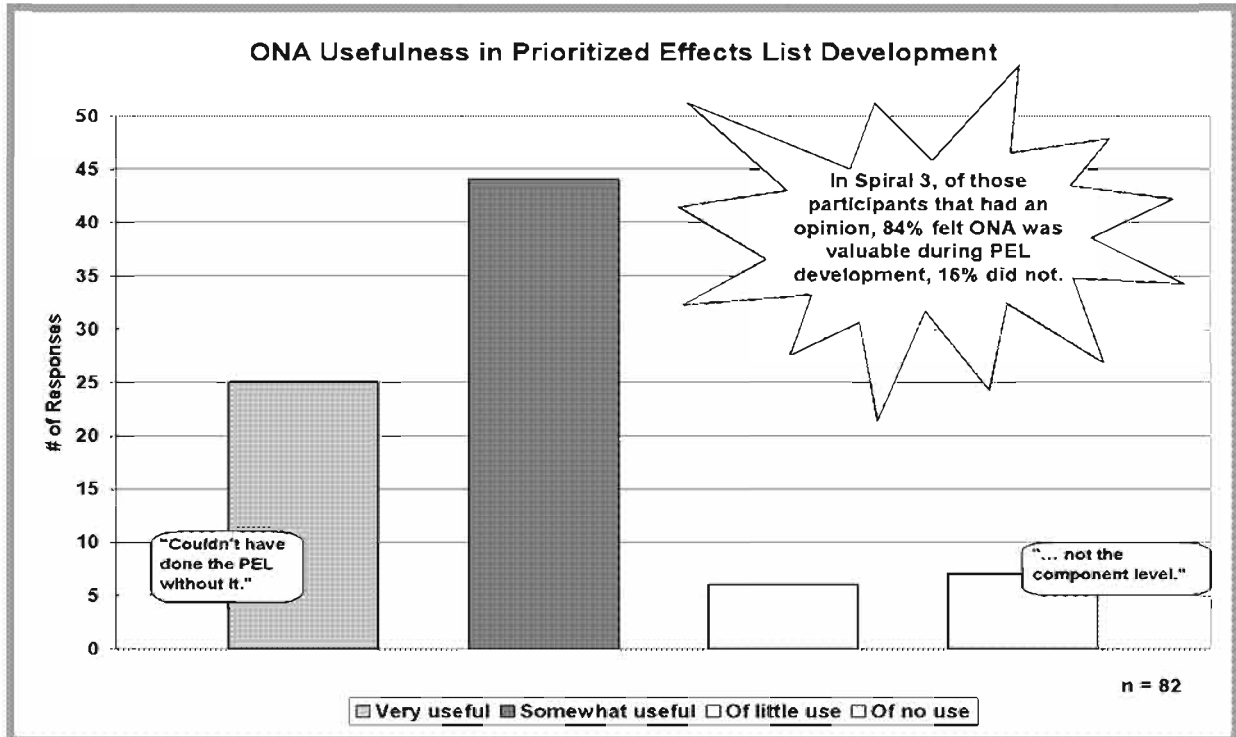


Figure 177: ONA was useful in PEL development

Better operational decisions normally would have considered more than tunnel vision, primary effects; ONA was intended to help identify adversary vulnerabilities as well as secondary, tertiary, and potential unintended effects that might result from proposed actions.

ONA should have supported course of action prioritization and selection. Finally, if the ONA concept was to produce better decisions, the using organization (JTF) should have been able to operate within the adversary's decision cycle. It should have kept the adversary responding and not initiating.

Listed below are the tasks that describe the second ONA challenge. Analysis of the five tasks indicated they were successfully completed and the second warfighting challenge was met.

**Challenge 2 Supporting Tasks:**

- Determine if the ONA products compliment JTF staff actions
- Identify adversary's vulnerabilities, intentions, and key nodes
- Identify potential second and third order effects for contemplated actions
- Prioritize and select potential courses of actions
- Use ONA to operate within adversary's decision cycle

**Task 7.2.1: Determine if the ONA products compliment JTF staff actions**

The addition of a new process or tool should not complicate existing staff functions, but rather it should compliment and improve. This staff activity should help increase decision quality, as well as improve the time needed to make a decision. Experiment survey results tended to confirm both criteria were enhanced. The four charts that follow detail this improvement.

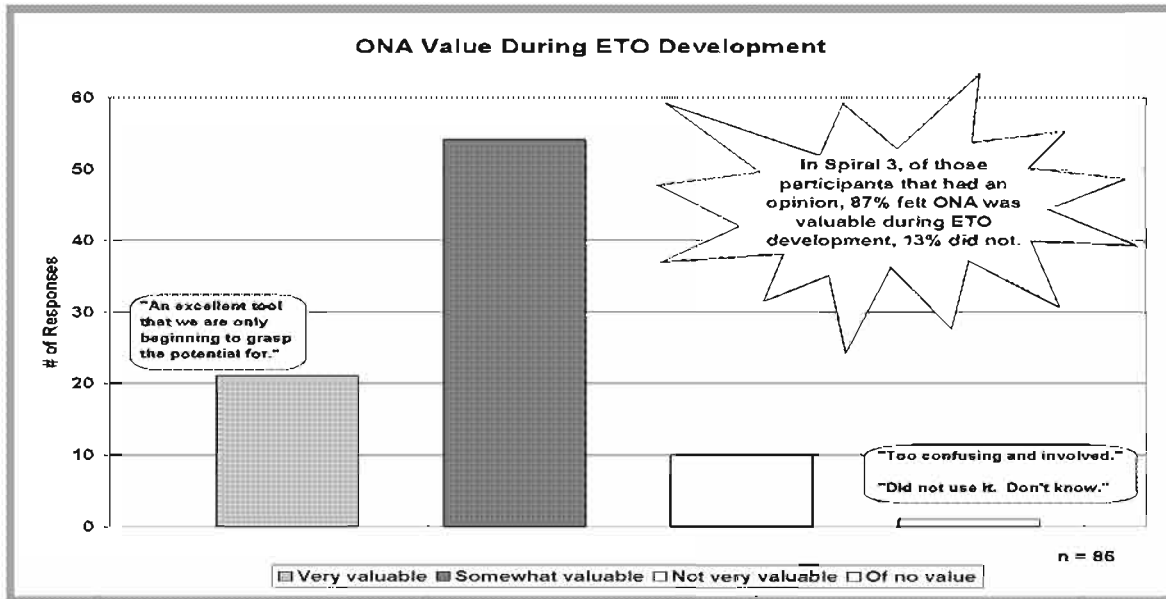


Figure 178: ONA was valuable to ETO development

Spiral 3 participants were asked to rate the utility of ONA in development of the Prioritized Effects List (PEL). Shown in figure 177 above, of the respondents that had an opinion, 84 percent (69 of 82) reported ONA was useful in working this JTF staff action; 16 percent (13 of 82) indicated it was of little or no use. Build of the PEL was a very important JTF staff action. This survey response provided confirmation of ONA's positive impact on this early staff activity.

During Spiral 3, experiment participants were asked to rate the value of ONA in development of the effects tasking order (ETO). Shown in

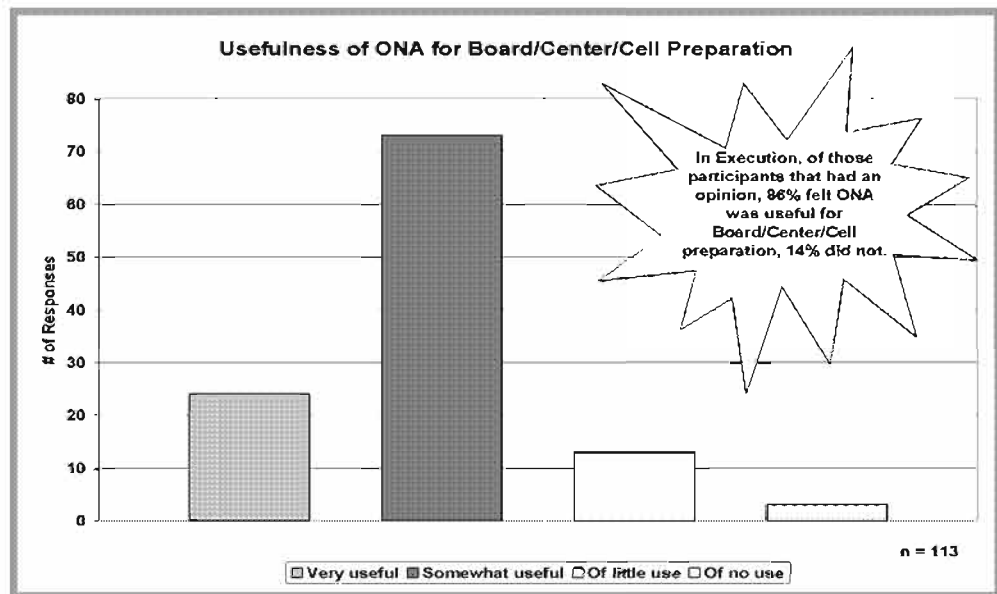


Figure 179: ONA usefulness for board/center/cell preparation.

figure 178, of those offering an opinion, 87 percent (75 of 86) said ONA was valuable in accomplishing this staff action; 13 percent (11 of 86) said it was of little or no value. This staff action was another high priority activity needed quickly after JTF formation. Again, participants believed ONA made a valuable contribution.

Dynamic conduct of JTF boards, centers, and cells occurred during MC02 execution. Participants were asked to rate the utility of ONA in preparing for these meetings. Shown in figure 179, 86 percent (97 of 113) indicated ONA was useful; 14 percent (16 of 113) said it was of little or no use. This was another plus for ONA and its contribution to JTF staff activity.

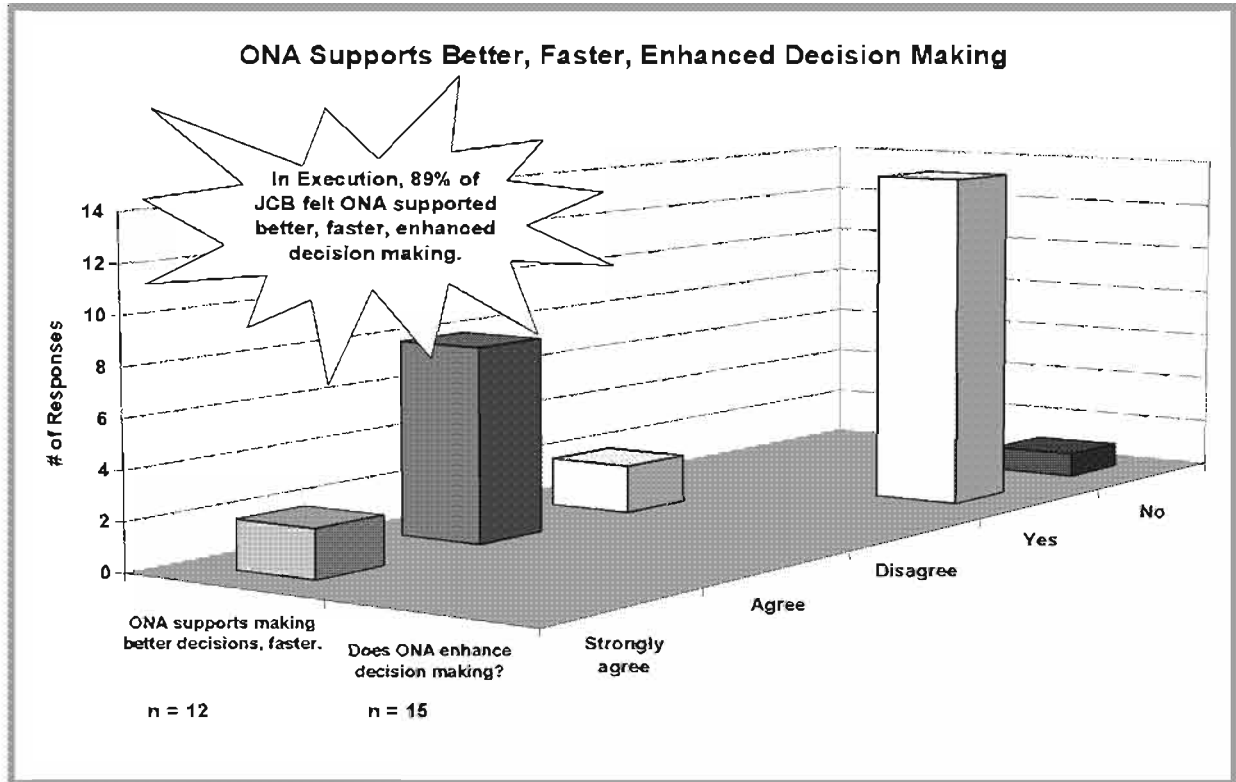


Figure 180: ONA supports enhanced decision-making

MC02 execution members of the Joint Coordination Board (JCB) were presented two questions aimed at the core of ONA Warfighting Challenge two. First, they were asked for agreement or disagreement with the statement, “ONA supports making better decisions, faster.” Next, they were asked for a simple yes or no response to the question, “Does ONA enhance decision making?”

The results of both survey questions shown in figure 180 indicate strong endorsement (89 percent; 24 of 27) by these members of the JCB for the supposition that ONA enhanced and speeded-up the staff decision process. Anecdotal comment by the JTF commander also provided the same support.

Based on positive participant response to survey questions asking their opinion about ONA’s support of PEL development; ETO building; board, center, cell preparation; and enhanced decision making, task 7.2.1 was completed. ONA did compliment JTF staff actions.

**Task 7.2.2 Identify adversary’s vulnerabilities, intentions, and key nodes**

A critical part of JTF staff planning was to identify adversary vulnerabilities, intentions, and key nodes. The commander looked for the staff to develop and update this information. The charted survey results and analysis that follow show ONA supported this JTF staff action.

During execution, experiment participants were asked to agree or disagree with statements of ONA’s utility in identifying adversary intentions, key nodes, and vulnerabilities. Figure 181 shows the combined results of these three questions. Eighty three percent (72 of 87) reported ONA was useful in identifying these three adversary items; 17 percent (15 of 87) disagreed.

ONA support of adversary intention identification was also displayed by response to the

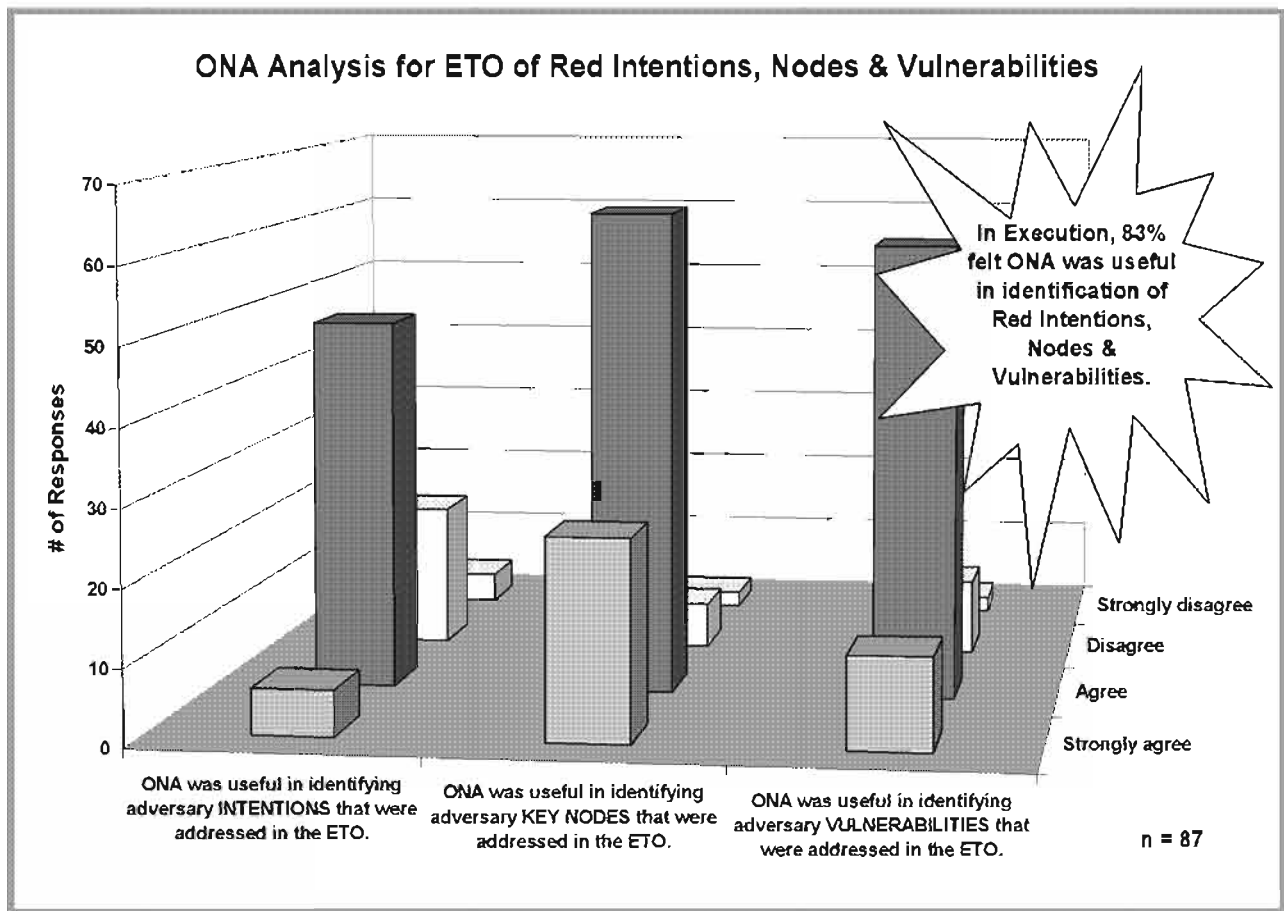


Figure 181: ONA analysis for ETO

two questions shown in figure 182. In Spiral 3, participants were asked to agree or disagree with the statement, “ONA was useful in identifying adversary intentions that were addressed in the ETO.” During execution, they were asked to agree or disagree with the statement, “The ETO addressed ONA analyzed Red intentions.” The combined results show that eighty three percent (65 of 79) of respondents with an opinion agreed that ONA identified and addressed adversary intentions. Eighteen percent (15 of 79) disagreed.

Survey question results during both Spiral 3 and execution indicated ONA did identify adversary vulnerabilities, intentions, and key nodes. Task 7.2.2 was completed.

**Task 7.2.3 Identify potential second and third order effects for contemplated actions**

A JTF staff is expected to provide second and third order as well as unintended effects for contemplated actions. ONA supported this staff action.

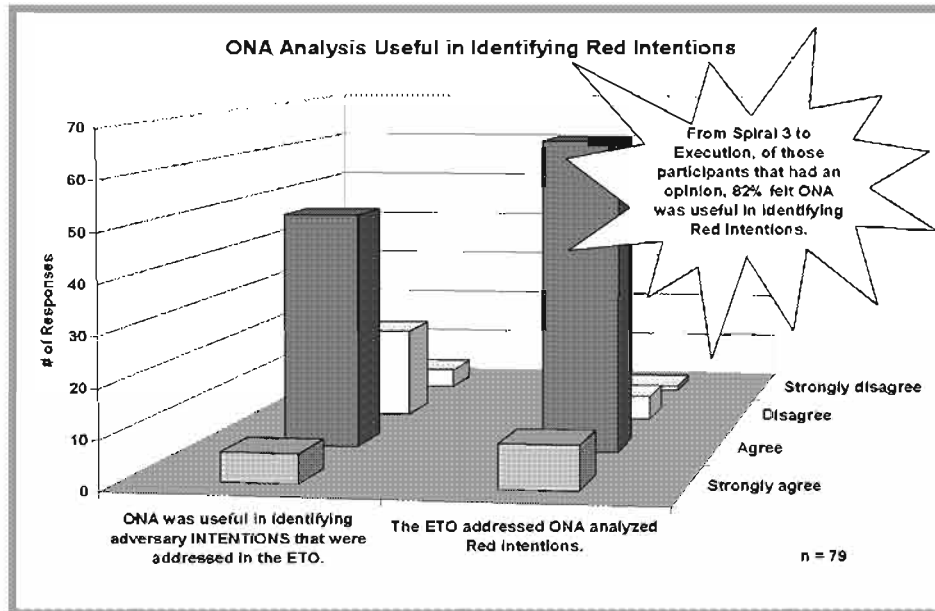


Figure 182: ONA analysis useful in identifying red intentions

During execution, respondents were asked to agree or disagree with the statement, "ONA derived second and third order effects were included in the decision process when considering action against Red." As shown in figure 183, replies indicated 86 percent (56 of 65) agreed with the statement and supported this task.

Although, there were tactical level instances where it appeared that the ONA failed to provide second order impacts or ONA was not used to consider these impacts when planning an action, respondents did acknowledge the importance of this ONA capability. This capability should be included in development of ONA. Task 7.2.3 was completed during the experiment.

**Task 7.2.4: Prioritize and select potential courses of action**

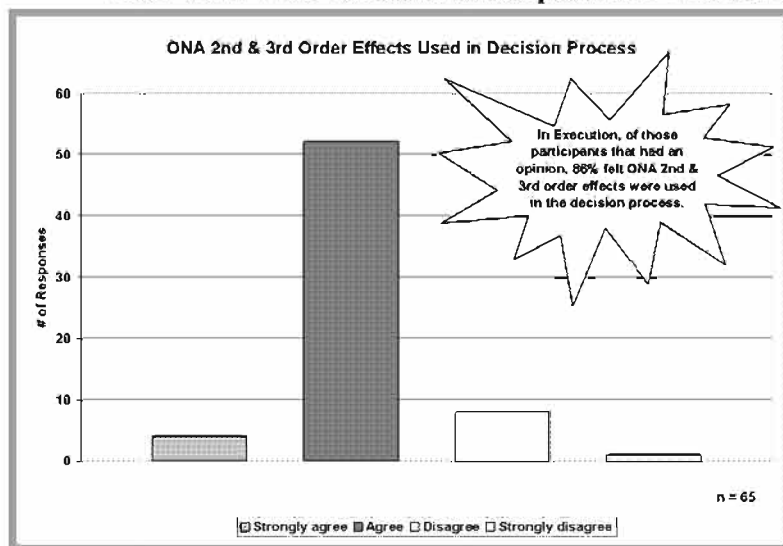


Figure 183: ONA 2nd & 3rd order effects used in decision process

Another important JTF staff task was to offer potential courses of action and to offer proposed prioritization of effects. ONA assisted both during the experiment.

During Spiral 3, SME observers were asked how an ONA impacted the course of action selection. Although the number of individuals surveyed was small, their experience and expertise were considered superior and their opinions respected. They essentially looked over the planner's shoulders while staff planning

was on going. They had first hand knowledge of ONA's impact on COA selection. As shown in figure 184, 67 percent (4 of 6) of these SME observers indicated ONA supported better COA selection but not necessarily faster COA selection.

Spiral 3 participants were asked if ONA was useful in their development of the PEL. This valuable tool established the commander's thinking and intentions early in the experiment. Support of its development suggested great potential for ONA.

As shown in figure 185, 84 percent (69 of 82) of the Spiral 3 respondents with an opinion indicated ONA was useful during production of the PEL. Sixteen percent indicated it was of little or no use when developing the PEL. Initial course of action development was a Spiral 3 JTF staff action supported with a PEL with the commander's PEL. Results of survey questions presented during Spiral 3 suggest ONA supported COA development. Task 7.2.4 was completed during the experiment.

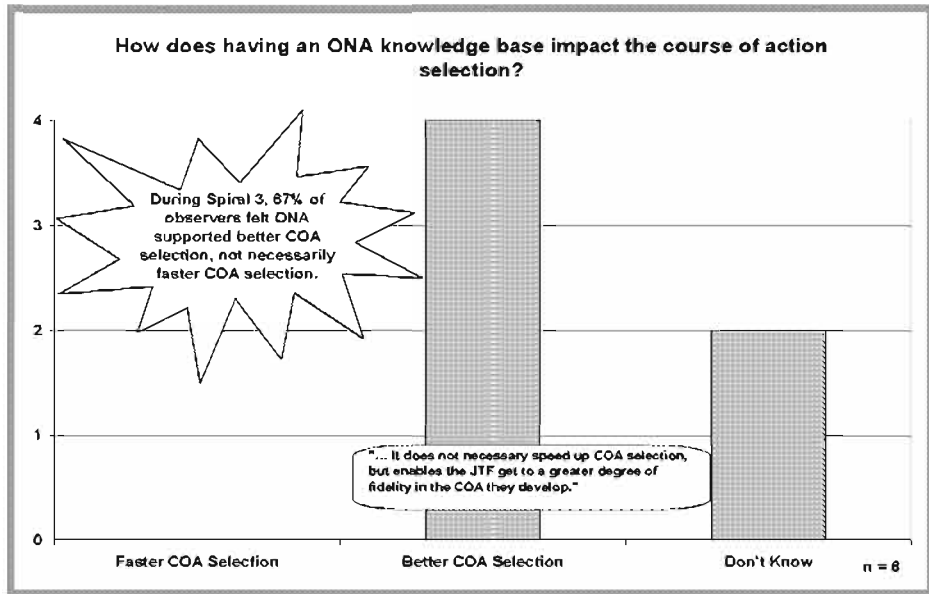


Figure 184: ONA impact on COA selection

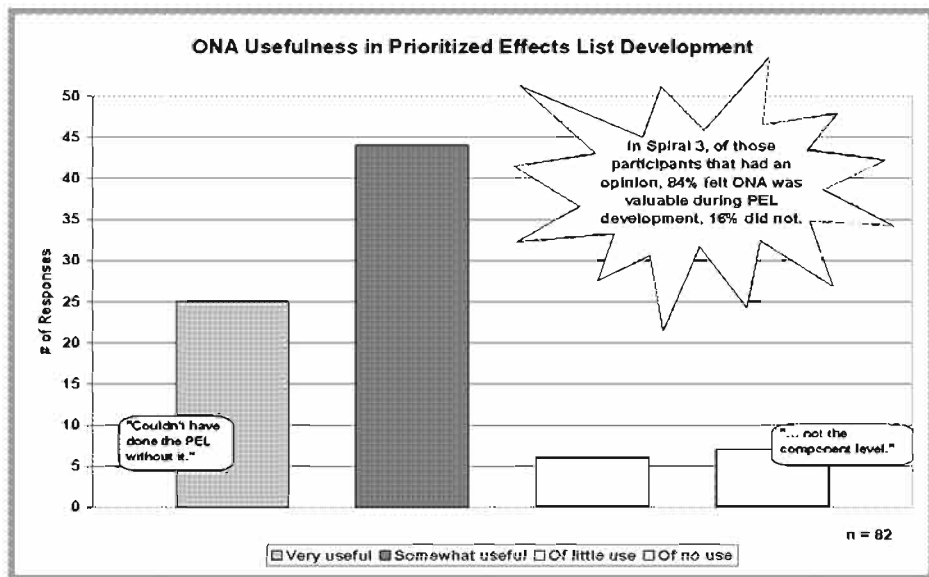


Figure 185: ONA usefulness in PEL development

### Task 7.2.5 Use ONA to operate within adversary's decision cycle

It was expected that if Blue operated within the adversary's decision cycle it would dominate. ONA should have contributed to this capability if it improved planning and force employment. The three charts that follow support the ONA contribution.

During execution, the three questions included in figure 186 were presented to experiment participants. Each was intended to elicit some indication of JTF ONA use to get inside of the adversary's decision cycle. Of the respondents with an opinion, 88 percent (90 of 103) agreed ONA (information) was used to interrupt the adversary's ability to communicate

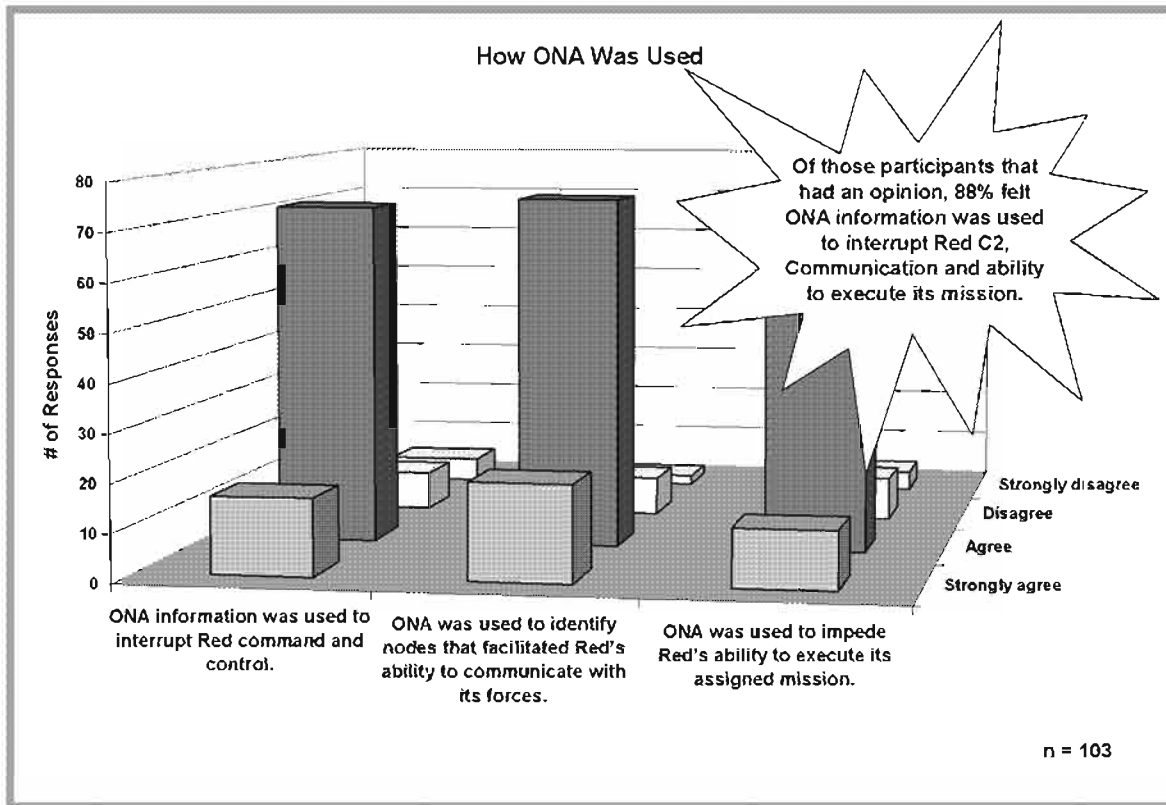


Figure 186: How ONA was used

with its forces and conduct intended activity. Twelve percent (13 of 103) disagreed. Twenty percent of all participants surveyed indicated they did not know if ONA supported interruption of this capability. Overall ONA did support this aspect of accelerating ahead of the adversary's intended activity.

During execution, participants were asked to respond to the statement, "Elements of the JTF are on the offensive because of specific support from the ONA." As shown in figure 187 above, 49 percent (65 of 132) of the respondents said there was some ONA support; five percent (six of 132) said ONA never was a factor; and 46 percent (61 of 132) did not know. In retrospect this large number of 'Don't Know' replies probably reflects a poorly worded

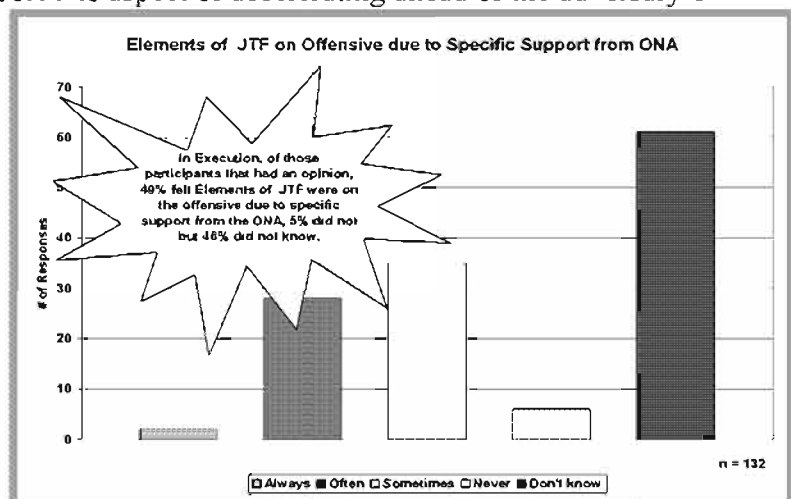


Figure 187: Elements of JTF on Offensive due to specific support from ONA

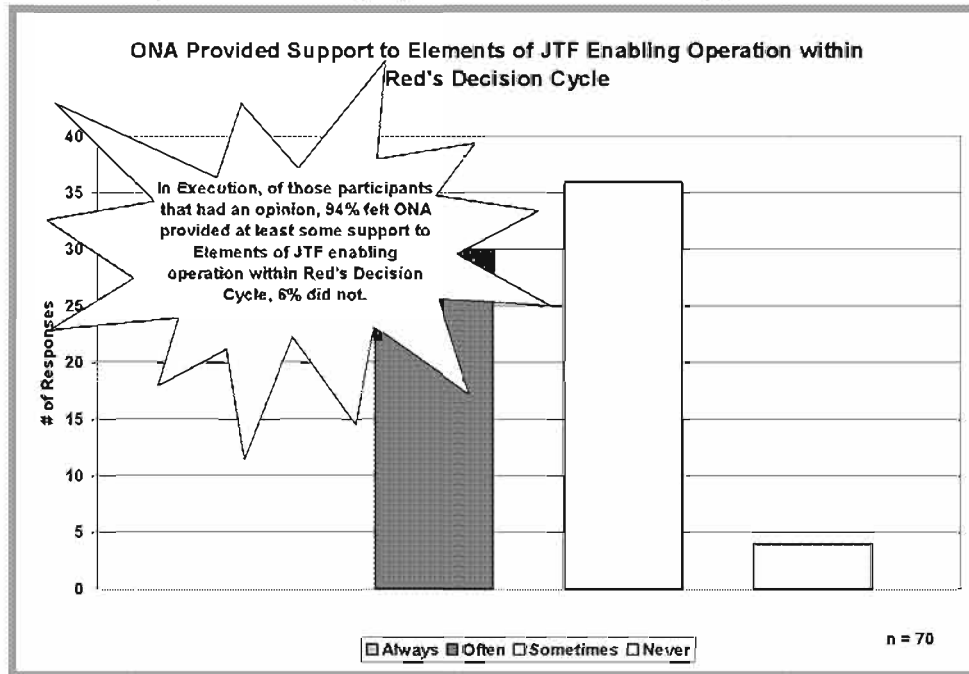


survey question. Taken at face value, these results indicated survey respondents believed ONA was used to support offensive operations with the expectation of operating inside the adversary's decision cycle.

During execution, survey participants were asked to respond to the statement, "ONA has provided specific support to elements of the JTF that enabled their operations within the adversary's decision cycle." This survey question directly addressed the task issue about using ONA to operate within the adversary's decision cycle. Of the respondents with an opinion, as shown in figure 188, 94 percent (66 of 70) reported ONA provided support; six percent (four of 70) indicated ONA never supported JTF operating within the adversary's decision cycle. Survey responses indicated ONA was used to interrupt adversary command and control and interrupt its mission performance.

They also said that ONA did provide support for units with the intent of their getting inside of the adversary's decision cycle. Task 7.2.5 was completed.

Both ONA challenges were met within the context of MC02 and the dendritic matrix. Task accomplishment during Spiral 3 and execution supported these two warfighting challenges.



This was the first experiment opportunity to examine the concept using a relatively "finished" ONA product. As noted earlier the database was not the robust product the concept demands, but it did demonstrate the potential of what might be possible with a mature and active ONA process.

Figure 188: ONA Provided Support to Elements of JTF Enabling

## **Appendix B — ONA Training**

Participant training on ONA presentations and tools was conducted as a part of the MC02 XC<sup>4</sup>I training effort. USJFCOM's charter was to teach functional use of IWS, ADOCS, and SharePoint Portal Server in 12 classroom hours. It was conducted in a classroom setting by an "in-house" team at JFCOM's Joint Training and Simulation Center (JTASC) in Suffolk, VA and a mobile training team (MTT) on the road. The MTT visited each of the component sites at least once; on-site or in-house training was conducted at the JTASC steadily from January to execution, in July. This training was in addition to the USJFCOM academic on-line concept training modules that were to be completed prior to the start of class. These modules were available on the USJFCOM J9 home page as well as USJFCOM academic computer-based training disks distributed at all MTT sites. Both training programs included definition of key terms associated with ONA such as system-of-systems, PMESII, and DIME. Students were also introduced to the nodes, actions, effects, and resources relationship of the relational database. The conflict stages were also included in this training.

Several experiment issues impacted the effectiveness of the MC02 C<sup>4</sup>I training. Foremost, it was evident that most "on the road" students had not completed the USJFCOM academic modules prior to the start of class. (The exception to this was at the Fort Hood site where J9 and J7 staff simultaneously conducted systems and concept training.) The intent of the MTT and in-house training was to familiarize students with the functionality of core MC02 C<sup>4</sup>I tools, not provide in-depth training of MC02 concepts. Also, it was expected that only a few individuals would be permitted to add ONA records during experiment activity; therefore, this activity was generally not covered during MC02 C<sup>4</sup>I tools training (it was not discussed at all at the component level during MTT training). Additionally, the majority of the personnel attending class had not yet been assigned exercise billets at the time of training and thus had little appreciation as to how ONA would be applied to their daily experimental duties and responsibilities.

To fully exploit ONA, the participants required extensive hands-on experience, as well as in-depth training and mentoring by ONA-experienced personnel. This level of instruction was impractical for military personnel, who simultaneously had real-world obligations and responsibilities that limited their time available for classroom instruction.

JTASC training and the MTT helped exercise participants access the ONA knowledge base through the SharePoint Portal Server. Players were shown the ONA informational pages (Executive Summary, et al) and the relational database. Within the database, report capabilities were used to reinforce the concept's effects, actions, nodes, and resources relationships. The effects-based planning support that allowed these items to be matched and linked was not included in the course syllabus because it was not available until Spiral 3. JTASC training on SPPS was conducted when server connectivity was available. The MTT servers contained an unclassified version of the ONA information and database that was available for all classes.

The practical exercise of the course highlighted ONA concepts. Students were given a fictitious ONA scenario with four nodes and a desired effect, and divided into virtual teams. Using the tools available (ADOCS, IWS, SPPS), each team was required to choose a node (which was also associated with a conflict phase – influence, deter, coerce, compel, or defeat), and then produce a "quad" joint tactical action/resources chart based on their node assignment.

The chart consisted of:

- An image of the node assigned
- A desired effect

## U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

- Blue actions
- Blue resources required by the actions to produce the given effect

The exercise was intentionally fictitious, and had no significant tactical or strategic value. Its intent was to exercise and practice functionality of the C<sup>4</sup>I tools and not to review the academic concepts.

## Appendix C — Additional Observations and Comments

Concerning Finding 1—

*SCD Observation:* “The ONA problem is ultimately turning data into knowledge into understanding.”

*SCD Comment:* “The ONA causes me to raise a couple questions. What is “knowledge?” Is it data? Is it information about the outside world? These are very different things. I’d spend time on definitions before I spent \$130M. It is easy to criticize the current ONA, but the problem is the concept. What will we do with it as a nation? Do we know what kind of knowledge we need to deal with our challenges? Does it fit with our national strategy?”

*SCD Comment:* “People are confused about the ONA. But if we build one using the SJFHQ and CIE, we’ll have an example.”

*Component Comment:* “The databases between ONA and MIDB were not reconcilable. We had to use MIDB because targets were not in ONA.”

*SME Recommendation:* “Concepts such as ‘ONA’ and ‘EBO’ and related terms must be explained and understood down to the tactical level if ETO’s are going to be used to write Op Orders and Frag Orders. Even with the translation from ETO to OpO, there will be some bleed-over of new joint terminology.”

*SME Comment:* “82<sup>nd</sup> ABN DTAC at Fort Irwin, CA received FRAGO #1 from 82<sup>nd</sup> ABN TOC at Fort Bragg on or about 26 July 02. FRAGO contained HHQ Cdr’s intent, which referenced Nodes and Effects. These terms were not understood at the tactical level as discovered with interviews with DTAC watch officers.”

*Participant Comment:* “A better definition of exactly what ONA stands for is required – the concept has often led members of the JTF and components (and JECG) to believe that the ONA should or will have just about all possible types of information included in it – in basis of all knowledge requirements for every elements on the JTF/component staff. While it is going to grow and improve, unless some expectation management and definition is provided, the ONA evolves from the concept into real-life in the coming years and will never meet the expectations of future users.”

*Participant Comment:* “It should be used as a research tool in order to provide decision makers the data that they need. It is difficult to maintain, and also is still just one source.”

*Participant Comment:* “Needs to support planning and execution.”

*Participant Comment:* (In response to, What should ONA contain?) “All relevant information, real time, and inherently easy to locate.”

*Participant Comment:* “Should be used in all phases, planning and execution.”

*Participant Comment:* “Useful in planning prior to combat ops.”

*Participant Comment:* “Most useful for planning.”

*Participant Comment:* “It was most powerful during planning.”

*Participant Comment:* “It is a good planning tool. In concept it would work. It will take work to become operationally useful. It is difficult to navigate and it isn’t linked with the targeting process.”

*Participant Comment:* “The ONA helps facilitate/drive the mission analysis process. The better the mission analysis the better chance for success you have.”

*Participant Comment:* “As the chief of operations, I very rarely if ever worked with the ONA. It is more of a planning tool than an operations tool.”

*Participant Comment:* "In Spiral 3, before the enemy was engaged, ONA was a great planning tool. We were all working with targets and concepts and data that the planners had anticipated. Once operations commenced, ONA value decreased."

*Boil Down Session Notes, Tuesday, 13 August 2002:*

*Component:* "ONA is a good planning tool; the question is at what level of input and maintenance it should be; combatant commander or SJFHQ or JTF should be responsible. ONA should contain information down to the targets and fires level of detail."

*Component:* "ONA belongs at the component commanders' level and to the strategic level beyond the combatant commander. ONA should not reside below the JIPB."

*Component:* "ONA has strategic and planning utility; other existing processes will take over from ONA down to the target folder levels. ONA might be a tactical net assessment level process."

### Concerning Finding 2

*SCD Observation:* "The Operational Net Assessment continues to grow and mature. The ONA has great potential, with one broad caveat. That is, the ONA is not a tool to satisfy all knowledge requirements."

*SCD Observation:* "The CJTF selection of desired effects to achieve the combatant commander's campaign objectives derived exclusively from the ONA."

*SCD Observation:* "The combination of the ONA and a focus on effects seemed to have a positive impact on the efficiency and effectiveness of the planning process."

*SCD Comment:* "There is an art to understanding ourselves and the enemy, to 'how we perceive the enemy and perceive ourselves.' Commanders fall along a bell-shaped curve. ONA can move the whole curve to the right, make a commander more artful, if the commander can inquire and get better answers."

*SCD Comment:* "Assessors need to understand every level of our activity and processes. We had too much IN and too little Ops."

*SCD Comment:* "ONA is a way of thinking that encourages emphasis on the whole rather than a focus on the parts of the whole."

*SME Comment:* "Almost everyone in the IO cell is using the ONA daily. JFMCC uses it much of the time, but information is not detailed enough to be more than an azimuth check. PSYOP/MMIC uses it to answer 1-2 questions/day. IW (information warfare) is a heavy user, but only recently received training (not in Spirals). Others stated that they used ONA several times a day to answer important questions."

*SME Comment:* "During discussion in JCB, WG, RM 101, 301530LJUL02, the targeting of an airport in CJTF-S area that had not been targeted before was discussed. It would just disable the use of the airport with minimal damage for possible return to GOR much later in the conflict. Great job of following ONA. Minimal damage to GOR territory and receiving the desired effect, no planes in the air to oppose BLUE forces."

*Participant Comment:* "ONA is a promising concept. It obviously takes a lot of work to manage and keep current!"

*Participant comment:* "ONA provided viable nodes for attack that lead to accomplishment of the JTF commander's desired effects."

*SME Comment:* "For those that use it, the ONA supports better, more informed decisions."

*Participant Comment:* “The ONA process has potential but needs significant refinement to be useful, including a change in institutionalized processes which disregarded the ONA in favor of more familiar methods?”

Concerning Finding 3

*SCD Observation:* “Training should be provided to components on effects development and submittal, so the entire joint force is operating from the same database.”

*SCD Observation:* “The JFLCC considers ONA a useful tool also. They caution that unless appropriate training occurs, the tool soon becomes useless. The training must be more than ‘buttonology’. By that, they mean the training must be more than learning how to physically use the tool. It must include the significance of the database functions, and how they support planning, operations, and effects assessment.”

*Component CC Comment:* “We liked it but we wanted it to be dynamic when the fight started. My planners had trouble updating it.”

*SME Comment:* “Everyone stated that the ONA interface was cumbersome and the amount of data provided was overwhelming. In spite of the large amounts of data provided, they often found that their particular question could not be answered. They said that if the gaps could be filled in, the tool would be much more useful.”

*SCD Comment:* “Clearly, the training piece for ONA is critical. Senior leaders have to ensure the operations center floor personnel understand more than “buttonology.” At present, most don’t understand the significance of ONA and how they can use the tool to support assessment.”

*Participant Comment:* “No formal training in the system so that made it harder to retrieve info in my ...”

*Participant Comment:* “ONA use needs to be sustained and improved; need a better tool to make the use be sustained and improved.”

*Participant Comment:* “Had a lesson, but didn’t have time to practice using since I didn’t have access to the info.”

*Participant Comment:* “Didn’t use it, wasn’t trained in it.”

*Participant Comment:* “The training method and training documents are terrible. I probably could not access 1/100 of the potential because most of my training with ONA and the database was OJT (even though I went through the class, which lasted about 1 hour at the most).”

*Participant Comment:* “I was taught the basics but when time allowed I learned more on my own.”

*Participant Comment:* “Most of my knowledge of how to effectively use the ONA was done by myself through trial and error.”

*Participant Comment:* “Last minute assignment into the slot did not allow for training time.”

*Participant Comment:* “We had a lot of process (training) but little, very little application.”

*Participant Comment:* “No training at all, learned it the old fashion way by just searching through the database.”

*Participant Comment:* “Found it hard to navigate around.”

*Participant Comment:* “Too complicated. If information is not a click away, it is worthless in a dynamic and fast flowing environment.”

*Participant Comment:* “No one really has in-depth knowledge on how to use the tool. There has to be a longer training course for this tool, something like a whole day. The same should be true for ADOCS.”

*Participant Comment:* “ONA is like the internet. It is out there somewhere but it may take you a month to find it.”

*Participant Comment:* “Once we trained ourselves to get by the spatial problems, it worked pretty well.”

*Participant Comment:* “Cannot update the ONA using other documents/spreadsheets or databases. ONA has to be manually updated, which in anything but a very low scale crisis would be impossible to maintain current.”

*Participant Comment:* “It is not user friendly enough.”

*Participant Comment:* “Needs work. People who use ONA need to sit down with programmers and help develop. ONA needs to be more operator friendly, rather than reflecting intelligence analysts comfort level.”

*Participant Comment:* “The database needs to be exportable to allow easier sorting for CC objectives.”

*Participant Comment:* “ONA is very hard to get useful information out of. While the information is valuable, it takes a long time to find it.”

*Participant Comment:* “I have a couple of graduate degrees and it hurts my head to figure it out. Get some simple thinking guys to produce a database that any person can understand. Otherwise, no one will use it and go out of their way to shy away from it.”

#### Concerning Finding 5

*SCD Observation:* “Unfortunately, without education and training on these advantages, the components may fail to fully exploit the ONA assessment, may not contribute to ONA upgrade and enrichment, and in fact may be unable to understand the enemy.”

*SME Comment:* “Yes, but only if it (ONA) is robust enough to provide a fine degree of granularity of detail and breadth of subject areas.”

*SME Comment:* “Overall the single version of the ONA makes sense for several reasons. Management of multiple databases could get difficult and promote conflicting information. It is additionally important for the components to get the view of what the higher headquarters has to deal with in regard of the DIE. (It is) having a database that allows you to probe the virtual mind of the CJTF and the combatant commander.”

*Participant Comment:* “The ONA provided basic insights. However, it did not fulfill its fundamental promise of tying specific facilities to various nodes. In my view, the value of the ONA is in shaping the operational strategy to meet strategic goals and objectives. It loses its value when it attempts to become a tool to define tactical objectives and tasks. These need to be derived from the JFC’s guidance and objectives based on his desired effects. The ONA allows the JFC to better frame his/her strategy by shaping the desired effects.”

*Participant Comment:* “The Operational Net Assessment (ONA) database and construct was not synchronized or readily adaptable with the component’s targeting databases and nodal analysis tools. The BE numbers and geo coordinates used by components did not always match with the ONA.”

*Participant Comment:* “As a planner, I use the ONA to research potential ECOA.”

*Participant Comment:* “I used ONA. Mostly during spiral 3 for planning and only when searching for specific critical mission related data during execution.”

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

*Participant Comment:* “I wanted to use the ONA to gather technical information concerning RED.”

*Participant Comment:* “I used ONA to understand personal relationships with the adversary leadership, very useful.”

*Participant Comment:* “Bird’s eye view, depiction of overall progress of efforts (graphical?). Order of Battle Bean-Counting correlated to Phase 2 (maybe Phase 1) BDA.”



## **Appendix D — ONA Database Development for MC02**

Development of the ONA knowledge base for MC02 was initiated in August 2001. In keeping with the intent of the ONA concept, USJFCOM attempted to include governmental departments other than the Department of Defense. Intelligence and law enforcement departments and agencies tentatively agreed to participate but, following the September 11, 2001 attacks, they were forced to withdraw committed support. Some informal involvement did continue. The USJFCOM Blue cell personnel (the system-of-system analysis [SOSA] cell) led the effort to develop knowledge and understanding of Red.

A series of USJFCOM J9 staff experiments (STAFEX) were conducted from September through November 2001 by the Blue cell to help focus attention on the task of identifying potential effects, nodes and actions. The cell members then used all available research avenues to enrich the knowledge base information and analysis. The project was a daunting effort that grew larger as progress was made. The project was further hindered by the absence of adequate analysis, assessment, and information management tools. Each effect required a range of node-action pairs that varied by phase and situation. Each variation tended to reveal another that produced an additional array of potential effects, nodes, and related actions. An ONA limited objective experiment (LOE) in October 2001 provided concept clarification and confirmed the concept requirement for an integrated effort of government departments and agencies to construct a knowledge base.

Development of the knowledge base continued through Spiral 3. The resultant product included: the ONA summary, six PMESII system summaries (for both Red and Blue), 15 regional country assessments, some 300 potential effects, 700 nodes and the appropriate actions and resources tied to them. The ONA was base-lined for country Red and subsequently tailored to the MC02 scenario setting for the experiment. The ONA knowledge base with its associated database provided sufficient clarity and options to respond to scenario situations. It was a solid introduction of a concept proposal.

## **Appendix E — ONA Knowledge Base Information**

**Intended Use.** For MC02, ONA is an operational support tool intended to show joint commanders effects-to-task linkages, which is based on systems analyses of the adversary's political, military, economic, social, infrastructure, and information (PMESII) elements of power. Within the context of the concept, ONA is a product of collaboration between strategic, operational, and tactical levels, providing a common knowledge base and available to decision makers from the national strategic level to the tactical level. The development process builds situational awareness and understanding that supports planning and execution of EBO. ONA embodies a philosophy that continuously drives a process to produce actionable knowledge. ONA is developed by the SJFHQ and it is this headquarters' IS group that has the overall responsibility for coordinating the ONA among the plans, operations, and knowledge management headquarters' groups.

**ONA Knowledge Base.** The ONA knowledge base includes the knowledge gained through focused research and analysis of a potential adversary. Context and actionable knowledge are the key components that are collectively referred to as the knowledge base. For the MC02 experiment, context access was provided through SPPS to the ONA Summary page and the ONA Matrix page. Actionable knowledge access in the relational database is also provided through SPPS. This database provides the specific effects-to-task linkages, as well as rationale and potential consequences of actions.

First, the ONA Summary page provides a high-level context and an overall net assessment of Red and Blue objectives. The Matrix page provides a single page table with hyperlinks to the PMESII summaries, PMESII vulnerabilities and diplomatic, information, military, economic (DIME) objectives from both a Blue and Red perspective. Additionally, assessments of regional perspectives are also presented with more detailed hyperlinks embedded. Relevance to the developing situation is the key attribute of establishing context.

The actionable knowledge in the ONA database is the linkage between effects, nodes, actions, resources, (E/N/A/R) rationale, and potential consequences of selected actions. For a desired effect in development of an effects-based plan, the commander presents a range of actions and key nodes for consideration.

**SPPS ONA Summary Page.** The ONA Summary page is an executive-level synopsis of Blue and Red objectives and a net assessment of the evolving situation. The summary provides a short assessment of ongoing activity and evaluates both complimentary and conflicting objectives to illuminate potential avenues for achieving Blue objectives. It is the result of a collaborative effort between the Blue Red cell and Pol/Mil planner in the plans group and the information superiority group.

**SPPS ONA Matrix Page.** The ONA Matrix page is a tailored selection of links to various executive level documents. The links include assessments from both Blue and Red points of view and allows the user to drill down to detailed documents supporting the assessment and the database. The matrix also allows selection of DIME strategy and presents a comparison of DIME intentions and Red vulnerabilities. Further, the Matrix page provides a collection of regional states and entity assessments that provide insight into how they might respond to Blue activities.

**ONA Database.** ONA includes an action-oriented process that provides a continuous stream of knowledge from desired Blue effects to adversary vulnerabilities to potential actions. Potential effects along with Red and Blue perspectives are captured from SJFHQ war-gaming

sessions. Within the database, effects are referenced to supporting strategic guidance and engagement plans.

As described within the concept key nodes are developed through system-of-systems analysis. Node selection requires an understanding of the adversary as a set of interdependent PMESII systems. This understanding is developed through in-depth research, analysis, and reach-back to centers of excellence. The operational net assessment development process relies upon habitual, persistent, institutionalized collaboration and integration to leverage a wide variety of experts from a wide variety of organizations to build a coherent knowledge base. Nodes descriptions and significance statements are presented in the database as well as links to supporting documentation.

Actions are based on the DIME capability construct that reflects the range of national power elements. Actions are linked to nodes where the combined action-node pair has the potential to achieve the desired effect. Each effect-node-action combination is supported with a rationale and identifies potential secondary effects or consequences. The ONA database provides multiple node-action pairs that may achieve an effect and are presented for planning consideration and command decisions.

**Tools.** As designed, ONA is a tool to support effects-based planning and commander decision-making. The ONA Summary and Matrix pages establish the context for understanding the adversary. The relational database captures the core information (E/N/A/R) and linkages identified in the analysis process. It reflects the potential cause and effect relationships for planning and decision use.

A planning module within the database brings together the effects, nodes, actions, resources, and secondary effects and presents a range of options to build an ETO. The planning module then provides a method to task components for selected effects as well as to prioritize and sequence effects and nodes. Changes to any effect, node, action, resource, or secondary effect are immediately reflected in plans based on those elements.

The ONA database offers an extensive reporting function. All aspects of the ONA database content are available as user selectable fields for generating reports.

Analyst Notebook is an analysis tool that provides a canvas for presenting, viewing, and understanding associations between entities. For better perspective, many diagrams using Analyst Notebook have been developed in the ONA analysis effort and are linked to the ONA summaries and database nodes.

In developing the ONA knowledge base for MC02, analysts used several models to further understand the adversary (Red). They include the Structured Evidentiary Argumentation System (SEAS), Situational Influence Assessment Model (SIAM), and Critical Intent Model (CIM). Built during ONA development, these models are manpower intensive. They do facilitate identification of interactions between PMESII categories, major influences on the adversary leadership, and critical activities required to conduct some threat operations.

The ONA database underwent minor improvements following Spiral 3. Most of the changes were designed to improve utility and consistency between the modules.

As presented within the experiment, the ONA knowledge base contains the knowledge developed in assessing the real world and overlaying the MC02 scenario. The real world provided the necessary fidelity to understand the cause and effect relationships that are expressed as effects/nodes/actions/resource linkages in the database. ONA is intended to provide a focused introduction for conducting effects-based operations and must be continuously updated by current operations and current intelligence.

Appendix F — ONA Knowledge Base Access and Use

The following charts display MC02 participant access to ONA Knowledge base items contained in the SPSS. The data was extracted using the Web Trends tool. Access and use of this information was far more intuitive than the database information. The tools provided were considered adequate by participants.

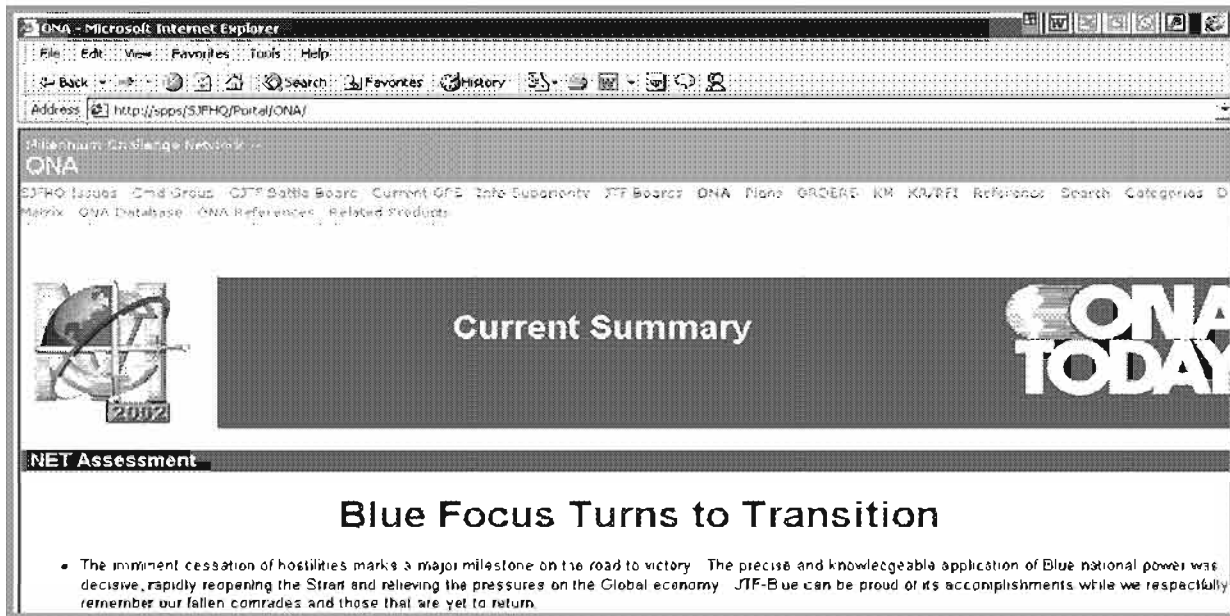
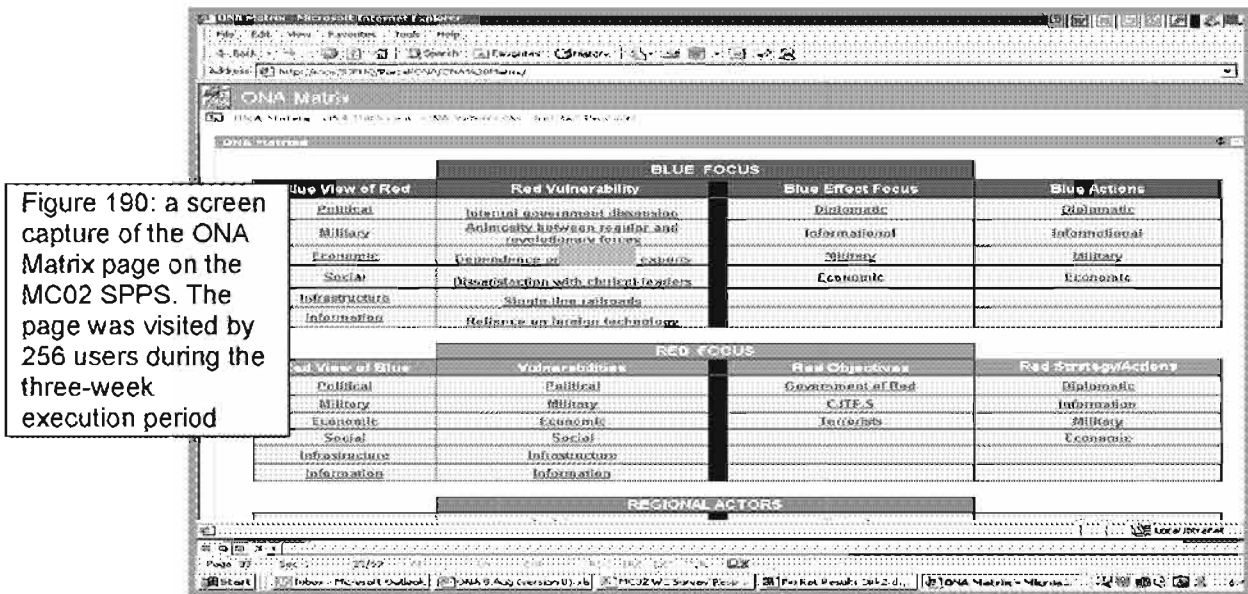


Figure 189: ONA Portal Page on SPPS. Figure is a screen capture of the ONA portal (entryway) page on the MC02 SPPS. The ONA portal was also used as the ONA Today Executive Summary page. As such, this Executive Summary and portal page recorded more visits than the other ONA pages because users predominantly used it to transit to their destination page(s). The ONA Portal logged 2,051 visits during the three-week execution period.



# U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

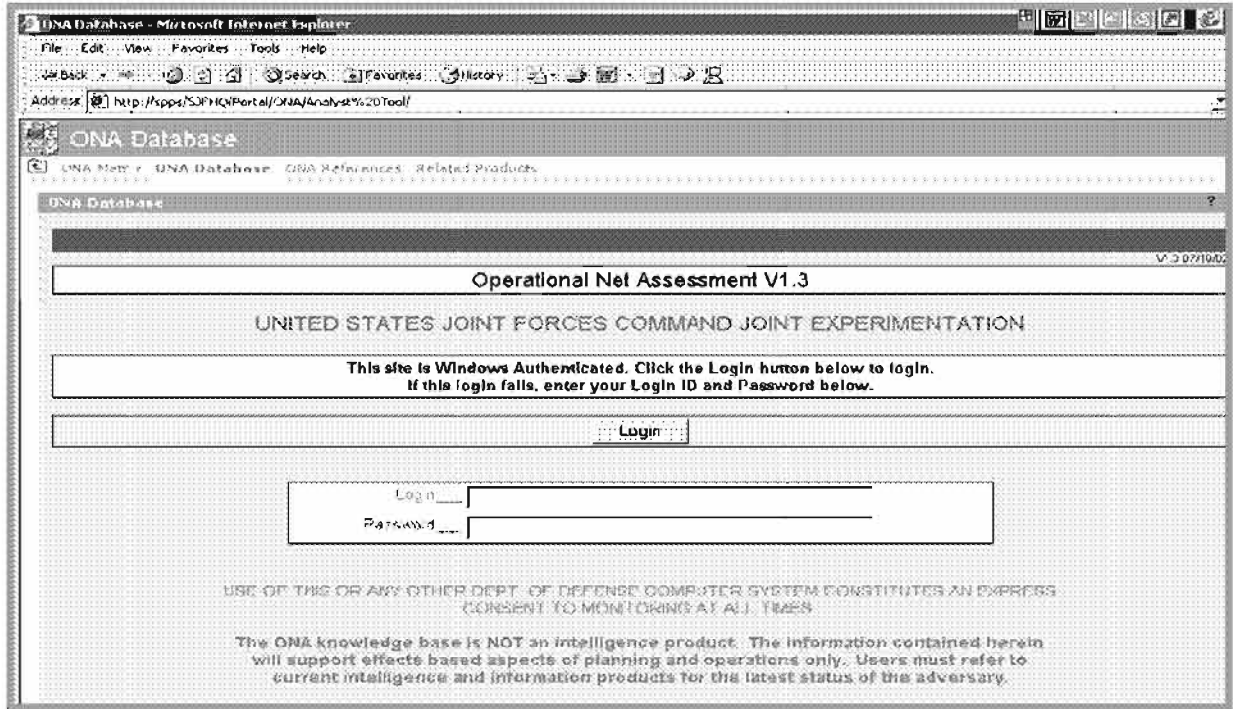


Figure 191: Screen capture of an ONA Database login page, 1,539 users visited the Login page during the three-week execution period

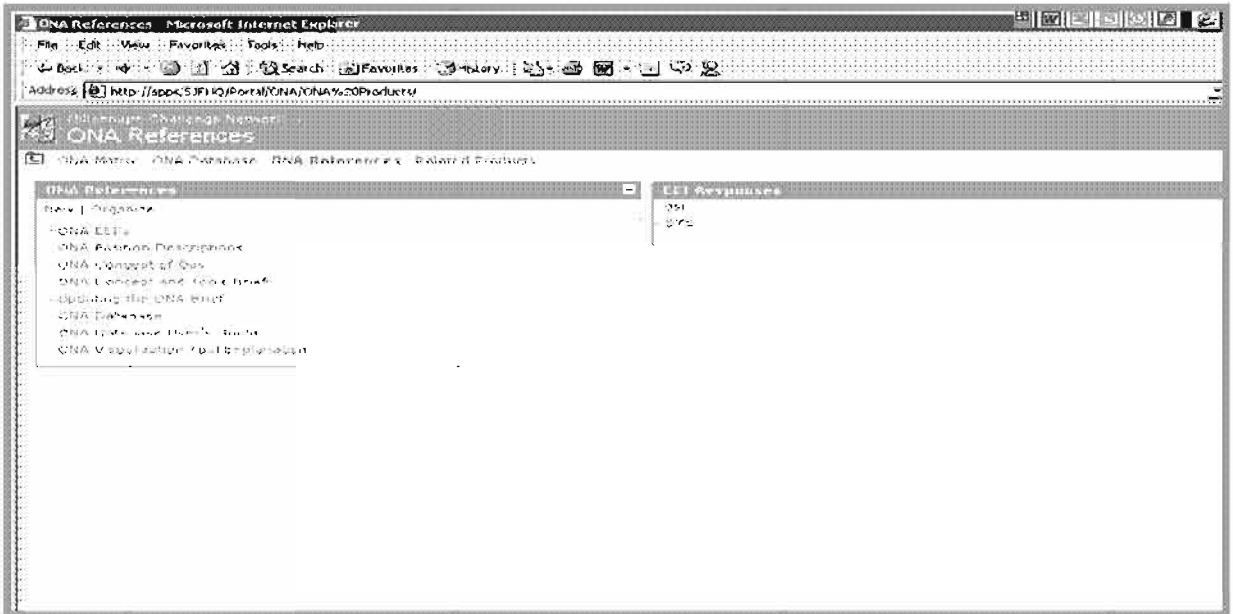


Figure 192: Screen capture of ONA reference pages. One hundred thirty users visited the References page during the three-week execution period

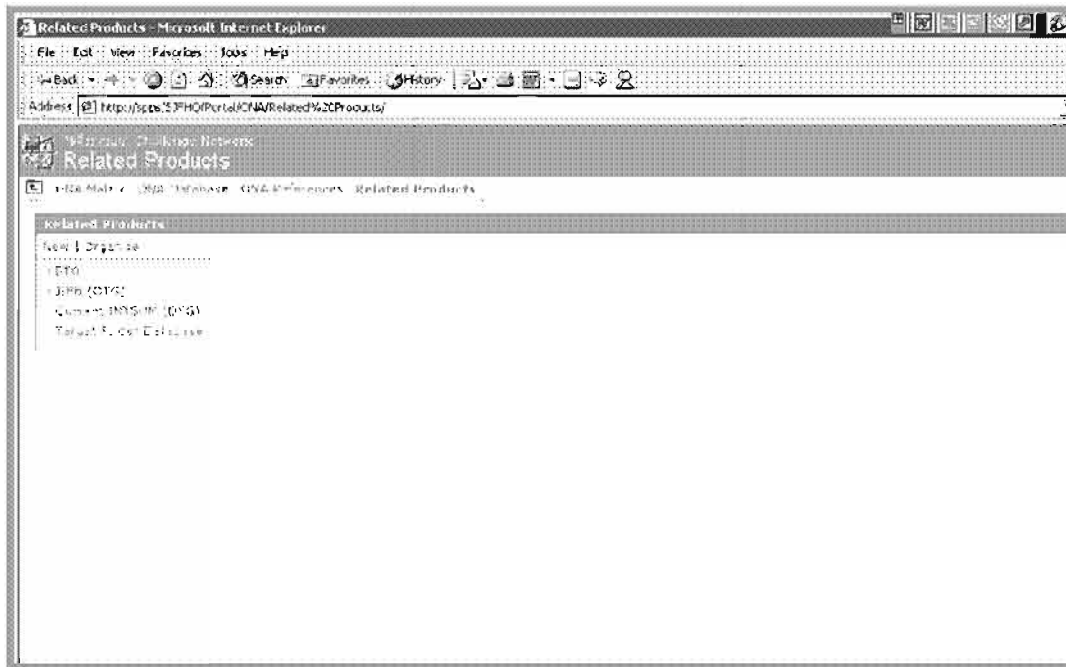


Figure 193: A screen capture of the ONA Related Products page on the MC02 SPPS. Sixty-nine users visited the Products page during the three-week execution period.

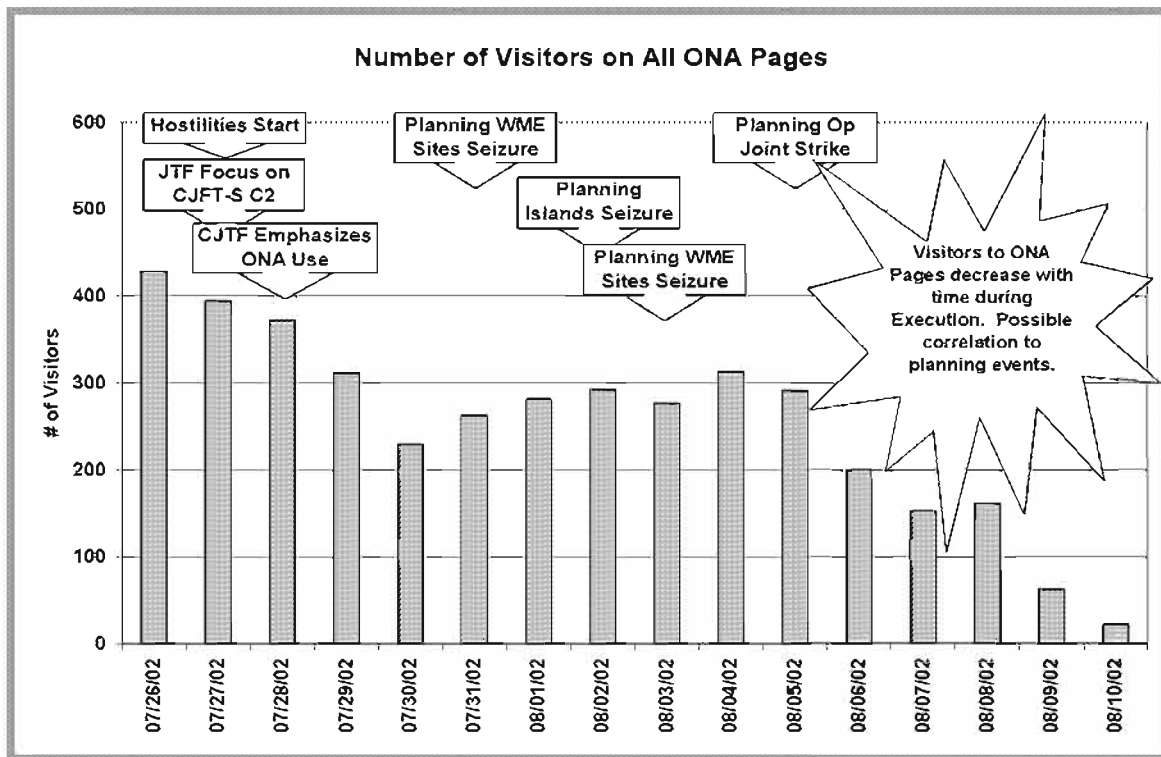


Figure 194: The cumulative number of visitors to all the ONA pages on SPPS per day. There appears to be a correlation between the major planning activities shown in the text boxes at the top of the chart with the cumulative number of visitors to the ONA pages.

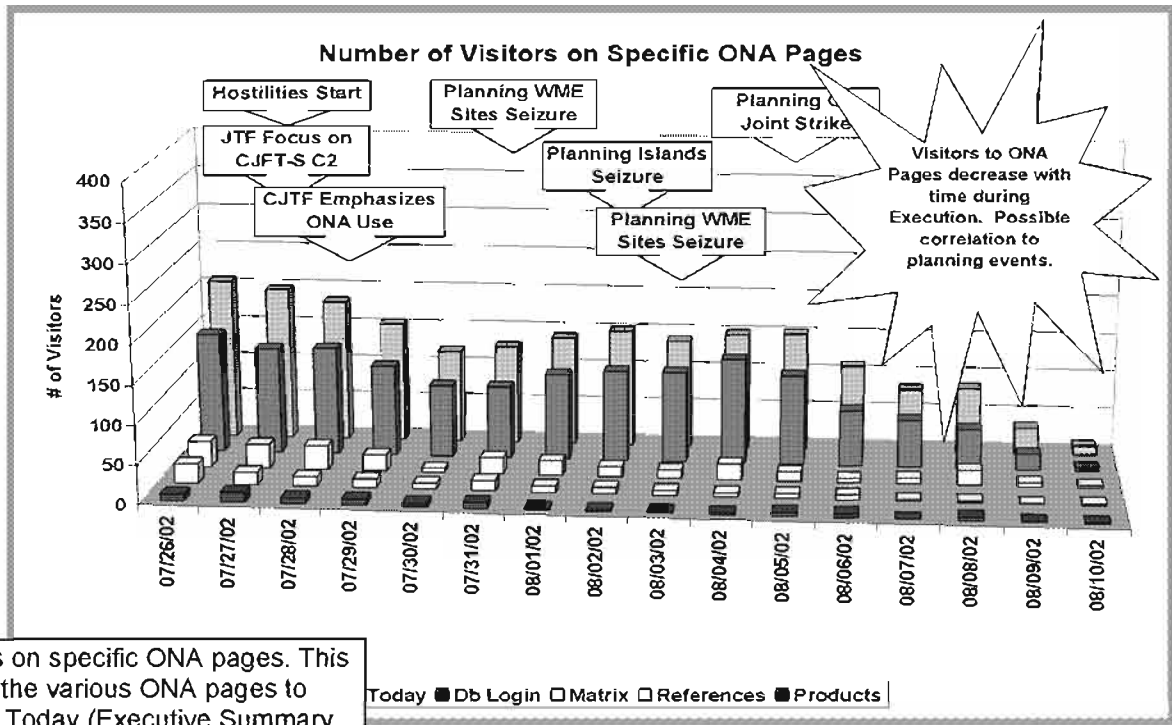
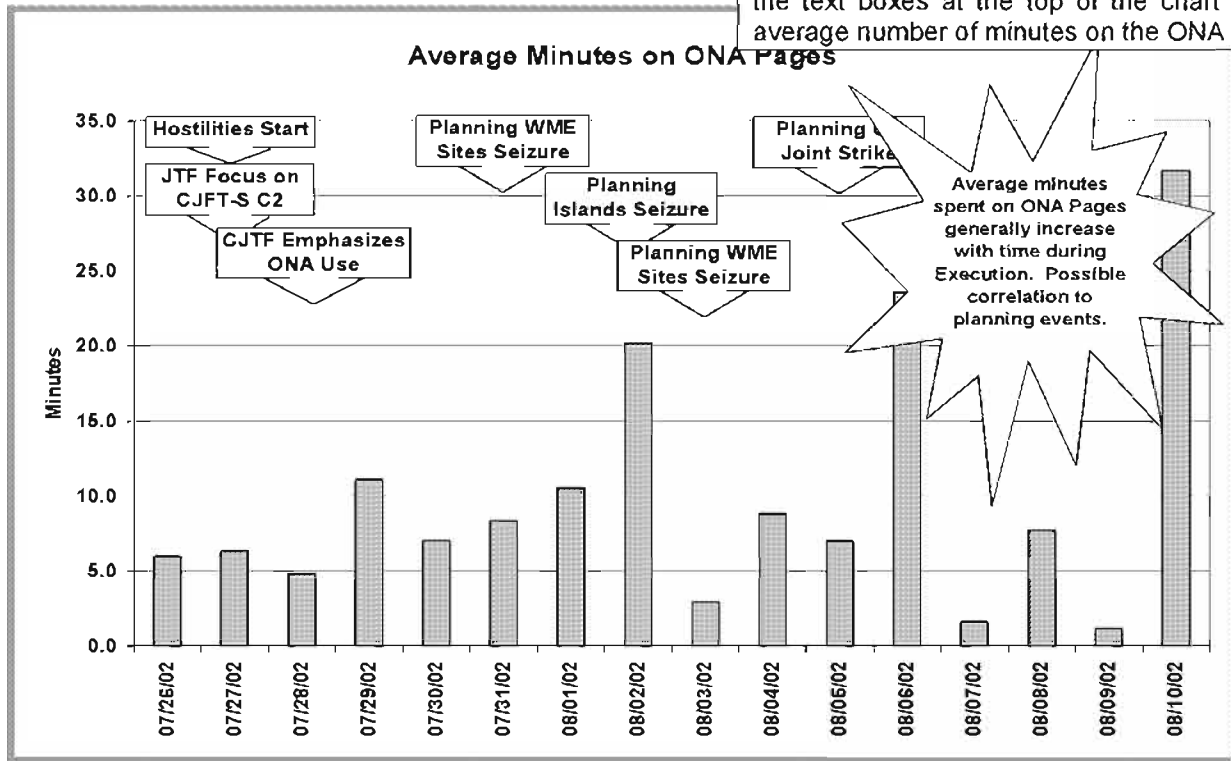


Figure 195: Visitors on specific ONA pages. This graphic breaks out the various ONA pages to show that the ONA Today (Executive Summary and portal) and the database login pages were the pages most often visited. There appears to be a correlation between the major planning activities shown in the text boxes at the top of the chart with the number of visitors.

Figure 196: This chart shows the average number of minutes spent on all the ONA pages on SPPS per day. This is the total number of visitors divided by the total number of minutes per day. There still appears to be a correlation between the major planning activities shown in the text boxes at the top of the chart with the average number of minutes on the ONA pages



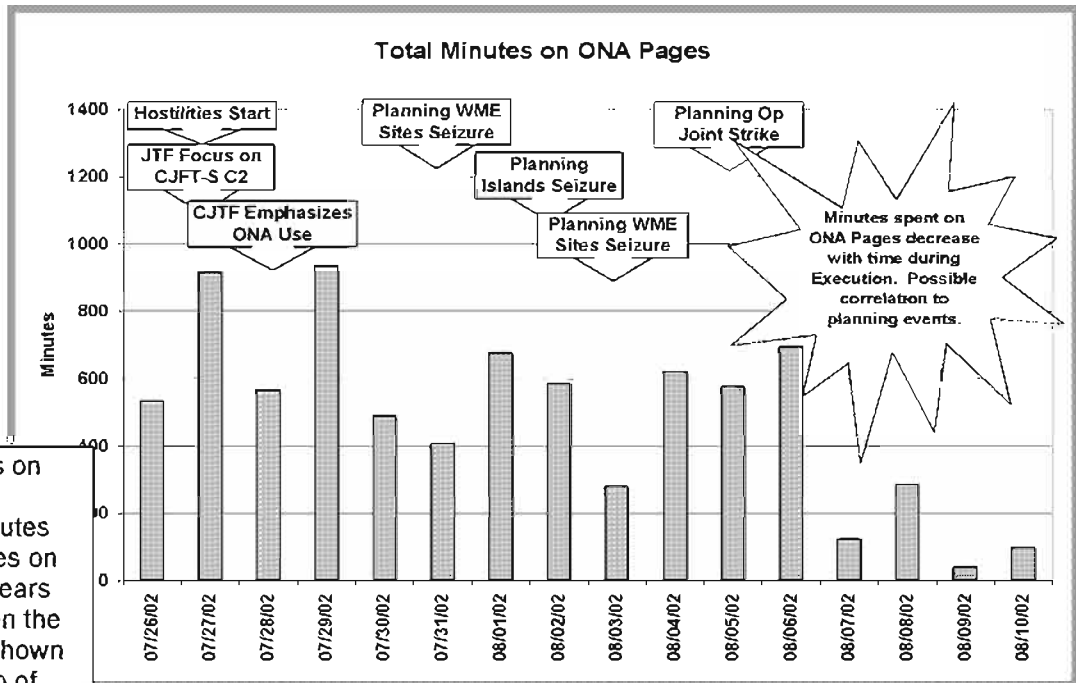
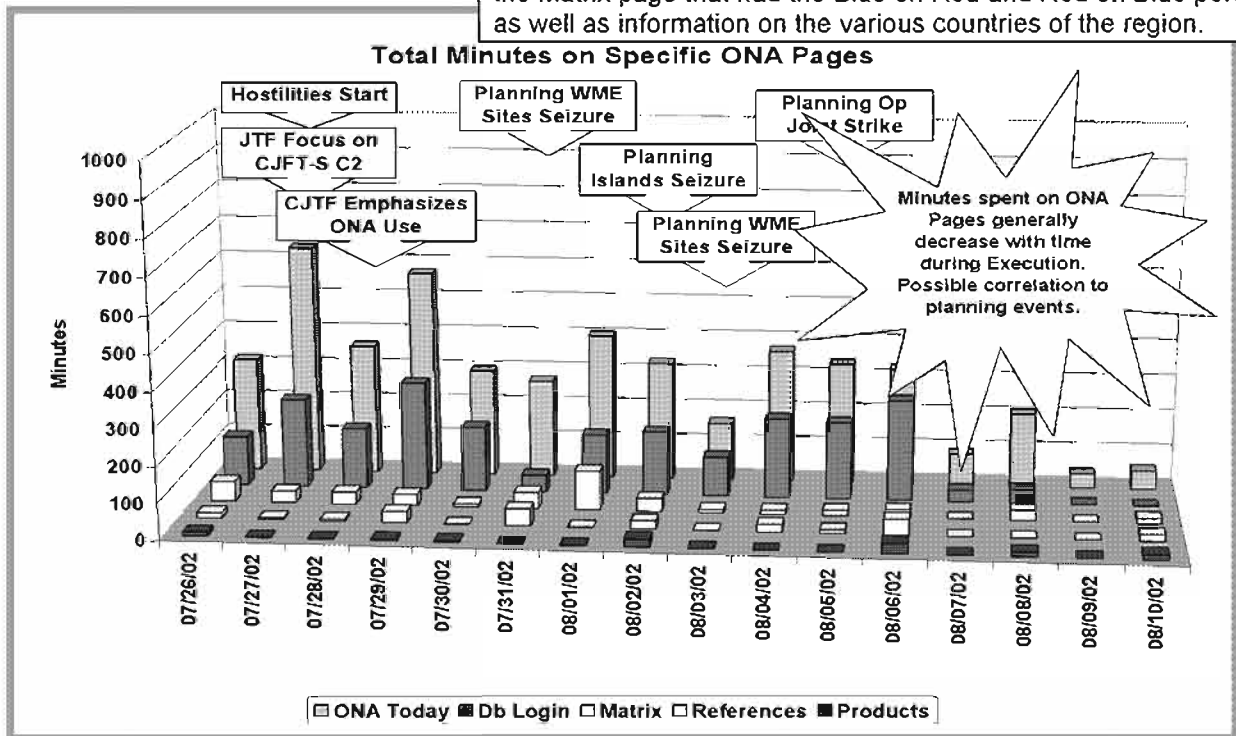


Figure 197: Total minutes on ONA pages shows the cumulative number of minutes spent on all the ONA pages on SPPS per day. There appears to be a correlation between the major planning activities shown in the text boxes at the top of the chart with the cumulative number of minutes on the ONA pages but it is less clear than the previous figures. It should be noted that the data does not differentiate productive from non-productive activity while spending time on the page(s).

Figure 198: Total minutes on specific ONA pages breaks out the various minutes spent on the various ONA pages to show that the ONA Today and the Database Login pages were again the favorites. There still appears to be a correlation between the major planning activities shown in the text boxes at the top of the chart with the number of minutes on each of the ONA pages but the correlation is less clear than the previous figures. More cumulative time was spent on the ONA Today page than on the database login page. What was unexpected was the lack of use of the Matrix page that had the Blue on Red and Red on Blue perspectives as well as information on the various countries of the region.





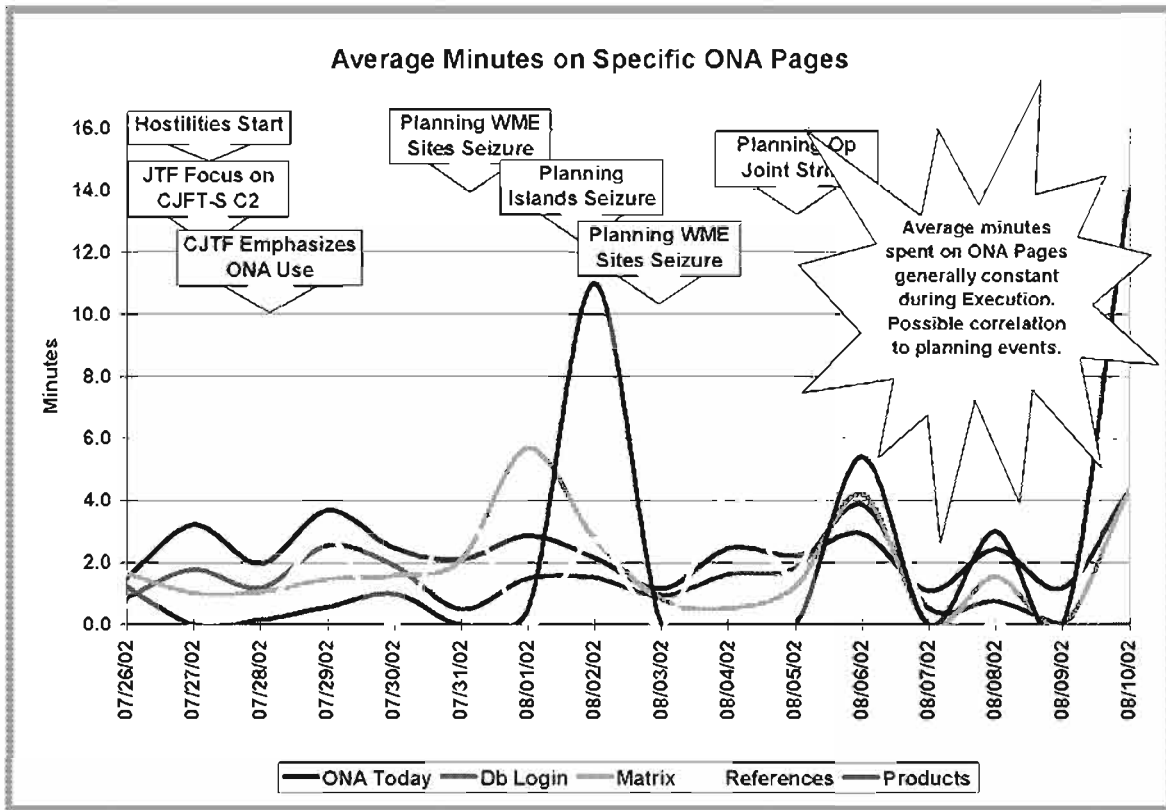


Figure 199: Figure shows the average number of minutes spent on each ONA page on SPPS per day. This is the total number of visitors divided by the total number of minutes per day. There still appears to be a correlation between the major planning activities shown in the text boxes at the top of the chart with the average number of minutes on the ONA pages.

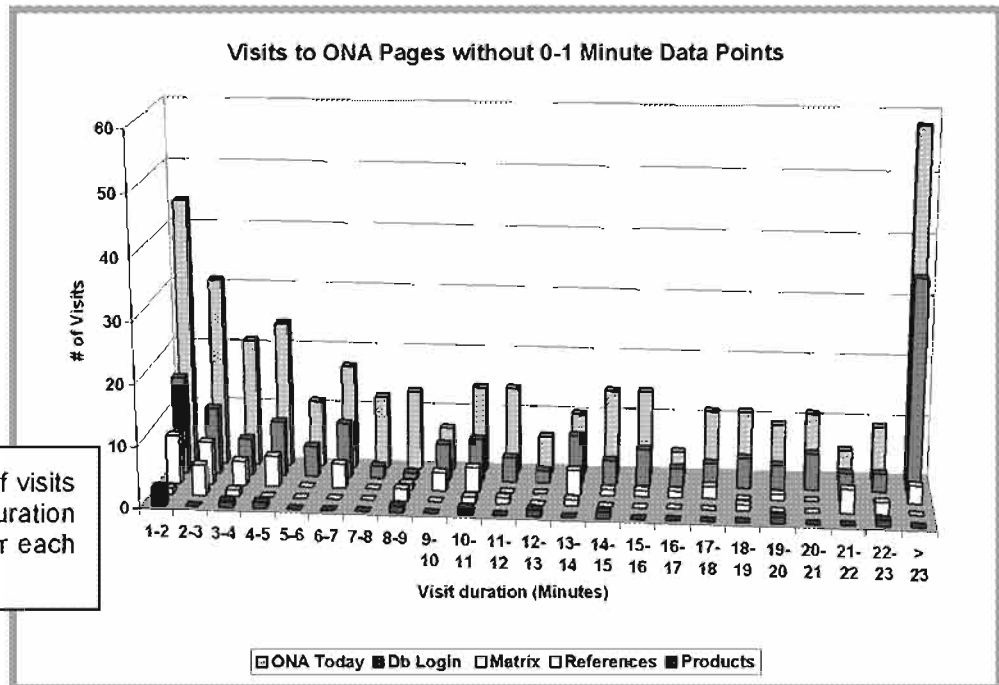


Figure 200: the number of visits categorized by the visit duration in one-minute intervals for each ONA page on SPPS

Figure 200, on the previous page, shows the number of visits categorized by the visit duration in one-minute intervals for each ONA page on SPPS. Since the ONA Today page was also the portal to the other pages, an assumption is made that the bulk of the 0-1 minute visits were transitions to the other pages. The 0-1 minute category, however, represented 81 percent of all duration categories.

Since the Database Login page did not require a user id or password but only a click of the “Login” button, an assumption is made that the bulk of the 0-1 minute visits were transitions to the SQL database (Web Trends loses track of activity, but the SQL audit log takes over). The 0-1 minute category, however, represented 89 percent of all duration categories. The Matrix, References, and Products pages saw nominal use during execution, relative to the ONA Today and Database Login pages. The 0-1 minute category represented 80 percent of all duration categories for the Matrix page, 85 percent of all duration categories for the References page, and 84 percent of all duration categories for the Products page. The 1-23+ minute categories represented 20 percent of all duration categories for the Matrix page, 15 percent of all duration categories for the References page, and 16 percent of all duration categories for the Products page.

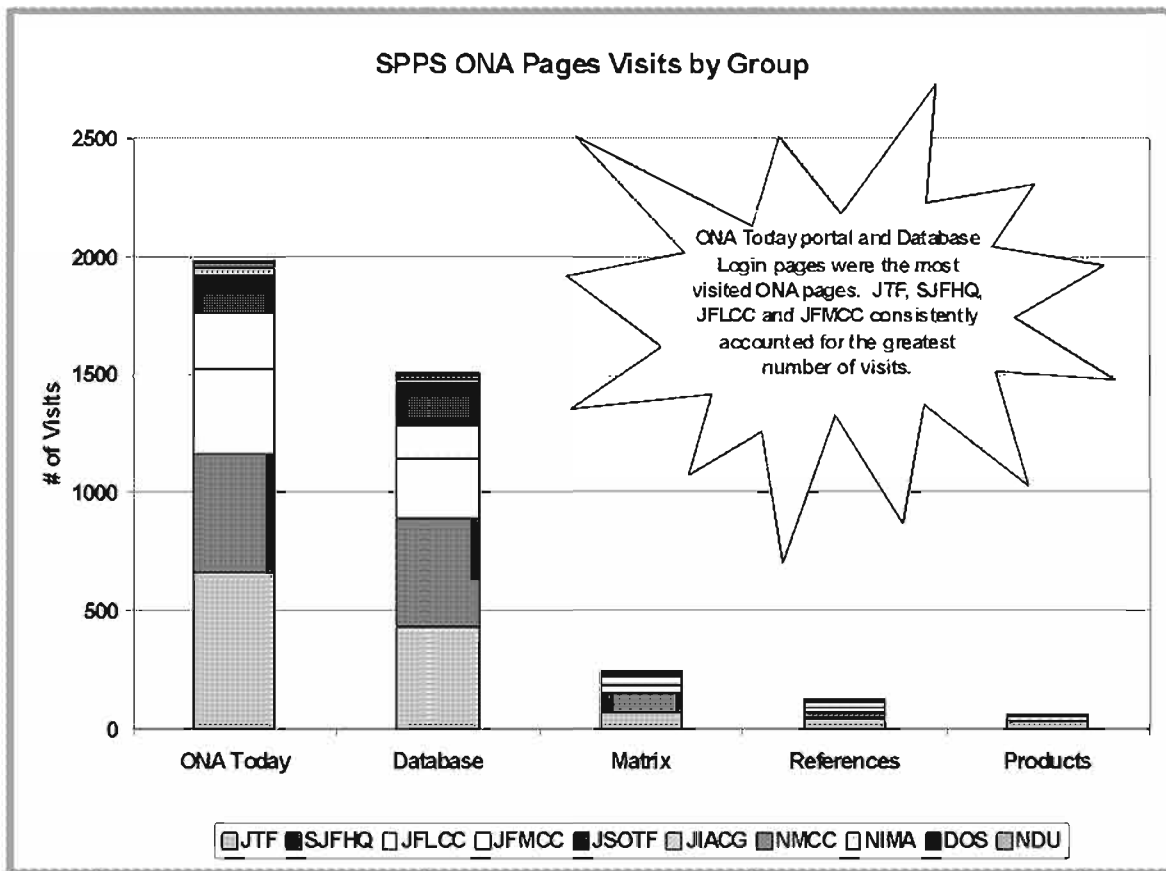


Figure 201: Figure breaks out the various ONA page visits by group to show that the ONA today (Executive Summary and portal) and the database login pages were the predominant pages visited consistently. The JTF, SJFHQ, JFLCC, and JFMCC groups consistently made the greatest number of visits to the various pages. Again, the lack of use of the matrix page that had the Blue on Red and Red on Blue perspectives as well as information on the various countries of the region was unexpected.

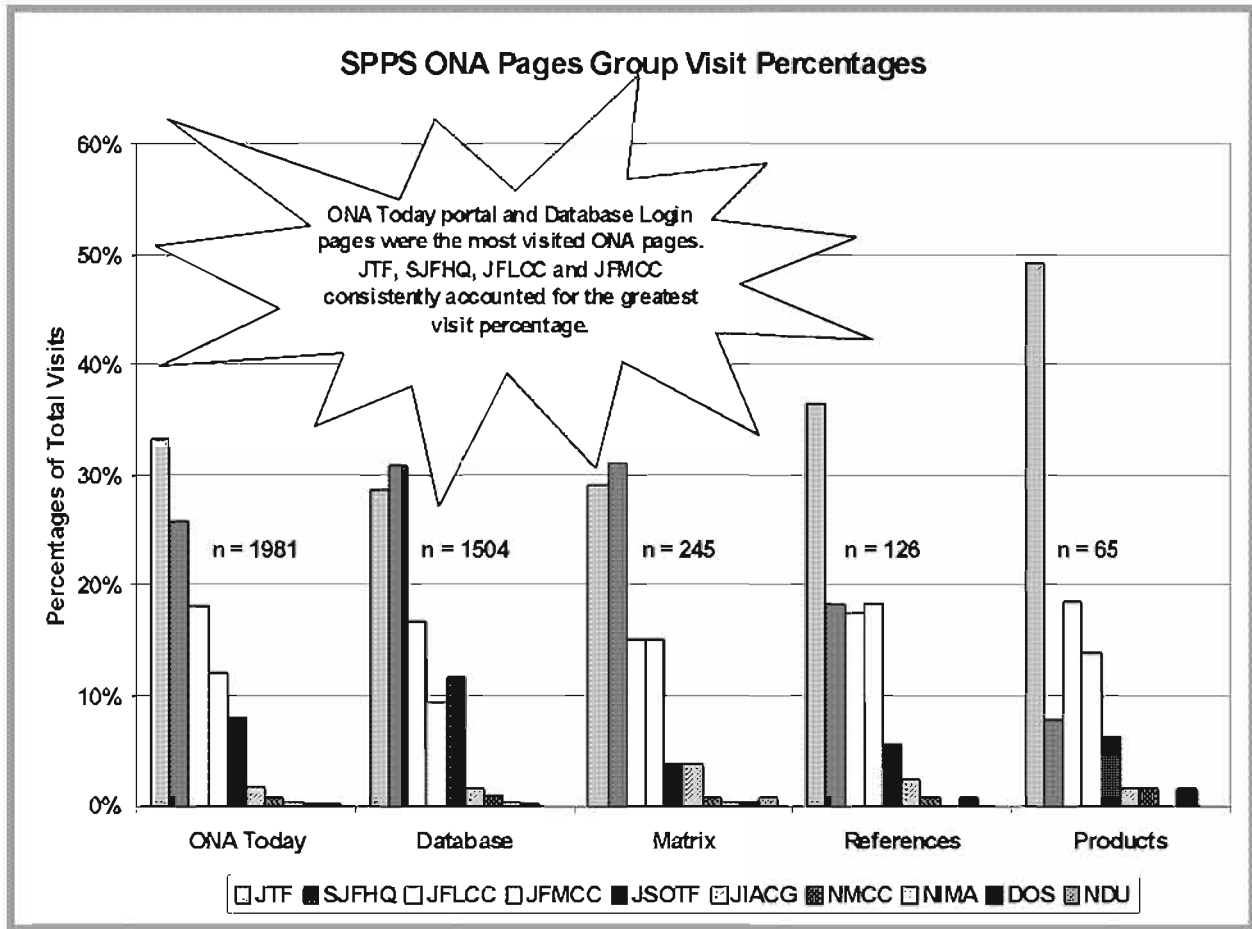


Figure 202: This graphic breaks out the percentages of the various groups visiting the ONA pages to show that the JTF, SJFHQ JFLCC and JFMCC groups consistently had the greatest percentage of visits to the various pages.

The bottom line: The ONA today and database login pages received the preponderance of visits / time spent and only scant attention was given to the matrix and other ONA web pages.

Appendix G — ONA Data Collection Matrix

| Concept/Challenge/Task/Measure/Data Requirement                                                                                                                     | Data Collection Method                                                     |     |     |     |          | Collection Audience (Who)               | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-----|-----|-----|----------|-----------------------------------------|-----------------------|-----------------------------|-----------------|
|                                                                                                                                                                     | SME                                                                        | SVY | SCD | M&S | Product. |                                         |                       |                             |                 |
| 7. CONCEPT: OPERATIONAL NET ASSESSMENT                                                                                                                              |                                                                            |     |     |     |          |                                         |                       |                             |                 |
| 7.1. WARFIGHTING CHALLENGE: Ability to construct and use an ONA knowledge base to support development of an effects-based strategy                                  |                                                                            |     |     |     |          |                                         |                       |                             |                 |
| Task: 7.1.1 Develop an ONA information knowledge base                                                                                                               | Is the Blue DIME vs. Red PMESII analysis in the ONA knowledge base useful? |     |     |     |          |                                         |                       |                             | ST 2.2          |
| Measure: 7.1.1.0.1 Rating of the adequacy of how Blue DIME capabilities versus Red/adversary PMESII systems comparative analyses are captured in ONA knowledge base |                                                                            |     |     |     |          |                                         |                       |                             | OP 2.4.1        |
| DR: ONA users' understanding of Blue DIME capabilities versus Red/adversary PMESII systems analyses                                                                 |                                                                            |     |     |     |          |                                         |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                                                            | S                                                                          | P   |     |     |          | Plans, Info S, & Cmd Gps.; JIAC; Comp.  | JDCAT Survey          | 7 Jun.                      |                 |
| DR: Utility of Red/adversary DIME/PMESII system analysis for ONA users (thorough; correct; shallow; wrong)                                                          |                                                                            |     |     |     |          |                                         |                       |                             |                 |
| DE: 2.Survey question(s)                                                                                                                                            | S                                                                          | P   |     |     |          | Plans, Info S, & Cmd Gps.; JIACG; Comp. | JDCAT Survey          | 7 Jun.                      |                 |
| DR: ONA users desired Red/adversary DIME/PMESII system analysis information missing from ONA knowledge base                                                         |                                                                            |     |     |     |          |                                         |                       |                             |                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                                                                            | Data Collection Method                                    |   |  |   |  | Collection Audience (Who)                   | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---|--|---|--|---------------------------------------------|-----------------------|-----------------------------|-----------------|
|                                                                                                                                                                            | S                                                         | P |  |   |  |                                             |                       |                             |                 |
| DE: 3.Survey question(s)                                                                                                                                                   | S                                                         | P |  |   |  | Plans, Info S, & Cmd Gps.; JIACG; Comp.     | JDCAT Survey          | 10 Jun.                     |                 |
| DE: 4.Count of JTF Hq DIME/PMESII system analysis requests for information (RFI)                                                                                           | S                                                         |   |  | P |  | Plans, Info S, Cmd & Ops Gps.; JIACG; Comp. | RFI Tool/log          | As occurs                   |                 |
| DR Army: Does the database/ONA provide detailed and comprehensive information about adversary vulnerabilities and leadership profiles to enable IO planning and execution? |                                                           |   |  |   |  |                                             |                       |                             |                 |
| DE: 5.Survey question(s)                                                                                                                                                   | S                                                         | P |  |   |  | Plans, Info S, & Ops Gps.                   | JDCAT Survey          | execution                   |                 |
| Measure: 7.1.1.0.2 Rating of Blue information adequacy included in ONA knowledge base                                                                                      | Is the Blue information in the ONA knowledge base useful? |   |  |   |  |                                             |                       |                             |                 |
| DR: Utility of Blue information included in ONA knowledge base for ONA users (thorough; correct; shallow; wrong)                                                           |                                                           |   |  |   |  |                                             |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                                                                   | S                                                         | P |  |   |  | Plans, Info S, & Cmd Gps.; JIACG; Comp.     | JDCAT Survey          | 7 Jun.                      |                 |
| DE: 2.Frequency count of ONA knowledge base accessed for Blue information                                                                                                  | S                                                         |   |  | P |  | Plans, Info S, Cmd & Ops Gps.; JIACG; Comp. | ONA audit log         | As occurs                   |                 |
| DR: ONA users' desired Blue information missing from ONA knowledge base                                                                                                    |                                                           |   |  |   |  |                                             |                       |                             |                 |
| DE: 3.Survey question(s)                                                                                                                                                   | S                                                         | P |  |   |  | Plans, Info S, & Cmd Gps.; JIACG; Comp.     | JDCAT Survey          | 10 Jun.                     |                 |
| Measure: 7.1.1.0.3 Rating of the adequacy of how the ONA knowledge base provides a shared awareness of the JOA                                                             | Does the ONA knowledge base provide awareness of the JOA? |   |  |   |  |                                             |                       |                             |                 |
| DR: ONA knowledge base contribution to battlespace awareness for JTF staff                                                                                                 |                                                           |   |  |   |  |                                             |                       |                             |                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                                                                                                                                | Data Collection Method                               |   |  |  |  | Collection Audience (Who)     | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|---|--|--|--|-------------------------------|-----------------------|-----------------------------|-----------------|
|                                                                                                                                                                                                                                | S                                                    | P |  |  |  |                               |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                                                                                                                       | S                                                    | P |  |  |  | Plans, Info S, Cmd & Ops Gps. | JDCAT Survey          | 9 Jun.                      |                 |
| DR: ONA knowledge base contribution to battlespace awareness for components                                                                                                                                                    |                                                      |   |  |  |  |                               |                       |                             |                 |
| DE: 2.Survey question(s)                                                                                                                                                                                                       | S                                                    | P |  |  |  | Comp                          | JDCAT Survey          | 9 Jun.                      |                 |
| DR: ONA knowledge base contribution to battlespace awareness for interagency                                                                                                                                                   |                                                      |   |  |  |  |                               |                       |                             |                 |
| DE: 3.Survey question(s)                                                                                                                                                                                                       | S                                                    | P |  |  |  | JIACG                         | JDCAT Survey          | 9 Jun.                      |                 |
| DR Army: <u>How does the Army Corps HQS</u> when serving as a JTF synchronize of the Joint Intelligence Preparation of the Battle Space (JIPB) process with the Operational Net Assessment (ONA) process?                      |                                                      |   |  |  |  |                               |                       |                             |                 |
| DE: 4.Survey question(s)                                                                                                                                                                                                       | S                                                    | P |  |  |  | Cmd, Ops & Info S Gps.        | JDCAT Survey          | execution                   |                 |
| DR Army: <u>What is the process</u> by which the Army Corps HQS when serving as a JTF synchronizes of the Joint Intelligence Preparation of the Battle Space (JIPB) process with the Operational Net Assessment (ONA) process? |                                                      |   |  |  |  |                               |                       |                             |                 |
| DE: 5.Survey question(s)                                                                                                                                                                                                       | S                                                    | P |  |  |  | Cmd, Ops & Info S Gps.        | JDCAT Survey          | execution                   |                 |
| Measure: 7.1.1.0.4 Rating of the adequacy of how the ONA knowledge base supports ETO development                                                                                                                               | Does the ONA knowledge base support ETO development? |   |  |  |  |                               |                       |                             |                 |
| DR: JPC's understanding of adversary's goals, intentions, strengths, and weaknesses using the ONA knowledge base                                                                                                               |                                                      |   |  |  |  |                               |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                                                                                                                       | S                                                    | P |  |  |  | JPC                           | JDCAT Survey          | 12 Jun.                     |                 |
| DR: Time it takes JPC to develop course of action packages                                                                                                                                                                     |                                                      |   |  |  |  |                               |                       |                             |                 |
| DE: 2.Time course of action planning initiated                                                                                                                                                                                 | P                                                    | S |  |  |  | JPC                           | Data Sheet            | 8 Jun.                      |                 |
| DE: 3.Time course of action planning approved                                                                                                                                                                                  | P                                                    | S |  |  |  | JPC                           | Data Sheet            | 8 Jun.                      |                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                     | Data Collection Method |   |  |  |  | Collection Audience (Who)                 | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|---------------------------------------------------------------------------------------------------------------------|------------------------|---|--|--|--|-------------------------------------------|-----------------------|-----------------------------|-----------------|
|                                                                                                                     | S                      | P |  |  |  |                                           |                       |                             |                 |
| DE: 4.Survey question(s)                                                                                            | S                      | P |  |  |  | JPC                                       | JDCAT Survey          | 9 Jun.                      |                 |
| DR: Determine the utility of the ONA knowledge base in building an ETO                                              |                        |   |  |  |  |                                           |                       |                             |                 |
| DE: 5.Survey question(s)                                                                                            | S                      | P |  |  |  | JPC                                       | JDCAT Survey          | 9 Jun.                      |                 |
| DR Army: Does an Army corps staff require augmentation and/or specialized training to exploit the ONA?              |                        |   |  |  |  |                                           |                       |                             |                 |
| DE: 6.Survey question(s)                                                                                            | S                      | P |  |  |  | Plans, Ops, & Cmd Gps.                    | JDCAT Survey          | execution                   |                 |
| Task: 7.1.2. Analyze Red's PMESII systems (for tangible and intangible strengths and weaknesses)                    |                        |   |  |  |  |                                           |                       |                             | OP 2.4.1        |
| Measure: 7.1.2.0.1 Rating of analysis comprehensiveness for Red's PMESII systems included in the ONA knowledge base |                        |   |  |  |  |                                           |                       |                             | OP 2.4.1.1      |
| DR: ONA users' understanding of Red PMESII analyses                                                                 |                        |   |  |  |  |                                           |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                            | S                      | P |  |  |  | Plans, Info S, Cmd & Ops Gps.; IAC; Comp. | JDCAT Survey          | 9 Jun.                      |                 |
| DR: ONA users' impression as to how robust the Red PMESII system analysis was (thorough; correct; shallow; wrong)   |                        |   |  |  |  |                                           |                       |                             |                 |
| DE: 2.Survey question(s)                                                                                            | S                      | P |  |  |  | Plans, Info S, Cmd & Ops Gps.; IAC; Comp. | JDCAT Survey          | 9 Jun.                      |                 |
| DR: ONA users' opinion as to what was missing from the Red PMESII analysis                                          |                        |   |  |  |  |                                           |                       |                             |                 |
| DE: 3.Survey question(s)                                                                                            | S                      | P |  |  |  | Plans, Info S, Cmd & Ops Gps.; IAC; Comp. | JDCAT Survey          | 9 Jun.                      |                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                                                                                  | Data Collection Method |   |  |  |     | Collection Audience (Who)                                                                      | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---|--|--|-----|------------------------------------------------------------------------------------------------|-----------------------|-----------------------------|-----------------|
| DR Army: How effective is the <u>JIPB</u> in providing sufficient detail to plan and implement surveillance and reconnaissance of adversary C2 including leaders and facilities? |                        |   |  |  |     |                                                                                                |                       |                             |                 |
| DE: 4.Survey question(s)                                                                                                                                                         | S                      | P |  |  |     | Plans, Info S. Ops Gps.                                                                        | JDCAT Survey          | execution                   |                 |
| DR Army: How effective is the <u>ONA</u> in providing sufficient detail to plan and implement surveillance and reconnaissance of adversary C2 including leaders and facilities?  |                        |   |  |  |     |                                                                                                |                       |                             |                 |
| DE: 5.Survey question(s)                                                                                                                                                         | S                      | P |  |  |     | Plans, Info S. Ops Gps.                                                                        | JDCAT Survey          | execution                   |                 |
| Measure: 7.1.2.0.2 Number of adversary nodes included in ONA knowledge base that adversary said were critical/high value                                                         |                        |   |  |  |     | Did the ONA knowledge base present nodes as critical that Red felt were critical?              |                       |                             | OP 2.4.1.1      |
| DR: Identify number of adversary nodes in ONA knowledge base identified as critical and that adversary felt were critical/high value                                             |                        |   |  |  |     |                                                                                                |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                                                                         | S                      | P |  |  | S   | OPFOR                                                                                          | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 2. Extract critical/high value adversary nodes from ONA knowledge base                                                                                                       | S                      |   |  |  | P/A | n/a                                                                                            | Data Sheet            | 6 Jun.                      |                 |
| Measure: 7.1.2.0.3 Number of adversary nodes in ONA knowledge base identified as vulnerable and that adversary felt were vulnerable                                              |                        |   |  |  |     | Did the ONA knowledge base present nodes as vulnerable that Red felt were vulnerable?          |                       |                             |                 |
| DR: Determine number of adversary nodes in ONA knowledge base identified as vulnerable and that adversary felt were vulnerable                                                   |                        |   |  |  |     |                                                                                                |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                                                                         | S                      | P |  |  | S   | OPFOR                                                                                          | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 2.ONA knowledge base identification of vulnerable adversary nodes                                                                                                            | S                      | S |  |  | P/A | n/a                                                                                            | Data Sheet            | 6 Jun.                      |                 |
| Measure: 7.1.2.0.4 Rating of the adequacy of PMESII analyses to promote understanding of adversary's                                                                             |                        |   |  |  |     | Did the analysis of Red PMESII in the ONA knowledge base promote understanding of Red's goals? |                       |                             | OP 2.4.1.2      |



U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                                     | Data Collection Method                                                        |   |  |  |  | Collection Audience (Who) | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---|--|--|--|---------------------------|-----------------------|-----------------------------|-----------------|
| goals (intentions)                                                                                                                  |                                                                               |   |  |  |  |                           |                       |                             |                 |
| DR: Percent of adversary goals correctly identified by JPC using ONA                                                                |                                                                               |   |  |  |  |                           |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                            | S                                                                             | P |  |  |  | OPFOR                     | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 2.Survey question(s)                                                                                                            | S                                                                             | P |  |  |  | JPC                       | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 3.Compute JPC percent correct identification of adversary goals                                                                 | P/A                                                                           |   |  |  |  | n/a                       | Data Sheet            | 6 Jun.                      |                 |
| DR: Percent of adversary goals correctly identified by Joint Interagency Coordination Group (JIACG) using ONA                       |                                                                               |   |  |  |  |                           |                       |                             |                 |
| DE: 4.Survey question(s)                                                                                                            | S                                                                             | P |  |  |  | OPFOR                     | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 5.Survey question(s)                                                                                                            | S                                                                             | P |  |  |  | JIACG                     | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 6.Compute JIACG percent correct identification of adversary goals                                                               | P/A                                                                           |   |  |  |  | n/a                       | Data Sheet            | 6 Jun.                      |                 |
| Measure: 7.1.2.0.5 Rating of the adequacy of PMESII analyses to promote understanding of the adversary's (self) perceived strengths | Did the ONA knowledge base correctly identify Red's self-perceived strengths? |   |  |  |  |                           |                       |                             |                 |
| DR: Percent of adversary strengths correctly identified by JPC using ONA                                                            |                                                                               |   |  |  |  |                           |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                            | S                                                                             | P |  |  |  | OPFOR                     | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 2.Survey question(s)                                                                                                            | S                                                                             | P |  |  |  | JPC                       | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 3.Compute JPC percent correct identification of adversary strengths                                                             | P/A                                                                           |   |  |  |  | n/a                       | Data Sheet            | 6 Jun.                      |                 |
| DR: Percent of adversary strengths correctly identified by JIACG using ONA                                                          |                                                                               |   |  |  |  |                           |                       |                             |                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                                      | Data Collection Method                                                                         |   |  |  |  | Collection Audience (Who) | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---|--|--|--|---------------------------|-----------------------|-----------------------------|-----------------|
|                                                                                                                                      | S                                                                                              | P |  |  |  |                           |                       |                             |                 |
| DE: 4.Survey question(s)                                                                                                             | S                                                                                              | P |  |  |  | OPFOR                     | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 5.Survey question(s)                                                                                                             | S                                                                                              | P |  |  |  | JIACG                     | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 6.Compute JIACG percent correct identification of adversary strengths                                                            | P/A                                                                                            |   |  |  |  | n/a                       | Data Sheet            | 6 Jun.                      |                 |
| Measure: 7.1.2.0.6 Rating of the adequacy of PMESII analyses to promote understanding of the adversary's (self) perceived weaknesses | Did the ONA knowledge base correctly identify Red's self-perceived weaknesses?                 |   |  |  |  |                           |                       |                             |                 |
| DR: Percent of adversary weaknesses correctly identified by JPC using ONA                                                            |                                                                                                |   |  |  |  |                           |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                             | S                                                                                              | P |  |  |  | OPFOR                     | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 2.Survey question(s)                                                                                                             | S                                                                                              | P |  |  |  | JPC                       | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 3.Compute JPC percent correct identification of adversary weaknesses                                                             | P/A                                                                                            |   |  |  |  | n/a                       | Data Sheet            | 6 Jun.                      |                 |
| DR: Percent of adversary weaknesses correctly identified by JIACG using ONA                                                          |                                                                                                |   |  |  |  |                           |                       |                             |                 |
| DE: 4.Survey question(s)                                                                                                             | S                                                                                              | P |  |  |  | OPFOR                     | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 5.Survey question(s)                                                                                                             | S                                                                                              | P |  |  |  | JIACG                     | JDCAT Survey          | 6 Jun.                      |                 |
| DE: 6.Compute JIACG percent correct identification of adversary weaknesses                                                           | P/A                                                                                            |   |  |  |  | n/a                       | Data Sheet            | 6 Jun.                      |                 |
| Task: 7.1.3 Continually update the ONA to reflect battlespace change                                                                 |                                                                                                |   |  |  |  |                           |                       |                             | OP 2.6          |
| Measure: 7.1.3.0.1 Number of times ONA updated after JTF formation                                                                   | Did the ONA knowledge base provide current information as changes occurred in the battlespace? |   |  |  |  |                           |                       |                             |                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                     | Data Collection Method                                 |   |   |   |  | Collection Audience (Who)                   | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------|---|---|---|--|---------------------------------------------|-----------------------|-----------------------------|-----------------|
| DR: Identify number of times ONA updated                                                            |                                                        |   |   |   |  |                                             |                       |                             |                 |
| DE: 1.Count of ONA knowledge base updates for incorrect information                                 |                                                        |   | P | S |  | n/a                                         | ONA audit log         | As they occur               |                 |
| DE: 2.Count of ONA knowledge base updates for missing information                                   |                                                        |   | P | S |  | n/a                                         | ONA audit log         | As they occur               |                 |
| DE: 3.Total ONA knowledge base updates                                                              |                                                        |   | P | S |  | n/a                                         | ONA audit log         | As they occur               |                 |
| DE: 4.JTF functional member who makes update                                                        |                                                        |   | P | S |  | n/a                                         | ONA audit log         | As they occur               |                 |
| Measure: 7.1.3.0.2 Rating of ONA update currency                                                    | Did ONA users trust the ONA knowledge base currency?   |   |   |   |  |                                             |                       |                             |                 |
| DR: Number of ONA users that knew it had been updated                                               |                                                        |   |   |   |  |                                             |                       |                             |                 |
| DE: 1.Survey question(s)                                                                            | S                                                      | P |   |   |  | Plans, Info S, Cmd & Ops Gps.; JIACG; Comp. | JDCAT Survey          | 12 Jun.                     |                 |
| Measure: 7.1.3.0.3 Time required to update ONA knowledge base                                       | How long did it take to update the ONA knowledge base? |   |   |   |  |                                             |                       |                             |                 |
| DR: Individual responsible for deciding what JISR information should be added to ONA knowledge base |                                                        |   |   |   |  |                                             |                       |                             |                 |
| DE: 1.Survey question(s)                                                                            | S                                                      | P |   |   |  | Plans & Info S. Gps.                        | JDCAT Survey          | 12 Jun.                     |                 |
| DR: Determine how information is passed from JISR to ONA for update                                 |                                                        |   |   |   |  |                                             |                       |                             |                 |
| DE: 2.Survey question(s)                                                                            | S                                                      | P |   |   |  | Plans, Info S. & Ops Gps.                   | JDCAT Survey          | 12 Jun.                     |                 |
| DR: Determine time required to update ONA after new node information available                      |                                                        |   |   |   |  |                                             |                       |                             |                 |
| DE: 3.Survey question(s)                                                                            | S                                                      | P |   |   |  | EAC,ISG;JOC,JPC                             | JDCAT Survey          | 12 Jun.                     |                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                             | Data Collection Method                                                                       |   |  |   | Collection Audience (Who)                   | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---|--|---|---------------------------------------------|-----------------------|-----------------------------|-----------------|
| Task: 7.1.4 Employ automated tools to virtually and collaboratively access, manipulate, and maintain the ONA knowledge base |                                                                                              |   |  |   |                                             |                       |                             | OP 5.1.4        |
| Measure: 7.1.4.0.1 Rating of automated tool adequacy for information retrieval from ONA knowledge base                      | Did the ONA knowledge base tools provide adequate information retrieval?                     |   |  |   |                                             |                       |                             |                 |
| DR: Ease of information access for ONA users                                                                                |                                                                                              |   |  |   |                                             |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                    | S                                                                                            | P |  |   | Plans, Info S, Cmd & Ops Gps.; JIACG; Comp. | JDCAT Survey          | 12 Jun.                     |                 |
| DR: Ease of information manipulation for ONA users                                                                          |                                                                                              |   |  |   |                                             |                       |                             |                 |
| DE: 2.Survey question(s)                                                                                                    | S                                                                                            | P |  |   | Plans, Info S, Cmd & Ops Gps.; JIACG; Comp. | JDCAT Survey          | 12 Jun.                     |                 |
| Measure: 7.1.4.0.2 Rating of automated tools adequacy for ONA knowledge base maintenance                                    | Did the ONA knowledge base tools provide adequate capability for knowledge base maintenance? |   |  |   |                                             |                       |                             |                 |
| DR: Determine ease of information maintenance/update for ONA analysts                                                       |                                                                                              |   |  |   |                                             |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                    | S                                                                                            | P |  |   | Plans, Info S, Cmd & Ops Gps.; JIACG; Comp. | JDCAT Survey          | 12 Jun.                     |                 |
| Measure: 7.1.4.0.3 Frequency of ONA knowledge base information access                                                       | How often was the ONA knowledge base accessed?                                               |   |  |   |                                             |                       |                             |                 |
| DR: Determine frequency of ONA knowledge base information access                                                            |                                                                                              |   |  |   |                                             |                       |                             |                 |
| DE: 1.Count of JTF ONA knowledge base information access by hour                                                            | S                                                                                            |   |  | P | ONA knowledge base                          | ONA audit log         | As occurs (tot. ea. wk.)    |                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                             | Data Collection Method                                                                               |   |  |  |  | Collection Audience (Who)                   | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---|--|--|--|---------------------------------------------|-----------------------|-----------------------------|-----------------|
| 7.2. WARFIGHTING CHALLENGE:<br>Ability to use ONA to enhance decision making                                                |                                                                                                      |   |  |  |  |                                             |                       |                             |                 |
| Task: 7.2.1 Determine if the ONA products compliment JTF staff actions                                                      |                                                                                                      |   |  |  |  |                                             |                       |                             |                 |
| Measure: 7.2.1.0.1 Time needed by ONA users to find desired information in ONA knowledge base                               | How long did it take ONA knowledge base users to find needed information?                            |   |  |  |  |                                             |                       |                             |                 |
| DR: Identify time it takes ONA users to find needed information in ONA knowledge base                                       |                                                                                                      |   |  |  |  |                                             |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                    | S                                                                                                    | P |  |  |  | Plans, Info S, Cmd & Ops Gps.; JIACG; Comp. | JDCAT Survey          | 12 Jun.                     |                 |
| Measure: 7.2.1.0.2 Rating of adequacy of ONA use for board/center/cell preparation and other staff actions                  | Did the ONA knowledge base support board, center, cell activity, and other staff actions adequately? |   |  |  |  |                                             |                       |                             |                 |
| DR: Determine if the ONA knowledge base enhanced board, center, and cell preparation                                        |                                                                                                      |   |  |  |  |                                             |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                    | S                                                                                                    | P |  |  |  | Plans, Info S, Cmd & Ops Gps.; JIACG; Comp. | JDCAT Survey          | 12 Jun.                     |                 |
| DR: Determine if the ONA knowledge base enhanced JTF staff actions other than board/center/cell preparation                 |                                                                                                      |   |  |  |  |                                             |                       |                             |                 |
| DE: 2.Survey question(s)                                                                                                    | S                                                                                                    | P |  |  |  | Plans, Info S, Cmd & Ops Gps.; JIACG; Comp. | JDCAT Survey          | 12 Jun.                     |                 |
| Measure: 7.2.1.0.3 Number of instances information desired by ONA users but not included or not found in ONA knowledge base | Did the ONA knowledge base contain the information its users needed?                                 |   |  |  |  |                                             |                       |                             |                 |
| DR: Identify number of times ONA users' desired information                                                                 |                                                                                                      |   |  |  |  |                                             |                       |                             |                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                 | Data Collection Method                                                          |   |  |  | Collection Audience (Who)                   | Collection Tool (How) | Collection Frequency (When) | UJTL Connection       |
|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---|--|--|---------------------------------------------|-----------------------|-----------------------------|-----------------------|
|                                                                                                                 |                                                                                 |   |  |  |                                             |                       |                             |                       |
| not included in ONA knowledge base                                                                              |                                                                                 |   |  |  |                                             |                       |                             |                       |
| DE: 1.Survey question(s)                                                                                        | S                                                                               | P |  |  | Plans, Info S, Cmd & Ops Gps.; JIACG; Comp. | JDCAT Survey          | 12 Jun.                     |                       |
| Measure: 7.2.1.0.4 Rating of adequacy of ONA use in PEL development                                             | Did the ONA knowledge base provide adequate support for development of the PEL? |   |  |  |                                             |                       |                             |                       |
| DR: Determine if ONA knowledge base supported PEL development                                                   |                                                                                 |   |  |  |                                             |                       |                             |                       |
| DE: 1.Survey question(s)                                                                                        | S                                                                               | P |  |  | Plans, Info S, Cmd & Ops Gps.               | JDCAT Survey          | 10 Jun.                     |                       |
| Measure: 7.2.1.0.5 Rating of adequacy of ONA use in ETO development                                             | Did the ONA knowledge base provide adequate support for development of the ETO? |   |  |  |                                             |                       |                             |                       |
| DR: Determine if ONA knowledge base supported ETO development                                                   |                                                                                 |   |  |  |                                             |                       |                             |                       |
| DE: 1.Survey question(s)                                                                                        | S                                                                               | P |  |  | Plans, Info S, Cmd & Ops Gps.               | JDCAT Survey          | 12 Jun.                     |                       |
| Task: 7.2.2 Identify adversary's vulnerabilities, intentions, and key nodes                                     |                                                                                 |   |  |  |                                             |                       |                             | OP<br>2.4.1.2/2.4.1.3 |
| Measure: 7.2.2.0.1 Comparison of ETO focus of adversary's vulnerabilities with ONA depiction of vulnerabilities | Did the ETO focus on vulnerabilities identified by the ONA knowledge base?      |   |  |  |                                             |                       |                             |                       |
| DR: Determine if ONA was used to identify the adversary vulnerabilities noted in the ETO                        |                                                                                 |   |  |  |                                             |                       |                             | OP<br>2.4.2.4         |
| DE: 1.Survey question(s)                                                                                        | S                                                                               | P |  |  | Plans & Info S. Gps.                        | JDCAT Survey          | 12 Jun.                     |                       |
| Measure: 7.2.2.0.2 Comparison ETO focus of adversary's intentions with ONA depiction of intentions              | Was the ETO developed with the ONA knowledge base depiction of Red intentions?  |   |  |  |                                             |                       |                             |                       |
| DR: Identify adversary's intentions                                                                             |                                                                                 |   |  |  |                                             |                       |                             |                       |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                    | Data Collection Method                                                                                              |   |   |  |   | Collection Audience (Who) | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---|---|--|---|---------------------------|-----------------------|-----------------------------|-----------------|
|                                                                                                                    | S                                                                                                                   | P |   |  |   |                           |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                           | S                                                                                                                   | P |   |  |   | Plans & Info S. Gps.      | JDCAT Survey          | 12 Jun.                     |                 |
| Measure: 7.2.2.0.3 Comparison of ETO focus of adversary's key nodes with ONA depiction of key nodes                | Was the ETO developed with the ONA knowledge base depiction of Red key nodes?                                       |   |   |  |   |                           |                       |                             |                 |
| DR: Identify adversary's key nodes                                                                                 |                                                                                                                     |   |   |  |   |                           |                       |                             |                 |
| DE: 1.Adversary's estimate of their key nodes                                                                      | S                                                                                                                   | P |   |  |   | Plans & Info S. Gps.      | JDCAT Survey          | 12 Jun.                     |                 |
| Task: 7.2.3 Identify potential second and third order effects for contemplated actions                             |                                                                                                                     |   |   |  |   |                           |                       |                             | OP 5.3.6        |
| Measure: 7.2.3.0.1 Percent of ETOs developed with second and third order effects identified for tasked actions     | What percent of ETOs included second and third order effects for nodes selected for attack?                         |   |   |  |   |                           |                       |                             |                 |
| DR: Determine percent of ETO effects that include second and third order effects                                   |                                                                                                                     |   |   |  |   |                           |                       |                             |                 |
| DE: 1.ETO effects with second and third order effects included                                                     | P                                                                                                                   | S |   |  | S | JPC; JOC                  | Data sheet            | 11 Jun.                     |                 |
| DE: 2.Number of ETO effects                                                                                        | P                                                                                                                   | S |   |  |   | JPC; JOC                  | Data sheet            | 11 Jun.                     |                 |
| DE: 3.Compute percentage of ETO (and updates) effects with second and third order effects                          | P/A                                                                                                                 |   |   |  |   | n/a                       | Data sheet            | As needed                   |                 |
| Measure: 7.2.3.0.2 Number of instances JFC and staff used second and third order effects in their decision process | How often were second and third order effects considered by the JFC and staff when considering actions against Red? |   |   |  |   |                           |                       |                             |                 |
| DR: Determine number of times JFC refused proposed COA because of second and third order effect information        |                                                                                                                     |   |   |  |   |                           |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                           | S                                                                                                                   | P | S |  |   | Plans & Cmd Gps.          | JDCAT Survey          | 9 Jun.                      |                 |
| DE: 2.Survey question(s)                                                                                           | S                                                                                                                   | P | S |  |   | Plans & Cmd Gps.          | JDCAT                 | 9 Jun.                      |                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                                                | Data Collection Method                                                                                               |   |   |  | Collection Audience (Who) | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---|---|--|---------------------------|-----------------------|-----------------------------|-----------------|
|                                                                                                                                                |                                                                                                                      |   |   |  |                           |                       |                             |                 |
|                                                                                                                                                |                                                                                                                      |   |   |  |                           | Survey                |                             |                 |
| DR: Instances of JFC using second and third order effect information in his decision process                                                   |                                                                                                                      |   |   |  |                           |                       |                             |                 |
| DE: 3.Survey question(s)                                                                                                                       | S                                                                                                                    | P | S |  | Plans, Cmd & Ops Gps.     | JDCAT Survey          | execution                   |                 |
| DR: Instances of JFC disregarding second and third order effect information in his decision process                                            |                                                                                                                      |   |   |  |                           |                       |                             |                 |
| DE: 4.Survey question(s)                                                                                                                       | S                                                                                                                    | P | S |  | Plans, Cmd & Ops Gps.     | JDCAT Survey          | execution                   |                 |
| Task: 7.2.4 Prioritize and select potential courses of action                                                                                  |                                                                                                                      |   |   |  |                           |                       |                             | OP 5.3.6        |
| Measure: 7.2.4.0.1 Number of instances JFC and staff used ONA knowledge base as reference source to <u>prioritize</u> COA branches and sequels | How often did the JFC and staff use the ONA knowledge base as a reference source for prioritizing courses of action? |   |   |  |                           |                       |                             |                 |
| DR: Criteria JFC uses to prioritize proposed courses of action                                                                                 |                                                                                                                      |   |   |  |                           |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                                       | S                                                                                                                    | P | S |  | Plans & Cmd Gps.          | JDCAT Survey          | 8 Jun.                      |                 |
| DR: Identify number of times JFC used ONA information to prioritize COA                                                                        |                                                                                                                      |   |   |  |                           |                       |                             |                 |
| Measure: 7.2.4.0.2 Rating of ONA knowledge base adequacy as reference source for JFC to <u>select</u> COA branches and sequels                 | How often did the JFC and staff use the ONA knowledge base as a reference source for selecting courses of action?    |   |   |  |                           |                       |                             |                 |
| DR: Identify number of times JFC used ONA as reference source for course of action selection                                                   |                                                                                                                      |   |   |  |                           |                       |                             |                 |
| DE: 2.Survey question(s)                                                                                                                       | S                                                                                                                    | P | S |  | Plans & Cmd Gps.          | JDCAT Survey          | 8 Jun.                      |                 |
| Task: 7.2.5 Use ONA to operate within                                                                                                          |                                                                                                                      |   |   |  |                           |                       |                             | OP 5.4.4        |



U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                                   | Data Collection Method                                                                   |   |   |  |  | Collection Audience (Who)     | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---|---|--|--|-------------------------------|-----------------------|-----------------------------|-----------------|
| adversary's decision cycle                                                                                                        |                                                                                          |   |   |  |  |                               |                       |                             |                 |
| Measure: 7.2.5.0.1 Number of instances ONA-supported Blue action interrupted adversary's ability to command and control its force | Did Blue use ONA knowledge base information to interrupt Red force command and control?  |   |   |  |  |                               |                       |                             |                 |
| DR: ONA impact on adversary's ability to command and control its forces                                                           |                                                                                          |   |   |  |  |                               |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                          | S                                                                                        | P |   |  |  | OPFOR                         | JDCAT Survey          | execution                   |                 |
| DR: ONA impact on adversary's ability to communicate with its forces                                                              |                                                                                          |   |   |  |  |                               |                       |                             |                 |
| DE: 2.Survey question(s)                                                                                                          | S                                                                                        | P |   |  |  | OPFOR                         | JDCAT Survey          | execution                   |                 |
| DR: ONA impact on adversary forces ability to execute their assigned mission                                                      |                                                                                          |   |   |  |  |                               |                       |                             |                 |
| DE: 3.Survey question(s)                                                                                                          | S                                                                                        | P |   |  |  | OPFOR                         | JDCAT Survey          | execution                   |                 |
| DR Army: How did the ONA enable the JTF to influence the adversary's decision cycle?                                              |                                                                                          |   |   |  |  |                               |                       |                             |                 |
| DE: 4.Survey question(s)                                                                                                          | S                                                                                        | P |   |  |  | Plans & Cmd Gps.              | JDCAT Survey          | execution                   |                 |
| Measure: 7.2.5.0.2 Number of adversary actions considered successful by JFC and staff                                             | How often did the JFC and staff feel Red had conducted a successful action against them? |   |   |  |  |                               |                       |                             | OP 5.4.4        |
| DR: Determine number of adversary actions considered successful by JFC                                                            |                                                                                          |   |   |  |  |                               |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                          | S                                                                                        | P | S |  |  | Plans, Info S, Cmd & Ops Gps. | JDCAT Survey          | execution                   |                 |
| Measure: 7.2.5.0.3 Number of adversary actions unexpected by JFC and staff                                                        | How often were the JFC and staff surprised by Red actions?                               |   |   |  |  |                               |                       |                             |                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement                                                                              | Data Collection Method                                                                               |   |   |  |  | Collection Audience (Who)     | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---|---|--|--|-------------------------------|-----------------------|-----------------------------|-----------------|
|                                                                                                                              |                                                                                                      |   |   |  |  |                               |                       |                             |                 |
| DR: Determine number of adversary actions unexpected by JFC                                                                  |                                                                                                      |   |   |  |  |                               |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                     | S                                                                                                    | P | S |  |  | Plans, Info S, Cmd & Ops Gps. | JDCAT Survey          | execution                   |                 |
| Measure: 7.2.5.0.4 Percent of time JFC and staff felt they were operating within the adversary's decision cycle              | What percent of the time did the JFC and staff feel they were operating within Red's decision cycle? |   |   |  |  |                               |                       |                             |                 |
| DR: Determine JFC and staff estimate of percent of time they were operating within the adversary's decision cycle            |                                                                                                      |   |   |  |  |                               |                       |                             |                 |
| DE: 1.Survey question(s)                                                                                                     | S                                                                                                    | P | S |  |  | Plans, Info S, Cmd & Ops Gps. | JDCAT Survey          | execution                   |                 |
| DR: Adversary's estimate of percent of time they were on the offensive                                                       |                                                                                                      |   |   |  |  |                               |                       |                             |                 |
| DE: 2.Survey question(s)                                                                                                     | S                                                                                                    | P |   |  |  | Plans, Info S, Cmd & Ops Gps. | JDCAT Survey          | execution                   |                 |
| DR: Adversary's estimate of percent of time they were on the defensive (reactive)                                            |                                                                                                      |   |   |  |  |                               |                       |                             |                 |
| DE: 3.Survey question(s)                                                                                                     | S                                                                                                    | P |   |  |  | Plans, Info S, Cmd & Ops Gps. | JDCAT Survey          | execution                   |                 |
| DR: Blue's perception of consistently being on the offensive                                                                 |                                                                                                      |   |   |  |  |                               |                       |                             |                 |
| DE: 4.Survey question(s)                                                                                                     | S                                                                                                    | P |   |  |  | Plans, Info S, Cmd & Ops Gps. | JDCAT Survey          | execution                   |                 |
| DR: Blue's perception of consistently being on the defensive (reactive)                                                      |                                                                                                      |   |   |  |  |                               |                       |                             |                 |
| DE: 5.Survey question(s)                                                                                                     | S                                                                                                    | P |   |  |  | Plans, Info S, Cmd & Ops Gps. | JDCAT Survey          | execution                   |                 |
| Measure: 7.2.5.0.5 JFC and staff rating of ONA effectiveness in support of operating inside of the adversary' decision cycle | How useful was the ONA knowledge base for Blue to operate within Red's decision cycle?               |   |   |  |  |                               |                       |                             |                 |
| DR: Determine JFC and staff estimate of ONA contribution to                                                                  |                                                                                                      |   |   |  |  |                               |                       |                             |                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Concept/Challenge/Task/Measure/Data Requirement | Data Collection Method |   |   | Collection Audience (Who)     | Collection Tool (How) | Collection Frequency (When) | UJTL Connection |
|-------------------------------------------------|------------------------|---|---|-------------------------------|-----------------------|-----------------------------|-----------------|
| Blue offensive (proactive) success              |                        |   |   |                               |                       |                             |                 |
| DE: 1.Survey question(s)                        | S                      | P | S | Plans, Info S, Cmd & Ops Gps. | JDCAT Survey          | execution                   |                 |



Figure 203: Secretary of Defense Donald Rumsfeld is briefed by Commander USJFCOM, Gen William F. Kernan during the Secretary's visit to JFCOM's Joint Training, Analysis, and Simulation Center, Suffolk, VA during Millennium Challenge 2002

## **Assessment Area 8 — Effects-Based Operations (EBO): Planning and Assessment**

### **Overall Assessment Results**

The EBO Planning and Assessment concept demonstrated strong potential for future Department of Defense application and could similarly benefit other government departments, providing better, more timely integration of department and agency responses to contingency situations.

Effects-Based Planning's (EBP) contribution to Blue force operations was showcased during MC02 and the ability to conduct the EBP warfighting challenge was met. The CJTF selection of desired effects to achieve the combatant commander's campaign objectives was derived exclusively from the ONA. Desired effects were translated into essential tasks for functional components. The components then framed their tactical actions in the context of desired effects and essential tasks even though the linkage between desired effects and key nodes, and synchronization between tactical actions and resources were not always apparent.

The process for assessing achievement of effects, however, did not work effectively and needs refinement. In some collaborative sessions, one or more components, the JTF staff, and the combatant commander reported different assessments of a specific effect. While it is not surprising that perceptions would diverge at different levels of command, there needs to be a process for identifying the reasons behind the divergence.

Not only is it a tremendous challenge to collect all the data and information necessary to conduct effects assessment, visualization of the knowledge thus gained is a serious mechanization (tools) challenge in its own right. In any case, it was clear the assessment process was either not understood or needs refinement.

### **Overall Assessment Results**

- **EBP EA concept demonstrated strong potential DoD application...**
- **Desired effects were translated into essential tasks for functional components...**
- **The process for assessing achievement of effects did not work effectively...**
- **It was clear the assessment process was either not understood or needs refinement...**

### **Methodology**

Participant surveys, SME surveys, SME observations, and comments from participants and SMEs were used as data collection tools. Additionally, senior concept developer observations and comments, In Focus sessions, Azimuth Checks, and out-briefs or 'boil-down' sessions, with the senior JTF and functional component planners were used as a means of collecting data to gain perspective on the EBP and the effects assessment concept. To aid in understanding specific participant grasp of the concept, the SMEs and analysis personnel also reviewed JTF and component planning and assessment products.

### **Warfighting Challenges: Ability to conduct Effects-Based Planning; and ability to conduct Effects Assessment**

**Finding 1► Operating in a CIE, JTF planners were better able to understand the operational situation and develop better-reasoned courses of action.**

The CIE tools provide the planner with greater access to information, while the use of IWS allows the free flow of information, and other more non-traditional players are brought into the planning process. Thus, planners can more fully understand the intended and unintended consequences of their actions because they have access to more information and insight. It was difficult to assess the ability of the planners to identify key nodes and vulnerabilities using the ONA. Most of the planners found the ONA tools incomplete and hard to work with.

- JTF level planners indicated the CROP enhanced the EBP process. Component level planners did not feel as strongly, however, their level of acceptance improved somewhat from Spiral 3 to the end of the execution phase.
- Desired effects were identified and taken into consideration at all levels of the planning process. This construct allowed for a more informed mission analysis.
- Except for identification of key nodes in the adversaries' system, the ONA as implemented in this experiment for JTF and component planner use in conducting joint operational mission analysis did not live up to participant expectations.

Based on observations and comments from the SMEs and responses to surveys administered to the warfighters, the consensus was that the CIE and CIE tools improved the planners' ability to assess the operational situation and develop better-reasoned COAs. The CIE tools provided the planner with more access to information than could be attained previously. In addition, the use of IWS allowed the free flow of information within the EBP process, and brought other more non-traditional players into the process, enabling the planners to more fully understand the intended and unintended consequences of their actions.

However, this additional information can cause 'information overload' and does need to be carefully screened in order not to inundate the planners. It may be necessary to assign a skilled operational planner to this screening task to ensure JPC members do not waste their valuable time. Education and training are keys to successful implementation of the CIE into the joint operational planning process.

Many problems encountered using ADOCS, IWS, SPPS, and other planning tools introduced during MC02 will be resolved as planners become more experienced and comfortable with using the tools, and implementation TTPs are developed for the tools' use. By its very nature, the increased level of participation and information in the planning process can lead to a slowing down of the process. However, the increased time needed to assimilate the information into a cohesive and well thought out plan can be more than offset by the planners' ability to produce a better-reasoned COA.

JTF level planners thought the CROP enhanced the EBP process. Component level planners did not feel as strongly, however, their level of acceptance improved somewhat from Spiral 3 to the end of the execution phase. Planners said that the CROP was difficult to use. As the experiment progressed, they became better at using the CROP, but information was hard to find, it was duplicative, and somewhat inconsistent.

Planners also cited planning time constraints and the personal time required to participate in virtual collaborative planning sessions as restricting their time available to use the CROP. A JFMCC planner expressed a common frustration, "The only situational awareness provided to future planners is provided through monitoring of briefings and planning sessions conducted over IWS."

The areas of the CROP identified as most useful by the JTF and component planners was access to planning documents via SPPS, graphic representation of the battle-space via ADOCS, and access to the ONA.

When asked what information was not available on the CROP, planners listed:

- thorough and authoritative written documentation of key collaborative sessions
- real reach-back to centers of excellence
- tools to better facilitate assessment
- COA analysis and war-gaming
- space planning tools
- plotting of nodes and nodal relationships
- chronological file of significant and analyzed intelligence

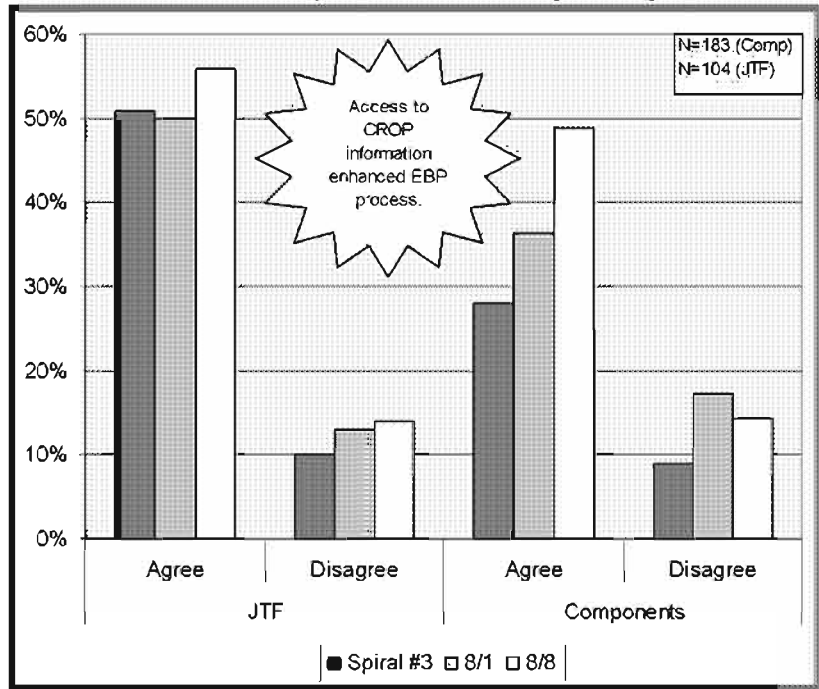


Figure 204: Access to the CROP enhanced the EBP process

An overwhelming number of JTF level planners indicated collaboration helped to develop a better-reasoned COA. Component level planners were not as enthusiastic, though, as the competing demands for time and attention between internal and external planning activities overwhelmed some of the operators. As such, planners, thus pressed for time, were not able to reflect on their work and conduct thorough collaboration, as they would have preferred.

Evidence suggests courses of action were developed in sidebars and vetted in collaboration. In the words of one component planner, “[CIE] brings more brainpower to the fight, but you need to have a staff product to help maximize the collaborative process, you cannot start with a blank page, and the collaborators need to see the information ahead of time to adequately prepare for quality collaboration.”

JTF level planners also thought the use of collaboration helped them develop COAs more quickly. Again, component level planners were not as supportive of the faster COA idea. Some stated horizontal collaboration was problematic and that too many people were participating in the process, creating delays in decision-making. Planners’ comments suggested virtual collaborative sessions must be driven hard to be timely. Planners also suggested it was very difficult to develop COAs through virtual collaboration, but collaboration worked well in reviewing COAs with distant headquarters.

A majority of JTF level planners agreed that additional demands on the planners’ time resulting from EBP was significant. Planners reported this was particularly true at the component level, where they were more sparsely manned yet had the greater burden, having to collaborate with more locations (higher, lower, and laterally). Some planners suggest the additional demands on time did not necessarily result from EBP, but from a lack of reasonable analytical support—

the analysis tools and products planners normally use were not available. Again, planners said that a significant amount of time was lost in collaboration because facilitators' failed to keep the sessions on track and did not have a clear idea of what results the session should be trying to accomplish.

Despite the significant increase in time spent using EBP in a virtual, collaborative information environment, the majority of the planners indicated the benefits derived from the virtual collaboration far outweighed the additional time spent. Planners cited lack of joint planning experience, the need for better time and session management, and better participant management as reasons for the increased amount of time demanded spent in collaboration.

The majority of SMEs surveyed during the experiment agreed that the additional demand on a commander's time resulting from EBP was significant—53 percent agreed and 47 percent disagreed.

SMEs commented that the additional demands might come from commanders feeling driven to play a more detailed and important role in the planning process. Although doctrine calls for command involvement, and has for sometime, commanders have varying preferences in their approach to this requirement.

The virtual collaborative environment during MC02 required the commander's focus and attention.

As noted by one of the SME's, "If the commander wants to make a quick, accurate decision, this process speeds up that process. If he wants to procrastinate until he has every piece of information, then he can ask questions until the cows come home; the process will allow him to do that. Ultimately, Effects-Based Planning [in a virtual collaborative information environment] amplifies both of these commander tendencies — the good and the bad."

A majority of SMEs surveyed during the experiment agreed that the benefits derived from virtual collaboration out-weighed the additional demands on a commander's time. The survey showed 83 percent agreed and 17 percent disagreed. As reported by one senior officer, "The commander has to strike a fine balance between the amount of time spent in virtual collaboration and being able to physically meet with component commanders and staff members. The collaborative environment has allowed the decision cycle to speed up greatly. This requires more commander involvement in the sessions in order to pass on guidance, intent, and make decisions. One pitfall is the commander can reach down and micromanage subordinates easily. The collaborative environment is "sexy" and the commander must fight the temptation to

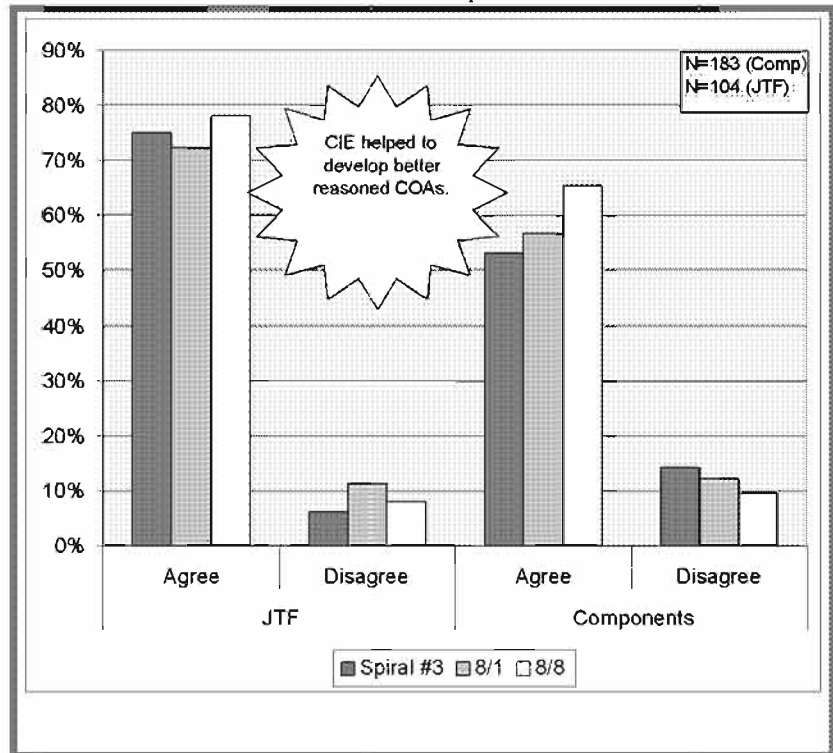


Figure 205: The CIE helped to develop better COA's



monitor all of the boards, centers, cells, and meetings so that he can continue to future-focus his efforts.”

Based on a review of the ETO prepared by the JTF during the experiment, desired effects were identified and taken into consideration at all levels of the planning process. This construct allowed for a more informed mission analysis. The planners identified the effects in terms of changes to the adversaries’ actions or behavior, the desired level of change, and the scope and distribution of the effects. Timing and duration of the effects was not apparent in the documentation examined. This omission has the potential to cause the PEL to be viewed as a sequenced prioritization list. Rather, the PEL probably should provide

the necessary timing to allow planners to take into account sequencing and the enabling actions/tasks in order to achieve the higher headquarters effect and/or objective. All of the desired effects listed in the PEL were present in the baseline ONA.

Based on examination of ETO 001 dated 12 June 2007 and its associated PEL, ETO 001A dated 26 July 2007 and its associated PEL, and ETO 002 WARNORD dated 3 August 2007 and its associated PEL, JTF planners:

- Stated desired effects in terms of adversary action or behavior to be changed, created, or prevented
- Stated desired effects in terms of the desired level of change, (e.g., create, prevent, develop, disrupt, deny, or neutralize)
- Stated desired effects in terms of the desired scope and distribution of the effect, (e.g., geographic, organizational, political, and cultural)
- Did not state the desired effects in terms of the intended timing of the effect, (i.e., time when manifestation is desired or intended), and duration of time the effect is desired or intended to exist

All of the desired effects identified in each of the approved PELs were present in the baseline ONA. There were seven prioritized effects in ETO 001 and 001A. ETO 002 contained six prioritized effects, retaining three from the original ETO 001 list and adding three new effects.

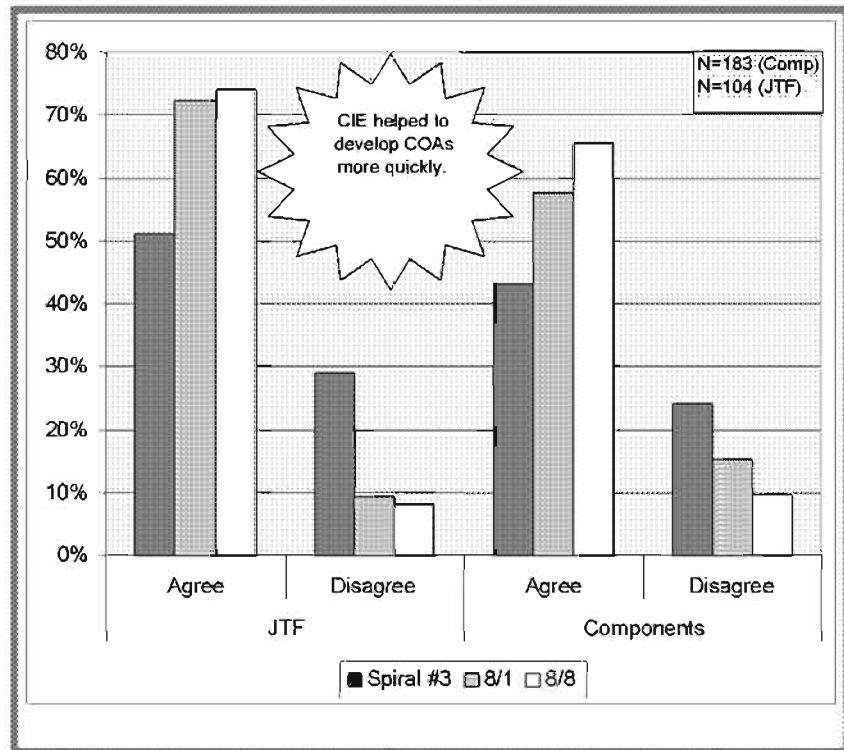


Figure 206: The CIE helps develop COA's more quickly

Subject matter experts agreed, that prioritization of effects such as use of the PEL, assists the development and adaptation of COAs. They added that the prioritization of effects, along with commander's intent and other command guidance, helped with developing and adapting COAs. At the functional component level, the PEL tended to drive the planning process.

Some additional observations offered by the SMEs include, "Although the PEL identifies priority of effort, it does not integrate and crosswalk links and key common nodes that should be the basis for COA development." "Prioritization of effects may actually hinder the development of a JTF level COA. The focus of planning becomes the priority effect and not the key nodes and links that may not be in that effect, but impacts on the entire operation or is the center of gravity."

Except for identification of key nodes in the adversaries' system, the ONA, as implemented in this experiment for JTF and component planner use in conducting joint operational mission analysis, did not live up to participant expectations. Planners, during the end of experiment out brief, suggested that, "with ONA, we're removing strategy. We're losing the operational art. We can still have objectives with ONA. CoGs help campaign planners determine desired effects. Objectives help focus the effects."

Most survey respondents found the ONA and JIPB incomplete and hard to work with. Some had no training in the use of either of these tools. A few of the respondents found the ONA to be overwhelming in the scope of the information it made available to the planner and found accessing the information cumbersome at best. Questions also arose concerning the quality and timeliness of the information. Like the CIE and its tools, experience and training are the keys to

successful use of the ONA and JIPB.

Component SMEs believed the ONA contributed to identification of key nodes in the adversaries' systems, but the JTF SMEs did not share that predominant view. The ONA assisted in the identification of nodes, but actionable levels of detail were lacking. Some of this lack of detail was probably due to classification restrictions required for work at the Secret level.

Furthermore, the experimental ONA was not as fully developed as the concept envisioned. Planner focus remained on adversary military systems with little work done on diplomatic, information, or economic aspects, especially at the functional component planning level.

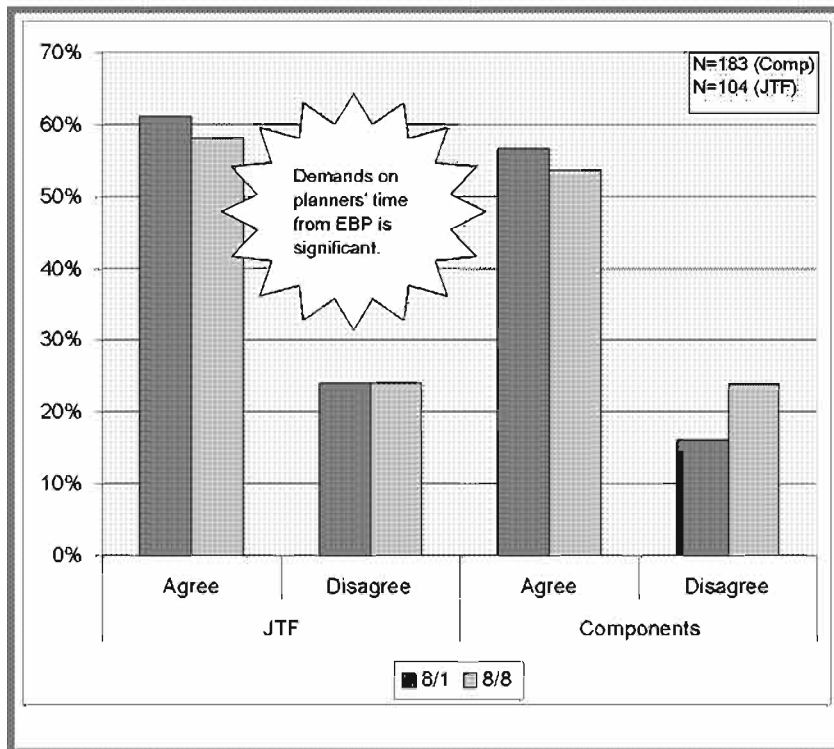


Figure 207: Demands on planners' time was significant

That said, this is a controversial topic and SMEs commented extensively on this question. Said one participant, “The ONA data provided initial identification of some of the key nodes. As discussed in the Azimuth Checks, the data was not fully complete and left significant holes in the intelligence picture,” he said. “This resulted in two problems: 1) the holes had to be filled from other sources of information. The information was hard to find and was located in over seven different locations, each with a different layout and search method. The data from the other sources was hard to verify — its origination, its time sensitivity, and its context. 2) The development of the JIPB is essential to discerning an enemy’s COA and intent.”

“The ONA was extremely difficult to use,” said another. “Its structure and lack of search capability made finding information very difficult and limited its usefulness in identifying targets. For the most part the ONA was like reading a DIA country manual. Although a lot of information was available, it was of such a general nature that it provided little real time, actionable information.

“Although the concept of the ONA is a good one, it is highly questionable that a single SJFHQ in each theatre could develop multiple or even a single ONA robust enough to meet the needs of EBO.”

“We really couldn’t tell [if the ONA identified key nodes and vulnerabilities],” said another participant. “You cannot access whether the key nodes that were identified were correct, there was no assessment made because the effects could not be determined. I see it as an OK planning tool, but what it fails to do is identify the key nodes that get at the centers of gravity, not the systems that allow the enemy to prosecute his campaign. If the ONA is not perfect in its understanding, then it is just a tool for planning, if you will, that allows us to think logically about setting the conditions to take this enemy down, sooner than later.

“For the time we take to build it, let alone maintain it, it is not worth the effort. As for the lone success story with the JSOTF, that was by accident. He had a target he had to take out, then he went back to look at the nodes that were associated to the target, and saw the bang for the buck. The nodes did not lead him to the target; the target led him to the nodes,” he said.

SMEs were about evenly split (11 – yes; 9 – no) in believing that anyone used the ONA to identify key links between nodes in the adversaries’ systems. As with the previous question, component SMEs were much more supportive of this observation than were those working at the

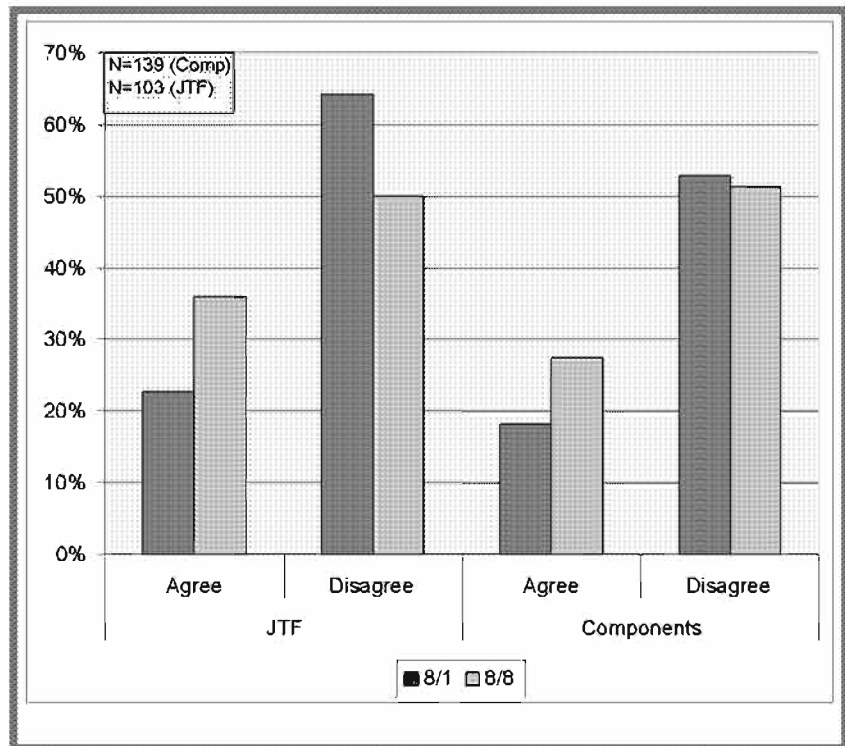


Figure 208: Participants disagreed with the statement, ‘Demands on planners’ time outweigh collaboration benefits’.

JTF level. Furthermore, comments indicated ONA was used even less during the execution phase.

Said one participant, “Although in the planning, it was determined that the [CJTF-S] was the center of gravity, the nodes did not lead you or tie you to that end-state.” During Spiral 3, of 22 responses received from SMEs, the majority (20) had no comments in regards to this question and indicated it was not being addressed in the event.

A majority of SMEs also did not believe the ONA contributed in any substantial manner to the identification of adversary leadership decision making processes. SME comments included statements such as “The ONA did not appear to be in-depth enough...” and “Identified who the key leadership was, but did not drill down far enough to identify decision making processes.” Of the 22 Spiral 3 responses received from SMEs, 19 of them were neutral, saying ONA contribution to this effort was not observed.

Continuing this trend, a majority of SMEs did not believe JTF or functional component planners used the ONA as a serious contributor to identification of friendly strengths and weaknesses relative to the adversaries. A recurring theme in the SME comments includes “... users of the ONA database at the [component] are not pleased with the utility of the ONA. Too slow, too many clicks to get anywhere, and people can't find what they want. Most give up in frustration.” “Since the enemy COA and intent could not really be developed with the data in the ONA, it was significantly more difficult to use the ONA to determine enemy and friendly strengths and weaknesses.”

Table 21: ONA survey questions and responses

|                                                                                                                                                                                                                                              |           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| SMEs do not believe the JTF or the functional component planners used the ONA as a major contributor to the conduct of center of gravity and critical vulnerability analysis. “Not that I could tell beyond planning,” said Survey Questions | Answers   |
| Did the ONA contribute to ID of KEY NODES in the adversary systems?                                                                                                                                                                          | 72% agree |
| Did the ONA contribute to ID of KEY LINKS BETWEEN NODES in the adversary systems?                                                                                                                                                            | 55% agree |
| Did the ONA contribute to the conduct of center of gravity and critical vulnerability analysis?                                                                                                                                              | 44% agree |
| Did the ONA contribute to ID of adversary leadership decision-making processes?                                                                                                                                                              | 35% agree |
| Did the ONA contribute to ID of friendly strengths and weaknesses relative to the adversary?                                                                                                                                                 | 35% agree |
| SME Responses                                                                                                                                                                                                                                | N ≈ 18-22 |

**Finding 2► The JTF required extensive experience with EBO before it was able to adequately analyze intended and unintended effects.**

Some improvement was noted during the execution phase. Since individuals and small groups, did in fact, do this level of analysis, the JTF task to use EBP to develop and analyze COAs has potential. The “DIME” and “PMESII” thought structure was weak except for “M” effects. In this experiment, the JIACG was integrated into the combatant commander’s staff, and worked through the JTF Joint Planning Center (JPC) pol/mil planners to influence operational level planning. Influence models and predictive analysis tools are not sufficiently available to assist in the COA development and COA analysis process. Simultaneous, parallel, horizontal planning between the components, which were assigned multiple, supported, and supporting effects-based missions, is difficult and extremely challenging. even to the most experienced of joint planners. A common sentiment among the JTF planners was that the EBP process idea of

predictive analysis seemed like a good idea, but needed work and time for planners to accept. When used, it appeared to make a difference.

Numerous aspects of effects-based thinking, as applied to the joint operational planning process of developing a COA, helped planners develop a better-reasoned COA. Consideration of intended and unintended potential outcomes, causal linkages, indirect effects, and outcomes outside of the local area add value to the planning process.

However, use of these aspects of effects-based thinking in conjunction with influence models and predictive analysis, as applied to the joint operational planning process to analyze COAs, was not well understood and even less well applied in MC02. Training, education, and maturing of ONA and COA analysis DSTs will help mitigate this challenge.

Aspects of effects-based thinking such as the JIACG, DIME, and PMESII had little visibility at the JTF planner level, which was not surprising since the JIACG was designed into the experiment at the combatant commander level.

Use of collaborative planning tools greatly assisted the components in horizontally integrating their tasks and actions. The JTF and functional component EACs however must be appropriately staffed to participate in both effects assessment and planning activities in order to properly link effects assessment to adaptation of plans for future execution.

The JTF EAC demonstrated the capability to identify assessment requirements, but translation of those assessment requirements back into the JTF and component level planning centers for branch and sequel planning in an anticipatory manner was extremely difficult.

Operational level war-gaming of the approved JTF-level COA by the JTF and functional component planners, using the CIE, was poorly done during this event. The JTF planners believed the in-depth war-gaming at the component level was sufficient to meet this task requirement. The component tactical level war-gaming, however, did not suffice for operational level synchronization and integration.

Except for identification of key nodes in the adversaries' system, the ONA as implemented in this experiment for JTF and component planner use in developing and analyzing joint, operational level COAs did not live up to participant expectations.

Based on observations from the SMEs and responses to surveys from the warfighters, the consensus was that numerous aspects of effects-based thinking, as applied to the joint operational planning process developing a COA, helped planners develop a better-reasoned COA. Consideration of intended and unintended potential outcomes, causal linkages, indirect effects, and outcomes outside of the local area add value to the planning process. However, use of these aspects of effects-based thinking in conjunction with influence models and predictive analysis, as applied to the joint operational planning process, analyzing a COA is not well understood and even less well applied. Training, education, and maturing of the IT support tools will help mitigate this challenge.

Manual analysis and Blue-Red cell deliberations were the primary methods used to consider adversary potential COAs and potential responses to friendly action, and it was done primarily at the JTF headquarters-level. SMEs did note an application of the ONA visualization tool, with promising results, during component led planning for one of the major operations. This planning group then worked with the JIACG to discuss possible mitigation of undesired effects and identification of possible unanticipated effects. JTF headquarters level SMEs reported a trend to not conduct war-gaming at the operational level.

The components conducted tactical level war-gaming, with the JTF synchronizing the operation in terms of task, purpose, time, space, and resources. The JTF did not conduct

action/reaction/counteraction war-gaming at the operational level. Functional component-level SME comments confirmed this tendency.

A majority of JTF and component level SMEs agreed, despite the lack of IT support tools and using only manual analysis techniques, predictive analysis helped the JTF produce a better-reasoned COA. This success is due mostly to the efforts of the Blue-Red cell. However, since the EAC participation in the JPC sessions to war-game the action/reaction/counteraction possibilities was viewed by the SMEs as minimal, this cell did not contribute to the effort as much as anticipated. EAC SMEs cite insufficient manning levels as the most probable cause for lack of EAC participation in the planning process.

Members of the war-fighting staff were asked to rate the EBP process' usefulness in predicting the direct and indirect effects (intended and unintended) of proposed tactical actions. Of the 183 surveyed members, 61 percent agree to some level of usefulness with 22 percent choosing to abstain because they did not participate in this activity. A number of them commented that the JTF seemed to be more reactive than proactive, or they could not discern a clear linkage. The most common reason cited was an unresponsive effects assessment process in turn due to slow BDA from the experiment's M&S systems. A common sentiment can be summarized as "A good idea, needs work, and needs time for planners to accept. Where it was used, it seemed to make a difference."

Members of the war-fighting staff were then asked to comment on what tool(s) most enabled them to conduct predictive analysis. Of the 183 surveys returned, 84 contained comments responding to this specific question. The most common "helpful" tool cited was the ONA, followed closely by the CIE. Several planners had very strong feelings regarding this topic with comments.

"None of the tools enabled predictive analysis in any way. The ONA, in fact, was a hindrance because of the missing linkages between effects and nodes."

"I like collaboration because one can hear the reasoning behind the analysis; tends to be more acceptable retaining most of the human element. Stand alone databases tend to lack credibility."

Most SMEs agree intended and unintended potential outcomes were examined for the effects published in the PEL. Multiple reports suggest unintended, second, and third order effects were a matter of routine discussion during the daily EAC working group deliberations. Such examinations however, are viewed as more of a JTF HQ task than a functional component task.

Table 22: SME survey questions and responses

|                                                                                                                                                       | EAC        | JPC       | Components |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|------------|
| Does predictive analysis, whether a manual process or assisted by knowledge management tools, help the JTF planners to produce a better-reasoned COA? | 25% agree  | 70% agree | 77% agree  |
| Were intended and unintended potential outcomes examined for each of the planned effects?                                                             | 100% agree | 70% agree | 64% agree  |
| Were the causal linkages (between nodes) through which actions create effects examined for each of the planned effects?                               | 100% agree | 50% agree | 64% agree  |
| SME responses                                                                                                                                         | N = 4      | N = 10    | N = 13     |

SMEs also agree the causal linkages between nodes were examined to determine those actions needed to create desired effects. Reports also suggest the current manifestation of the ONA did not permit the detailed analysis necessary to reduce and focus the JTF operational efforts.

Table 23: SME survey questions and responses

|                                                                                                | EAC        | JPC       | Components |
|------------------------------------------------------------------------------------------------|------------|-----------|------------|
| Were indirect outcomes considered for each of the planned effects?                             | 100% agree | 60% agree | 62% agree  |
| Were outcomes outside of the joint operations area considered for each of the planned effects? | 50% agree  | 60% agree | 38% agree  |
| Did the ONA help the JTF planners in conducting predictive analysis?                           | 75% agree  | 70% agree | 62% agree  |
| SME Responses                                                                                  | N = 4      | N = 10    | N = 13     |

SMEs agree the indirect outcomes for each of the planned effects were considered; however, many commented some serious possible outcomes (e.g., adversary preemptive attack, adversary media manipulation), in hindsight, did not receive a proper discussion.

Consideration of outcomes outside the JOA was problematic for members of the JTF planning staff. Mention is made regarding deliberations of non-military effects outside the JOA, but these discussions were mostly restricted to macro-level discussions of economic and media impacts. Many planners saw this discussion primarily at JTF or combatant commander level with guidance passed down to planners for their use, or as participation by the political-military planners in the various planning centers.

SMEs agree the ONA helped the JTF planners in conducting predictive analysis, with

Table 24: SME survey questions and responses

|                                                                                                                              | Planners  |
|------------------------------------------------------------------------------------------------------------------------------|-----------|
| Interagency participation in the EBP process was useful in developing better-reasoned branch and sequel COAs?                | 52% agree |
| Center of Excellence (COE) participation in the EBP process was useful in developing better-reasoned branch and sequel COAs? | 23% agree |
| SME responses                                                                                                                | N = 183   |

strong agreement at the JTF level and weaker agreement at the functional component level. Dissenting comments included, “ONA does not have the degree of detail, up to date information, and information reliability to be a useful planning or analytical tool,” and, “ONA was only good for an overall, if inaccurate, picture of the military situation. It was seriously lacking in the D, I, and E.”

As noted earlier, newer aspects of effects-based thinking, such as the JIACG, DIME, and PMESII, were not well understood and had little visibility at the JTF planner level. Those ideas have even less visibility at the functional component planner level and most non-military planning information was routed through the Pol/Mil planning staff, which was embedded in the JTF HQ staff. It was this group that is credited with success for this aspect of effects-based thinking as used in the joint operational planning process.

JTF and functional component planners agreed interagency participation in the EBP process was useful in developing better-reasoned branch and sequel COAs at the JTF level. Numerous comments were received, as well.

“Very useful at JTF level—Not appropriate for the component commander level,” said a participant. While another participant was unaware of significant JIACG involvement, “the only IA participation I was aware of was the [Pol/Mil] planner, and I don't know how linked in he was.” “We were able to engage with (a member of the group) yesterday,” said one officer, “and his input and collaboration was extremely helpful.”

Table 25: SME survey questions and responses

|                                                                                                          | EAC       | JPC       | Components |
|----------------------------------------------------------------------------------------------------------|-----------|-----------|------------|
| Were the actions planned for execution selected based on their impact against adversary pressure points? | 75% agree | 40% agree | 69% agree  |
| Were MoP developed by the components for each task and/or action?                                        | 75% agree | N/A       | 54% agree  |
| SME Responses                                                                                            | N = 4     | N = 10    | N = 13     |

“This would have been helpful from the beginning. Daily interaction is necessary. Helpful when we got it, but there are still many questions hanging out there and little current input. The JTF needs direct access to IA, not through the combatant commander — too slow in RDO.”

Table 26: SME survey questions and responses

|                                                                                                                         | EAC       | JPC       |
|-------------------------------------------------------------------------------------------------------------------------|-----------|-----------|
| During development of the COA (s), were all aspects of PMESII considered?                                               | 50% agree | 60% agree |
| Were all military and non-military (DIME) effects specified in the current ETO properly synchronized in time and space? | 25% agree | 30% agree |
| During development of the COA (s), were the capabilities of all elements of national power (DIME) considered?           | 50% agree | 60% agree |
| SME Responses                                                                                                           | N = 4     | N = 10    |

One participant thought the group’s participation grew as the experiment progressed, “The interagency participation actually seems to be increasing/improving. It seemed fairly limited in Spiral 3 and between Spiral 3 and the experiment execution,” he said. “They seemed to be very useful to the plans process as a whole, but I found that I had little access to this resource.”

Few JTF and functional component planners observed the participation of centers of excellence in the EBP process, hence, were unable to rate their usefulness in developing better-reasoned branch and sequel COAs. This result was expected as robust COE participation was eliminated from the experiment’s design due to IT costs and scenario sensitivities. Comments were almost exclusively positive.

“Although I did not use them, I believe the concept is good,” said one. “If we'd had any input, it would have proven useful. However, we had no COE players in IO.” “Never heard from them or used them. Too bad they were not available to support an exercise of this scope. Turn the concept into reality.”

SMEs were asked to report observations of JIACG, COE, NGO, or other non-traditional participants in the effects-based planning process. Their reports indicate they saw little use of



these organizations at the JTF planner level and even less use at the functional component level. As indicated previously, the JIACG was integrated into the combatant commander's staff during the experiment, and worked through the JTF JPC Pol/Mil planners to influence operational level planning.

One participant said, "I believe the IAC is the most important part of this experiment, however, if they do not possess the understanding of how a CJTF prosecutes his campaign, and how their expertise and efforts facilitate that process, then we need to start over." While another MC02 participant said, "The lack of play with these elements significantly detracted from our ability to experiment with DIME." These comments were representative of the whole.

Few SMEs thought all aspects of PMESII were considered during development of the branch and sequel COAs. Although 60 percent of participants at the JTF JPC agreed, comments clearly indicate this concept was sparsely used. "Some were just touched upon," said one SME. Another added, "IIP Service was given to PMESII." Added another, "I saw very little of anything but the M in PMESII considered." Most SMEs indicated the JTF planning emphasis was primarily focused on the military element of national power, with little if any focus on the other elements of national power.

"Very little if any D, I, and E coordination and synchronization were evident," said one observer, while another noted that there was some discussion at the macro level, but the discussions never reached the operational level of detail.

Based on observations from the SMEs and responses to surveys from the war fighters, data suggests use of collaborative planning tools greatly assisted the components in horizontally integrating their tasks and actions. The JTF and functional component EACs, however, must be appropriately staffed to participate in both effects assessment (EAC) and planning (JPC) activities in order to properly link effects assessment to adaptation of plans for future execution.

Most SMEs at the JTF EAC and at component planner level believe the actions planned by the components were selected based on their impact against adversary decisive points. SMEs at the JTF planner level disagreed, saying, "Most actions were planned to accomplish a mission and not really based on desired effect. Take islands... Capture WME sites... What's different?" This disagreement is due in most part to observations regarding the appropriate level for effects planning and assessment.

During MC02 execution, functional components were given supported commander (or main effort) responsibilities to plan and executive effects level missions, thus JTF operational level planning for these effects was minimal. Additionally, JTF EAC SMEs observed components developing measures of performance for each task or action planned, primarily based on their attendance at JTF EAC working group meetings. Linking the EAC work to the planners was problematic, however, since most assessment personnel were gainfully employed with assessment tasks and were not able to actively and robustly participate in planning sessions at their respective levels.

Members of the war-fighting staff were asked to comment on the usefulness of the collaboration system in helping the components synchronize their horizontal planning, (i.e., component to component planning.) Of the 183 surveys returned, 74 percent responded the CIE was useful in this endeavor. Comments included:

"Yes, we still have a way to go with this to get the right synchronization. In some ways by bringing them in too early, we bog down the process and might send them into needless planning. We (JTF) need to be involved in horizontal collaboration to keep it synched with our plan so we have an understanding of their planning and to provide guidance if required "

“The lower the level of command, the more assumptions had to be made to plan concurrently. This becomes a liability.”

“The power of this was that the functional components could lead the planning effort and have the same information available that the JTF had. This process really brought the power of functional components to the forefront.”

The JTF EAC demonstrated the capability to identify assessment requirements. However, translation of these assessment requirements back into the JTF and component level planning centers for branch and sequel planning in an anticipatory manner is extremely difficult. As stated in the previous task, the JTF and functional component EACs must be appropriately staffed to participate in both EAC and planning (JPC) activities in order to properly link effects assessment to adaptation of plans in anticipation of adversary action(s).

The SMEs observing the JTF EAC gave high marks to the JTF’s ability to accomplish the ‘identify assessment requirements’ task, a critical component of using the EBP process, to develop and analyze courses of action. Accomplishment of this task was given much lower marks at the JTF JPC and at the component planning levels. The lower marks resulted because

Table 27: SME survey questions and responses

|                                                                                                                          | EAC        | JPC       | Components |
|--------------------------------------------------------------------------------------------------------------------------|------------|-----------|------------|
| Are all component actions and/or tasks traceable back through the desired effects to higher-level strategy (objectives)? | 100% agree | 60% agree | 90% agree  |
| Were MOE developed for each JTF level desired effect?                                                                    | 100% agree | 60% agree | 60% agree  |
| Were the MOE developed for the JTF level desired effects tied to theater objectives?                                     | 75% agree  | 60% agree | 60% agree  |
| Were the MOE developed for the JTF level desired effects reliable?                                                       | 75% agree  | 40% agree | 40% agree  |
| Were the MOE developed for the JTF level desired effects observable?                                                     | 75% agree  | 40% agree | 60% agree  |
| SME responses                                                                                                            | N = 4      | N = 10    | N = 10     |

the SMEs were looking for branch and sequel adaptations of the plan, based on assessment (and accomplishment) of the JTF prioritized effects.

In fact, the combatant commander or the CJTF directed much of the branch and sequel planning based on his own assessments and, in some cases, political realities. Said one observer, “I never got the impression the requirements were reviewed and examined to see if desired effects were achieved — particularly in the IO arena.” Another observer said, “Since some of the tasks lacked clarity as to what effect was really desired, the assessment cell was unable to rate the JTF’s effectiveness in reaching those goals.”

Operational level war-gaming of the approved JTF level COA by the JTF and functional component planners using the CIE was not well demonstrated during this event. The planners believed the in depth war-gaming at the component level was sufficient to meet this task requirement. The component tactical level war-gaming, however, did not suffice for operational level synchronization and integration. Had resources been more constrained in this experiment, this would have been much more evident.

Collaboratively analyzing the JTF level COA across the JTF HQ staff with functional component participation is a complex task and presented a serious challenge to the JTF JPC. As the tabulated data below indicates, the SME's favorably viewed participation in the Blue-Red cells. OPFOR reactions to Blue actions (more difficult) were considered, but not as vigorously at the operational level. Blue counteractions to potential OPFOR reactions (even more difficult) were less well defined and largely ignored at the operational level. JTF EAC and JPC SMEs were evenly split on their agreement of whether or not the JTF planners conducted effective war gaming using the CIE. Components were supportive of the position that planners had effectively war-gamed their COAs, but during this event, the lion's share of the war gaming was done at the tactical level by the component planning staffs.

With respect to the 'value-added' of Blue-Red cell participation, one observer noted, "The Blue-Red cell tends to be macro in their analysis of the enemy. The planners will tell you that they are not getting the fidelity in possible enemy COAs that they need." Another agreed that the Blue-Red team brought value to the deliberations, but added that the old J2 used to do the same thing, so where is the quantum leap in change, he said, asking "what's the difference?"

**Finding 3► The ETO process can be effective at both the JTF and the functional component commander level.**

The process of ETO preparation enhances effectiveness of planners at both levels. Synchronization issues are common and need careful attention at both the JTF and component levels.

Most participants at both the JTF and functional component levels understand preparation of the ETO. The relationships and effects, both supporting and supported, were clearly understood. Initially, the task to prepare, synchronize, and issue effects tasking orders went smoothly, but the large number of fragmentary orders issued during the experiment tended to confuse many personnel as time passed.

Table 28: SME survey questions and responses

|                                                                                | EAC       | JPC       | Components |
|--------------------------------------------------------------------------------|-----------|-----------|------------|
| Does participation of the Blue-Red cell enhance the COA analysis process?      | N/A       | 70% agree | N/A        |
| Were potential Red reactions to Blue actions considered?                       | N/A       | 60% agree | N/A        |
| Were Blue counteractions (branches) planned for these potential Red reactions? | N/A       | 40% agree | N/A        |
| Did the JTF planners effectively war game the COAs using the CIE?              | 50% agree | 50% agree | 67% agree  |
| SME responses                                                                  | N = 4     | N = 10    | N = 13     |

The CIE did enhance cross component planning, there were individuals in charge of the process, and there was a beneficial synchronization of the planning process.

The joint integration matrix (JIM) did not add much to the component planning process. This document was intended to address the ISR and operations synchronization challenge. Its limited use thus led to serious challenges keeping ISR synchronized with the effects-based planning and assessment processes.

Issuance of the ETO was straightforward. Not all of the components were using the same planning procedures or tools, however, and the resulting variations led to some desynchronized actions.

SMEs overwhelmingly believe effects-based orders issued by the JTF to functional components were clear.

“Crystal,” said one expert, “Collaborative environment allows the commander to immediately confirm/deny with subordinates, and as important, all levels of staffs.” Similarly, they also believed the supported and supporting command relationships were clearly understood by the functional components. A few cautions were noted, however.

“There is still an unclear picture as to who claims responsibility for fires in the JOA. Supported and supporting command relationships tend to cloud the picture even further when it comes to who is responsible for fires,” said one participant. While another noted, “As the term ‘main effort’ got thrown around more and more, relationships got confusing.” “Would have been better with establishing directives.”

During the boil-down session with the JTF and component planners, they suggested the supported and supporting command relationship during MC02 was not a problem because resources were not constrained. They further suggested that if resources were constrained, “... we probably would have come up short in some areas.”

Likewise, SMEs overwhelmingly supported the assertion that the collaborative planning process contributed to the joint force and component integration and synchronization of capabilities. Again though, a caution: a SME noted, “It both contributed to and detracted from the planning process. The unstructured nature of many of the collaborative sessions delayed actual planning efforts and in some cases caused confusion and misinformation. On the other hand there was better situational awareness and when sessions were established with specific goals they contributed to and enhanced the process.”

The majority of SMEs agreed the military actions of the functional components were synchronized in time and space to maximize capabilities. As cautions, SMEs indicated, “The operational and tactical commands may not completely integrate properly. Some operational staff seem to be thinking at the tactical level and losing the ‘long term’ operational view.” SMEs also believe IO was not as fully integrated as possible: “Although the IO campaign does strive to get the themes of the JTF commander out to

Table 29: SME survey questions and responses

|                                                                                                                                     | JTF OPS    | Components |
|-------------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| Were effects-based mission orders clear to the components?                                                                          | 100% agree | 100% agree |
| Were “supported” and “supporting” command relationships clearly understood by the components?                                       | 80% agree  | 86% agree  |
| Did the collaborative planning process contribute to the joint force and component integration and synchronization of capabilities? | 100% agree | 100% agree |
| SME responses                                                                                                                       | N = 10     | N = 13     |

Table 30: SME survey questions and responses

|                                                                                                             | JTF       | Components |
|-------------------------------------------------------------------------------------------------------------|-----------|------------|
| Were military actions of the functional components synchronized in time and space to maximize capabilities? | 80% agree | 79% agree  |
| Did the Joint Integration Matrix enhance the component planning process?                                    | 10% agree | 15% agree  |
| SME Responses                                                                                               | N = 10    | N = 13     |

the public and take advantage of information opportunities, I don't feel that the IO effort has been fully incorporated into the operational plans and execution effort."

**Finding 4** The organization that owns the effect must be able to accomplish and assess it.

Because the JTF adopted the 'effects' from the combatant commander's CONPLAN, a number of those 'effects' were beyond the ability of the JTF to assess and achieve given the context of this experiment. Compounding the problem, the JTF assigned effects to the functional components that were likewise beyond their ability to completely accomplish and assess. The resultant gaps were not properly addressed in the execution of the JTF effects assessment process.

The EBO concept envisions the JTF as the 'owner' and 'assessor' of operational level 'effects', but it may be appropriate, on occasion, to designate a functional component as the 'owner' and 'assessor' of an operational level 'effect'.

The process by which a force's progress in achieving the full range of operational effects (DIME) is monitored is conceptually sound. However, this experiment was heavily "M" oriented and needed to expand to include "D, I, and E."

The deficiency analysis processes, (assigned tasks and actions are being executed to standard [MOP], however, the desired effect is not being realized [MOE]) did not work particularly well and the construct of the MC02 ONA contributed to this shortcoming. First, it was deficient with respect to its handling of key links between nodes. Second, center of gravity and critical vulnerability analysis was not handled well. Third, the adversary leadership decision-making process was not supported well enough, and fourth, friendly strengths and weaknesses relative to the adversary were not broached. Hence, "targets" may have been leading to nodes rather than nodes leading to "targets." Mitigating factors included M&S' lack of BDA timeliness, accuracy, and completeness. In addition, the joint information superiority center (JISC) may need a predictive analysis and fusion cell to enable the anticipatory requirements necessary to "lead turn" the adversary.

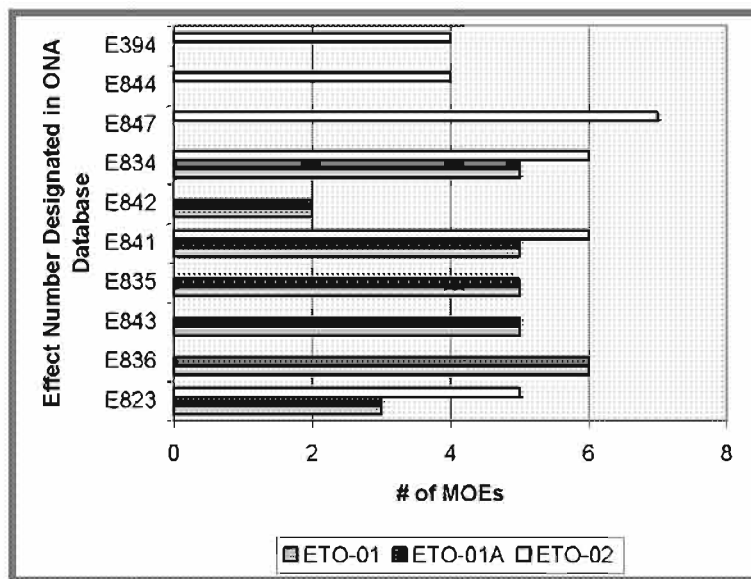


Figure 209: Effect number designated in the ONA database vs. the number of Measures of effectiveness

In the design of this experiment, the concept and analysis teams expected the JTF's JPC, in cooperation with the IS Group's EA cell to develop MOEs for each of the approved JTF level desired effects. Additionally, they were to ensure each of those MOEs was covered by at least one asset in the JISR collection plan. Noting that there was no data being collected that was aimed at determining whether the MOEs were adequately developed, a SME said, "MOE are not being collected against. MOE assessment is the analytical effort that is the result of the collection effort against PIR and DE [desired effects]." He added,

“Currently the collection plan appears to be focused primarily on DE. Looking at the posted collection plan, no PIR are depicted. My understanding is that this is a work in progress and future collection plans will reflect collection against PIR.” (D-Day)

Figure 209 depicts the ETO developed by the JTF with associated desired effects and corresponding number of MOEs selected for the effect published in those respective orders. Furthermore, the matrix form of the effects with associated MOEs developed for ETO-02 clearly indicate an intent, to at least attempt, to assess each MOE on a day by day basis. ETO-01 and ETO-01A did not contain any such matrices.

Seventy-five percent of the members of the JTF JISE responded positively to a survey question asking if the additional workload created by the effects assessment process was significant. EAC and supporting organization staffing levels need to be reviewed to ensure the JTF is capable of properly assessing MOE and desired effects in an anticipatory fashion.

SMEs were asked daily to comment on what direct and indirect effects were actually produced because of tactical actions and did the JTF correctly assess them.

Survey results included:

“Little to no BDA, but decision process is very logical. EAC is using all components, IO, SOSA, BRC in making assessments.” (D+4)

“Assessment always seems to be ‘in progress.’ As a result, no direct or indirect effects are actually assessed within the current day’s execution cycle.” (D+9)

“The EAC assessed the JTF actions in a very logical manner and presented the best assessments possible based on information and experience available. SOSA cell was very helpful in these assessments.” (D+12)

In a related question, SMEs were asked daily to comment on what direct and indirect effects were actually produced because of Blue tactical actions. Comments were anecdotal, and for the most part, generally tactical in nature, suggesting that the JTF was struggling with the process of gathering together the collective results of component force actions on the battlefield and relating them to the measures of effectiveness. And, reflecting those MOE “measurements” back to their respective desired effects and the follow-on lashing of collective desired effects back to their respective campaign objectives became difficult.

We were also interested in how the component combat assessments were passed to the EAC and how much of this BDA did the EAC really use. SMEs observing the assessment process said that the EAC received BDA inputs from components and the JISE through the CIE. SMEs further said, “Component BDA was not getting to the EAC or the JISE [in a timely manner]. The lack of BDA negatively affected EAC ability to assess; they defaulted to worst case [mission failure; assessing effects accomplishment as unacceptable or red on a stoplight chart].”

EAC SMEs responded overwhelmingly (100 percent) positive to the follow-on question, asking ‘if MOP were useful in assessing MOE,’ but then noted that most meaningful inputs came out during the JCB. Concept and analyst teams expected this work to be routinely accomplished in the daily collaborative EAC working group meetings. The JCB is the intended recipient of the EAC’s assessment work, not the intended generator of the effects assessment.

Were all the effects resulting from JTF and component actions anticipated (planned for)? This question was asked daily to SMEs in the JTF EAC, the JTF JOC, and JTF JPC during the period D-2 thru D+13. The survey results showed that effects were anticipated 29 percent of the time by the EAC, 60 percent of the time by the JOC, and 37 percent by the JPC.

Responding to a follow-on daily question, EAC SMEs said that the MOEs developed for each desired effect were correctly focused to best observe that effect just 27 percent of the time. Below are a number of effects assessment questions posed during the experiment.

- The collaboration system used in the effects assessment process was useful in producing more accurate assessments [agree, Disagree, Did Not Use]
- Interagency participation in the effects assessment process was useful in producing more accurate assessments [agree, Disagree, Did Not Use]
- Centers of Excellence participation in the effects assessment process were useful in producing more accurate assessments [agree, Disagree, Did Not Use]
- What non-traditional player brought the most value to the effects assessment process [Comment, No Comment]

The prevailing response to all four questions was either “Did Not Use” or “No Comment,” indicating these aspects of the concept were not visible or not used by the EAC.

Table 31: SME survey questions and responses

|                                                                                                                                                      | JTF<br>EAC     | JTF<br>JOC   | JTF<br>JPC   |
|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|--------------|
| Did the EAC provide centralized management of the effects assessment process?                                                                        | 75%<br>agree   | 60%<br>agree | N/A          |
| The CROP visual display of effects assessment was useful in providing adequate detail and clarity to enable me to maintain good situation awareness. | did not<br>use | 77%<br>agree | 61%<br>agree |

Even though a majority of SMEs agreed that the EAC provided centralized management of the effects assessment process, the comment, “Saw several levels of effect assessment, — don’t think the JTF cell was one-stop shop for effects assessment,” was supported by analysts’ observations. Interestingly, the JTF EAC did not use the CROP as an effects assessment or situation awareness tool. Instead, the EAC used collaborative sessions during the EAC working group meetings as the forum to determine current affects assessment status. JTF JOC personnel, on the other hand, were supportive of the CROP as an effects assessment or situation awareness tool, with less support from the JTF planners. Since the JOC was much more “today” focused than the planners were, this divergence would be expected.

**Finding 5► Assessment and prediction are separate and distinct functions, and may require separate cells within the JTF to properly address both of these process functions.**

The EAC performed the effects assessment function, but their efforts fell short of the mark as they failed to anticipate adversary behavior and were not able to influence the JTF COA execution. Although the Blue-Red cell is assigned this task, their involvement in COA development, analysis, and effects assessment may have been too much work for such a small group.

Effects assessment had little impact on the adaptation of JTF plans during this particular experiment, according to SMEs observing JTF operations in the EAC, JPC and JOC. The experts were asked to determine if the effects assessment process assisted in development of branch plans, sequels, and adaptation of COAs (See Table 32). Additionally, members of the JTF JPC were asked if effects assessment was completed and posted to the CROP in a timely manner to

impact planning for future operations. Although 56 percent of the respondents believe this was true, the respondents were very vocal with their impressions as follows:

“I agree, but we had problems with timeliness. Mostly fumbling with new systems.”

“This is a process which requires much examination and work. Assessing the progress of the IO battle, difficult at best [with] the lack of metrics in many areas, did not occur in a manner that allowed for timely redirect of the battle. The "fog" of war played a big part in this, but the ability of a technologically advanced adversary to readjust his communications paths in near real time fashion will require a similarly speedy reaction on our part. Assessment must be speedier than we currently see.”

“No. Information was not posted in a timely fashion. More important, it was not posted in a visible fashion. The traditional TOC map is still a good idea. Situational awareness would be enhanced if graphics of the battlefield were maintained and updated regularly, and the changes were linked to a pop-up or permanent display on each terminal. Probably needs to be a different slide for different staff groups, but everyone should be able to see and know ‘where the fight is’.”

“As the deputy director of plans, I have no idea where they were posted. I only saw them when briefed to the commander. These were not vetted through us so I have no basis to judge if they were accurate or not.”

Table 32: SME survey questions and responses

|                                                                                                                         | JPC+EAC         | JOC             |
|-------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|
| Were the set of tactical actions employed to achieve a desired effect changed as a result of deficiency analysis?       | 20% of the time | 26% of the time |
| Was the approved COA adapted (branch plan) to respond to an unanticipated effect or enemy action?                       | 14% of the time | 28% of the time |
| Did the effects assessment process influence ETO execution when unanticipated effects or enemy actions were discovered? |                 | 48% of the time |
| Were military and non-military (DIE) effects maintained in synchronization in time and space?                           |                 | 45% of the time |

“As the future planner, I was never able to read an assessment, that reached out more than 96 hours, and that appreciably affected planning. The partial reason is that the JTF focus dropped to within 48 hours. Secondly, sufficient MOE planning and ISRT tasking does not appear to have been successful, or JECG could not provide the background for assessment that far out in this experiment.”

In a related question, JTF war fighters were asked if the JTF was able to maintain the initiative relative to the adversary. Respondents from the EAC offered no observations. Members of the JOC overwhelmingly (100 percent) agreed that the JTF maintained the initiative, “With the exception of the initial attack. I believe that we had the initiative for the entire operation and [the] enemy forces were reacting to our actions (albeit in asymmetrical ways).” On the other hand, the OPFOR believed they maintained the operational level initiatives in the movement and position of WME warheads and in the conduct of their IO campaign and analysts agreed with this interpretation.

How did the CIE enhance the planning, execution, hand-off, assessment, and adaptive planning battle rhythm? Members of the JOC (100 percent) and the JPC (74 percent) agreed that the collaborative environment enabled the JTF HQ to maintain a more efficient battle rhythm. Many of the responses were qualified with comment. A review of the comments led analysts to



conclude that experiment participants believed the CIE enhanced the execution, hand-off, and adaptive planning functions during this event, but hindered the planning and assessment functions. A representative sampling is provided as follows:

“[If] efficient means ‘fight the war faster,’ maybe. [If] efficient means ‘accomplish the normal work with less time or energy,’ then, NO, it's not efficient.”

“Not as efficient as it will be, but as we get better and more practiced, we will be more efficient.”

“Collaborative environment complicated personal battle rhythms. Trying to synchronize battle rhythms was next to impossible.”

“However, CIE allows you to attend more sessions because you don't have to physically attend and as a result you are pulled to more sessions and it is difficult to perform your primary duties.”

“The JTF ran faster than expected and was more productive! The components had trouble keeping pace—better organization is required for them to support the joint benefits to warfighting that we can achieve—what a great way to get inside the enemy's decision cycle.”

“Initially started out OK, but soon drifted back to giving briefings despite the best intentions/efforts of a lot of people. We then became locked into the time of briefings (briefings stressed)/meetings as opposed to what the concept said (i.e. JFE W/G should meet about one

hour after JCB). Well, the JCB lasted two hours and quite often 1+30. So, did we move the W/G back to allow an hour for the components to meet and discuss the guidance? No, the JFE W/G met immediately or five minutes later after the JCB. Another example, later in the experiment, (the JTF) was dispensing with the battle rhythm entirely to focus on the island campaign, part two. Why would you delete the very thing designed to add rigor and help with planning and managing? We should have been able to do what the commander asked within the battle rhythm.”

“This goes without saying. This new paradigm has exceptional potential. We are just beginning to scrape the surface of what could be possible in the future. We were able to understand intent and monitor discussions. I think it dramatically improved our situational awareness and staff work.”

“However, we need to establish better data management by using the technology more in line with its capabilities. Data collection and dissemination needs to be done with databases as opposed to e-mail, chats and spreadsheets.”

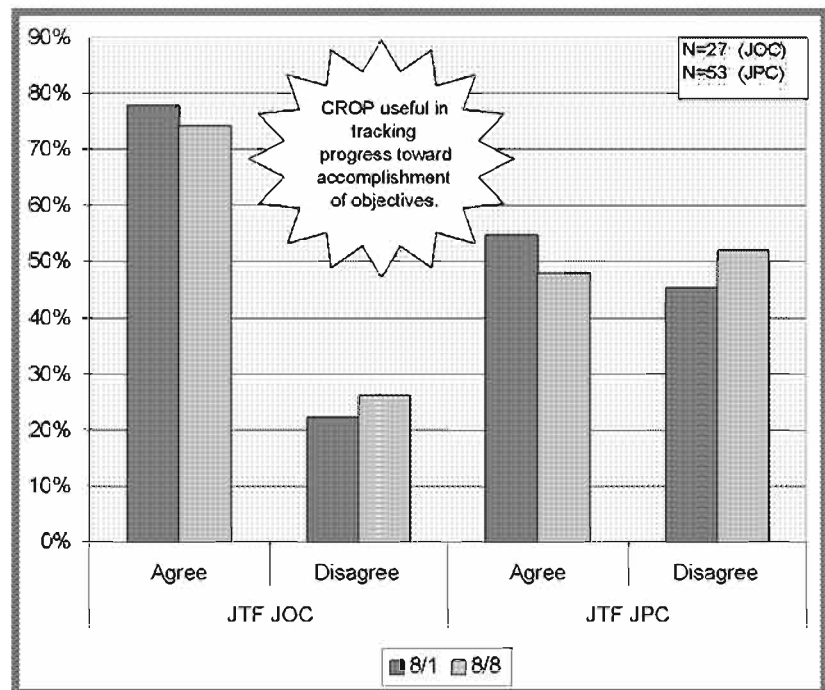


Figure 210: Most thought the CROP was useful in tracking progress

“Collaboration worked well. I am not sure I see a relationship with the collaborative environment supporting the battle rhythm. I see it the other way. The battle rhythm is a method to manage the collaborative environment by scheduling participation and directing the timing for the sessions.”

Sixty-one percent of the functional component planners said it was easy to know when the ETO had been changed. Several comments include:

“Not immediately obvious to a guy slugging out 10 different e-mails, monitoring two briefs and fielding phone calls.”

“If you do a routine walk through all the data pages.”

“Maybe an auto alert on all critical messages would be key to 100 percent awareness. Most of the time got the word through JCB's.”

“I often only stumbled upon changes to the ETO. The numbering convention still confuses me. I never felt up to speed on this.”

### **Other Observations**

#### **Observation 1: Functional component assessment of measures of performance is adequate, given the observed latencies in BDA reporting.**

Except for the JFLCC, as noted during various JCB sessions, there appeared to be no linkage of the measures of performance to associated measures of effectiveness. In turn, measures of effectiveness appeared to play little or no role in the assessment of campaign objectives and end state, or in the deficiency analysis process for possible modifications to JTF operational level ETOs.

The JTF EAC SMEs, who observed and documented the process developed by the JTF to support the assessment of combatant commander and/or JTF objectives, provided the following comments:

“The process to support assessment or effects (as opposed to objectives) is pretty much per experiment SOP. PEL is established, components develop MOP to support DE, JTF (EAC/JISE) develop MOE for DE, and the subsequent assessment (stoplights) are reviewed during the EAC and presented at the JCB. During the JCB, the EA analyst also presents an assessment of JTF success relative to combatant commander objectives.”

“The EAC met twice a day with the components, IO, Red/Blue cell, ISR planner, Pol/Mil, ONA effects/assessment, members of SOSA cells. Cell discussed components MOPs, recommendations, and issues. The EAC chief would make a subjective assessment and present to CJTF during the JCB. One area where assessment seemed watered down was the amount of competing assessments that was presented to the CJTF at the JCB. Example of assessments given: EAC, intelligence, components, Red/Blue, COM-Blue, IO assessments—so to some degree there was no fusion of assessments given to the CJTF.”

“Component commanders provided reporting that assessed status of assigned actions against nodes in support of JTF effects. This reporting was consolidated at the JTF level in order to evaluate success or failure with reference to meeting combatant commander and JTF objectives.”

A majority of JTF JOC personnel agreed, that the CROP visual display of progress toward combatant commander and/or JTF objectives, was useful in providing adequate detail and clarity, enabling maintenance of good situational awareness. JTF JPC personnel were not as enthusiastic, and became even less enthusiastic as the experiment went along.

In this event, the CROP seemed more useful for use in the close fight and was found lacking in its usefulness in anticipating requirements for future operations and plans. Even from those war fighters that agreed to some usefulness, comments included such things as:

“Tools were not adequate for ground planning and situational awareness.”

“It’s not there yet, too much pull and not enough push—too much data mining.”

“Most situational awareness was obtained in the briefs that were conducted and tracking the comments in the JOC room. ADOCS did not provide a picture detailed enough to keep up on all happenings in the JOA.”

“The concept is a good one, however, relative to providing adequate detail and clarity to enable me to maintain good situational awareness, not so.”

SMEs, especially at the functional component level, supported the idea that collaboration processes enhanced and/or influenced the collective accomplishment of assigned objectives and effects.

“The collaborative process supported the planning and execution process in not only the horizontal/linear plane, but vertically as well. It allows instantaneous decision making from the combatant commander down to the component level.”

“I’m not sure that we necessarily plan faster, although depending how complex the task, one could argue either way. I think the issue is the planning effort is able to assimilate much more information and make more valuable judgments and decisions as a result.”

### **Relationship to Other Objectives**

EBP and EA are processes (methodologies, ways of thinking) designed for use at the JTF headquarters and functional component headquarters during the conduct of the MC02 experiment. As such, operational level implementation was dependent upon a number of other objectives and concepts being tested and/or observed during this event.

- Assessment Area 2: Setting Conditions, (i.e., a “product” of the EBP and assessment process)
- Assessment Area 3: Assured Access, (i.e., a “product” of the EBP and assessment process)
- Assessment Area 4: Conduct Effects-Based Operations, (i.e., a “product” of the EBP and assessment process)
- Assessment Area 5: Sustain the Force, (i.e., a “product” of the EBP and assessment process supporting effects-based operations, assured access, and setting conditions)
- Assessment Area 6: Standing Joint Force Headquarters, (i.e., the physical organization of the JTF headquarters implementing the EBP and assessment process)
- Assessment Area 7: Operational Net Assessment, (i.e., the knowledge base upon which the SJFHQ drew its information and knowledge in order to conduct EBP and assessment)
- Assessment Area 9: Collaborative Information Environment, (i.e., the physical information systems used by the JTF and functional components to actually execute the EBP and assessment process)
- Assessment Area 10: Interagency, (i.e., the “organization” the JTF collaborated with to integrate all elements of national power during the EBP and assessment process in order to conduct effects-based operations, assured access, and setting conditions)
- Assessment Area 13: JISR, (i.e., the primary mechanism to physically plan and conduct effects assessment in order to design and adapt operational plans using the EBP process)

### **Relationship to Baseline Analysis**

- There was no baseline data available with which to compare EBP&A. USJFCOM SMEs offered some comments on their estimate of EBP&A impact on JTF performance. These were founded on their personal experience and perception from the USFCOM training environment and were not made in relation to a historical baseline

### **DOTMLPF Linkage**

- There is no DOTMLPF package associated with this Assessment Area

### **Recommendations**

1. JFCOM, explore reach-back in future experiments and exercises as a feature of virtual collaborative planning and assessment to define potential reach-back agencies that enhance future operations. ►

2. JFCOM, develop decision support tools for effects visualization and modeling. ►

- They are desperately needed to assist planners in their understanding of the relationships between and amongst the various DIME/PMESII nodes and links contained in the ONA. DSTs must support mission analysis, COA development, COA analysis, and the effects assessment process.

3. JFCOM, modify the EBO concept to include effects timing in the PEL in addition to describing desired effects in terms of changes to the adversary's actions or behavior, the desired level of changes, and the scope and distribution of the effect. ►

- This will allow planners to take into account sequencing and the enabling actions and tasks in order to achieve the higher headquarters' effect and or objectives.

4. Joint Staff J7, establish, through the Military Education Coordination Council (MECC), the requirement for joint and Service professional military education institutions to incorporate the effects-based concept into their curricula. ►



Figure 211: Line handling evolutions onboard USS *Coronado* (AFG11) flagship for Commander Joint Maritime Forces Component Commander and deployed headquarters for the Commander Joint Task Force during Millennium Challenge 2002

## Assessment Area 9 — Collaborative Information Environment (CIE)

### Overall Assessment Results

The objective, 'Establish and Maintain a Collaborative Information Environment', was accomplished in an effective and meaningful manner during the experiment. The three major concepts that made up the CIE, the common operational picture (COP), the enterprise information portal, and the collaborative tool, which was used to communicate in the CIE, were all effectively established at the start of the experiment and were maintained in a operational status for 98 percent of the experiment period.

Among these concepts, the use of the collaborative tool, both for planning functions and for command and control functions during execution, was clearly demonstrated as a useful and desirable capability for a future Joint Task Force headquarters. The CROP, incorporating a collaborative information portal, was also found to be a useful and desirable means for rapidly disseminating important information, for storage of multitudes of JTF and component generated products, and, to a lesser degree, for searching and retrieving needed information residing outside the direct control of the JTF and its components. The COP received mixed reviews for a variety of reasons, but, in general, was able to present a timely and accurate depiction of the forces in the Joint Operating Area for use at the operational level. As a whole, this portion of the experiment demonstrated that a JTF commander, his staff, and components sharing information in the CIE could achieve and maintain a detailed and timely level of situational awareness. The experiment also showed that joint forces could use this shared awareness to collaborate effectively in both planning and execution phases, and that they could synchronize their efforts at the joint, operational level to a degree beyond traditional deconfliction activities.

### Methodology

USJFCOM built a CIE for use in MC02, using a series of surrogates, as no existing integrated system was available. The architecture was based on a wide area network (WAN), which included both the JTF and combatant commander's headquarters, co-located at the JTASC in Suffolk, Virginia, and the functional component headquarters located at Nellis AFB, NV (JFACC); Camp LeJeune, NC (JFLCC); onboard the USS *Coronado* (AGF-11) (JFMCC) homeported in San Diego, CA; and at Naval Base Norfolk, Norfolk, VA (JSOTF).

Also in the WAN were external agencies including the Department of State, the Joint Chiefs of Staff, and the Department of Justice, all participating out of locations in Washington,

### Overall Assessment Results

- [XC4I tools], were all effectively established at the start of the experiment and were maintained in a operational status for 98 percent of the experiment period...
- CROP, incorporating a collaborative information portal, was also found to be a useful and desirable means for rapidly disseminating important information...
- The COP got mixed reviews...
- Experiment demonstrated that a JTF commander, his staff, and components sharing information in the CIE could achieve and maintain a detailed and timely level of situational awareness...

D.C. The WAN was built within the DoD SIPRNET and it carried the extensive data communications necessary to integrate numerous models and simulations, as well as live-force reporting data (See Chapter 5 for more details).

A common suite of experimental tools was provided for all participating MC02 organizations. These tools served as surrogates for tools that were projected potentially to be

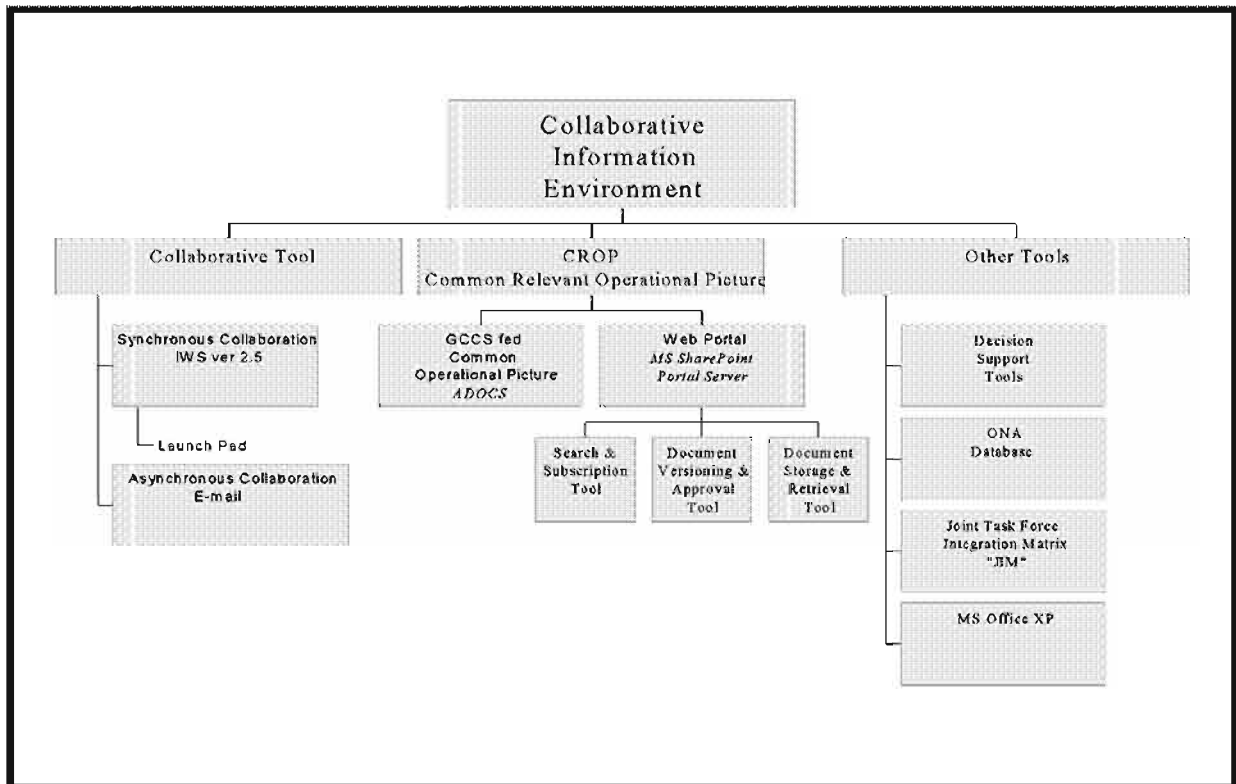


Figure 212: CIE architecture at the time of MC02 execution

available for use by all JTF's by the year 2007, the hypothetical setting of the experiment. This suite of tools, with its linking communications, was referred to as the Experimental Command, Control, Communications, Computer, and Intelligence (XC<sup>4</sup>I) System. It must be re-emphasized that the XC<sup>4</sup>I system used in the experiment was a surrogate for a future system. It was built from commercial-off-the-shelf (COTS) and government-off-the-shelf (GOTS) systems to test the experimental concepts. To the extent that the concepts proved viable, the surrogate components are a potential point-of-departure for creating a prototype system for detailed development. XC<sup>4</sup>I is not and never was intended for immediate deployment. For example, the XC<sup>4</sup>I system was constructed to be as "open" as possible to facilitate getting it to work properly with the resources available. A future prototype operational system would incorporate security features that would not be practical to develop and install for experimentation.

For the COP, the standard military Global Command and Control System (GCCS) was used. The architecture was as follows:

This architecture included inputs from live forces participating in the western ranges and from various models and simulations distributed across the country. These inputs entered the system at the component level, or below. When these inputs and all their potential formats are

considered, the level of complexity involved increases significantly. COP architecture, hierarchical by design, was fashioned to synchronize and disseminate the picture to all participants.

The COP synchronization tool (CST) was incorporated into the system at the JTF level so that a single, synchronized view of all tracks and units in the JOA was available to every participating headquarters.

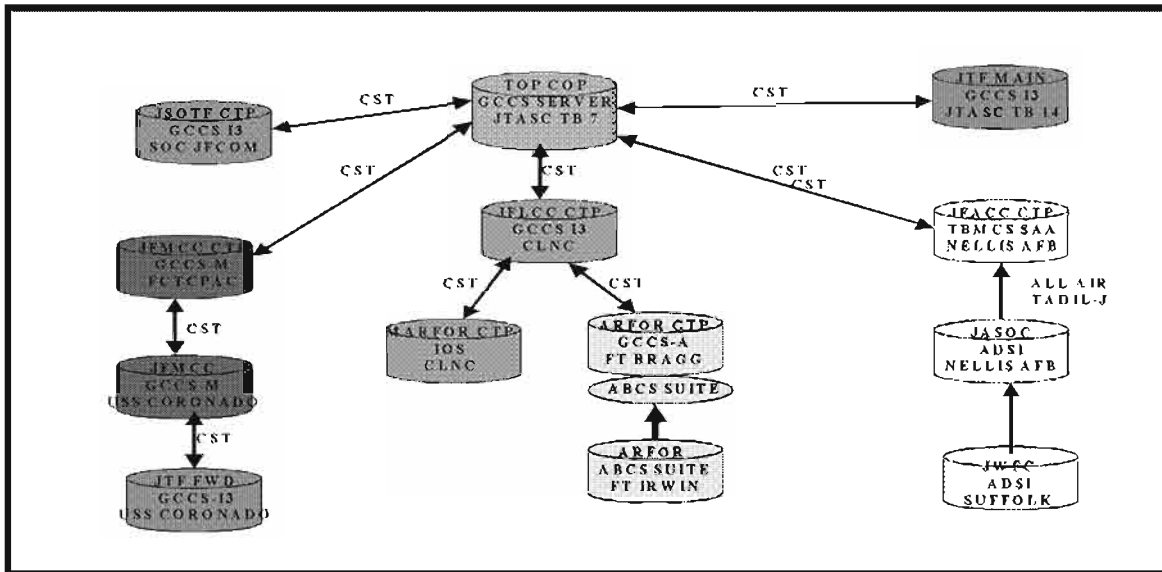


Figure 213: COP architecture at the time of MC02 execution

Figure 213, above, illustrates the complexity of the COP as it was integrated into the models, simulations, and live forces that it depicted. The CROP and the collaboration tools can be described as a flattened, wide area network “cloud” with all the participants having access to the system servers in a client-server environment. There were some work-arounds necessary to get the surrogate systems in the XC<sup>4</sup>I to function properly.

One such adaptation involved the size of the associated server farm. The collaborative tool required a server farm to handle the volume of activity. While the system size required eight servers, the available technology limited the IWS server federation to six local LAN servers. The result was that two locations, USS *Coronado* (JFMCC) and Camp LeJeune (JFLCC), had servers that were confederated into the system, but were not integrated. This adaptation, while functional, resulted in degradation in the quality of performance at those locations as the IWS server federation traffic experienced unrecoverable errors due to long-haul encrypted WAN links.

The COP, which was viewable through any appropriate “viewing” software, used Automated Deep Operations Coordination System (ADOCS) to display its data. ADOCS, chosen based on its performance during a previous year’s LOE, had capabilities such as 3D terrain viewing, ATO visibility, and fires planning and execution modules that were desirable in a graphic depiction of the battlespace. These modules were believed to have the potential to improve operator situational awareness.

For the CROP, the XC<sup>4</sup>I tool was Microsoft’s SharePoint Portal Server (SPPS). This tool, a COTS product, provides users with a web-enabled capability to post and retrieve their staff products. It also incorporates a search engine that enables users to search the web for



information, as well as a local configuration capability that allows users, at all levels, to structure their portal windows to meet their individual or group needs. The collaborative tool used in the experiment was another COTS product—the InfoWorkSpace (IWS) tool.

In addition, every XC<sup>4</sup>I workstation was provided with the Microsoft Office (2002) suite for document production. This suite included the Microsoft Outlook application for sending and receiving e-mail.

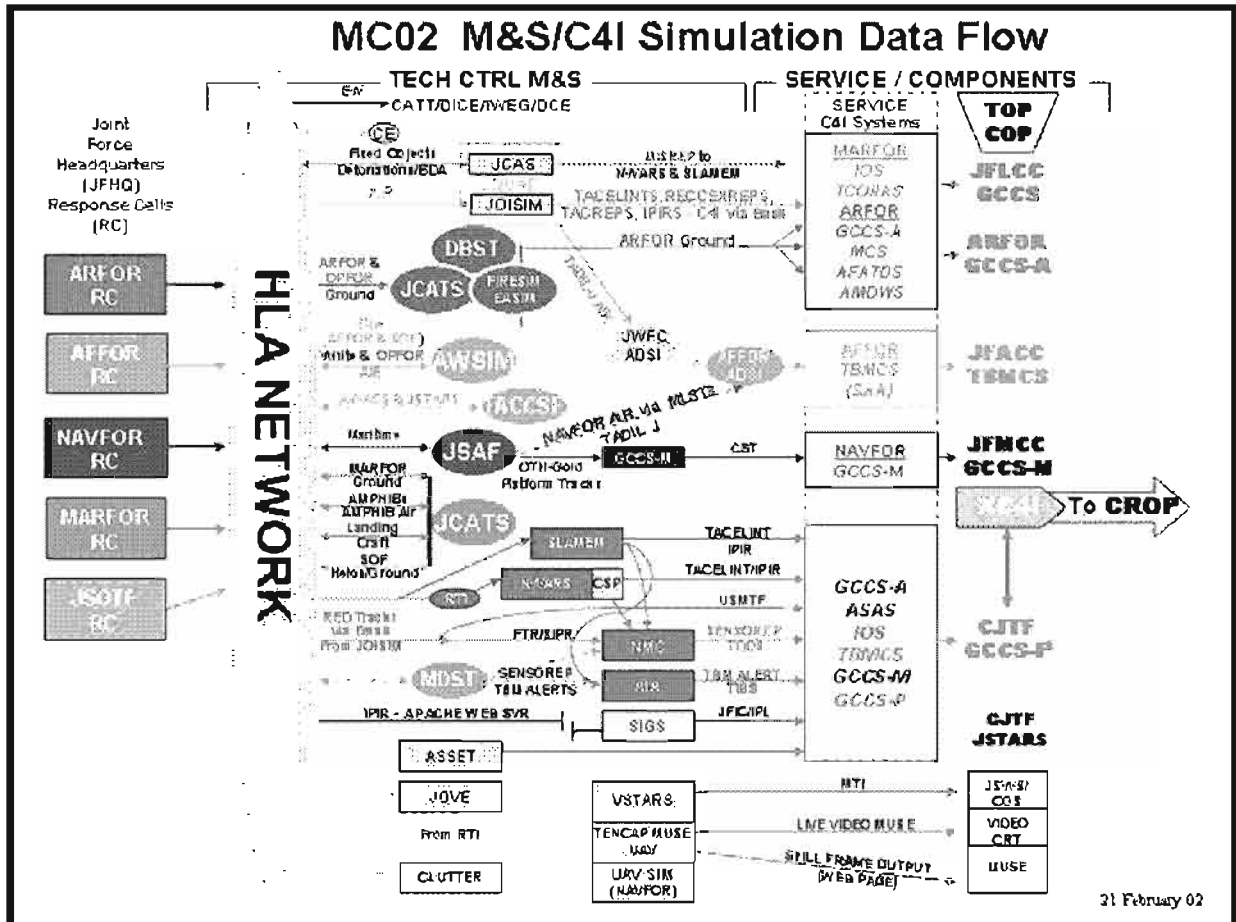


Figure 214: A depiction of how data flowed from the components' response cells to the Log CROP

Tool selection, made by the JFCOM staff following the Unified Vision 2001 experiment (May 2001), was based on several factors, including cost, user acceptance, known or identified functional capabilities, operational requirements, training requirements, and known or identified configuration requirements. To meet the requirements of the experiment, the staff selected a set of tools that readily conformed to the CIE concept and that could be adapted for use in the XC<sup>4</sup>I system, could be acquired with the funding available, and that could be available early enough in sufficient quantities to meet the training requirements. Both the JTF and the functional component staffs required training on the tools.

To experiment with the CIE, analyst developed a series of experimental issues or Warfighting Challenges that addressed the basic functionalities required by the concept as well as what the surrogate tools could be expected to produce in a networked environment. These functionalities were developed from the USJFCOM concepts of joint interactive planning (JIP)

and the CROP, and later, from the concepts described in *Understanding Information Age Warfare*, by Dave Alberts, John Garstka, Richard Hayes, & David Signori (2001) from the DoD Command and Control Research Program (CCRP).

Analysts, working with the concept developers, then dendritically broke down the warfighting challenges into supporting tasks and subtasks. At the task and subtask level, appropriate data requirements were developed against which experimental data could be collected. This effort was finalized in the form of an experimental matrix that contained all the necessary information to support the data collection plan.

A data collection method was developed for each data requirement associated with the

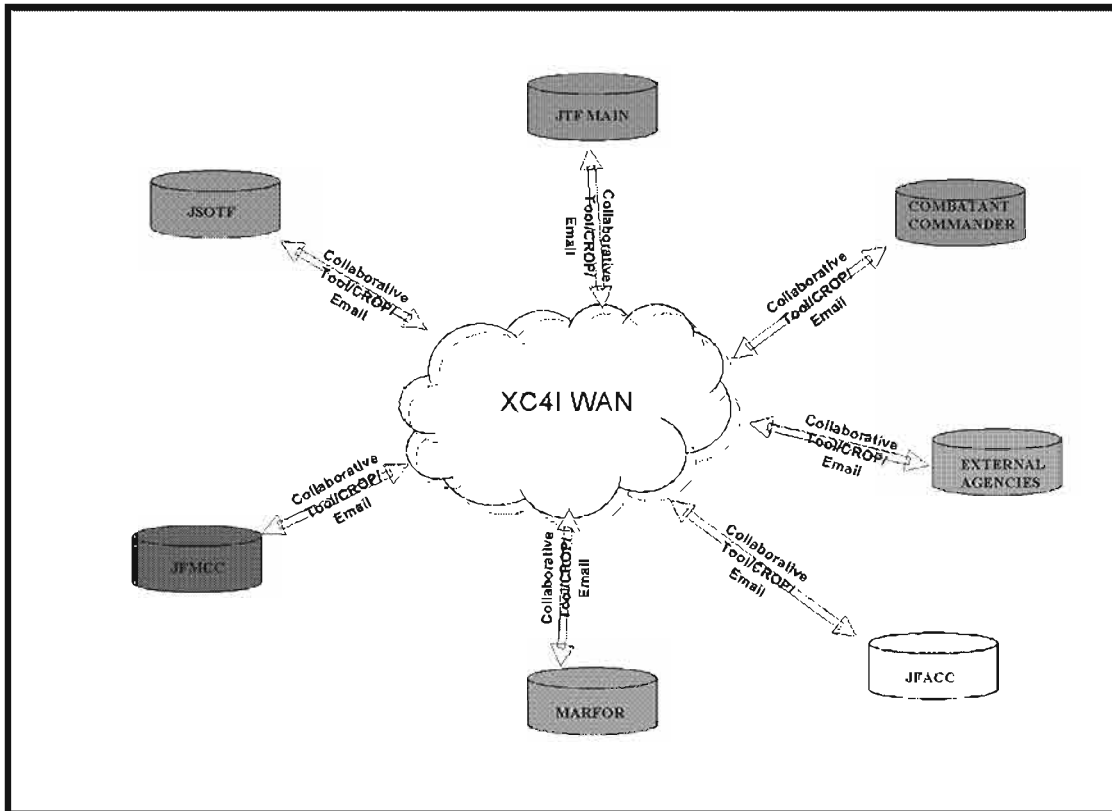


Figure 215: XC<sup>4</sup>I wide area network running the CROP

tasks and subtasks. Many questions associated with the tasks and subtasks were subjective. To gather data on those subjective questions, a series of surveys were prepared. During the experiment, these surveys on the COP, CROP, and collaborative tool were sent electronically to both participants and subject matter experts, who functioned as experiment observers and data collectors across the JTF and components. Also incorporated into the experiment design was the use of a group of very senior retired officers, retired three-and-four-star generals and flag officers as well as former ambassadors, who were brought together on a daily basis to share their observations and insights on the experiment. Both formal and informal notes were taken of these meetings and used as sources of data for the experiment analysis.

For data collection and analysis of the COP, a tool was developed through a contract with the U.S. Army Electronic Proving Ground to capture ground truth data from both simulations and instrumented live forces and perceived truth as contained in the GCCS database. This tool, the Digital Collection, Analysis, and Review System (DCARS), was used throughout the

experiment to collect the specified data. Other objective data collected in the course of the experiment included video tapes of approximately 100 collaboration sessions held at all levels during the experiment, logger data from both the collaborative tool servers and the CROP servers, and records of e-mail transactions.

**Warfighting Challenge: Ability to establish a valid COP and build the CROP in a CIE**

The first CIE warfighting challenge focused on the friendly force's ability to establish, maintain, and display a graphical depiction of available data on both friendly and adversary units and platform locations. This challenge also addressed how the friendly force developed information on the status of their own units, as well as, how the friendly force developed and displayed their opponent's locations, capabilities, and intentions. Additionally, this challenge covered the JTF's capability to collect, store, and disseminate information as a means of increasing force situational awareness.

**Warfighting Challenge: Ability to plan collaboratively in a distributed joint C2 environment**

This warfighting challenge was postulated because of the belief that the simultaneous involvement of the combatant commander's HQ, the Joint Force commander, the JTF, and the component commanders and their staffs in the planning and execution activities should result in the following:

- A better understanding of the commander's intent, better unity of effort, and reduction of planning-cycle times
- Providing the Joint Force commander a significant, asymmetric advantage over his adversary, saving time, and enabling an efficient use of information from the CROP

**Finding 1► The Joint Task Force was able to establish a persistent collaborative environment across all echelons of command.**

The data and observations on collaboration provided by the SMEs, participant surveys, the objective record of respondents' use of the collaboration tools (IWS server logs), and the knowledge management and collaboration working groups' results were analyzed. This analysis indicated that the CIE was established at the start of the experiment and remained in place, with no major disruptions (except for a few technical problems, short audio outages and short, infrequent losses of network connectivity). The collaborative environment was operational approximately 97 percent of the time.

IWS, the surrogate collaboration tool used in MC02, was a web-based system owned by Ezenia Corporation. A commercial, server-based software system, it offered a bundled package of collaborative tools such as whiteboard, virtual workplaces in rooms and auditorium, audio and text chat, and distributed viewing of the same presentation to facilitate on-line communication, data access, and knowledge management among its users. IWS uses a physical metaphor of buildings and meeting rooms in which users can virtually assemble in order to conduct collaboration activities. This physical arrangement adds context to the virtual environment enabling participants to plan, develop courses of actions, and present briefings to other members. IWS was selected as the experimental collaboration tool because it met three warfighter needs:

- It allowed large-scale meetings across the enterprise
- It allowed users to be present in more than one virtual location at once

- It allowed users to conduct “sidebar” chat sessions with others in the enterprise

There were two types of IWS sessions. First, IWS provided a virtual conference center in large auditorium rooms where users could present a fully interactive on-line presentation for hundreds of audience participants. Second, it offered numerous small group-size meeting rooms where 25 or fewer participants could hold a meeting for the exchange of information or synchronous collaboration activities using IWS tools.

The IWS tool set used in MC02 consisted of the features listed below:

- Audio
- Public and private text/audio chat
- Collaborative rooms (large auditoriums and small meeting rooms)
- File transfer
- Whiteboard
- Application sharing (shared view)
- Document storage of Word, PowerPoint, images and other documents in a file cabinet located in the small meeting rooms
- Polling (online voting, survey construction and analysis of results)

These tools provided the necessary capabilities and functions to support the warfighters’ collaborative sessions in a virtual environment. These tools and their uses were outlined in the concept of operations for the CIE publication.

Nearly 1,300 unique MC02 participants used IWS, to share information and collaborate across all echelons at some time during the experiment. Over the course of the experiment, however, a large portion of these participants, approximately 489 participants each day, did not log onto IWS (See Figure 216). These infrequent users ranged from a low of 416 on C+7, to a high of 916 participants on C+17, the last day of the experiment.

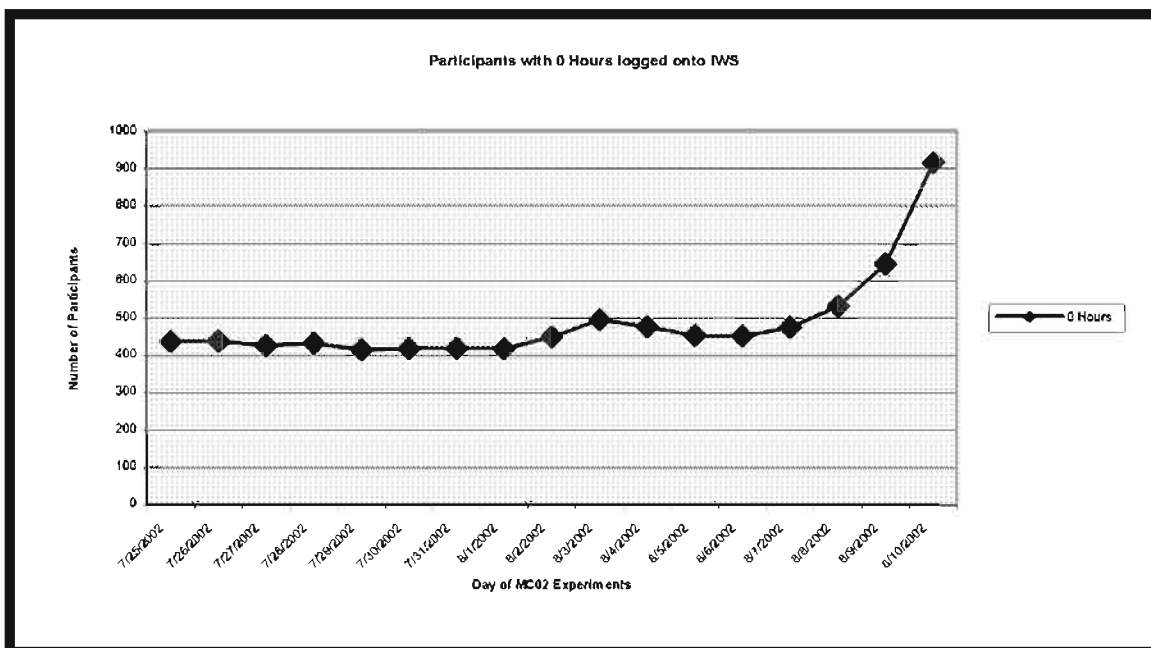


Figure 216: The number of participants that were logged onto IWS was fairly constant until the last days of the experiment

The majority of the “active” MC02 participants logged onto IWS between three to four hours a day. The average was 3.71 hours, over 17 days of the experiment, with a low of 2.7 hours, on the first and third days and a high of six hours on C+12 (See Figure 217).

Participants, surveyed on their use of the time they spent in the collaborative environment, indicated that they spent 48 percent of their time in collaborative sessions, and 43 percent of their time in informal briefings. Over 70 percent of the participants surveyed indicated that they opened eight or more collaborative sessions on IWS every day. A majority of participants reported that the time spent in the collaboration session was beneficial in terms of task completion and product production (See Figure 218).

Participants were informed of the schedule for daily meetings by the MC02 battle rhythm (See Figure 219) and from daily meeting announcements published on the JTF calendar (See Figure 220) and other calendars.

To function properly in a collaborative environment, a battle rhythm must be disciplined. There was a pre-experiment expectation that with collaboration there would be more potential scheduling flexibility. It was found, however, that

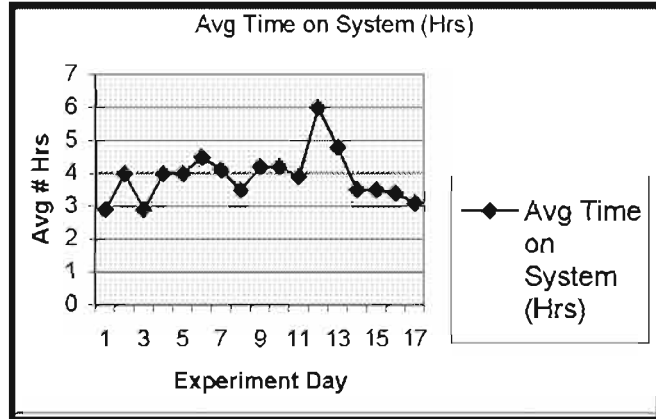


Figure 218: Avg. duration (in hrs) participants were active on IWS. The graph is in one-hour increments from zero through seven hours.

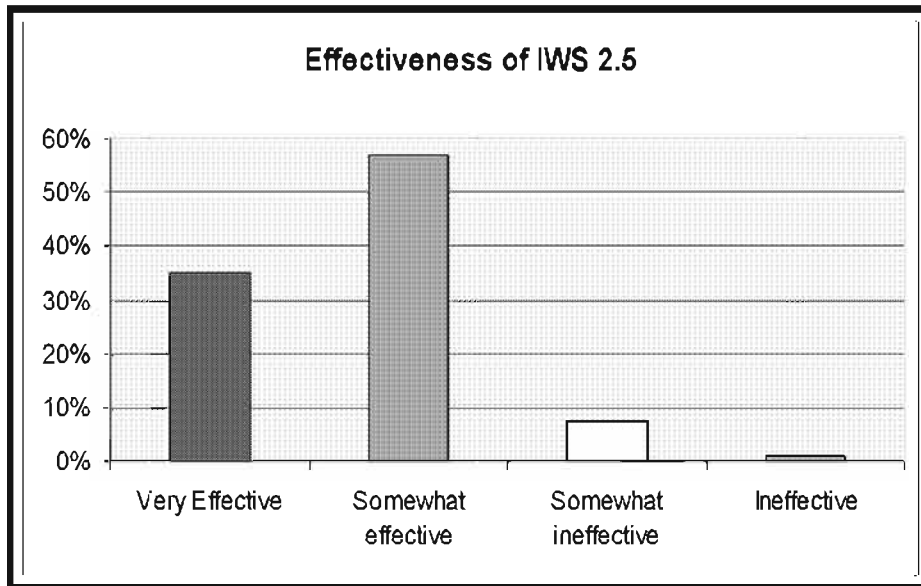


Figure 217: IWS considered effective by most

times, or postponed or cancelled meetings) were made informally and not disseminated through a formal procedure. Meeting leaders often posted a change announcement on the IWS bulletin board, or, if in the auditorium, posted a change announcement on a slide so those entering the auditorium would see the change and go to the new location at the appropriate time. The other

It was found, however, that the battle rhythm established by the JTF also had to be used by the components, higher HQ, and the interagency community to plan participation in JTF sessions, as well as to develop their own battle rhythms. Both the meeting schedulers and meeting participants had to remain flexible. It was observed that changes to the daily battle rhythm (meeting time or location changes, delays in meeting start

informal method was by word of mouth. These procedures appeared to work satisfactorily once participants became familiar with them.

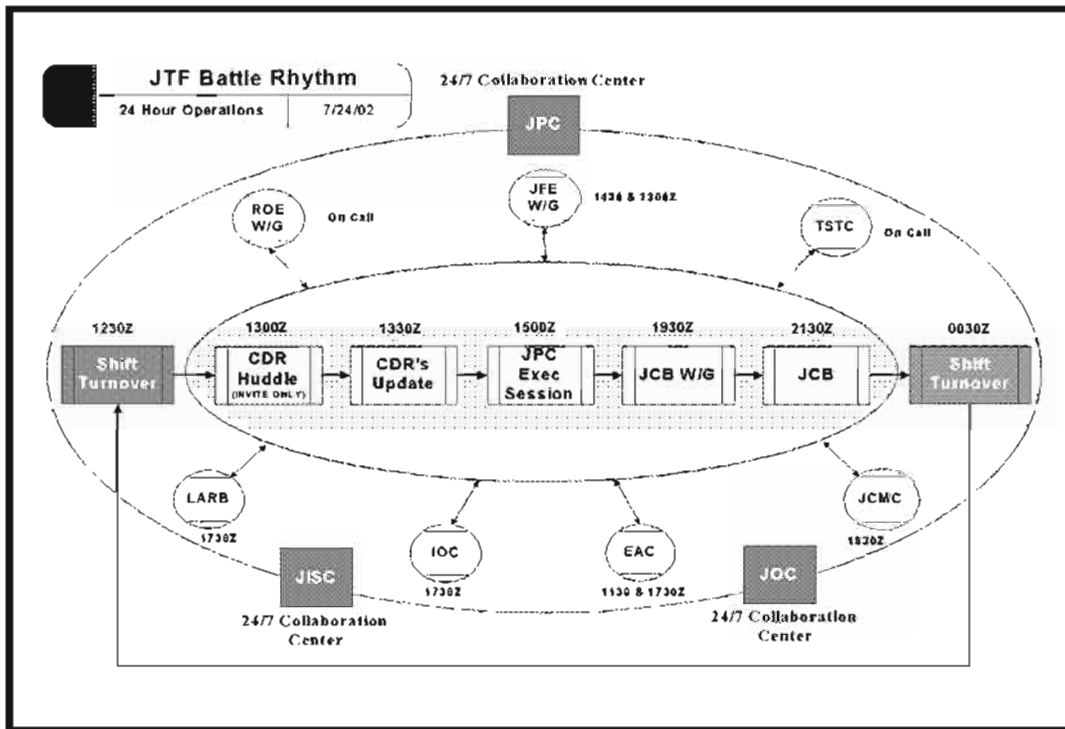


Figure 219: A depiction of the JTF Battle Rhythm used in MC02

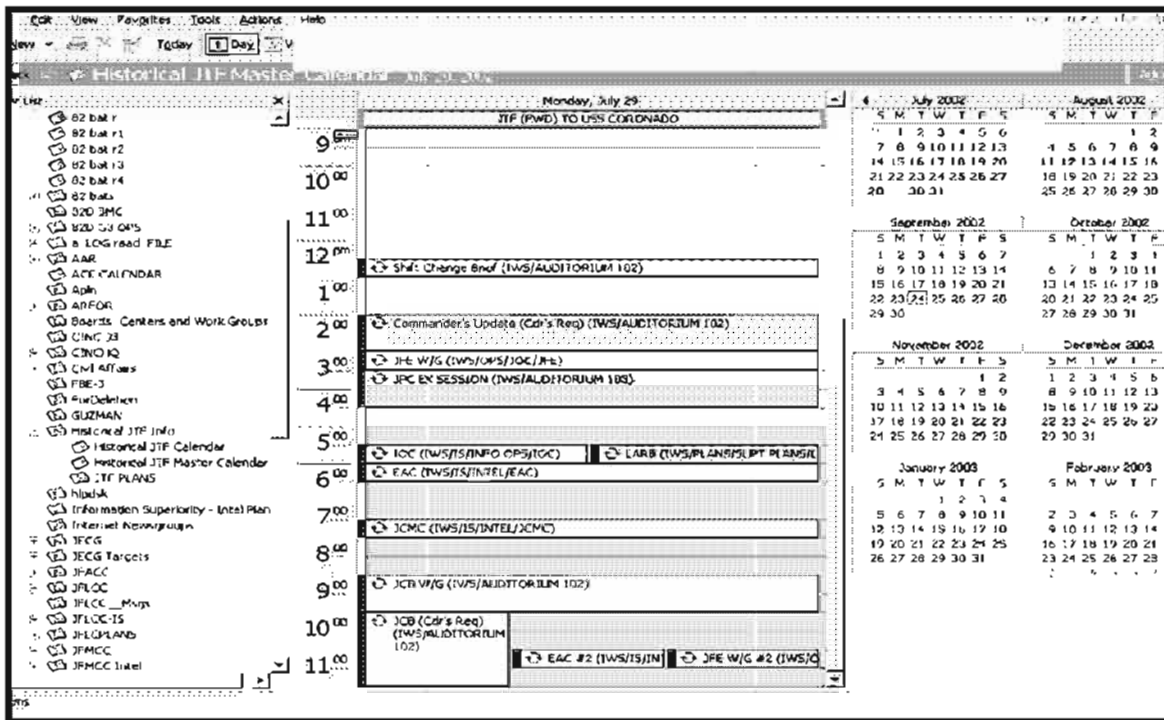


Figure 220: Snapshot of MC02 CJTF standing schedule of events

**Finding 2** The COP provided an adequate picture for situational awareness at the operational level.

As part of the effort to establish a valid COP and build the CROP in a CIE (see diagram 3 below), three major areas of COP data accumulation and display were examined. The data and display of enemy ground forces were looked at. The data and display of enemy air and naval

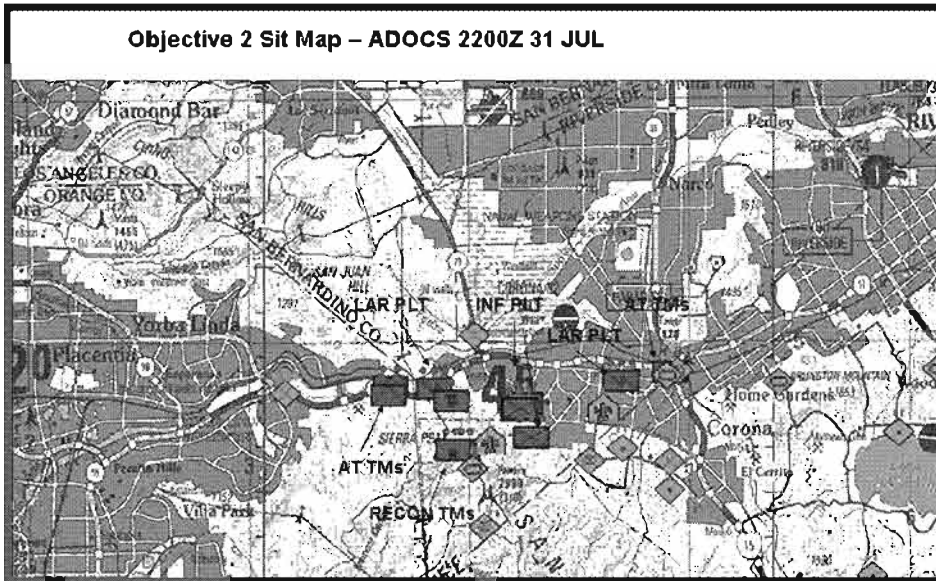


Figure 221: Snapshot of ADOCS mapping during the experiment

units and track data were reviewed. Lastly, the data and display associated with both friendly units and tracks of platforms were studied.

Opponent ground force or unit information (unit id, location, and time) in the Modernized Information Database (MIDB) was readily displayed on the

COP. Numerous views were collected throughout the course

of the experiment to show the information being provided to friendly forces on opponent ground forces by the COP. Spot checking of this data against the times that it was posted in the COP

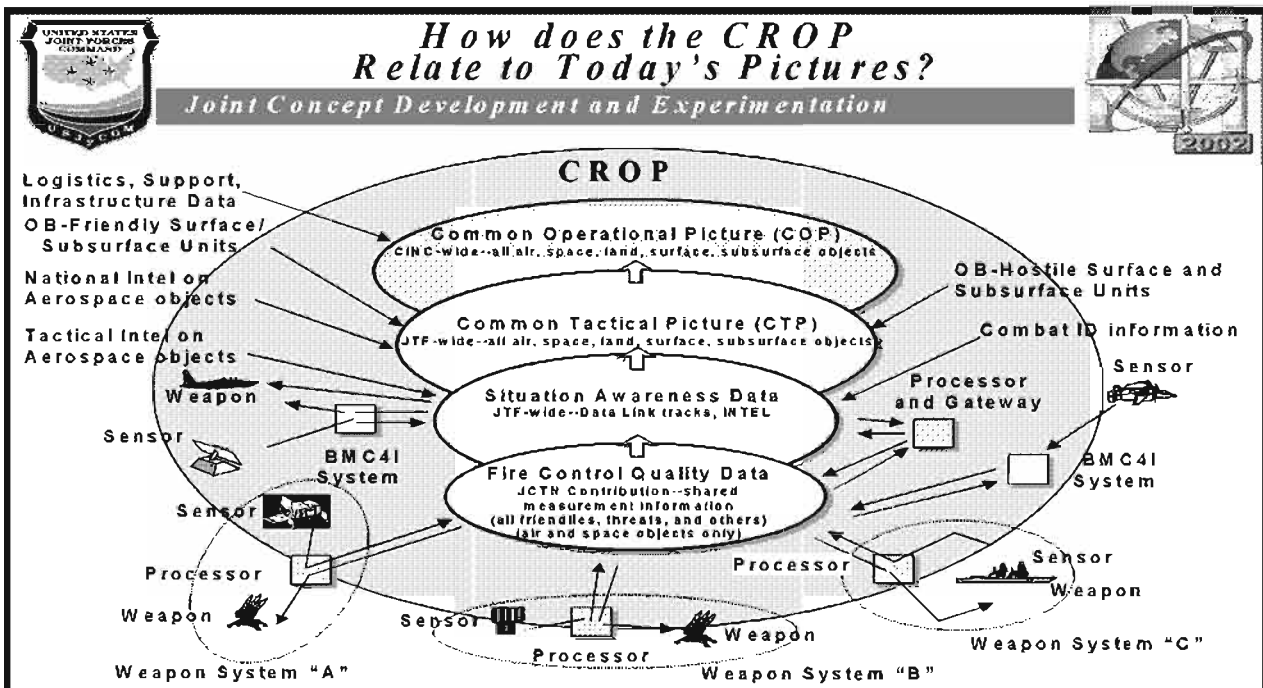


Diagram 3: CROP relationship

indicated that the information displayed was the latest contained in the MIDB. An example of these views is shown. In this view, various opposition units can be seen to the west, east and south of the friendly forces near JTF objective 2 (See Figure 221).

A major problem with the information contained in this view, and with the use of the COP during the experiment, was the timeliness and accuracy of the enemy position updates. New information on opposition forces had to be processed, fused, and entered into the MIDB by someone before the display was updated.

This was not always done and responsibility for this process was never clear. Intelligence personnel were reportedly trained to perform this function in accordance with the MIDB replication concept of operations prior to the experiment. It is not clear why they were unable to do this.

The non-contiguous, non-linear battlespace no longer clearly distributes the responsibility for unit updates as a function of component areas of responsibility (AOR), the way it was done in the past on the linear battlefield. Since no one "owns" the battlespace except the JTF, how are tactical level reports of enemy activity placed into the picture in a timely and coherent way? Surveys indicated the timeliness of the COP display was acceptable (See Figure 222), but their written comments

indicated that the update process was too slow.

The level of detail on opponent forces available in the COP was regarded as acceptable by participants at the operational level as shown in survey results (See Figure 223). Many participants also indicated that they expected a COP view that was more useful at the tactical

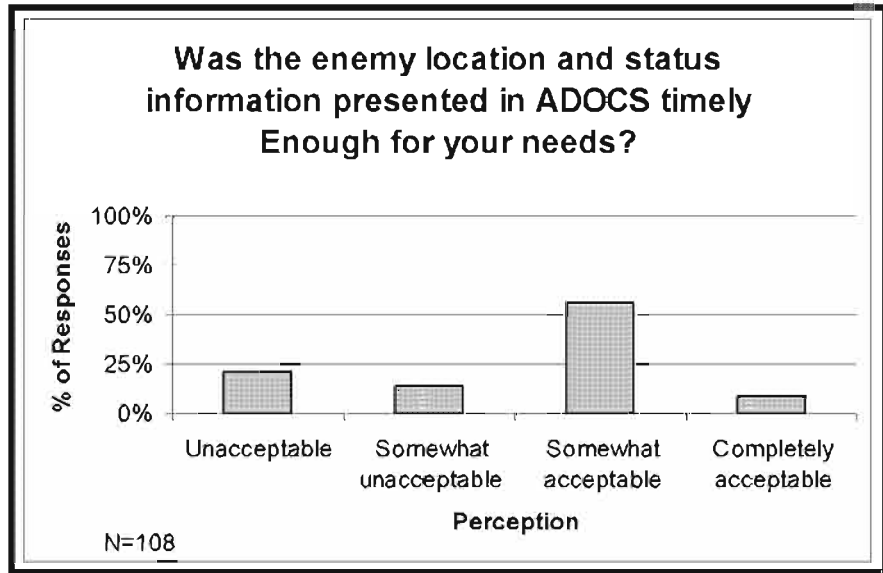


Figure 222: Enemy location/status timeliness in ADOCS

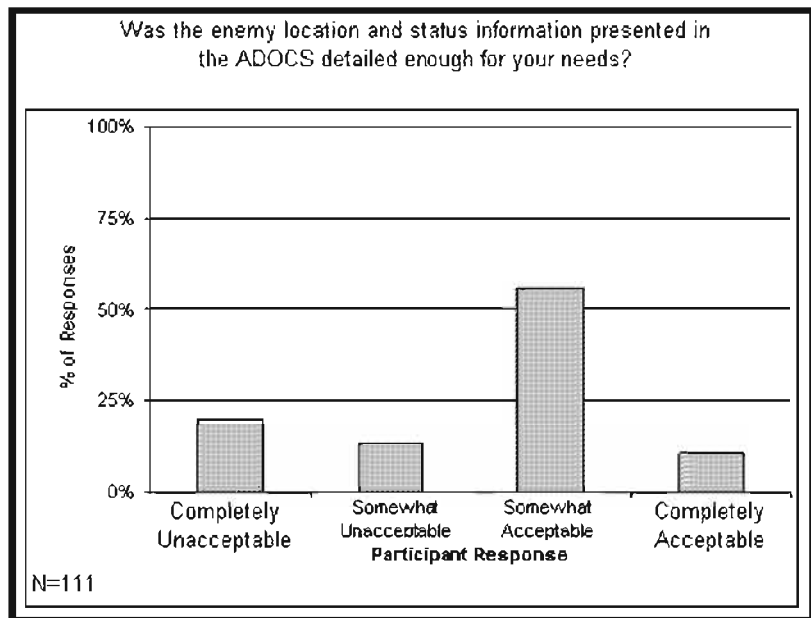


Figure 223: Enemy location/status detail in ADOCS



level. In particular, the responsiveness of both the update procedures and the system itself appeared to be too slow for use in command and control of forces at the tactical level.

Opponent track information (naval surface/subsurface and air) was displayed on the COP in a timely and accurate manner for operational-level situational awareness. Participants also said that these displays were adequate for situational awareness at the operational level. However, as with the ground unit data, the picture was not accurate or timely enough for those making decisions at the tactical level.

Spot-checking of track data indicated that it was updating on a regular basis. Using the DCARS tool, data was collected from both simulations, including ground truth, and GCCS data files used by the participants. Snap shots were compared. The result indicated that for both OPFOR air and sea

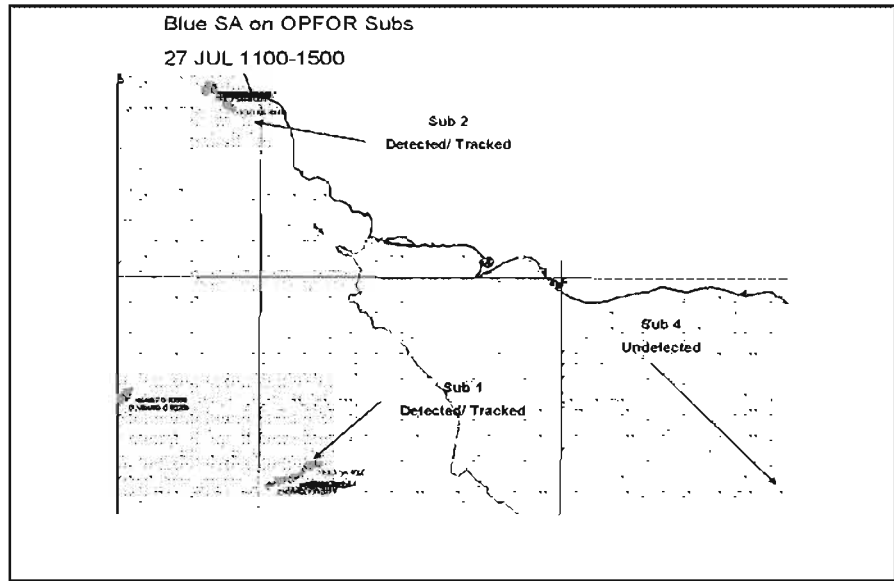


Figure 224: OPFOR submarine tracks in GCCS

tracks, there was sufficient information available to maintain situational awareness for making operational-level decisions.

For example, OPFOR submarines were regarded by both the JFMCC and the JTF commander to be operational level threats. Blue forces hunted these vessels before fighting began and subsequently tracked them down and destroyed them as a high priority. The DCARS graph at figure 224 depicts ground truth simulation tracks and the COP data available on the subs at all levels for situational awareness and decision-making.

Components were able to generate their own friendly picture of units and tracks, pass that

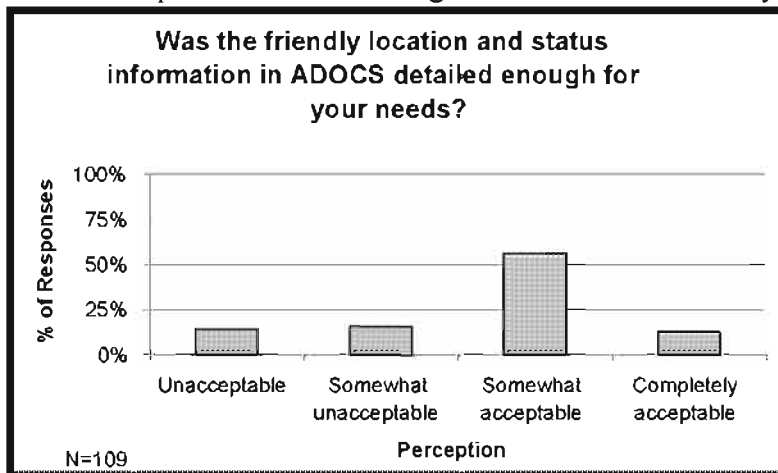


Figure 225: ADOCS information was only 'somewhat acceptable' with regard to level of detail

picture to the combat support team (CST) at the JTF and receive back the necessary data to build a timely and accurate friendly force picture at the operational level. However, again, the picture was not sufficiently timely for making tactical level decisions. Survey responses indicated that a majority of participants thought the friendly force information in the COP met their needs, at least minimally, for detail, timeliness, and accuracy as seen in the charts

(See Figures 226-228).

However, the survey responses also indicate that the Blue COP suffered from slow update rates hard to maintain tracks. Track information was sometimes incomplete or erroneous,

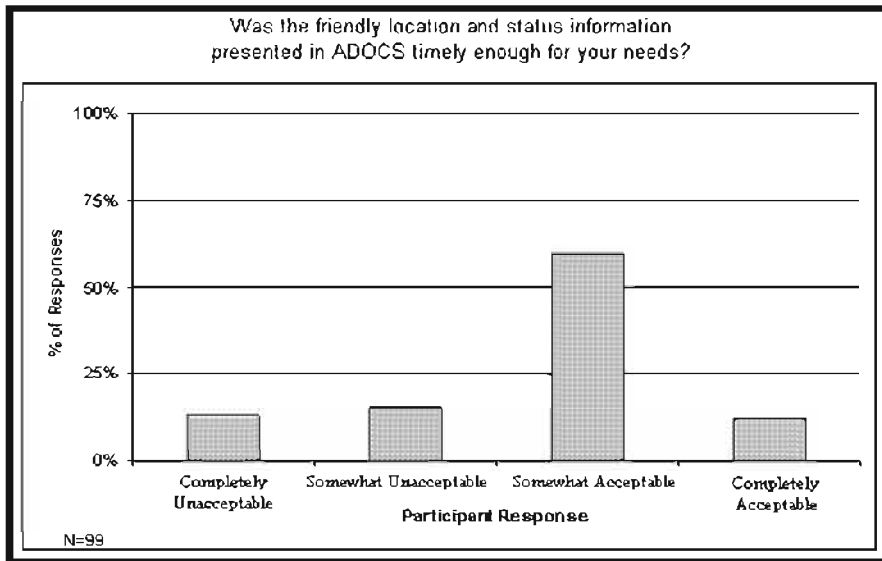


Figure 226: ADOCS information was only 'somewhat acceptable' with regards to its timeliness

such as duplicate tracks or ship tracks traveling at excessive speeds. However, the COP was useful for situational awareness at the operational level.

Numerous examples of the COP displays were collected such as the amphibious ready group situation map at figure 228, below. Participants, in some cases, and particularly at the JFLCC, fell back to the use of paper maps to track units or maintain

situational awareness on friendly or opposition force contacts of interest. Reasons for doing so included a perception of greater confidence in the information displayed.

There was also an apparent sense of frustration with the difficulty of maintaining the COP. The difficulty was partly due to a lack of adequately trained personnel, and the perception that available information, such as the anticipated results of overflights by UAVs, was not getting to the COP displays with accuracy and timeliness.

Again, DCARS was used to compare ground truth to GCCS data—the results were mixed. There were observable problems such as tracks not reporting in the COP or reporting as multiple tracks in the COP.

However, many of the problems appear to be attributable to a lack of operator training and experience.

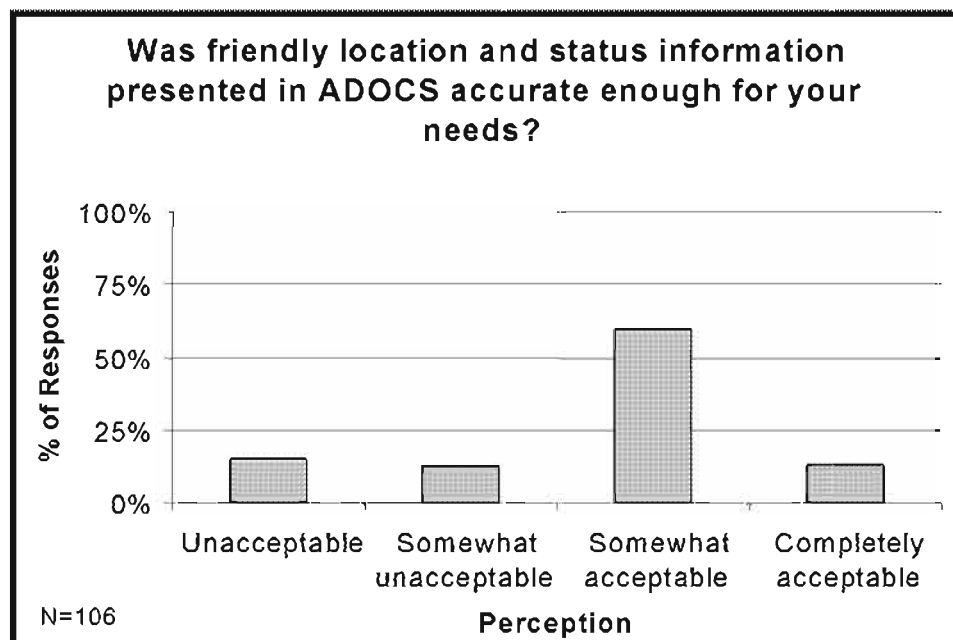


Figure 227: ADOCS displayed information was only 'somewhat acceptable' with regards to accuracy

Of all the XC<sup>4</sup>I tools used in the experiment, operators received the least training in the COP. Training classes were limited to “buttonology” familiarization and application training. There was no pre-experiment activity to provide appropriate track and unit feeds to GCCS to allow operators to practice their skills at manipulating COP filters in a dynamic environment. Only during the last day of Spiral 3 were there hands-on operational sessions in which units and tracks appeared in the COP in a coherent manner. These two practice vignettes lasted three hours each and incorporated only a minimal number of tracks and track activity.

Nevertheless, training issues aside, comparisons of GCCS tracks on the COP and ground truth indicated that for both air and sea tracks a majority of the tracks were reasonably accurate. In figure 229, the USS *Boxer*, USS *Comstock*, and USS *Duluth* are underway in the same relative formation in both the simulation and the GCCS track data. This indicates that an accurate and

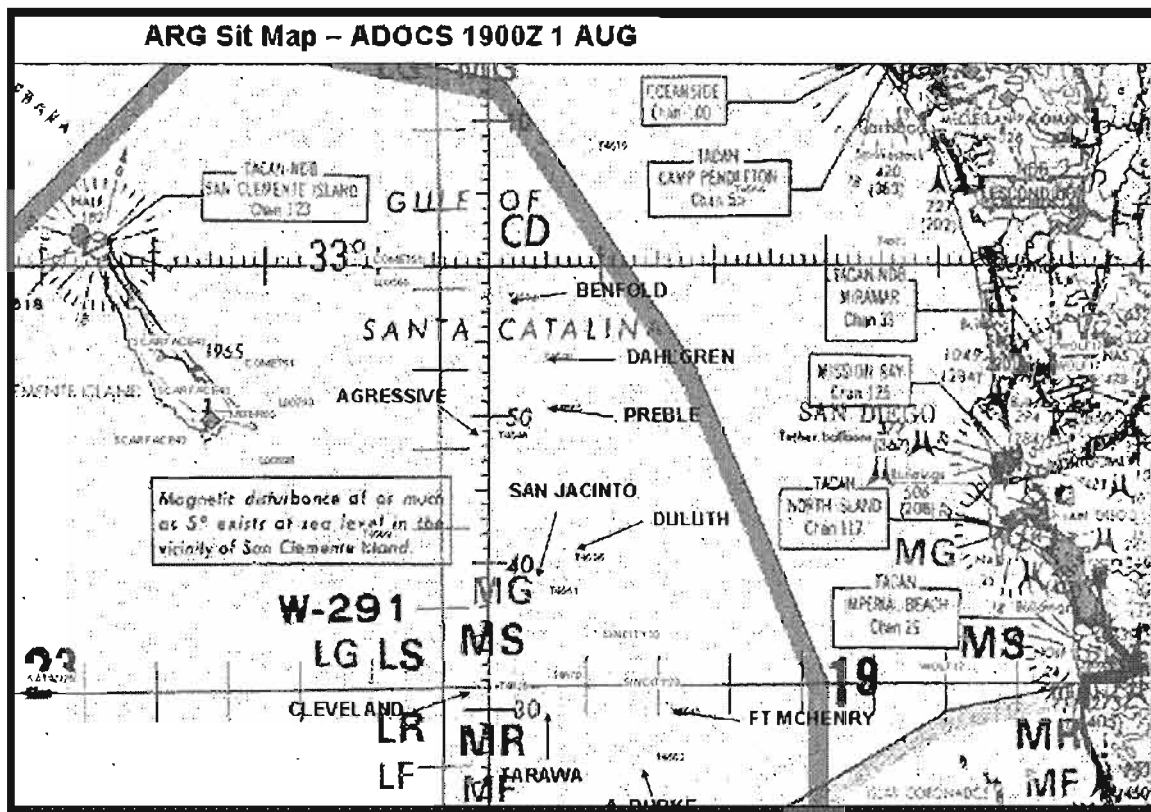


Figure 228: Naval forces chart displayed in ADOCS

timely picture of these ships was available to anyone who had the COP with filters properly set.

In figure 230, GCCS and simulation tracks for both rotary and fixed-wing aircraft participating in the action against JTF objective 2 on C+6 are displayed. This view also shows that most of the simulation tracks were in the GCCS database and therefore were potentially visible with acceptable accuracy to everyone who had access to the COP and had properly adjusted their filters.

In an effort to determine the quality of the picture that was potentially available in GCCS, an analysis was conducted, comparing friendly naval surface tracks with ground truth from the simulations. Locations of ships were determined for the same period (1500Z – 1700Z) every other day beginning C+2. The study concluded that, on average, 75 to 85 percent of the tracks were displayed accurately and reflected the current ship locations for every track in the force.

Specifically, and as can be seen in table 33 on the next page, not all ships in the simulation appeared in the COP. On any given day, some ships appeared in the COP without appearing in the simulation during the sampling period. There was also a subset of those ships appearing in both the simulation and the COP, during the daily sampling period. While there is substantial variability from day-to-day, about 78 percent of the unique ships are simultaneously present in both databases some time during the period.

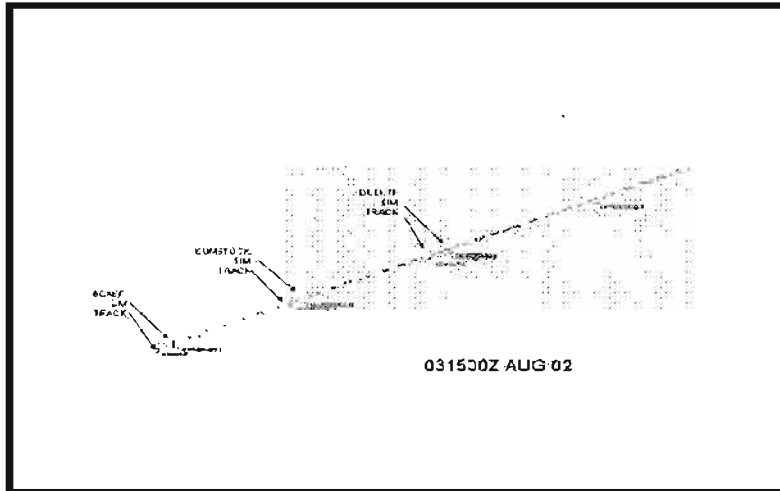


Figure 229: Ground truth and simulation locations were relatively accurate as displayed here.

As shown in table 33, it was found that an average of 86 percent of those ships present in both databases could be considered correlated for operational level situational awareness purposes. If we take the ships in the simulation database as ground truth, then the percentage of COP tracks, that are correlated, averages 75 percent.

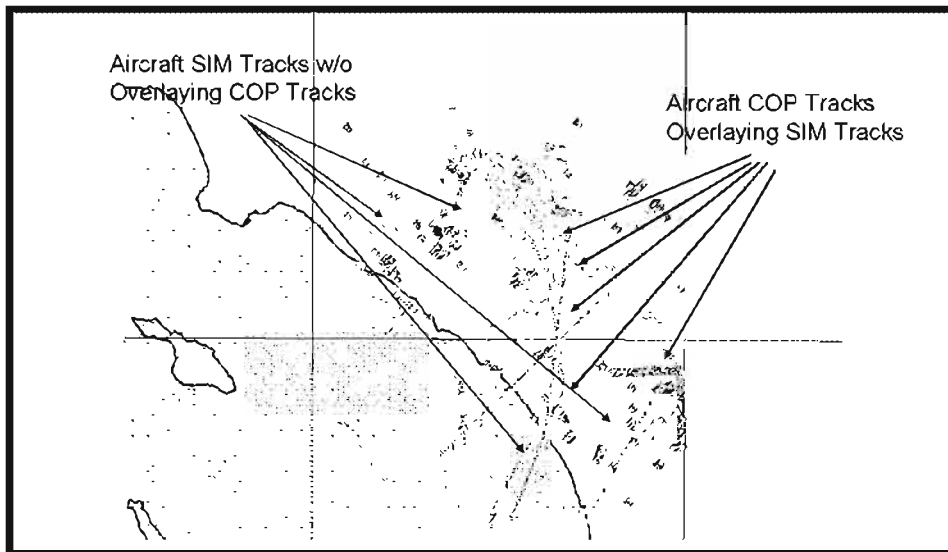


Figure 230: JFLCC attack on objective two showing both ground truth and the GCCS display

awareness, planning and decision-making at the operational level (combatant commander, CJTF,

present in both databases some time during the period.

For determining the quality of the COP, an analysis of the correlation of the simulation and COP tracks was conducted. To be considered correlated the two tracks had to be within one-tenth of a degree of both latitude and longitude or about six miles apart during at least two, ten-minute periods of the two hours of sample data.

This evaluation period was centered on 1530Z and 1630Z whenever the data allowed.

As shown in table 33, it

A more detailed and extensive analysis might adjust these figures somewhat. However, the 25 percent difference between the COP display and ground truth is probably the reason why the operators expressed concern with the quality of the COP. It must be noted that this level of track accuracy is likely acceptable for situational

JFMCC), but is not acceptable for use at the tactical level. However, for some operational assets such as JISR, greater capability is necessary to coordinate day-to-day activities.

**Finding 3► The JTF was able to maintain command and control of on-going operations using the collaborative tools.**

Maintaining command and control in the MC02 CIE was determined to be successful and effective. There was a consensus among participants, SMEs, and senior observers that the situational awareness and common understanding resulting from the C2 sessions in the virtual joint operations center (JOC) in IWS were acceptable.

Face-to-face, synchronous collaboration is the ideal form of collaboration. Virtual collaboration appears to be the next best substitute when face-to-face collaboration is not feasible. However, there remains a perceived need for improved collaboration tools and

Table 33: Comparing data between the SIM and COP databases

| DATE    | Ships in SIM database | Ships in COP database | Total of unique ships in both databases | Ships present in both databases simultaneously | Ships in both databases that are correlated | Percentage of ships in both databases that are correlated | Percentage of ships in ground truth database that are correlated |
|---------|-----------------------|-----------------------|-----------------------------------------|------------------------------------------------|---------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------|
| C+2     | 38                    | 43                    | 43                                      | 38                                             | 31                                          | 82%                                                       | 82%                                                              |
| C+4     | 41                    | 34                    | 44                                      | 31                                             | 27                                          | 87%                                                       | 66%                                                              |
| C+6     | 35                    | 32                    | 40                                      | 27                                             | 25                                          | 93%                                                       | 71%                                                              |
| C+8     | 31                    | 30                    | 32                                      | 29                                             | 27                                          | 93%                                                       | 87%                                                              |
| C+10    | 30                    | 29                    | 31                                      | 28                                             | 27                                          | 96%                                                       | 90%                                                              |
| C+12    | 19                    | 26                    | 29                                      | 15                                             | 15                                          | 100%                                                      | 79%                                                              |
| C+14    | 29                    | 26                    | 30                                      | 25                                             | 19                                          | 76%                                                       | 66%                                                              |
| Average | 32                    | 31                    | 36                                      | 28                                             | 24                                          | 86%                                                       | 75%                                                              |

processes for use by the joint force. Virtual collaboration during MC02 never appeared to reach its full potential. Some observations indicated that virtual collaboration appeared to increase the time required to do certain tasks. Some participants reported that virtual collaboration was harder for them to execute than traditional methods and was not effective for all types of activities. It was noted that virtual teams could not sense nonverbal cues from other participants in a collaborative session. Such problems, however, did not appear to degrade the usefulness of the collaborative tool in executing command and control of the joint force.

**Finding 4► To enable operational and tactical-level situational awareness, COP unit icons must be linked to status information such as posture, activity, and readiness.**

A linkage between a track displayed on the COP and databases that contain current, accurate information on that track (unit or platform) is needed to provide adequate situational awareness. Such linkages were put forward for use as part of the COP during MC02 planning, but were not available to incorporate into the system. Participant survey comments indicated that they needed more, current information for planning and decision-making. Because the necessary

information was not always available in COP linkages, they turned to the CROP (SPPS) and made inquiries within the information portal. Failing that, the operators went directly to other staff participants via synchronous or asynchronous means to get the information they needed.

The most sought after information was related to combat readiness. Such information could be automated and presented to the viewer in the form of drop down windows displayed whenever the user clicked on a COP icon. Information available on the MC02 COP included platform identification, course, speed, and altitude. Other items needed could include time on station, anticipated time remaining on station, current weapons and ammunition status, fuel status. For units, the information available might include unit authorized strength, current strength, ammunition status, fuel status, time since last rest or maintenance period, or current engagement status.

This use of the COP also highlights the apparent convergence in joint force operations between the operational and tactical levels of war. During MC02, the JTF generated and executed plans in which relatively small units, normally regarded as tactical units, were used with speed and precision to create effects that were intended to have an impact at the operational and even strategic level. This was particularly true of ground actions aimed at seizing or neutralizing weapons of mass effect in the battlespace. Planning and execution of these actions at the joint level required more detailed planning than what would normally be expected for JTF operational level planning and execution. As operational level actions move toward a model based on speed and precision, the level of detail, accuracy, and timeliness required in the COP increases.

This requirement was also reflected in participant comments to the COP survey. Participants needed tactical level detail for planning and executing MC02 activities. While it must be noted that the context of the experiment, small-scale contingency in a high threat environment, drove the planning and execution in this direction, the trend running from previous military actions to MC02 is clear. Despite the much discussed potential that the availability of detailed information systems will enable the higher headquarters to jump echelons in the chain-of-command, there is increased evidence that the precision and speed inherent in future joint operations will require a widely disseminated tactical COP with appropriately improved levels of detail, accuracy, and timeliness to be fully successful.

**Finding 5► The collective bandwidth requirement for a JTF using C<sup>4</sup>I tools similar to the XC<sup>4</sup>I tools used in the MC02 experiment is approximately 15 Mb/s with a sustained surge capacity to 25 Mb/s. This order of bandwidth usage is much greater than that which has been available to JTFs to date.**

Data for this analysis was based on XC<sup>4</sup>I application bandwidth usage over the Soft Permanent Virtual Connections (SPVC) that linked the major participant locations (See Table 35). Because SPVC usage could not be collected by application this analysis is limited to the total reported usage.

The MC02 experiment used five major command centers each with one or more server hosts for each of the XC<sup>4</sup>I applications. Permanent virtual path (PVP) circuits provided WAN connections between them.

WAN connections, for command and control systems between the components and the JTF headquarters, were accomplished by 13 SPVC subdivisions of PVP links. A SPVC may travel through more than one PVP to complete the assigned route as depicted in figure 231. A SPVC was not used to connect the JFMCC aboard the *Coronado*. Instead, an eight Mb/s Ku

Band VSAT link from Navy’s Fleet Training Center – Pacific, in San Diego, California (FTCPAC) was used instead. Since the SPVC’s to FTCPAC contained both M&S and C2 traffic, the VSAT link report was used. Unfortunately, only two days of data had been received for this analysis. The level of usage for the two days was so similar that the two-day average was used on all other days in the period D-2 to D+12 in order to account for the traffic to and from the JFMCC.

Each SPVC had a capacity in mega bits per second assigned. The automated enforcement of the capacity was varied. In the case of MC02, exceeding the capacity for short periods was allowed.

Some design decisions were made early on in the planning process in order to help conserve bandwidth and to enable degraded operations (contingency mode) in the event of link failures. The location of servers, pre-positioning of data and means of updating were part of the early design choices. Some of the asynchronous bandwidth requirements and link reliability requirements were unclear.

Early in the building of the WAN, measures were taken to help conserve bandwidth and to support contingencies. The considerations and measures taken were similar to what would be encountered in the real world, addressing trade-offs associated with deployed configurations when it comes to data integrity, reliability, and synchronization. The JTF had three SPVC to component locations and the KU Band VSAT link to the JFMCC.

Table 34: Command level participants

| Command                      | Number of Participants |
|------------------------------|------------------------|
| JTF, IA, combatant commander | 427                    |
| JFACC                        | 235                    |
| JFLCC                        | 313                    |
| JFMCC                        | 298                    |
| JSOTF                        | 73                     |
| Total                        | 1346                   |

Table 35: SPVC identifiers and associated bandwidth

| Identifier | Assigned SPVC | Bandwidth (Mb/s) |
|------------|---------------|------------------|
| 0-169      | JFACC         | 6.000            |
| 0-259      | JFLCC         | 20.000           |
| 0-261      | JSOTF         | 4.000            |
| Ku Band    | JFMCC         | 8.000            |

Table 36: Four secondary PVC linked mainly to the JFLCC

| Identifier | Assigned SPVC  | Bandwidth (Mb/s) |
|------------|----------------|------------------|
| 0-168      | JTF to Langley | 3.000            |

|       |                  |        |
|-------|------------------|--------|
| 0-262 | Langley to JFLCC | 1.000  |
| 0-269 | JFLCC to ARFOR   | 20.000 |
| 0-270 | JFLCC to JSOTF   | 1.000  |

Table 37: The remaining SPVCs were as follows:

| Identifier | Assigned SPVC      | Bandwidth (Mb/s) |
|------------|--------------------|------------------|
| 0-260      | JTF to ARFOR       | 20.000           |
| 0-179      | Langley to JFACC   | 1.000            |
| 0-263      | Langley to ARFOR   | 1.000            |
| 0-279      | Ft. Irwin to ARFOR | 8.000            |
| 0-280      | Ft. Irwin to JFLCC | 3.000            |

A synchronous bandwidth requirement (intel video distribution) was presented after the network had been designed and put in place. The synchronous bandwidth demand would have been 64 Mbit/Sec (worst case) as defined by the intelligence requirement. Significant steps were

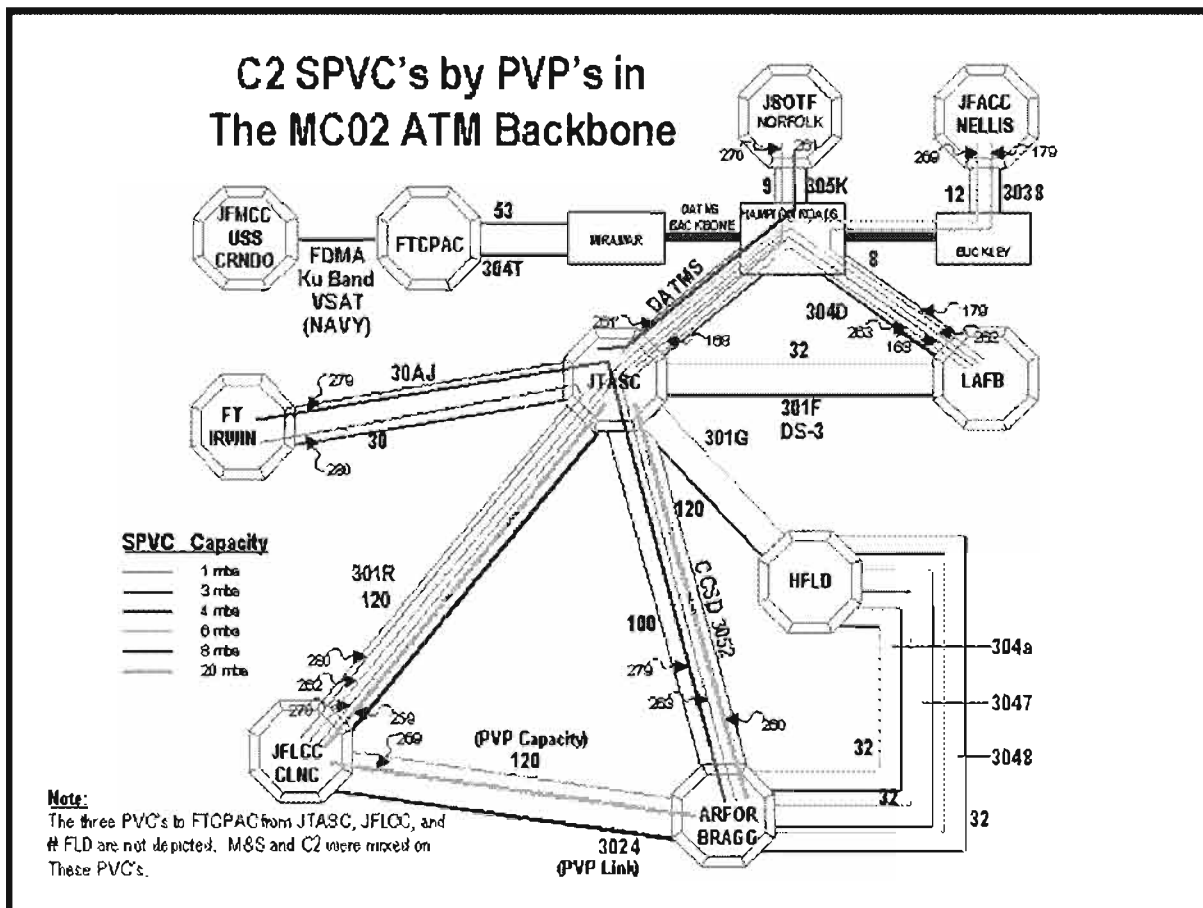


Figure 231: MC02 permanent virtual pathways (PVPs) with soft permanent virtual connections (SPVCs) supporting command and control applications



taken in order to keep video data from overwhelming the network. The video distribution system essentially cut back on the frame rate, dropping from 4Mb/sec to 256 Kbit/sec per source. Seven SPVC's were dedicated to this streaming video traffic. Since the traffic and resolution of the products on these PVC's was not realistic, the statistics for these PVC's were not collected.

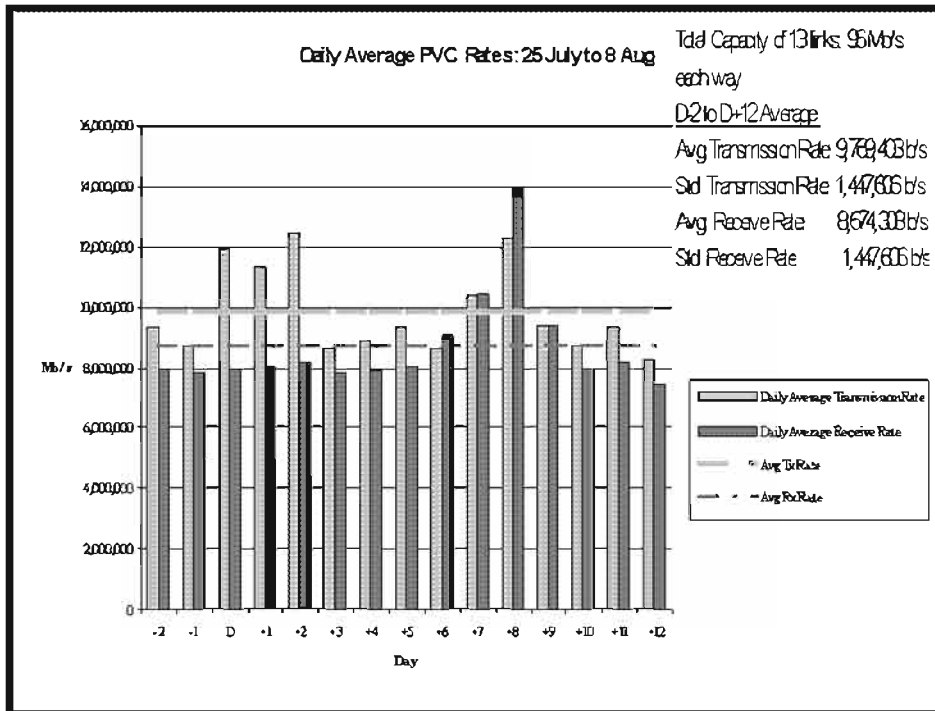


Figure 232: average bandwidth usage (transmit & receive) for each hour over the entire experiment (14 days)

Data collection was accomplished by the Spectrum Network Management application. Spectrum Network Management is a network management software program developed by a commercial firm, Aprisma. Spectrum was configured with the ATM Circuit Manager, providing accurate recording of ATM related statistics. For the experiment both receive and transmit throughput were recorded per PVC.

Polling intervals were generally set to one poll every 30 seconds, recording every poll. The actual statistics were derived from standard calculations of PVC throughput provided by the ATM Circuit Manager application. Approximately 15,000 observations of transmission and receive rates per SPVC were collected.

For each SPVC a table of the average and maximum transmission and receive rates for each day was computed. A table adding all the SPVC's together was then produced. For each SPVC, two tables were calculated, one each for transmission and receive, showing the average rate for each hour for each day D-2 through D+12 and overall. From these, daily totals were calculated (See Figure 232).

The overall average transmission rate was 9.8 Mb/s. The average receive rate was 8.7 Mb/s. Figure 233 shows the overall averages by hour. This reveals that when the JTF was actively operating as a full staff, they were using 15 Mb/s for transmission and 10 Mb/s receive. This would suggest having 15 Mb/s collective capacity. However, the usage, according to intensity of operations, has to be considered.

The total of daily averages shows that D+7 and D+8 were the days of the greatest overall usage (See Figure 234 and Figure 235, respectively).

A review of the combatant commander's Daily Update, on 3 and 4 August, show these two days were some of the most intense, being the climax of combat operations, and the period in which the "main effort shifted to the JFMCC at 1300Z". The usage observed on these two

days should be held as representative of the bandwidth requirements of a JTF, using the C4I envisioned for the year 2007. Usage begins to build mid-day on D+7 and peaks at the 20 Mb/s range in the 0700 to 0900 hours on D+8.

Taken as a whole, the above data indicates that a JTF, using an XC<sup>4</sup>I-like system in a

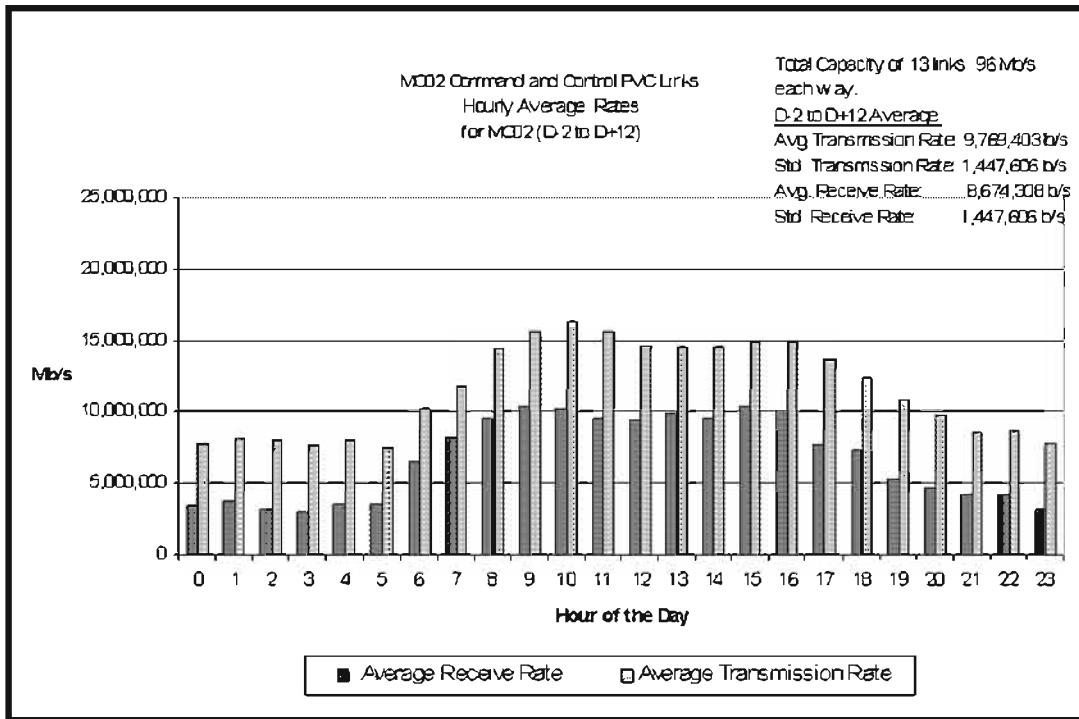


Figure 233: Average Bandwidth Usage (Transmit & Receive) For Each Day (14 Days)

CIE, will require a continuous bandwidth capacity of 15 Mb/s and a surge capacity of 25 Mb/s over a sustained (6+ hour) period. This bandwidth requirement is larger than traditional bandwidth. The XC<sup>4</sup>I-like system bandwidth requirements were derived in an unconstrained environment. In actual operating environments, constraints will exist. In order to retain the full CIE capability, C<sup>4</sup>I system bandwidth requirements can be no larger than available bandwidth given the constraints of real world operations.

Users and systems internal to the CIE must take advantage of bandwidth compression opportunities. These opportunities may reside in process changes, application of business rules or adoption of new technologies.

**Finding 6** Interoperability problems prevented effective

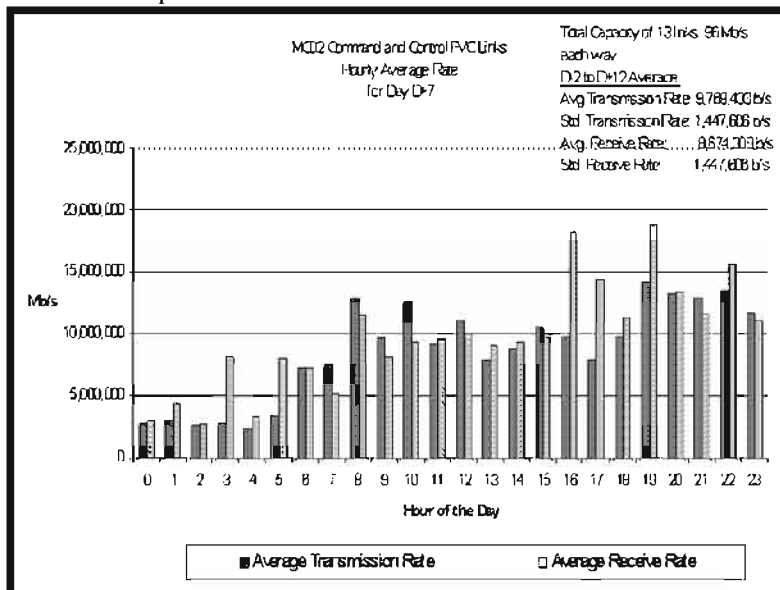


Figure 234: average bandwidth usage (transmit & receive) for each hour for day d+7

**COP database management.**

The JFCOM Joint C<sup>4</sup>ISR Battle Center (JBC) addressed technical problems with the COP as part of an assessment they conducted. JBC performed a follow-on assessment to a 1999 Joint Intelligence Interoperability Board (JIIB) Systems Baseline Assessment (JSBA) in which they examined the progress made to date in improving systems interoperability, including the systems that provided the MC02 COP. The JBC found that the JIIB systems (GCCS-M, GCCS-A, TBMCS, GCCS-I3) were technically able to share a stable and dynamic COP between the JTF and component headquarters. They noted however, that there are still problems with database exchange and database replication

that remain to be resolved, particularly between the Army's All-Source Analysis System (ASAS) and other systems in the COP. The JBC report noted that while interoperability enhancements allowed the ARFOR to have a near real-time COP, the maintenance of enemy ground order of battle at the joint level was still cumbersome. In particular, they noted the continuing requirement for manual injections of data as a requirement to properly maintain the picture.

The JBC report further said that, GCCS-I3, GCCS-M, and TBMCS all shared the same basic database during MC02. This allowed the JTF to confederate database maintenance. The result allowed key components to maintain and update a portion of the shared database for others to use. JBC regarded this as a major improvement in interoperability with the potential for the JFACC to maintain the air order of battle for the entire force using TBMCS and for the JFMCC to maintain the naval order of battle through GCCS-M. The Army's ASAS system, however, could modify data automatically only within its own Oracle-based all source correlated database and, therefore, needed to send data updates manually by USMTF messages to the rest of the joint force via GCCS-A.

Survey respondents also noted that the amount and level of training received on the COP was less than that received on the other portions of the CIE and was inadequate in their view. As discussed earlier, COP training was mainly focused on "buttonology" and applications. There were very few pre-experiment opportunities to work with the COP and perform the tasks required to maintain the databases needed to keep the COP picture up-to-date and accurate. There appeared to be a lot of on going "cross pollination" type training between individuals on the COP during the experiment. This activity was helpful for many, but survey comments indicate that many participants never were able to acquire the necessary skills to adequately configure or shape their own COP to meet their needs.

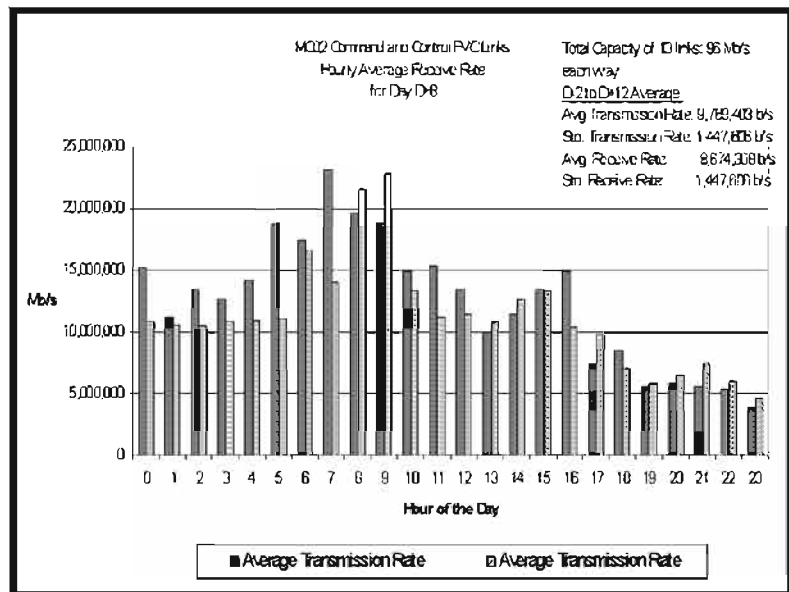


Figure 235: Average Bandwidth Usage (Transmit & Receive) For Each Hour for Day D+8

**Finding 7► Systems maintenance and the operational battle rhythm have to be closely integrated to maximize system performance at critical points in the battle.**

Two post event workshops were held on the subjects of knowledge management and collaboration. Knowledge managers from the SJFHQ, the JTF, the components, and several JTF and component staff principals attended. The workshops noted that application restarts for IWS, SPPS, and GCCS/ADOCS were often a surprise to the JTF staff and frequently occurred at the worst possible times. During the course of the experiment, there was improvement when recurring maintenance actions began to follow a routine schedule. However, specific operations requiring exceptions to the routine remained a problem. For purposes of analysis, the maintenance issues with SPPS were examined in detail.

For example, a request was made by the JFMCC on 29 July to reschedule maintenance that evening in order to support the arrival of the JTF commander on the *Coronado*. Although the JFMCC KM received a positive response, the adjustment did not happen and the performance of SPPS was degraded. In addition, that same night, special operations against WME required maximum availability of systems, again scheduled maintenance could not be coordinated, and system availability was degraded.

The JFMCC KMO raised the maintenance scheduling issue at the 30 July daily KMO meeting. The time of the back up was supposed to be 2200 (PST). Instead, with only 30 minutes warning it was advanced to approximately 30 minutes before the JTF commander's arrival. The JFMCC KMO indicated that the JFMCC alternate procedures required at least two hours warning with four hours lead-time being best. The JSOTF KMO echoed the same complaint saying that the four hours of down time (the JSOTF experienced) right in the middle of the previous night's operations was unsatisfactory. This discussion occurred in the KM collaboration room using both text chat and audio.

KMOs also observed system degradation in conjunction with peak periods of document publication to SPPS. This observation was made regularly at the deadline times for posting new ETOs and FRAGOs. Altogether, there were three ETOs and 52 associated FRAGOs. The FRAGOs consisted of one document. The three ETOs contained 47, 52, and 53 documents, respectively. System administrators on seeing the performance loss and not understanding the cause would restart the SPPS application. In several cases, work was lost. Listed below is a summary review of performance and availability issues submitted by the SPPS system administrator.

Table 38: Maintenance Activities Impacting on SPPS Availability and Performance

|                       |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Application restarts: | Unplanned maintenance: | Before caching was turned on the SPPS server would become unresponsive. The condition was corrected when the IIS Web server service was stopped and restarted. The administrators observed the IIS was waiting for something to happen. All four processors would slow down to one percent or less activity for an extended period. On a few occasions, the administrators waited 20 or 30 minutes and the Web server would "come back" and resume normal operation. The restart was the appropriate protocol for this condition as a restart could be completed faster than the 20-30 minute wait. Microsoft prescribed turning on the cache utility to avoid this problem. |
|-----------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                   |                            |                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   |                            | After caching was turned on, the SPPS server would become unresponsive in a different way. The users would see a Microsoft IIS Server-side error instead of a decline in the Dashboard performance. To get the server to respond, the administrator had to recycle (stop/restart) the Microsoft Exchange Web Store |
|                                   | Routine service recycling: | At night, after the Share Point Exchange Online defragmentation routine ran, the administrators would receive an hourly error message indicating the Share point Exchange Web Store was fragmented. If that particular series of hourly error messages was seen in the morning, the Web store was recycled.        |
| Server reboot                     |                            | A couple times after recycling the web store the service did not restart. The server had to be rebooted                                                                                                                                                                                                            |
| Temporary Performance Degradation |                            | Performance was degraded noticeably when coordinators modified a dashboard while users were trying to view the dashboard. Users viewing the Logistics CROP while coordinators worked (changing web parts) on the logistics CROP complained of slow response time.                                                  |

MC02 was originally designed for a 12-hour experiment day, but operators altered the regime to a 24-hour day (although limitations were placed on operations in the later half of the workday). Technically, however, the experiment was still on a 12-hour clock and the twice-daily interruptions to SPPS availability (bracketing the 12-hour experiment day) previously planned were not addressed. Since no adjustments were taken for this change in workday regime, the routine maintenance had a significant impact that had to be planned around. The XC<sup>4</sup>I desk recorded these and the unplanned events in a journal. The journal entries recorded 15 non-routine losses of SPPS availability.

The overall result was that normal issues of systems availability and serviceability negatively affected the experiment. Scheduled and unscheduled maintenance requirements imposed synchronization and surge management challenges on the CIE. These challenges would have to be addressed through either technology improvements or changes to processes and procedures that would reduce the impact of scheduled and unscheduled systems down time.

**Finding 8► The Joint Enroute Mission Planning and Rehearsal System- Near Term (JEMPRS-NT) was effective in enabling the JTF commander and his staff to collaborate while traveling between command posts.**

The JTF commander was able to accomplish all planned tasks, while airborne and enroute to the theater. He used the JEMPRS-NT to enable mission planning via use of IWS while enroute to NAS North Island, CA, and the USS *Coronado*. He and his staff traveled together aboard a special operations low level (SOLL-II) C-17 aircraft.

While in transit, the CJTF and staff used 13 workstations loaded with CIE tools for conducting two joint coordination board (JCB) virtual meetings and to maintain continuous situational awareness. The JTF commander personally used JEMPRS-NT to participate in two collaborative sessions. The first virtual meeting was on C+5 during the transit to California. The second meeting was on C+8, on their return flight. The CJTF participated in the JCB virtual meetings with the JTF main headquarters and interagency community in attendance. For these

meetings, they used the main IWS conference center, auditorium room 101, which was the normal virtual meeting location for the JCB.

The time required for completing the session during the first JCB virtual session was 85 minutes, beginning at 1730 (EST) and ending at 1855 (EST). During this session, audio and video problems were experienced during the latter part of the event. Communications with the CJTF were lost for five minutes between 1829 and 1834, during which the deputy CJTF ordered a pause. During this session, briefing charts displayed in IWS could not be seen by many of the JCB participants probably due to bandwidth limitations. Very detailed ADOCS screen-capture slides were slow to load. At 1847, the audio with the aircraft was lost. The IWS collaboration session was observed to have “locked up” at 1853. The session was finally terminated at 1855 after it was determined that most of the work required was accomplished.

The second JCB meeting was 94 minutes in length. The session started at 1730 and ended at 1904. A pause occurred to allow time to restore the communications with the aircraft around 1830. Communications were restored and the session ended at 1904.

Most of the warfighters responded positively to survey inquiries regarding the effectiveness of the JEMPRS-NT for use in joint enroute planning. Those surveyed about the ability to use JEMPRS-NT to perform required staff tasks and activities responded with 17 percent endorsing it as excellent, 44 percent as good, and 22 percent as adequate. One drawback, noted by these users, was the communications data transfer rate. Thirty-seven percent indicated the data rate as partially adequate, 17 percent rated it as adequate, 28 percent as good and only five percent said it was excellent.

**Other Observations**

**Observation 1: The anticipated value of the portal for sharing information and situational awareness was not fully realized because of shortfalls in KM expertise, distribution of KM responsibilities, tool skills, application standardization, establishment of KM billets, and KIMP development.**

In the CIE concept, the CROP is both a repository of information and an access point to the global information grid (GIG). The GIG was unavailable to the MC02 experiment, but in lieu of the GIG, a substantial amount of information was created or, where possible, assembled to provide the JTF with the data and the information required for planning and execution. This limited repository was the defacto “virtual warehouse” of information for the experiment. The evaluation approach was to determine if users could subscribe to needed information, search the system for needed information, publish information products, and make others aware of

Table 39: Warfighters Choice for Most Useful Information Tool

| IWS   | E-Mail | CROP  | Other | COP  | Telephone |
|-------|--------|-------|-------|------|-----------|
| 42.8% | 24.4%  | 13.8% | 9.1%  | 6.3% | 3.8%      |

availability of information using the XC<sup>4</sup>I information management and distribution system (the portal). Users were able to subscribe, search, and publish, but not as effectively, as was desired. The portal did not supplant e-mail, the traditional asynchronous collaboration method.

Survey results (see table 39) showed that participants found the portal to be a distant third to the experimental collaboration tool IWS and to E-Mail in providing the most useful information. The results from 321 respondents to the question, “In your billet which of the tools listed provided you with the most useful information” show the collaboration tool IWS was

considered the most valuable information tool with nearly 43 percent of the votes and e-mail was ranked second by just over 24 percent of the respondents.

Analysis of the application logs also showed that significantly fewer participants used the portal on a daily basis than either the collaboration tool or e-mail. The average number of participants using a tool at least once a day is shown below in table 40.

Figure 236 illustrates the daily usage for each of the tools, Microsoft SharePoint Portal Server (SPPS), the CROP, IWS collaboration tool, and e-mail:

The CROP was established by fielding the surrogate technology, the web portal, in the

Table 40: The average daily number of users 26 July through 8 August 2002

| Tool        | Average Users/day | Average Deviation | Standard Deviation |
|-------------|-------------------|-------------------|--------------------|
| E-Mail      | 720               | 31                | 26                 |
| IWS         | 618               | 35                | 46                 |
| SPPS (CROP) | 467               | 30                | 29                 |

form of the SPPS, and by developing and implementing applicable sections in the KIMP. The web portal provided the functionality that supported the creation and synchronous sharing of information. The KIMP provided the policies and procedures for establishing and using the CROP. The concept of operations in the KIMP placed knowledge management responsibilities for many KM tasks on individual members of the JTF and component staffs. Together, the portal and the KIMP had important implications.

As seen above, SPPS is a web portal that implements Microsoft Digital Dashboard technology and is described as a dashboard site. Figure 237 is an example of an SPPS web portal page. As a dashboard site, it contains a number of page links, or dashboards, and includes customizable pages and custom web part forms. The dashboard site distributes information to workspace users through a web browser. It provides a web-type view of the workspace and enables users to search for, view, and manage documents in the workspace as well as to search for and view content from other sources. Users can find a variety of information on the dashboard site, including group or enterprise news, announcements, links to other sites, personalized notifications regarding changes to documents, and more. The digital dashboard technology makes it relatively easy for the coordinators and users to add and

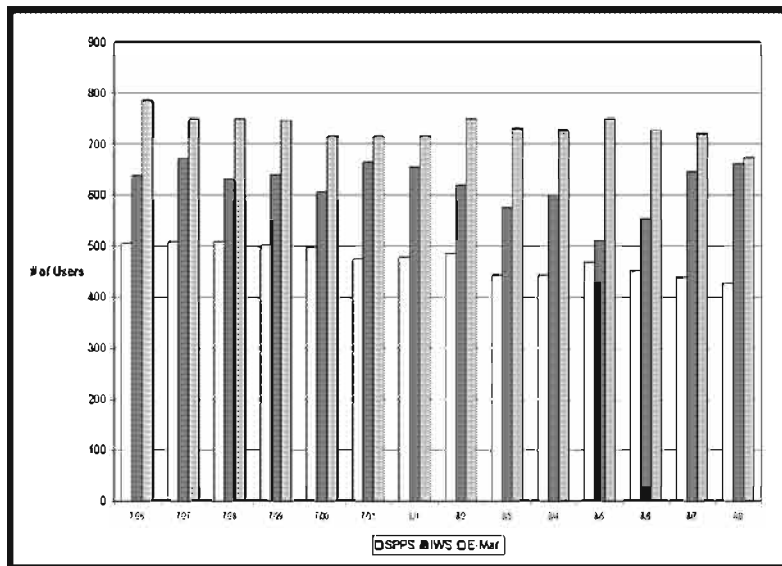


Figure 236: E-mail was the tool of choice for MC02 participants, but experimental networking tools such as the InfoWorkSpace and the Shared Point Portal Server were afforded a tryout.

other sites, personalized notifications regarding changes to documents, and more. The digital dashboard technology makes it relatively easy for the coordinators and users to add and

customize the web parts that make up the visible content of the dashboards and thereby more effectively bring users the information they need.

These features also allow for the distribution of portal building and management responsibilities. The KIMP implemented and supported this distribution of responsibilities and the knowledge managers supervised the configuration of the portal interfaces, accordingly.

Activation of the MC02 portal began before activation of the JTF. In accordance with the SJFHQ concept, the SJFHQ staff populated the portal with information and built the required dashboards. This was done without access to the real-world GIG and was a first of its kind

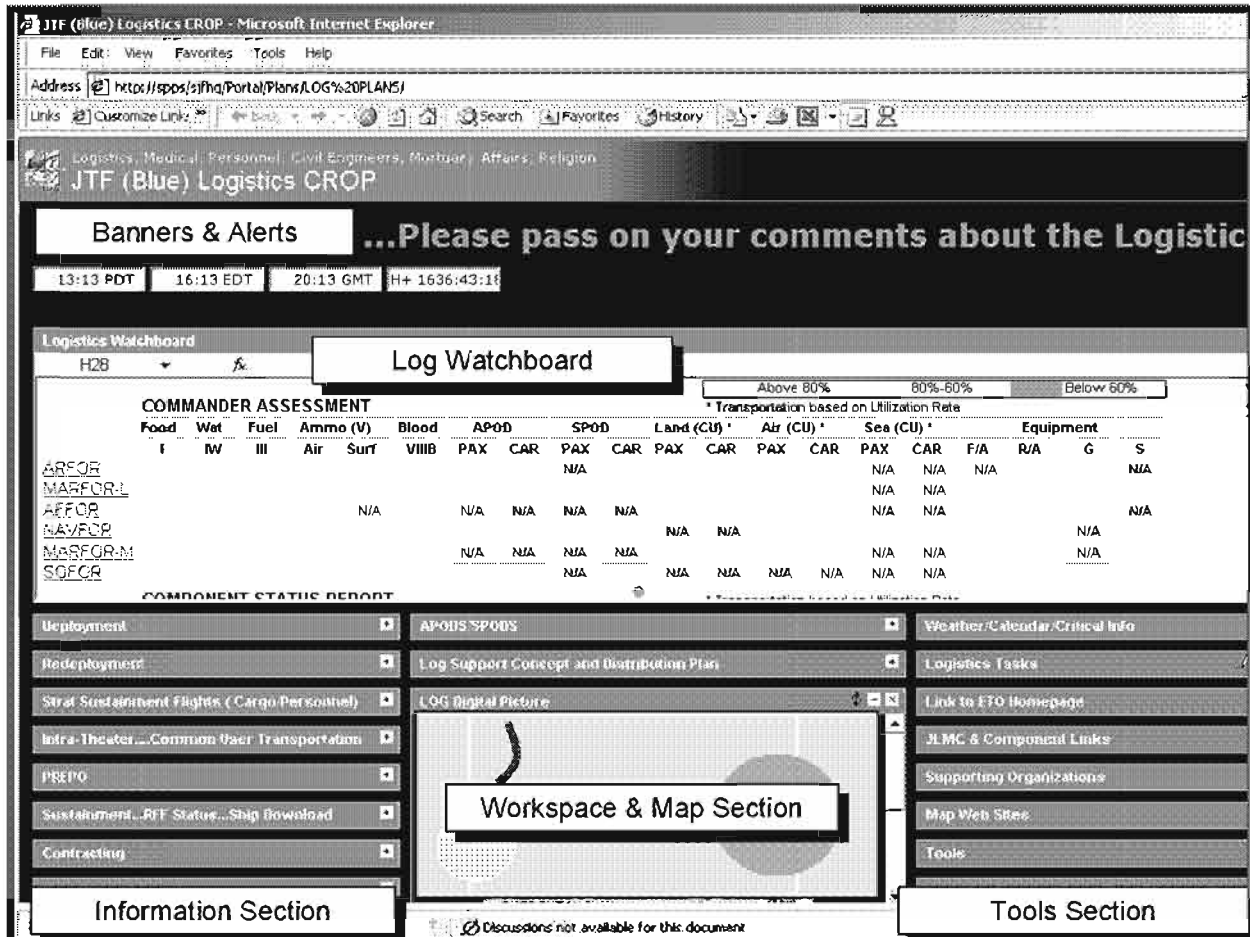


Figure 237: Web Portal Page – Logistics

endeavor. The JTF was activated at the start of Spiral 3 (3-14 June 2002). The building of the portal continued during and after Spiral 3. The knowledge demands of the commanders and their staffs occurred at such a volume and frequency that, to be effective, the CROP applications had to operate at maximum availability. Additionally, the application functions had to achieve exactly what was required, and the participants had to comply proficiently with the KM tasks and practices as defined in the KIMP. Participants also had to apply practiced IT tool skills in order to get the job done. This did not happen to the required degree.

With notable exceptions, the participants did not follow the processes and procedures in the KIMP nor did most participants have the high KM and/or IT skills needed to perform their functions in accordance with the KIMP. Furthermore, the experimental portal application encountered periods of both availability and performance degradation. For those using the



CROP, MC02 was actually a high-pressure exercise and not an experiment. As a result of these problems and the resulting pressures the participants tended to fall back on what they were comfortable and confident with, that is, reliable and familiar e-mail.

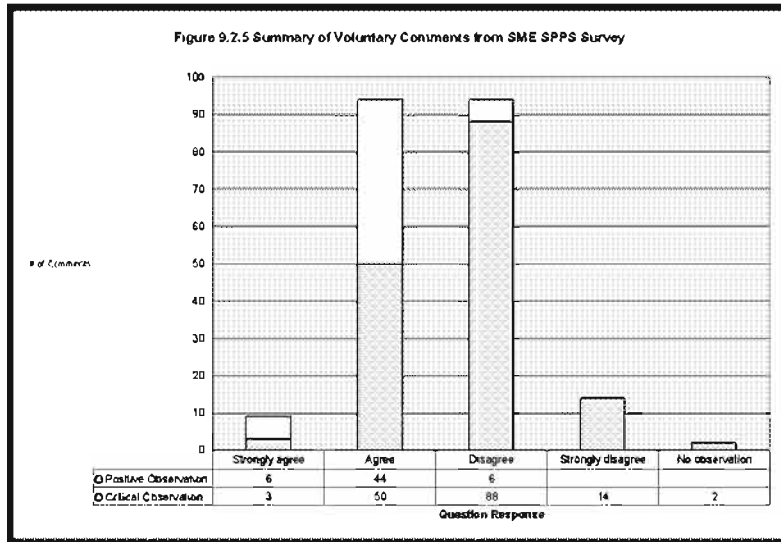


Figure 238: Surveys/comments on SPPS elicited 103 positive and 108 negative responses. Eighty-three of the positive responses contained negative comments in the response narrative

key to the distribution of information. The total number of participant messages was 175,569. Twenty-three percent or 41,240 of all e-mail messages are estimated to have carried attachments. These messages varied in number of addresses from one to over 1,000. Messages with attachments functioned as a means for distribution or publication of documents. The pre-experiment expectation was that these tasks would be accomplished via publication on the portal.

Voluntary comments (See Figure 238) explain the users' preference for e-mail. The comments noted that SPPS information was often too difficult to access or locate due to the large volumes of information present on the server, apparently a form of information overload. In addition, comments indicated there was too little time for conducting searches and, that they could find information easier via IWS or e-mail. Additionally, experiment participants indicated that they did not have enough experience working with the portal. They said that documents were often moved or replicated in the course of updating, that credibility of the information was uncertain, that documents developed using the collaboration tool (IWS) were belatedly or sometimes never posted in the CROP, and that information needed for their jobs was not always available. A third of the comments from those in strong agreement on the positive impact of the portal qualified their endorsements by pointing out a fault.

The comments and recommendations application on the portal was examined and all submissions containing the words portal, SPPS, or CROP were reviewed for observations directly addressing the portal (See Figure 239). Eighty-seven comments submitted during the MC02 event were found. For each submission, the drafter had to select an indicator for the observation as favorable, somewhat favorable, neutral, somewhat unfavorable, or unfavorable. The voluntary nature of making such a submission indicates extra motivation on the part of the submitter. Overall, the critical comments outnumber the positive comments two to one. Two-thirds of the comments labeled neutral were also found to be critical when reviewed. Ten of the

Experiment data indicates that participant e-mail usage jumped to 10,000 messages per day on the second day of the experiment and never dropped below that level until 7 August when participant attendance and the pace of information sharing activity started dropping off significantly. A baseline of e-mail usage for a similar sized JTF operation without a portal would provide an interesting comparison, but a record of such usage has not been located.

E-mail was the primary IWS adjunct information-sharing tool. E-mail carried the bulk of notifications, searches, and was a

16 favorable and somewhat favorable comments addressed the Logistics CROP (dashboard). A thorough examination of the MC02 portal showed this dashboard to be the most developed. An informal poll of the logistics staff showed a high degree of satisfaction with this dashboard. Analysis of the portal logs showed this dashboard and its included web parts to be the fifth most used content group. Logistics documents were a close sixth and combined the logistics pages were the most visited content group in the CROP. The implication—a well-developed portal/web page had a positive impact, whereas a poorly developed page did not.

While the CROP as used in the experiment had many shortcomings, it was not rejected as a failure. Eliminating the shortfalls found in KM expertise, distribution of KM responsibilities, tool skills training for every day users, application standardization, establishment of KM billets, and KIMP development may improve the acceptance and usefulness of the CROP and reduce the observed reliance on e-mail.

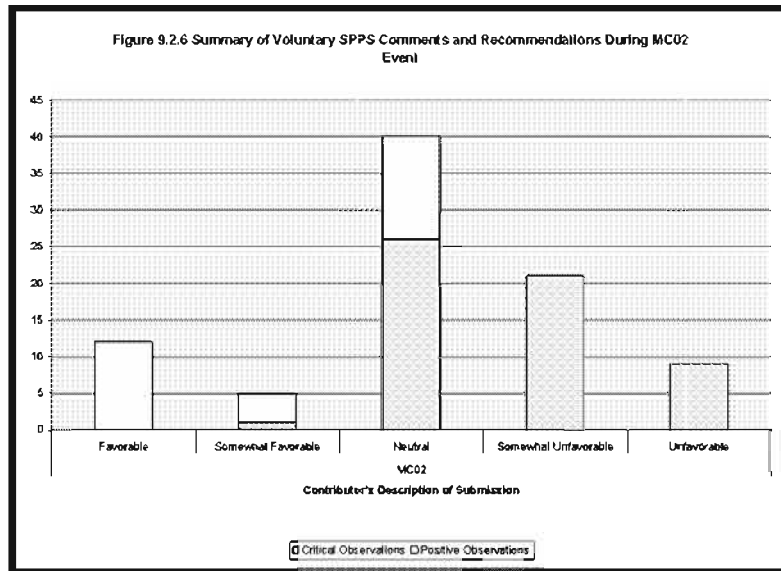


Figure 239: Eighty-seven voluntary comments on SPPS were 2:1 critical of the tool. Only the Logistics page got strong reviews

**Observation 2: Vertical collaboration between the JTF and components was easier to perform than horizontal collaboration between components.**

Two distinct types of collaboration emerged during the experiment—vertical collaboration and horizontal collaboration. Differences in users’ satisfaction between vertical and horizontal collaboration in the CIE were noted. The JTF staff provided a more positive endorsement of the collaboration process than did the components. The components’ lower endorsement of IWS as a useful tool was because of difficulties encountered during horizontal collaboration between the staffs.

Collaboration was operationally defined in MC02 as activity involving two or more team members working together to solve a common problem. It generally resulted in a shared situation interpretation or course of action and a final product that was an improvement over its original, pre-collaboration session form. This collaboration definition is based on definitions in the book, *Understanding Information Age Warfare*, by Dave Alberts, John Garstka, Richard Hayes, & David Signori (2001) of the DoD Command and Control Research Program (CCRP). Another, more precise, definition of collaboration is needed for the future and should be phrased in terms better understood by the layman and aimed at the warfighter.

Collaboration among members of the joint force consisted of using appropriate electronic and physical communication and information sharing tools in standardized military planning and mission execution processes, such as during crisis action planning, within the CIE. For virtual collaboration, the CIE was a robust and interactive technical architecture, offering 100 percent connectivity between forces (especially among distributed sites). It was implemented and scaled to the needs of the users.

Vertical collaboration occurs when information is exchanged between two or more organizations at different echelons such as between the CJTF and the JFLCC. Horizontal collaboration occurs when knowledge and information is shared among co-equal participants within a single organization or between teams, such as between the JTF boards, cells and centers and from different organizations. The relationship between vertical and horizontal collaboration processes used by the joint force commander and the JTF are illustrated in figure 240 below.

Post-experiment collaboration workshop discussions on vertical and horizontal collaboration revealed reports of insufficient time for components to do all activities required of them. The requirement for components to collaborate among themselves, that is, horizontally, needs to be explored.

Participant responses indicated that the primary reason for collaboration being difficult to execute was insufficient time being available to perform all the required tasks. In particular, the horizontal collaboration required between components to synchronization their actions as part of EBO, were an additional burden that stressed their resources.

It was also noted that when operations and crisis action planning occur simultaneously, the collaborative system must be capable of supporting both horizontal and vertical activities at the same time. Key staff may be required to provide critical inputs to both crisis action planning and mission execution. Attendance of these individuals at both types of collaboration sessions may be essential to mission success. The collaboration system makes this possible if the individuals in question have the ability to deal with simultaneous attendance in multiple sessions. During the experiment, certain individuals were observed, who appeared to be able to attend such multiple sessions successfully.

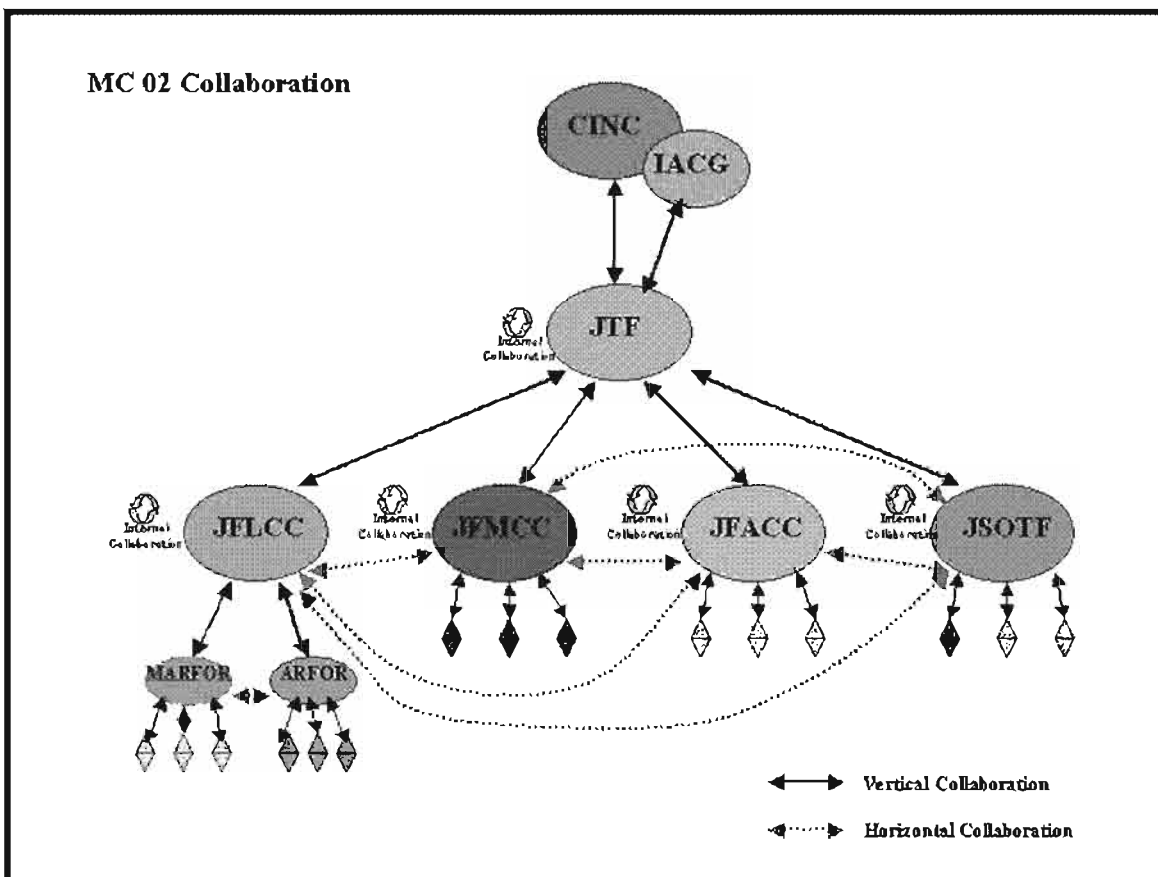


Figure 240: Vertical and Horizontal Collaboration as done during MC02

In future experiments, participants should have a longer planning cycle. The planning time available during MC02, particularly during Spiral 3 when a significant amount of collaboration was required, was too short. The lack of time affected the participant's perception of the usefulness of the collaborative system. When operations and planning are occurring at the same time, participants needed to strike a balance between vertical and horizontal collaboration duties. Vertical collaboration is usually a one way, top to bottom (leader to subordinate) effort, while horizontal collaboration was less structured, but more complex and required more time. There was also a tendency to want to have the same key people continuously participating in many on-going sessions.

MC02 participants were asked to rate both the effectiveness of the collaborative tool and the concept behind it. The message from 90 to 95 percent of the IWS users was that collaborative tools were effective. More important, this effectiveness supports the horizontal and vertical coordination efforts necessary to synchronize the joint actions on the battlefield.

Some issues were identified in after-action reviews that addressed differences and difficulties experienced by the MC02 participants in collaboration performance between the JTF and components.

JTF interface with components. The components were slower starting their collaborative activities and often changed principal points of contact. This created collaboration problems and slowed the JTF's ability to get needed feedback for situational awareness. Most observed collaboration was vertical with information passing from the JTF to components unless the components were requesting information. The collaboration rooms were used by the components, but a more direct interface as part of activities, such as effects assessment, would probably have improved situational awareness for all.

Battle rhythm, in the face of manpower shortages, needs to be realistic. Discussion comments during post-MC02 collaboration workshops indicated that participants were worn out from performing 24-hour operations. The experiment was not intended to be conducted on a round-the-clock operations cycle, however, that was what occurred. This change had an impact on the experiment and the experimental results. For example, system maintenance time was planned for slack periods to keep the collaboration tool working properly, but on some days, there was no slack time. Many of the components' night shifts were not manned adequately for 24-hour operations. Mission creep was also noted. There was a tendency to continuously do more with less.

Senior leader participation. In the JFACC, the commander personally spent over 10 hours a day in collaboration sessions, which was not his command style. He indicated there was no time to "walk the terrain" or get a sense of the operation. Commanders need some time out of the collaborative environment for deep thinking.

Collaboration improved as the experiment progressed as participants became more familiar with the process and therefore asked fewer "how-to" questions, and learned out how to find and disseminate the information they needed on the portals without having to ask for it.

**Observation 3: MC02 training had a positive impact on the collaboration performance of the JTF and component staffs. The amount and type of training received impacted the participants' ability to collaborate.**

Training on collaboration systems and tools had an impact on the performance of the JTF at the start of the experiment. The MC02 mobile team training that was provided to participants during May-June 2002 was effective. The training investment paid off during execution with the incidence of fewer training related calls for help on collaborative tools.

The digital rules of engagement were developed with the intention of facilitating collaboration and of documenting meeting transactions and decisions. The rules were briefed and explained prior to MC02 execution, however, it appears that many of the MC02 participants ignored these rules and supporting procedures. The JTF and KMO leadership made no significant effort to enforce the rules. Problems encountered with collaboration and use of the COP and portal could have been reduced if the rules had been followed more closely.

Approximately four to five days of intense hands-on activity in the collaborative environment were needed by the MC02 participants to fully understand and master the collaborative tool set in the CIE. Observations indicate that on about C+4 of execution, participants began to reach a steady state of performance, knowing what to do, how to use the right application, understanding how to perform their jobs in a collaborative environment, and understanding the strengths and limitations of the CIE architecture.

Part of the value that collaboration added to the experiment was how it enhanced the new concepts being tested. For example, while the steps used in the coordination process for IS, C2, ONA, EBO, or IAC, they all still shared such common features as gathering information, sharing information in a virtual setting, building products, problem solving and forming group consensus.

In his *Techniques and Strategies for Virtual Teams* publication, CPT Joshua Frank (March, 2000) outlined the successful steps for migration of the collaborative process. He theorized, "The successful migration of one's processes in a collaborative environment depends on several factors:

- Buttonology- Knowing how to use the collaborative tool
- Leadership-Competent leaders with a knowledge of collaborative technology are critical to long term success
- Virtual Team Development Training-Understanding how the processes we use on a daily basis are transformed in a virtual arena and how to maximize the benefits of the technology to support your end objectives
- Senior Management Buy-in-This is probably the most critical factor. You can plan, conduct exercises, and buy a server, but without direct support from senior management, collaborative technology will fail to be viewed or used as a key process in your organization" (Frank, March 2000, p. 8)

The accomplishment of the above four steps are critical. The training program conducted with the MC02 participants was excellent. However, more training on how to collaborate could have been done to make the MC02 participants ready and enabled to collaborate among themselves and others from the start.

**Observation 4: A clear, concise, actionable knowledge management concept is required in order to successfully operate in the CIE.**

The CIE MC02 CONOPS established an information/knowledge management organization to enable CIE. In the course of executing the KM tasks, the knowledge managers discovered the need for development of a concept to guide the execution of knowledge management. Paragraph one of the Millennium Challenge 2002 Joint Task Force Knowledge & Information Management Plan (KIMP), 15 July 2002, final coordination draft stated, "Knowledge management includes all processes involved in the creation, receipt, collection, control, dissemination, storage, retrieval, protection, and disposition of information. KM also

includes processes used to organize information and determine its applicability to a specific person, element, or larger process. In general, the goal of KM is to ensure the best information is available when needed to commanders and staffs as they execute command and control. In short, the right information needs to be available to the right person at the right time.”

The KIMP provided the CJTF and his staff with the necessary guidance to accumulate information, create knowledge, and disseminate a product throughout the JTF. The KIMP was a tool for warfighters to conduct JTF-wide KM. Each warfighter had a knowledge management responsibility. This plan specified how to conduct a unified KM effort. The KIMP mapped all processes to ensure that current, correct, complete, and germane information were available for command and control. The goal of the KIMP was to operationalize knowledge and information management in the JTF.

The MC02 KIMP established that the concept of operations for execution of KM was that the war fighters would conduct the KM and explained how they were to accomplish this function. The goal was to have the right information available, to the right person, at the right time.

The purpose was to satisfy the information needs of the commander and staff, so they can execute command and control. This purpose manifested itself in a continuous avalanche of “need” windows of short duration after which the issue passed. The avalanche of short duration needs created a premium on the readiness of the staff to conduct KM and use the tools and the data warehouse.

The MC02 participants were not generally ready to execute this concept. In the post experiment working groups it was noted, “The KIMP tried to empower the users with a SPPS and allow them to address their own information needs. JTF knowledge managers did not dictate how to do information storage, publishing, and retrieval.”

The trouble was the users were not uniformly able to use the tools and procedures, or had the skills and understanding of what knowledge management is all about. Preparation of a well-developed concept of knowledge management for each JTF ought to be completed early and used to guide the preparations for future experiments. Knowledge management theory progressed during the experiment and this body of experience should be referenced when developing new concepts. The MC02 KIMP should be available as a model for future JTFs.

**Observation 5: Data collection in the CIE was facilitated by the various internal system capabilities.**

During MC02, analysts used a variety of tools and techniques in the CIE to collect a breadth and depth of data that is not readily available when collecting data solely in the physical environment using traditional means. The CIE allowed MC02 data collectors to have a comprehensive knowledge of experiment/exercise battle spaces, battle rhythm and overall situational awareness regardless of physical location to include red and white cell events and activities; 24x7 access to all data/information posted within the CIE; and awareness of technical issues affecting experiment/exercise play. Use of the CIE also increased member interactions with fellow data collectors and other SMEs, such as JFCOM data analysts, red and white cell members, and computer systems and network support technicians.

These advantages are thought to have enhanced the overall quality, quantity, and validity of the MC02 data collection process. Although no data was gathered during MC02 to provide empirical support for this assertion, the paragraphs below discuss how the use of specific CIE tools enhanced team member interactions and improved MC02 data collection process.

Increased knowledge of the MC02 battlespace, battle rhythm, and situational awareness were gained using specific CIE tools and capabilities. During the experiment, data collectors adopted similar methods for posting and sharing data and used business processes similar to those being used by Blue cell team members. Specifically, these tools and capabilities provided access to all portal content, situational awareness, and battle rhythm postings at all military echelons and levels no matter where the data collector was physically located. This allowed for data comparisons and analysis not usually experienced in solely a physical environment. The tools also increased awareness of all (both physical and virtual) meetings being conducted at every military and interagency echelon and level, including detection of battle rhythm changes due to meeting postponements and cancellations.

These capabilities also allowed data collectors to “tag” specific documents, announcements, and other related portal content, so that an automated alert system would notify them when previously posted items had been modified or deleted. This allowed them to quickly identify changes and pending trends in situational awareness and battle rhythms. Data collectors were also able to gather data almost exclusively in an electronic format, making it easier for them to collect a more comprehensive data set (both text and graphics) in shorter periods. Much of the data derived from text applications within IWS and SPPS captured the players’ MC02 situational awareness and use of battle rhythms (e.g., IWS file cabinet documents, bulletin board notes, text chat, and question logs created in IWS auditoriums). Graphics capabilities provided by IWS whiteboard and ADOCS screen captures, and SPPS graphics such as PowerPoint slides, image displays, and IWS room snapshots. It also enhanced the effectiveness of the data collection process.

The CIE allowed data collectors to monitor multiple virtual meeting rooms at the same time, enabling them to “shift focus” to more active IWS rooms and cells when activities decreased or ceased in a given room. Multiple room monitoring also helped data collectors to gain a greater overall awareness of how well the player cells were working together as an organized group. It also allowed data collectors to conduct more comprehensive analysis of the data by allowing them to search announcements, web links, files, and other portal content posted on SPPS for all MC02 sites. Furthermore, it allowed data collectors to understand the progression of concept development using the SPPS documents versioning capability. As each new version was posted, data collectors had a greater awareness concerning where players were having difficulty working through the concepts, and gained insight into how well players understood the significance of specific experiment MSELs and events.

The CIE also significantly increased interaction among the data collectors and SMEs (internal staff) and interactions with the white cell team members (external staff). It allowed data collectors to fully use CIE tools and techniques to work together as a team regardless of the physical locations of individual team members. Specific examples of how CIE tools helped to foster effective team member activity are cited below:

Data collectors used a private IWS room to conduct meetings for all staff members regardless of physical location. This facilitated staff vertical and horizontal collaboration, reduced data analysis confusions, and improved coordination of team member activities before, during and after experiment/exercise execution. Documents, bulletin board notes, and text chat helped team members to maintain a heightened awareness of their own internal activities and events throughout the MC02 environment.

Data collectors had greater situational awareness by being able to contact white cell members to clarify data points, and to talk with technical support administrators (no matter

where they were physically located) to discuss experimental technical issues such as CJTF travel using the JEMPRS-NT, and his USS *Coronado* visit.

Data collectors had a more comprehensive understanding of data being presented in the IWS virtual rooms due to an increase in the number of data collectors able to attend each meeting (due to the distributed CIE). Most meetings had three or more data collectors in the room that could compare notes concerning the collected data.

More experienced data collectors were able to mentor novice data collectors located throughout the CIE to ensure the data collection process was being conducted properly. Novice data collectors contacted more experienced data collectors and managers to receive clarification concerning duties/task, and to ask questions concerning data being presented within the cells.

Data collectors created and populated their own internal SPPS portal page that allowed all data collectors (regardless of physical location) to view/download daily, intermediate, and final data analysis/reports. This portal page provided common data storage for all data collectors since no shared drive capability existed for users in the distributed virtual environment. This page was especially valuable post-MC02 for the continuation of data sharing and analysis amongst the team members at the distributed sites.

Data collectors were able to identify and report problem areas or “weak spots” in the data collection process earlier in the game by being able to access all information within the CIE. This increased oversight into the data collection process, allowed data collection managers to refocus team efforts quickly and address shortfalls effectively.

In addition to the impact on data collectors, use of CIE tools and technologies also elicited similar player behavior and responses in the areas of MC02 computer/network technical support and experiment/exercise control (white cell) personnel. For example, help desk technicians used IWS to monitor collaboration meetings for technical problems, decreasing technical response time, and improving technical coordination and troubleshooting across the distributed environment. MC02 change configuration requests, lessons learned, and trouble reports were posted to a SPPS portal page for internal team review. Team members set up Alert subscriptions to learn when updates occurred. MC02 white cell members monitored blue cell collaborative meetings, and searched file cabinets, bulletin boards, and SPPS portal pages to determine players’ response times (regardless of physical location) to specific MSEL events, ground truth interpretation, and other activities critical to effective experiment play. Using this information, white cell members adjusted experiment play to properly stress the MC02 concepts.

In summary, CIE played an extremely important role in the exchange of data at every level of the experiment among all staff players (data collectors, white and blue cell team members and technical support administrators). It allowed players access to a wider breadth and depth of knowledge than previously experienced working in a ‘non-virtual’ experiment/exercise environment. Consequently, CIE revealed itself as a “force multiplier” in many areas of MC02 administration.

## **Relationship to Other Objectives**

### **SJFHQ**

- The concept of the CIE is a basic component to the functioning of the SJFHQ concept. The capabilities that the CIE provides are prerequisites for the SJFHQ to perform the tasks of a JTF HQ with its limited number of personnel. Likewise, the SJFHQ personnel are a prerequisite for forming a JTF HQ from a service operational HQ because they will be the primary training cadre



to ensure the transition to the use of the CIE. The two concepts are tightly interlinked and require one another to be successful

#### ONA

- ONA will exist as a computer-based system. Access to it will be through the CIE or some similar method. The use of SPPS in MC02 indicated that the placement of ONA as a link in the CROP was practical

#### EBO

- The ability to be able to conduct EBO including planning, execution, and assessment tasks in an efficient manner is based on having a CIE-like capability available. The MC02 results show that the situational awareness and collaboration needed to conduct EBO are greatly enhanced by the use of the CROP and collaborative tool. Conducting EBO tasks without a CIE would appear to be exceptionally difficult

#### Sustainment

- The ability to share information, achieve shared awareness, and collaborate real-time both vertically and horizontally contributed to the JTF staff's ability to coordinate logistics issues during MC02. Use of the CROP/SPPS display for the logistics watchboard set a standard for the use of that capability throughout the JTF. Continued use of the CIE to support logistics planning and execution activities appears to be advantageous

#### Interagency

- Again, the capabilities of the CIE were fundamental to the execution of the interagency concept activities. To be a part of the planning, execution, and assessment processes of either the JTF or the combatant commander's HQ the interagency coordination group requires a CIE-like capability. While they could participate in meetings via videoconferences and teleconferences without a CIE, they would not have the ability to be active, continuous participants in collaboration and decision-making that they can be with the CIE

#### JISR

- As with the above areas, the CIE provides a means by which JISR planners and operators can readily synchronize their activities and thereby become more productive

### **Relationship to Baseline Analysis**

Baseline findings that are relevant to the CIE concept were extracted from the information management and command and control sections of the baseline, Annex B. These are listed below.

- In general, experimental observations compared favorably to baseline findings. A high profile difference between the baseline findings and the MC02 experiment results is that knowledge management emerges as an effective information dissemination capability

Table 41: Comparison of baseline findings and experiment observations

| Baseline Finding                                                                                                                    | Experiment Observation                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| IM is a critical element of successful JTF headquarters operations. That success depends on a well developed IMP and a capable IMO. | Knowledge management has been added as a critical element for successful JTF headquarters operations. Success appears to be related to a |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Baseline Finding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Experiment Observation                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The inverse is also indicated; JTF staffs struggle when the IMP and/or the IMO are weak or lacking.                                                                                                                                                                                                                                                                                                                                                                                              | well-developed KIMP and dependent upon skilled KMOs and the IM skills and initiative of individual JTF members.                                                                                                                                                                                                                                                                              |
| Having all commanders at a single meeting for back-briefs facilitated cross-component understanding of each other's plans, and identified cross-component coordination and interoperability issues.                                                                                                                                                                                                                                                                                              | Cross-component situational awareness was routinely achieved with commanders at distributed HQs using IWS, with the same result.                                                                                                                                                                                                                                                             |
| "The extraordinary success that the JTF experienced in handling, analyzing, and providing critical information to the commander can be attributed to four key factors: commonly understood IM processes, employment of a JTF Homepage, accessibility of the commander, and a manageable RFI process."                                                                                                                                                                                            | Of the four key factors, three of them were improved or expanded upon: the JTF homepage in the form of the SPPS portals, accessibility to the commander, and the RFI process. The contents and process described in the KIMP were not commonly well understood. The processes associated with the CIE appeared to have been commonly understood.                                             |
| The task of disseminating information is difficult even when all conditions are met. Rapid advances in, and unfamiliarity with, available technology often cause information to be misrouted or inaccessible, which may result in required actions not being taken. When using web-based technology for disseminating information, it is necessary to ensure that the data is not buried too deeply in the system.                                                                               | The task of disseminating information was not difficult during MC02. In general, technology did not cause information to become inaccessible; the opposite was true. In cases where it was inaccessible, it was due primarily to a lack of a discipline in storing information. It was still necessary to ensure data was not buried too deeply. The search functions did not overcome this. |
| JTF information managers had to constantly review, evaluate, and prioritize information on the web pages to ensure that information was current and not buried under layers of directories.                                                                                                                                                                                                                                                                                                      | No change. In addition, during this experiment the JTF KM organization was heavily burdened with maintaining the systems. This interfered with the ability to execute the planned KM processes. The JTF KM organizations were not resourced with standard tools to execute the review, evaluate, and prioritize processes.                                                                   |
| Web-based technology does not replace active command and control (C2).                                                                                                                                                                                                                                                                                                                                                                                                                           | No change with respect to Web-based technology. The collaboration system did effectively support and supplement command and control.                                                                                                                                                                                                                                                         |
| Access and security issues also hinder execution of a good IMP. In exercises and operations that include allies and coalition partners, problems often arise with gaining access to U.S. systems.                                                                                                                                                                                                                                                                                                | This problem was not encountered in the experiment because allies and coalition partners were not part of the experiment. There was no indication that this challenge would be overcome by adoption of the concepts.                                                                                                                                                                         |
| IW activities were accomplished in the J3Command and Control Warfare (C2W) cell. As course of action (COA) development progressed, the commander decided to form another organization to address IW. He had several options: 1) form a J3IW element as part of the operations Directorate; 2) create a Joint (J) (IW) Directorate on a par with the other "J" codes; 3) form functional component Joint Information Warfare Centers (JIWC); 4) create a Joint Information Warfare Center (JIWC). | The JTF experienced similar problems in developing and integrating information warfare operations. The CIE concept did not contribute to resolving them.                                                                                                                                                                                                                                     |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Baseline Finding                                                                                                                                                                                                                                                                                                          | Experiment Observation                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Boards, centers, cells, and agencies placed a heavy time demand on the JTF staff, in some cases becoming counterproductive.                                                                                                                                                                                               | No change. An additional, similar burden was placed on commanders who participated in many sessions.                       |
| The joint force had trouble in the use of video teleconferencing (VTC).                                                                                                                                                                                                                                                   | Minimal VTC usage. VTC requirements were replaced by collaboration tool.                                                   |
| The Air Force forces (AFFOR) liaison officer (LNO) to the joint force air component commander (JFACC) and the Joint Task Force (JTF) staff did not communicate during most of the exercise. This lack of communication led to a delay in JTF understanding of AFFOR actions, primarily in airlift and tanker constraints. | Use of the collaboration tool appeared to resolve many of these communications problems.                                   |
| There was confusion within the JTF staff as to what information should be communicated between staff sections.                                                                                                                                                                                                            | This confusion appeared to have been minimized by use of the collaboration tool.                                           |
| The JTF had success in handing off critical information to the JFC due to excellent information management (IM) processes, JTF homepage, JFC accessibility, and a manageable request for information (RFI) process.                                                                                                       | No change.                                                                                                                 |
| The JTF was successful in handling, analyzing, and providing information to the JFC and key JTF staff members.                                                                                                                                                                                                            | No change.                                                                                                                 |
| The JTF plans/operations were biased toward land operations.                                                                                                                                                                                                                                                              | No bias observed despite the CJTF being a nominally a land commander. Collaboration appeared to have reduced this problem. |
| The Army forces (ARFOR) and JFACC could not directly interface, as Service tactical decision support systems did not link across Service lines.                                                                                                                                                                           | ARFOR and JFACC had uninterrupted connectivity when required via the collaboration system.                                 |
| It was difficult to ensure that each organization was using the same version of a document. It was also often difficult to locate specific documents.                                                                                                                                                                     | No change. KM processes planned for the portal should have reduced this problem. They were not used on a regular basis.    |
| The joint force had trouble in disseminating information through use of web pages.                                                                                                                                                                                                                                        | This was minimized by the use of both the collaboration system and the portal.                                             |
| The joint force disseminated information without regard to the level of importance.                                                                                                                                                                                                                                       | This was minimized by the use of the collaboration system                                                                  |
| Collocation of the JTF headquarters and the JFACC proved to be an effective method of organizing the joint force.                                                                                                                                                                                                         | Collocation requirements were reduced by the persistent, distributed CIE.                                                  |
| The joint force had trouble in managing information.                                                                                                                                                                                                                                                                      | No change.                                                                                                                 |
| Having all commanders at a single meeting for back-briefs facilitated cross-component understanding of plans, identified cross-component coordination issues, and interoperability problems.                                                                                                                              | This was reinforced with the use of the collaborative tool.                                                                |
| The JTF had trouble with internal information                                                                                                                                                                                                                                                                             | No change. KM processes planned for the portal                                                                             |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Baseline Finding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Experiment Observation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| flow.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | should have reduced this problem. They were not used on a regular basis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Use and management of the homepage proved difficult for the JTF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | No change. KM processes planned for the portal should have reduced this problem. They were not used on a regular basis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Assessment completed by the JTF staff tended to be compartmented and was not updated to incorporate operational updates.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | This was minimized by the use of the collaboration system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| The JTF had trouble in formulating an assessment of the operational situation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | The exact opposite was true. The CIE facilitated situational awareness at all levels.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| The JTF had trouble in completing mission analysis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Mission analysis was facilitated by the use of the CIE and particularly horizontal collaboration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| The OPG planning effort lacked focus.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | This was not the case.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| The JTF staff spent a disproportionate amount of time on one COA during development/analysis of COAs. This COA was eventually selected as the best COA for the JTF.                                                                                                                                                                                                                                                                                                                                                                                                                                                | This was not the case.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| COA teams lacked the capability to develop COAs because they did not possess requisite expertise, e.g., there were not enough "specialists" in fires, information operations (IO), civil military operations, etc., to support three teams.                                                                                                                                                                                                                                                                                                                                                                        | This was minimized by the use of a collaborative tool.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Lack of coordination, and subsequent lack of visibility of the joint special operations task force (JSOTF), caused significant confusion on the joint force land component commander (JFLCC) and combatant command staffs.                                                                                                                                                                                                                                                                                                                                                                                         | The collaborative tool minimized this problem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| The JSOTF capabilities were not fully used by the JTF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | This was not the case.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| The JTF JOC had difficulty planning for requirements associated with integrating and synchronizing JTF operations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The collaborative tool minimized this problem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| The JOC had difficulty in maintaining SA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The exact opposite was true. The CIE facilitated SA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| The JFC guidance was not translated effectively into staff action.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The exact opposite was true.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Common C/JTF Standing Operating Procedure (SOP); Tactics, Techniques, and Procedures (TTP), and Collaborative Tools. It is imperative that an information management plan that clearly defines guidelines on how information is to be handled is essential. What can be called the "push/pull dilemma" has stifled many JTF. "Pushing" too much information overloads staff personnel and "information overload" makes it impossible for the staff to separate the important from the mundane. Posting information on homepages and expecting personnel to "pull" the information usually leads to information not | The KIMP and SJFHQ SOP for KM were intended to resolve the problems described here. There were measures in place to use the available hardware and software to push and pull information. They were only partially successful primarily due to not being used or adhered to as written. KMs were diverted from addressing this shortfall because they were forced by default to become deeply involved in the administration of both hardware and software systems. Keeping the experimental systems working on a continuous basis was not their intended purpose but it had to be done. The result was that the KMs did not have time to devote to the |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Baseline Finding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Experiment Observation                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>getting to the proper individuals because they do not know where to find it or that it even exists. Hardware, software, and processes that solve this problem must be identified. Additionally, the database tells us that the battle rhythm of the JTF must serve the process of delivering products and the information needs of higher and lower headquarters and the timing of product delivery to both. An information manager within every major division of the JTF staff is a requirement for efficient operations.</p> | <p>processes and procedures for moving information and knowledge.</p>                                                                                                                                                                                                                                           |
| <p>Common Operational Picture (COP). The COP is not used in the JTF staff very often. This is because commanders and staff at the JTF staff level do not use it to make decisions. Mention is made of inaccuracies in the COP being caused by lack of trained operators to keep it updated. The COP is obviously important, but at the JTF staff level, it has not been used for decision-making.</p>                                                                                                                              | <p>The COP was used extensively for operational level situational awareness. Participants indicated that it was insufficient with indications that they needed a system that was timely and detailed enough for tactical level planning and execution.</p>                                                      |
| <p>"Initially, information was difficult to locate on the Homepage. Many documents were filed within the file structure of the originating staff rather than under a topical label. For instance, the exercise IMP was filed on the exercise Homepage under J-3 Current operations instead of under IMP. For staff members who did not know the origin of documents, it took considerable time to locate them."</p>                                                                                                                | <p>The XC<sup>4</sup>I system using the portal appeared to reduce this problem somewhat. However, the file structures and the instructions on the creation of Meta-data required by the KIMP were not followed with the result that documents could not be readily located. This continues to be a problem.</p> |
| <p>"Using the Homepage as the primary means of disseminating information, the training audience was exceptionally effective in handling, analyzing, and providing critical information to the JTF commander and key decision makers."</p>                                                                                                                                                                                                                                                                                          | <p>Data indicated that difficulties encountered in the use of the portal resulted in a heavy reliance on e-mail to move information both point-to-point or broadcast. Since the portal is easier to use than a web page, the cited finding is somewhat suspect.</p>                                             |
| <p>"Recommend that the component command further develop and document IM processes. It is vitally important that procedures be standardized and practiced to achieve a smooth transition to unified operations under the IMO, and to integrate augmentees, liaison, and coalition members into the IMP."</p>                                                                                                                                                                                                                       | <p>No change. A KIMP that can be adapted by the components is a requirement. Processes and procedures require training and hands-on experience before they can be effectively used.</p>                                                                                                                         |

**DOTMLPF Linkage**

- The CIE assessment supports on-going DOTMLPF CIE submissions. In particular, it shows that there is a significant value in using a XC<sup>4</sup>I-like system for both planning and execution activities at the operational level. It also points out that there is a need to further refine the technology and the processes and procedures so that the same system can be used effectively at the operational level, as well. The results of the CIE portion of the experiment also support DOTMLPF linkage with the same use of the CIE such as SJFHQ, ONA, and JISR

## **Recommendations**

1. JFCOM and the Joint Staff, use the MC02 XC<sup>4</sup>I system as a baseline for immediate development of a prototype C<sup>4</sup>I system to support future joint operations. ►
  - Such a prototype system should include the necessary hardware and software as well as the organizational structure required to operate it. The prototype should also include the training program required to bring operators up to a satisfactory skill level to use the system successfully.
2. JFCOM, develop decision support tools to support EBO. ►
  - This will mean a significant JFCOM effort in locating appropriate tools and adapting them such as was done with the XC<sup>4</sup>I system for MC02. Or, if necessary, JFCOM should develop new decision support tools that will meet the needs of joint commanders at the strategic, operational and tactical levels. ►
3. JFCOM, and the Joint Staff, use the MC02 XC<sup>4</sup>I network as a model to connect the JTF with its components and combatant commander. ►
  - Based on the results of MC02, JFCOM should develop a wide area network capability that can provide a continuous bandwidth capacity of 15 Mb/s and a surge capacity of 25 Mb/s over a sustained (6+ hours) period.
4. JFCOM, consolidate and streamline common CIE tools. ►
  - A consolidation of tools for C<sup>4</sup>I in the JTF is a recurring theme among warfighters, SMEs, and SCDs. Organization, training, leadership, and materiel are key DOTMLPF areas which would benefit tremendously from the consolidation of C<sup>4</sup>I equipment used by JTFs. In this case, the reduction in the number of systems used to conduct PE would directly contribute to increases in JTF effectiveness and efficiency. CJFACC mentioned that we need business rules to impose discipline and ensure we minimize time spent in collaborative sessions. A single DoD collaborative system is required.

Appendix A — Top Comments Group

| Top Comments Group |                                         |           |                   |        |
|--------------------|-----------------------------------------|-----------|-------------------|--------|
|                    | Group Name                              | Hits      | %Total Group Hits | Visits |
| 1                  | CC Blue                                 | 227,363   | 6.05 %            | 6,503  |
| 2                  | JTF Current Ops                         | 1,921,216 | 51.12 %           | 5,157  |
| 3                  | JTF Info Superiority                    | 958,902   | 25.51 %           | 3,509  |
| 4                  | JTF Plans                               | 64,540    | 1.71 %            | 3,399  |
| 5                  | Logistics Dashboards (JTF & Components0 | 63,024    | 1.67 %            | 3,294  |
| 6                  | Logistics Documents                     | 57,499    | 1.53 %            | 3,247  |
| 7                  | JTF Orders                              | 213,202   | 5.67 %            | 2,368  |
| 8                  | ONA Dashboard (Current Summary)         | 24,150    | 0.64 %            | 2,342  |
| 9                  | Search Dashboard                        | 9,419     | 0.25 %            | 2,297  |
| 10                 | ONA References via Document Library     | 16,790    | 0.44 %            | 2,162  |
| 11                 | News                                    | 7,506     | 0.19 %            | 1,600  |
| 12                 | JTF Command Group                       | 42,782    | 1.13 %            | 1,500  |
| 13                 | JTF Boards                              | 56,855    | 1.51 %            | 1,436  |
| 14                 | ONA Database                            | 1,945     | 0.05 %            | 1,382  |
| 15                 | Document Library                        | 2,552     | 0.06 %            | 1,355  |
| 16                 | Reference Dashboard                     | 40,667    | 1.08 %            | 1,233  |
| 17                 | Categories                              | 4,800     | 0.12 %            | 1,091  |
| 18                 | JTF KM                                  | 18,114    | 0.48 %            | 739    |
| 19                 | KR/RFI                                  | 4,222     | 0.11 %            | 684    |
| 20                 | ONA Matrix                              | 9,107     | 0.24 %            | 513    |
| 21                 | Manage Personal Subscriptions           | 987       | 0.02 %            | 351    |
| 22                 | ONA Matrix: Blue View Of Red            | 7,253     | 0.19 %            | 349    |
| 23                 | ONA References                          | 834       | 0.02 %            | 122    |
| 24                 | ONA Matrix: Red View Of Blue            | 222       | 0.00 %            | 66     |
| 25                 | ONA Related Products                    | 425       | 0.01 %            | 64     |
| 26                 | ONA Matrix: Country Profiles            | 683       | 0.01 %            | 63     |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| Top Comments Group |    |                                 |       |                   |        |
|--------------------|----|---------------------------------|-------|-------------------|--------|
|                    |    | Group Name                      | Hits  | %Total Group Hits | Visits |
|                    | 27 | JTF Battle Board                | 2,594 | 0.06 %            | 35     |
|                    | 28 | ONA Matrix: Blue Effects Focus  | 54    | 0.00 %            | 30     |
|                    | 29 | ONA Matrix: Red Vulnerabilities | 47    | 0.00 %            | 21     |
|                    | 30 | ONA Matrix: Blue Actions        | 35    | 0.00 %            | 16     |



**Appendix B — SME CROP Survey Questions**

The 17 questions are listed below. [SME CROP Survey]

|                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------|
| 1: Friendly unit status info posted in the CROP (SPPS) was AVAILABLE when needed by the users.                                              |
| 2: Friendly unit status information posted in the CROP (SPPS) was SUFFICIENTLY ACCURATE for planning and operational level decision-making. |
| 3: Posted weather information in the CROP (SPPS) was accurate for operational level planning and/or C2 of execution.                        |
| 6: The CROP (SPPS) information provided to participants was COMPLETE.                                                                       |
| 7: The CROP (SPPS) information provided to participants was CORRECT.                                                                        |
| 8: The CROP (SPPS) information provided to participants was TIMELY.                                                                         |
| 9: The CROP (SPPS) information provided to participants was CURRENT.                                                                        |
| 10: The CROP (SPPS) information provided to participants was ACCURATE/PRECISE.                                                              |
| 11: The CROP (SPPS) information provided to participants was RELEVANT.                                                                      |
| 12: The CROP (SPPS) information provided to participants covered physical features of the JOA in sufficient depth and detail.               |
| 13: The CROP (SPPS) information provided to participants covered enemy OOB in sufficient depth.                                             |
| 14: The CROP (SPPS) information provided to participants covered relevant/needed POLITICAL information in sufficient depth.                 |
| 15: The CROP (SPPS) information provided to participants covered relevant/needed SOCIAL information in sufficient depth.                    |
| 16: The CROP (SPPS) information provided to participants covered relevant/needed ECONOMIC information in sufficient depth.                  |
| 17: The CROP (SPPS) information provided to participants covered relevant/needed INFORMATION (MEDIA) information in sufficient depth.       |
| 18: The methods used for collecting, storing, and retrieving information in the CROP (SPPS) were useful participant's purposes.             |
| 20: The search capability provided in the CROP (SPPS) was satisfactory.                                                                     |

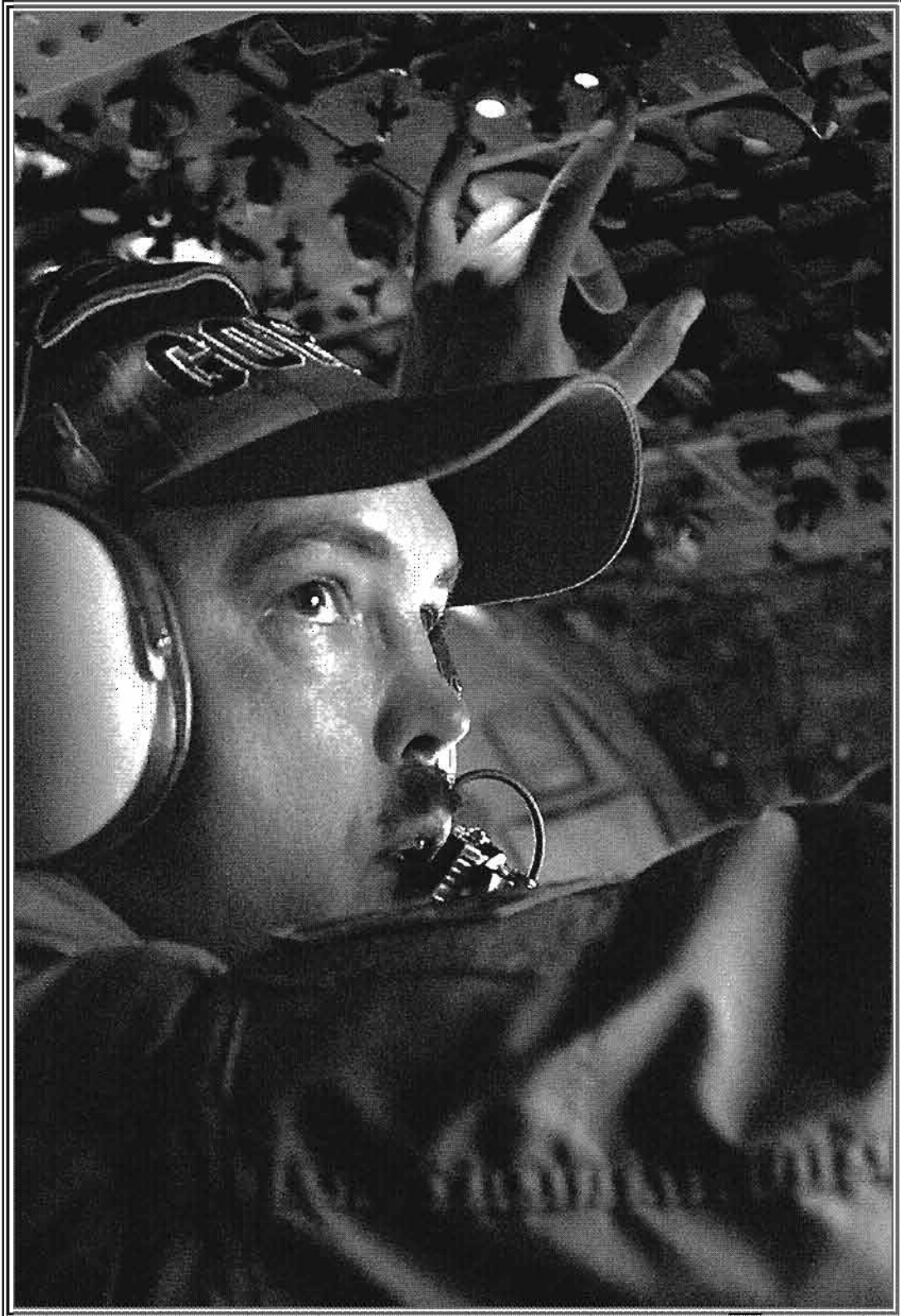


Figure 241: USAF AC130 pilot prepares his aircraft for operations in support of MC02

## Assessment Area 10 — Enhance Interagency Perspective within the Joint Force Headquarters

### Overall Assessment Results

The Millennium Challenge 2002 experiment confirmed the benefits of the concept of enhanced interagency perspective within the joint force headquarters. Experimental conditions prevented the assessment of the concept as envisioned in the subject white paper. However, the MC02 experimental approach applied to assess the utility of a Joint Interagency Coordination Group (JIACG) confirmed the benefits of enhanced interagency (IA) perspectives to support Effects-Based Planning and Operations. Guided by the concept described in the white paper, *“Improving US Interagency Operational Planning and Coordination,”* the IA Assessment Team (IAT) collected sufficient data to assess JIACG efficacy in a small-scale contingency that resulted in joint military forces conducting combat and transition operations. Key personnel and participants in MC02, with extensive experience in the strategic and regional-level interagency coordination and adequate visibility to judge the performance of the MC02, responded to five surveys administered over the three-week experiment. By a three to one margin, these respondents expressed a favorable opinion of the JIACG in support of the JTF, combatant commander, and participating members of the interagency community. Most respondents recommended further concept refinement and experimentation. In addition, respondents surfaced IA issues described in other MC02 assessment areas pertaining to information operations, EBO, ONA, and SJFHQ.

**Overall Assessment Results**

- **Enhanced interagency benefits confirmed by MC02.**
- **Participants expressed a favorable opinion of the advantages of the JIACG, collaborative environment in improving operational campaign planning.**

### Methodology

The focus of MC02 interagency assessment was on the Joint Interagency Coordination Group (JIACG) nested in the important headquarters. The JIACG consisted of participants located in Suffolk, VA and at three sites in the Washington, DC area (virtual members). Due to real-world requirements, the “virtual” members participated in scheduled collaborative sessions, depending on the subject and the availability of the individual. They used the MC02 Collaborative Information Environment (CIE) components InfoWorkSpace (IWS) and the SharePoint Portal Server (SPPS) over the SIPRNET. Participants represented the Department of State, US Agency for International Development (USAID), and the Departments of Justice and Defense (OSD-SO/LIC and Joint Staff). These members served as subject matter experts (SMEs) during several collaborative sessions.

The data collection focused on “how” the JIACG interacted with the SJFHQ, the combatant commander staff, the JIACG “virtual” members, and the IA SMEs in Washington, DC. Data collectors in Suffolk observed the JIACG, the Director of the JIACG, the SJFHQ, and JTFHQ pol-mil planners. Data Collectors in Washington, DC focused on Virtual and SME participants at State, the Pentagon, and at the National Defense University. Suffolk participants completed surveys in JDCAT and provided Comments and Recommendations in SPPS. Senior participants provided written or oral responses to “Questions of the Day,” which were then

added to the JDCAT database. Data collectors in Washington, DC surveyed or interviewed participants, adding the results to the JDCAT database.

The IAT reviewed, reduced, and collated the survey comments, comments/recommendations, and data collector observations with the warfighting challenges, tasks, and sub-tasks. The IAT reviewed and collated SCD comments from in-focus sessions, azimuth checks, and after action reviews. The IAT identified the insights throughout the collation of the reduced data.

**Warfighting Challenge: Ability to quickly achieve and maintain cohesive relationships with the IAC.**

The first challenge in enhancing interagency perspective within the joint force headquarters was the ‘ability to quickly achieve and maintain cohesive relationships with the IAC’. The tasks required to assess this warfighting challenge were to establish a JIACG, establish an interagency CIE, and develop secure processes and protocols among the IA participants to enable effective collaboration. The rationale was that the implementation of the three tasks would enable the achievement and maintenance of the cohesive relationship between the combatant commander’s staff and the other members of the IAC.

**Warfighting Challenge: Ability to improve interagency campaign planning and execution.**

The second challenge in enhancing interagency perspective within the SJFHQ was the ‘ability to improve interagency campaign planning and execution’. The tasks required to assess this warfighting challenge were to implement pol-mil plans, and to provide continuity in coordinated planning and operations from pre-crisis through execution and transition with the JIACG. The rationale was that the implementation of the two tasks would enable improved interagency campaign planning and execution throughout the continuum of conflict. The benefits accrued to all members of the IA with equities in the crisis scenario. The context was the national prosecution of a RDO.

The IA participants executing the National Security Council Advance Planning Process crafted a strategic approach for the scenario region. As the crisis emerged, the IA participants prepared a comprehensive pol-mil plan for approval by a notional deputies committee. The pol-mil plan identified 18 mission areas and the respective responsible departments and agencies. The scenario required the failure of pre-crisis efforts in order to allow the full examination of the supporting concepts. Though the military solution was a forgone conclusion, the IA participants leveraged the opportunity to explore potential contributions to the combatant commander’s planning and execution, and particularly to transition.

**Finding 1► The JIACG enabled the combatant commander to harmonize operational plans with national policy decisions and guidance.**

The idea of synchronizing IA efforts with the combatant commander’s efforts was essential in the concept white paper. During the spirals and execution, the participants agreed that “synchronization” would be difficult, if not impossible. The word “harmonize” became a more realistic and, therefore, a more achievable standard. During a discussion of the application of the ETO, one SCD commented, “We want to ensure the military components’ actions are harmonized with the interagency efforts, and not vice-versa.” Another SCD added, “When you

said synchronize, the most you probably can achieve is harmony, but you can't synchronize diplomatic activities. We work on common guidance and consensus, not synchronization."

The IA participants produced a comprehensive pol-mil plan during the months leading up to the experiment. The CJTF had the benefit of being able to incorporate this plan into the JTF planning process. However, the JTF pol-mil planner cautioned the SCDs that it may be unreasonable to expect the scope and quality of that pol-mil plan in real-world operations, "From where I sit, we have a detailed political-military plan embedded in the JTF plan. The JTF knows what is in it. But we may have created a false expectation of IAC play," he said.

The two planning areas where the JIACG would be most valuable are the development of the theater engagement plan (TEP) and in the transition-planning role for the combatant commander. In the inter-crisis period, the focus will be on the harmonization of interagency actions in development and refinement of the TEP. Harmonization of transition plans becomes more important as a crisis evolves to the extent that a military course of action becomes inevitable. A JTF planner commented on transition planning, "I see this as an area where the reach-back to the JIACG and the centers of excellence is so important. We began with an ONA in peacetime, and the groundwork that leads you in, can lead you out as well. Coordination therefore is very important. We must link tightly with the JTF and the combatant commander's staff. There is a clear link between transition and re-deployment."

The CJTF offered that during transition, where the DI&E piece reasserts itself, where other departments and agencies reassert their dominance, the ONA and the collaboration, at that point, may be more important than in combat. "This may be the missing link that explains why we win battles, but lose wars," the commander said. "We're desperately seeking guidance. Ten years later, people will second-guess not how we fought, but how we extracted ourselves." The SCDs recognized the utility in transition planning early in the crisis.

**Finding 2► The JIACG concept, as it was implemented for the MC02 warfighting scenario, was most properly positioned to operate at the combatant command level, since most of the non-military effects are at that level of responsibility.**

Five IA senior mentors responded to the question, "Where should the JIACG be located? With the combatant commander's staff, elsewhere in the region, or in Washington/NCR?" All senior mentor respondents agreed that the JIACG must be located with the combatant commander. Senior concept developers provided several reasons. They mentioned access to other staff elements as an area where their capability would be most useful. Further, the face-to-face dynamics of human interaction between the JIACG and the combatant commander provide maximum effectiveness. One IA mentor stated, "Any other location would dilute its purpose of giving the combatant commander greater awareness of the IA policy process." During an SCD session, a member offered that the JIACG should be an "autonomous entity like any of the other J (staff) functions."

The SCD added that the JIACG should operate under the combatant commander chief of staff's direction. Additionally, the JIACG should be "able to ask for support from other J-staff elements, and should be able to be asked to support other J-staff elements." This SCD continued that the JIACG should coordinate requests from within the command and JTF for information and assistance from elements of the Washington IAC. Additionally, the group should be a 'funnel' into the command for data needed by the Washington IAC for actions where policy is already set. After stating, "If the concept is to work, the JIACG must be just as much a part of

the combatant commander's staff as any other staff element," an SCD asked, "Would you design a J5 not co-located with the combatant commander? A J2?"

Real-world concerns prevented the "virtual" members' full time participation in the experiment. This concern is a result of the experimental conditions agreed to by the Washington area participants. While the participants were instrumental to the success of the IA collaborative sessions they attended, their absence was felt as well. Use of part-time "virtual" JIACG members can reduce the effectiveness of the collaboration with the combatant commander staff and engaged agencies. One JTF HQ planner noted the requirement for more JIACG involvement and more "higher HQ" JIACG meetings with State, Justice, and other Washington elements. This planner said, "during the diplomatically-driven, pre-hostilities phase, we need more such meetings in order to more quickly

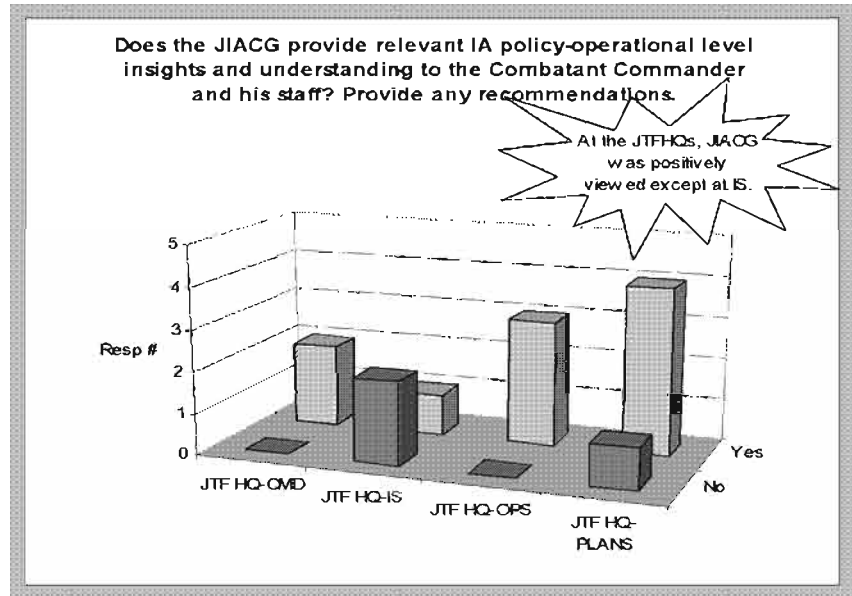


Figure 242: JIACG was positively viewed at JTF HQ

resolve the usual pol-dip (diplomatic) issues that control the pre-hostilities phases—over flight, ISR, NOTAMs (Notice to Aviators/Mariners). It still took too long to get answers to these issues; JIACG should expedite." In a dynamic environment, waiting for a time when the part-time, 'virtual' member is available to service the issue will hamper the overall planning effort. The virtual membership concept was expedient for near-term implementation. It should be studied further.

**Finding 3► A compatible CIE linkage to engaged agencies is essential for the effective harmonization of IA actions.**

The following questions and comments facilitated the analysis of Task 10.1.2—Establish USG IA Collaborative Information Environment (CIE). Twenty-five participants responded to the question, "Does the JIACG provide relevant IA policy-operational level insights and understanding to the combatant commander and his staff?"

Out of the 25 that responded, 21 responded positively (84 percent, see figure 242). The next chart (See Figure 243) shows the distribution of answers of the various groups. Within the JTFHQ (CDR, IS, OPS, & Plans) 10 of 13, or 76.9 percent, stated, "JIACG provided relevant IA policy, operational level insights and understanding." Typical comments from those giving a negative response were "Don't Know," and "much room for improvement." One SJFHQ planner stated that the JIACG provided only strategic level insights. Typical comments from those giving positive comments indicated the value of the advice provided to the JTF commander.

One senior member of the JTF command group said, “The advice given to the commander has been extremely beneficial. It has kept the CJTF sensitized to the interagency challenges.” An observer made a similar observation during Spiral 3. He observed the JIACG’s

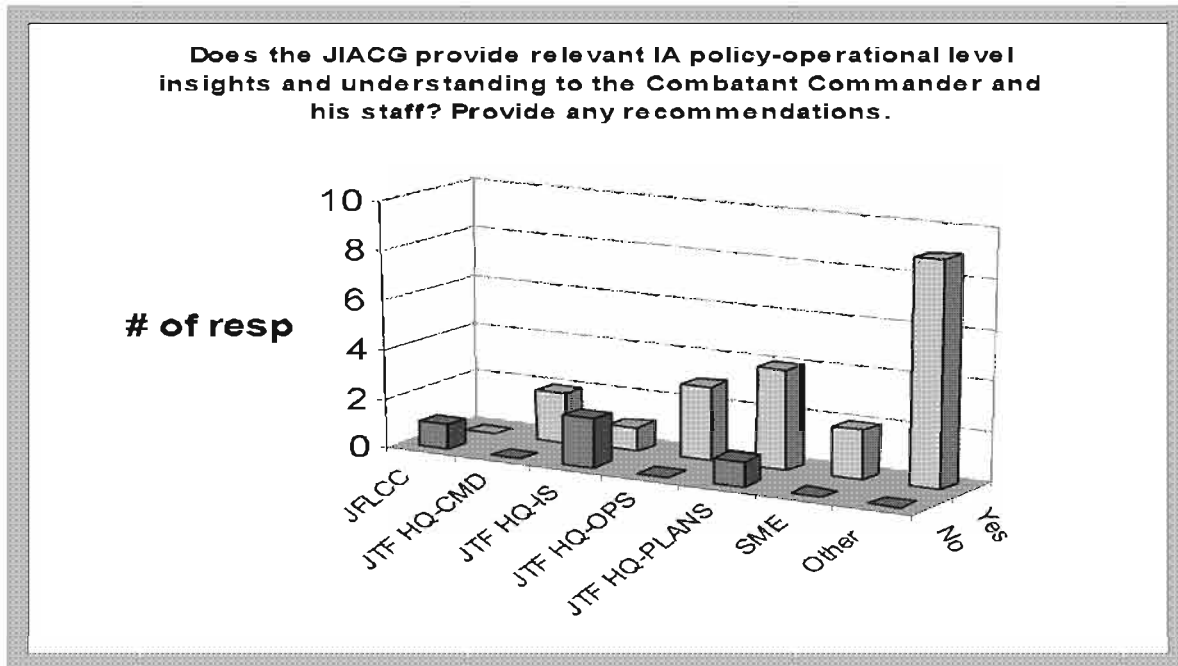


Figure 243: Does JIACG provide relevant IA policy-operational level insights and understanding?

participation in a mission analysis briefing that included a slide called “Interagency Support Actions” with lead agencies annotated. This was beneficial to the CJTF because it provided the opportunity to review ongoing actions in the diplomatic, information, and economic areas. If CJTF had any questions, the JIACG director was present to answer.

Still others on the JTF staff indicated an appetite for more, by stating that “Commanders rely on JIACG to ‘read the tea leaves’ in their areas of expertise and provide concrete guidance

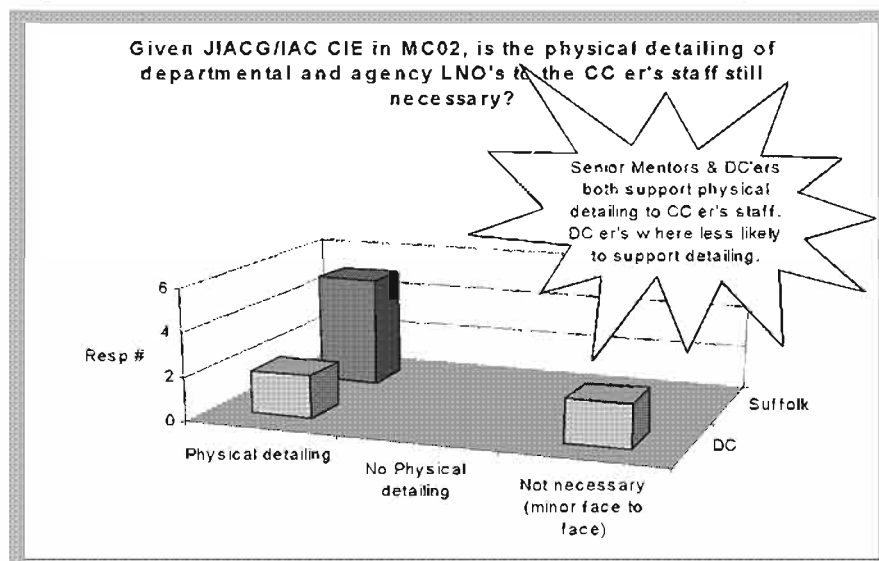


Figure 244: Physical detailing of JIACG IA LNO's is still necessary

about what to expect—and when—in the pol-dip areas, such as demarches, over flight rights, and NOTAMs,” he said. “It took too long to get these answers, especially when the pre-hostility phase was so uncertain. Great uncertainty here merited more JIACG meetings and more concrete JIACG guidance.”

Figure 244 details survey responses from IA senior mentors in Suffolk (i.e., JIACG director,

and a number of former POLADs) and a limited number in Washington, DC. They were asked, "Given the JIACG/IAC collaborative environment in MC02 is the physical detailing of departmental and agency LNO's to the combatant commanders still necessary?" Although IWS CIE provides a key linkage between JIACG/combatant commander staff and IAC, "face-to-face" interaction, is viewed to be a key requirement in order to have an effective JIACG/IAC operation. According to all senior mentors, "physical detailing is still required." Two of the senior IA mentor comments are provided for added clarification. "While IWS and other tools are helpful in reducing time/space constraints, and the JIACG could not be fully integrated into the combatant commander staff unless its lead elements at least were physically with the combatant commander. If the concept is to work, the JIACG must be just as much a part of the combatant commander's staff as any other staff element," said one mentor.

The second mentor added, "Yes. The collaborative environment can reasonably be expected to make steady progress over the next several years, but for the time being — until the principal users gain sufficient familiarity with it—nothing beats the eye-to-eye/personal handshake, particularly when one begins to transgress from "data" issues to "policy" issues."

Two other IA senior mentors were asked how could JIACG improve this operational coordination and integration? (See Figure 247) The virtual JIACG identified the IWS (CIE) as a way to improve coordination and integration. The core JIACG identified "old boy/girl network" and "the IWS enabler—a collaborative tool." One participant commented that the ability for the JIACG/IAC to collaborate real time on a secure system is a priority one for many of the IA departments and agencies. The lack of such a system in today's environment (Information age) is troubling and needs to be corrected as soon as possible. Another SCD described the teamwork aspect. "This operation involves more than JTF-Blue. Commander Blue and our national leadership have an oar in the water, as do the coalition partners." One SCD provided another concern, that we must include guidance and knowledge from all elements of our national power structure without inhibiting the military C2 structure.

**Finding 4► The JIACG composition should be based on the combatant commander's regional requirements.**

Several senior mentors recognized that the JIACG should be "tailored to the specific circumstances of the specific command," and that there "cannot be a one-size-fits-all model for a JIACG." Another agreed, "We can't be too prescriptive as to how the combatant commander has to organize. We need to let each combatant commander decide how the theater requirements lead him to organize." The SCD explained that EUCOM with NATO would be configured very differently from SOUTHCOM or CENTCOM. Another SCD gave an example stating, "SOUTHCOM may in fact have the largest JIACG, though it is a small theater. The SOUTHCOM JIACG is heavily weighted to DOJ and the Bureau of Alcohol, Tobacco and Firearms. The JIACG will have to be very fluid in design and execution to ensure the combatant commander gets legitimate peripheral vision."

**Finding 5► The combatant commander's ability to plan and execute RDO requires a rapid and decisive national policy determination process.**

This finding surfaced during Unified Vision 01 when a SCD said that you couldn't have RDO without rapid decisive "policy." During MC02, an SCD commented, "The interagency has to be rapid when we are rapid, and vice versa." Then as now, the implementation of this idea is outside the realm of the JFCOM and DoD. The obstacles to implementation of this concept are



rooted in the bureaucracies of the executive branch of the U.S. Government—in the manner in which it executes its foreign policy responsibilities.

One SCD with Department of State experience said, “There are various mechanisms (some run by the NSC), but history suggests we should not be optimistic about frequent and uniform policy emanations. What we do have is an executive branch with various departments, one of which, the Department of State, is profoundly opposed to planning. Its great strength is policy development.”

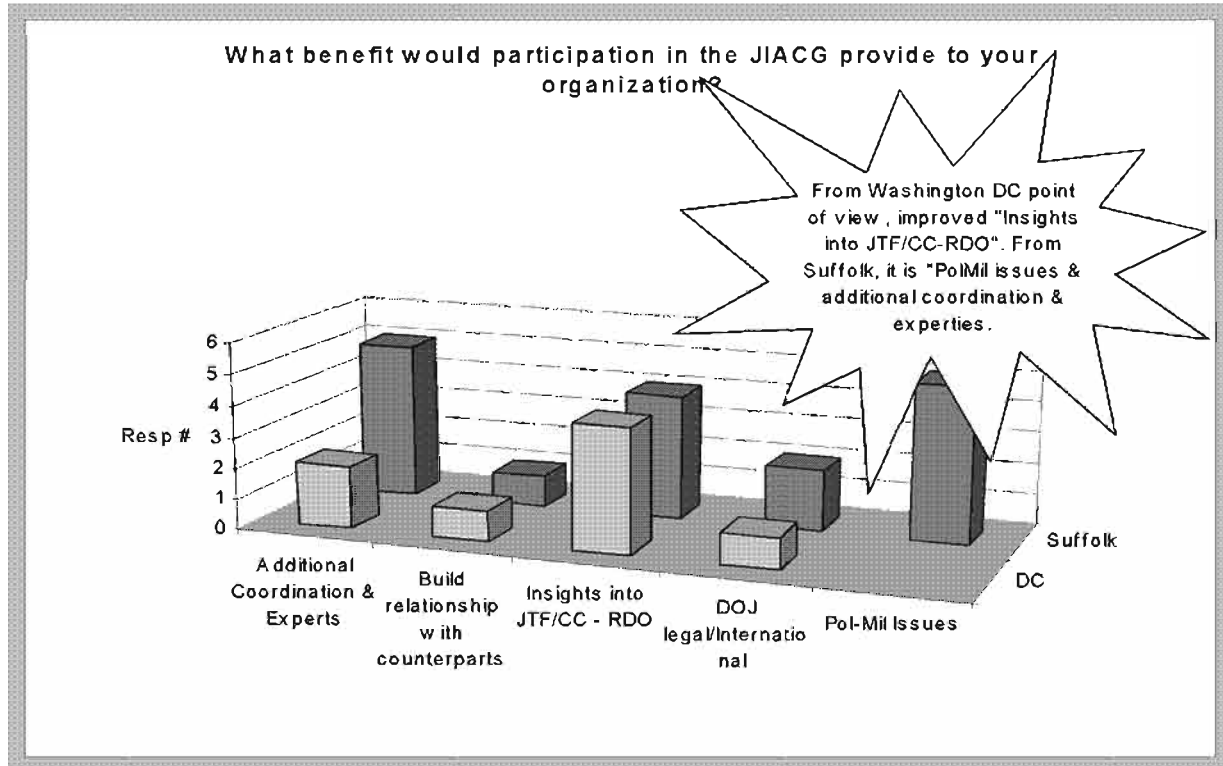


Figure 245: Improved insight into the JTF and combatant commander decision process was listed as the biggest benefit from the IA point of view, while access to the pol-mil debate by the military staff was the greatest benefit seen by experiment participants.

He further likened the State Department to a soccer team that kicks the policy ball around (instead of scoring policy goals). This paradigm is reactive, and is precisely what RDO is intended to mitigate. Additionally, he pointed to the cautious nature of “real world” interagency meetings, where “carefully prepared talkers from each department are presented that would have to have [statements] screened at the policy-level first.” All this exists to avoid the perception that anyone was giving guidance to the combatant commander or CJTF other than SECDEF.

Accommodating all of the interests of the departments and agencies increases the time required to react, allowing the crisis to worsen, and therefore increasing the risk. At the same time, the SCDs recognized that the JIACG could not overreach with regard to relations with the executive branch. They also recognize the concern that the JIACG is too commander-centric, and there would be some potential to enhance the role of the combatant commander in policy making. A former combatant commander allayed this concern by offering, “In my experience, most combatant commanders don’t seek a dominant (national) policy role. However, they do realize they are marginalized to the extent that they don’t have good policy insight. Few have

sought to unduly influence or control civilian agency resources, either. But we have to cultivate a climate of greater trust and confidence and the JIACG, properly employed, and properly located, would assist this effort.”

One survey asked, “What benefit would participation in the JIACG provide to your organization?” The response, in figure 245, illuminated the differences between the core JIACG in Suffolk and the virtual JIACG in Washington, DC with regard to the potential for the JIACG to overreach its combatant commander’s responsibilities. The figure shows the results of the question ‘what benefit would participation in the JIACG provide to your organization?’ The participant responses are divided between the core JIACG and the virtual JIACG/IA. The Suffolk group (core JIACG; combatant commander & staff) saw JIACG providing additional IA coordination and expertise, and pol-mil understanding/focus on IA issues.

In contrast, the Washington, DC group (virtual group) saw JIACG providing insights into JTF/combatant commander—RDO. Some SCDs, to include the senior mentors, suggested that there is a greater probability that DC/IAC participants will get involved in planning and

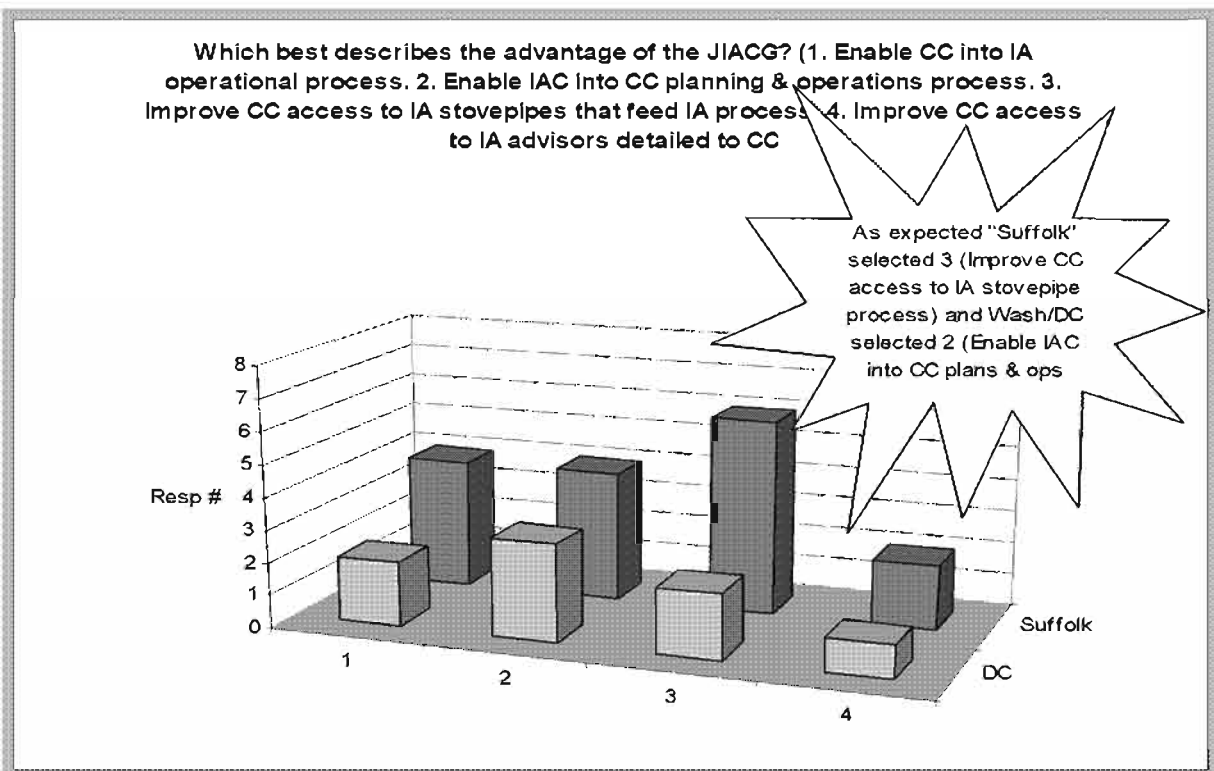


Figure 246: JTF staffers considered combatant commander access to the interagency to be a significant capability, while the Washington, DC agency sought access to the commander’s planning and operations process.

execution, than will the combatant commander getting involved in IAC policy issues. This suggests the overreaching is more likely to happen from the Washington, DC community into the combatant commander/JTF, than from the combatant commander/JTF (military side) into the national policy/IAC side. Given the potential for “overreach” in both directions, a rapid and decisive national policy determination process is critical for successful combatant commander RDO operations.

Historically, the military is wary of micromanagement by the civilian leadership. The CJTF put this concern in context: “The real issue is how well the JTF can leverage this

information. In MC02, we have the preferred mode, but that may not be how the information exchange structure will transpire. We in the military want [IA] involvement, but don't want interference with lethal warfighting."

When asked, "Which best describes the advantage of the JIACG?" (See Figure 246) the Suffolk participants reinforced the idea of military wanting IA involvement as selected by #3 "Improve combatant commander access to IA stovepipes that feed IA process." Whereas, the Washington, DC group selected #2, "Enable IAC into combatant commander planning and operations process." The long-term success of this concept will be dependent on the JIACG adhering to its advisory role and bring the interagency perspective to issues vice trying to direct

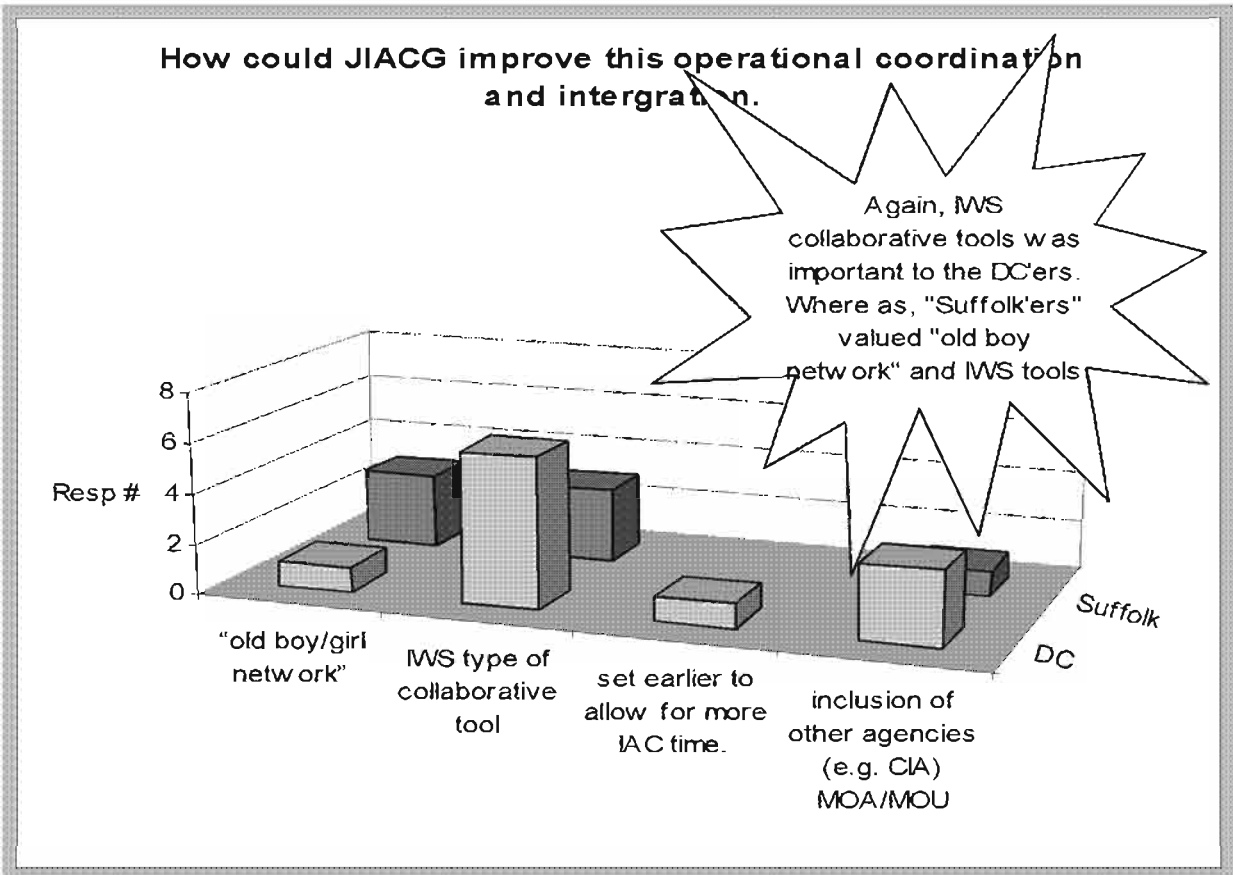


Figure 247: IWS was deemed an important collaboration tool, especially for the DC/IAC

or influence the IAC to meet current and future combatant commander specific plans. This last area is the purview of the Secretary of Defense and the Chairman of the Joint Chiefs of Staff.

Finally, an SCD declared that JIACG concept was a clear winner that aids in the development of the RDO and EBO concepts. He noted that JIACG-like organizations have been established at each of the regional combatant commands, suggesting that the combatant commanders have accepted this concept in some form. One SCD noted that the Deputy National Security Advisor approved a six-month trial in the global war on terrorism. However, the trial JIACGs are not focused on advance or deliberate planning. These JIACGs are focused on execution. Further, the current posture depends primarily on temporary military manning.

**Finding 6** The JIACG’s principal function is to focus on providing IA advisory support to the combatant commander and staff, not on producing combatant commander plans.

One SCD provided a comprehensive description of the major issues with regard to the principle functions of the JIACG. “But I don’t share the view that planning should be a JIACG’s primary function, or that JIACG planning should be embedded in a combatant commander’s staff in the way that a JS’s deliberate planning responsibility is, with direct responsiveness to Joint Staff deliberate planning.” An SCD said, “Total planning responsibility would undercut a JIACG’s important advisory role in providing the combatant commander with Washington policy perspectives. To the degree that a JIACG is seen to be engaged in formal planning, it risks being viewed by Washington interagency players, including both state and the Joint Staff, as a threat

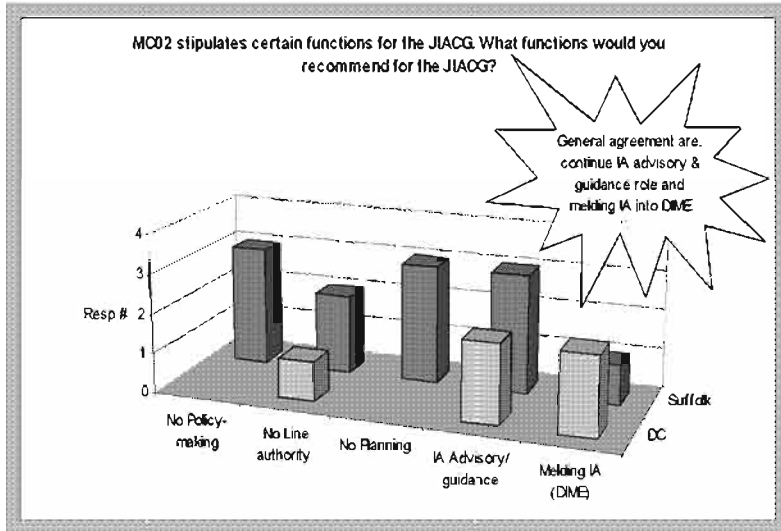


Figure 248: Participants agreed that IA advisory and guidance role was successful and should be continued, melding with DIME to their policy authorities rather than a value added policy insight into the regional combatant commander’s priorities and plans.”

Another SCD expanded the scope of the discussion stating, “If the focus for a JIACG is to try to plug into and identify different views in Washington, or to get parts of the interagency to act on a discrete issue, the JIACG will be effective,” he said. “A JIACG working for the combatant commander can provide invaluable information on what is going on inside the beltway.”

Another SCD said, “JIACG serves an advisory function to identify related issues. This is a validated concept, but the words you gave us do not all resemble the JIACG as we practiced it for MC02. It is too heavy on the planning side. It is not possible to provide a ‘coordinated’ position for Washington decision-making. No one wants the JIACG to make policy!” One of the IA SCDs responded, “The JIACG should make a significant contribution to the combatant commander’s

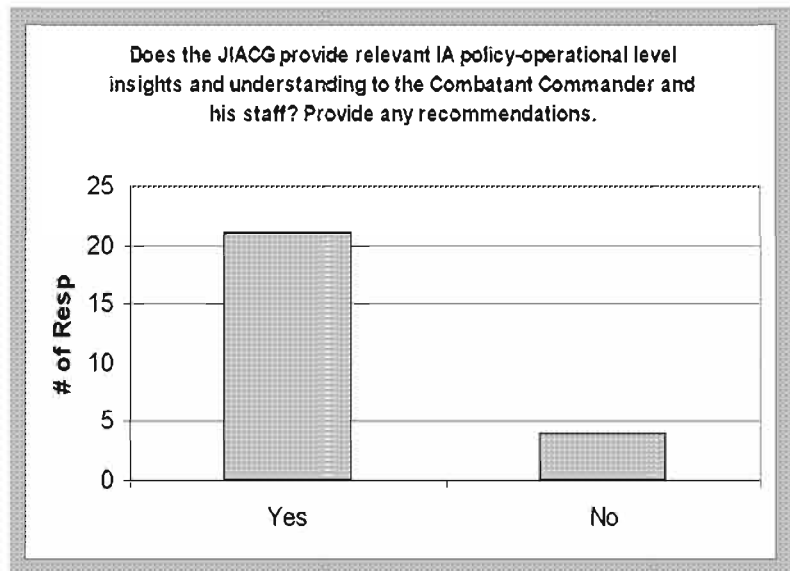


Figure 249: Does JIACG provide relevant IA policy-operational level insights and understanding

theater engagement and contingency planning, but I don't share the view that planning should be a JIACG's primary function. I don't believe that JIACG planning should be embedded in a commander's staff in the way that a J5's deliberate planning responsibility is, with direct responsiveness to Joint Staff deliberate planning."

He went on to say, "Total planning responsibility would undercut a JIACG's important advisory role in providing the combatant commander with Washington policy perspectives. To the degree that a JIACG is seen to be engaged in formal planning, it risks being viewed by Washington interagency players, including both State and the Joint Staff, as a threat to their policy authorities rather than as a value added policy insight into the regional commander's priorities and plans." Figure 248 reflects the sensitivity of the "policy making, combatant commander planning, and combatant commander line authority role of the Suffolk and DC community."

### Other Observations

#### Observation 1: The JIACG should consist of senior level personnel with extensive regional and Washington (strategic-level) experience.

Four IA senior mentors responded to the question "What Knowledge, Skills, and Abilities are required in the JIACG Director?" Figure 250, shows the distribution of responses. All agreed that the JIACG director should possess the rank similar to that of the other combatant

commander staff directors. The JIACG director should have the "temperament and managerial qualities" to lead. The JIACG director requires experience and knowledge of the formal and informal workings of the agencies and departments most likely to be involved in a potential crisis action. One IA senior mentor provided a concise list:

- Must be a credentialed, credible player in IAC
- Have served in IAC, preferably in NSC, and have working knowledge and facility in both the "formal" and "informal" processes in IAC
- Credibility and access to [the] combatant commander/staff
- Working knowledge and familiarity with combatant commander staff processes
- Ability to travel and communicate "securely" on daily basis, not just a player in crisis

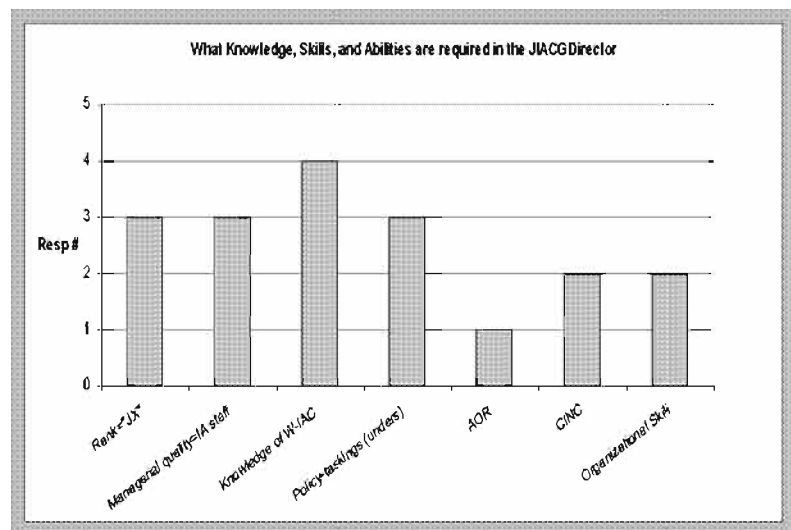


Figure 250: Key skills and abilities of the JIACG Director are defined by the MC02 participants

Another offered that the JIACG Director "should probably not have a tenured position or be a permanent Civil Service employee, but must serve at the pleasure of the combatant commander, and probably not have been around long enough to develop an 'I was here before

you and I'll be here after you' attitude toward the combatant commander." With regard to rank and background, one SCD offered that the director should probably be an O-7/8 SES 3/4 equivalent, preferably not from the State Department or Foreign Service. The IA senior mentor reasoned that this would prevent overlapping competencies and possible competition between the JIACG director and the combatant commander's POLAD.

Additionally, this source would reduce the possibility of too heavy a "State Dept" cast to JIACG activities. Further, the JIACG personnel should rank at the O-4/5/6 or GS-13/14/15 level. It should have a higher density of civilians with experience in the Washington IAC.

Thirty participants answered the question, "Is the JIACG organization, composition, and size about right for its desired functions?" Most said that the experiment did not provide the opportunity to make a complete analytical assessment of the JIACG concept. However, several saw a correlation between the size of the JIACG and its advisory role. The size and composition as envisioned in the concept will support the advisory role. Several saw the JIACG's size increasing should the role change from an advisory group to a product-oriented planning staff.

**Observation 2: Habitual collaboration among JIACG, departments, and agencies provides benefits to all participants by increasing the knowledge of one another's requirements, culture, and procedures.**

This lesson was learned during Service experimentation. Knowing an adjacent unit's strength, capability, mission, and intent has been proven essential to successful operations. Likewise, synergistic benefits of collaboration are evident in the business world. Knowledge is the key. MC02 provided the opportunity for all participants to gain greater understanding of the missions, capabilities and issues of the other engaged departments and agencies. The production and dissemination of the 'strategic approach' and the 'pol-mil plan' stimulated great interest in the potential of the concept. It also illuminated the many issues still requiring resolution. A better informed combatant commander, familiar with the equities of the other departments and agencies, is better able to engage the SECDEF to get his policy guidance.

Several SCDs commented on the value of collaboration with respect to working with other members of the interagency community. One SCD observed the benefit working on a single collaborative net, "The combatant commander has a long-term focus, and the JTF has a very near-term focus. The JTF did have great situational awareness on Washington policy, and the Washington community had better situational awareness on what was happening at the JTF level. One collaborative environment is where you want to go."

Another offered comment on the value of active participation, "What they picked up from the transition guidance allowed them to do a tremendous transition plan of their own. The JIACG folks should know you have had a tremendous impact on the training audience. The take-away by JTF commanders and staffs and components is extremely positive. We got a lot better because they participated."

One of the observer-trainers noted the "huge need for pol-mil information" and the fact that the JIACG provided it. One SCD added that the process stimulated the JTF's appetite for a JIACG capability of its own; "There ought to be a cell as an extension of the JIACG at the JTF level that could keep us apprised of key policies and guidance so the JTF could better disseminate and synchronize. For example, we captured a key subordinate, but we've received very little fallout from the interrogation for further exploitation. The interagency collaboration might also have given us much needed insight into work on release for the captured A-Team."

### **Relationship to Other Objectives**

The requirement to enhance interagency activities in operational level planning and implementation affects all other objective areas. The JIACG will work closely with the SJFHQ pol-mil planner cell. While the JIACG will not input the DIME elements of the ONA, it can educate the staff proponent for IAC ONA policy and agency issues. The JIACG will use the CIE to maintain habitual relationships with members of engaged departments and agencies and other members of the combatant commander's staff. The JIACG will educate the combatant commander staff on the IAC's programs and initiatives, and focus on IA execution of DIME actions within the context of Effects-Based Operations.

With respect to JISR support during transition planning and operations, the JIACG plays an essential advisory/planning role in coercive diplomacy, condition setting, access dominance, and post hostilities transition. JISR has to continue providing feedback to the decision-maker during the transition phase. Generally, JISR support to decision-making during transition operations will be much more difficult than JISR support during earlier phases. Regardless, the commander still has to make effective decisions—these decisions now involve a wider range of people, organizations, and stakes. Thus, feedback for actions leading to desired effects are often much more complicated. This feedback usually involves intangibles and a wide variety of non-traditional sources of data, information, and knowledge.

Often expertise required to turn information into knowledge is not with either the JTF or the combatant commander's headquarters. Architectures, knowledge production roles and missions, collaborative communities of interest and communities of practice, software and hardware, access rights, and request for information channels have to occur early in planning cycles for transition operations. Sharing of data, information, and knowledge in a CIE will be different and important. This phase will find more of a focus on force protection, perceptions of populace, and civilian populations of neutrals, coalition partners, and people in the United States. The sources of data, information, and knowledge needed to design effects and assess their effectiveness will often come from interaction with the national interagency community, such as, Department of State professionals, and open source information existing on the internet. Human intelligence sources will also be very important for force protection and perception manipulation management of host nation people. The communications, automation, and collection architectures to support transition will have to be planned by the SJFHQ before the execution of operations.

### **Relationship to Baseline Analysis**

- There is no baseline data for the JIACG assessment area

### **DOTMLPF Linkages**

The following findings from the JIACG DOTMLPF package are consistent with the findings of the MC02 experiment.

- A clear, cohesive NSC approved political-military plan is required to fully employ the totality of national power against an adversary
- Military operations must include an interagency planning cell (JIACG) as part of the combatant commander or JTF staff to bridge the gap between strategic and operational levels of planning

- The JIACG strategy/concept is the vehicle for coordinating the operational level planning efforts between the civilian interagency community and the combatant commander or JTF staff in the execution of the political-military plan
- Habitual, collaborative relationships between military planners on the combatant commander or JTF staff and the interagency facilitates the planning process for both, and improves the quality of the plans
- It is possible to define a core JIACG staff while also providing flexibility to the combatant commander in the staffing of the JIACG based on specific missions and AORs
- A comprehensive pol-mil plan, and early collaborative planning is essential for the successful conduct of military operations other than war
- A reliable and secure CIE is essential to leverage the knowledge and perspective found in the military and civilian planning community
- Interagency participation in experiments and exercises, as facilitated by the JIACG, provides valuable training for military and civilian planners, as well as the benefit of training in the use of CIE tools
- Participants require extensive training on rules of engagement for complex, contingency operations
- Results of experiments such as MC02 have shown the value of interagency collaboration as facilitated by the JIACG, and guided military planners on incorporation of civilian agency input into military plans
- Military planners need to better understand the interagency planning and coordination process
- Military planners need to understand how to collaborate with the interagency to produce more effective campaign plans
- Professional military education at all levels needs to include an understanding of the NSC and interagency process, and reflect the value of the interagency process to operational planning
- Lack of secure, interoperable communications systems inhibits effective interagency collaboration as well as collaboration with combatant commander and JTF staffs
- For the JIACG to be effective, it needs a secure, collaborative communication system.
- DoD needs to consider the communication initiatives of other agencies to assure the development of a collaborative information environment that is interoperable across the executive branch of the interagency community

### **Recommendations**

1. JFCOM, in conjunction with a combatant command, stand-up a JIACG prototype, in conjunction with the SJFHQ, to refine doctrine, TTP, and manpower requirements. ►
2. JFCOM, refine roles and responsibilities, relationships, functions, vertical and horizontal communication, and authority of a JIACG during peacetime, theater engagement, crisis preparations, crisis response, transition, and recovery. ►
3. JFCOM, explore interagency contributions to the SJFHQ and its enabling concepts (CIE, ONA, EBO, and JISR). ►
4. JFCOM, explore coordination of civilian multinational entities, regional and international organizations, and non-governmental organizations into the concept. ►
5. JFCOM and OSD, expand interagency play in joint exercises. ►



6. OSD, develop and field an interagency CIE to implement a secure CIE capability for use by all departments and agencies with national security responsibilities.▶
7. JFCOM in conjunction with OSD, develop business rules such as TTP's, for collaborative engagement internal and external to DoD.▶



Figure 251: Night operations at China Lake during MC02 field exercises

## Assessment Area 11 — Joint Theater Logistics Management (JTLM)

### Overall Assessment Results

The MC02 experiment clearly demonstrated that there has to be interaction between planners on all levels to successfully integrate deployment and sustainment planning into the Effects-Based Planning process.

During Effects-Based Planning sessions, the combatant command-level Joint Logistics Management Center (JLMC) and the logisticians embedded in the JTF groups combined to significantly improve the process of integrating and coordinating deployment, employment and sustainment actions, and capabilities. Having the SJFHQ logistics personnel embedded in the operations and plans groups was also important to that integration process, improving the coordination and synchronization of logistics and situational awareness.

The experiment also examined the Joint Standard Operating Procedures (JSOP) descriptions of the JTF logistics positions, as well as, functions and essential elements of logistics information. Further refinement of the functions and information needs are required. The organization and structure of the JTF logistics organization needs to be made more functional and an examination of the skill sets involved is needed. The roles and responsibilities of the JLMC, log plans and log operations require some refinement in the JTF JSOP. Additionally, there was support for a logistics support group, putting the senior logistician in the JTF in parity with the operations, plans, Information Superiority, and knowledge management directors.

The collaborative logistics board, center, cells, and working groups enhanced the performance and situational awareness of all planners and operators in the JTF, components, and the JLMC. The Logistics Action Response Board (LARB) proved itself instrumental in the daily JTF and component battle rhythm structure. Several key, functional areas created their own collaborative cells and working groups, increasing situational awareness (notably the deployment-planning cell, engineer, personnel, and medical cells).

The experimental construct allowed the JTF the ability to leverage decision support tools (DST) and other emerging technologies, to rapidly process data and create operationally relevant logistics information. The web based Global Combat Support System (GCSS) portal tool was the most useful and beneficial in gathering data for planning and operations. Much of this information was assessable throughout the force through links created on the Log CROP. The Log CROP successfully provided logisticians a single place to find common information and achieve overall situational awareness. The log watchboard was

**Overall Assessment Results**

- Interaction between planners proved essential to integrate deployment and sustainment planning ...
- Examined the JTF logistics position functions and essential elements of logistics information...
- Leveraged DST emerging technologies to rapidly process data and create operationally relevant logistics information...
- Employed a networked sustainment distribution structure...

equally well regarded, although users could not tie the data to an actual database or receive timely data updates.

### **Methodology**

To analyze the first task in this concept, 'integrate deployment and sustainment planning as an integral part of the Effects-Based Planning process', three specific areas were observed. First, RDO construct to facilitate management of logistics functions. Second, the logistics C2 battle rhythm, and third, how the JTLM reduced the logistics footprint in theater and in the JOA.

The second concept task, 'define the JTF logistics position functions and essential elements of logistics information', looked in detail at the functions, roles, and relationships of the logisticians in the JTF operations and plans groups. The next task, 'leverage DST emerging technologies to rapidly process data and create operationally relevant logistics information', analyzed the tools to provide the JFC and subordinates the information required to determine the logistics feasibility of operational actions. The logistics displays were also reviewed to synchronize sustainment in support of RDO.

The final task in the concept, 'employ a networked sustainment distribution structure', was assessed by determining how the following effected sustaining the force:

- Tailoring intermediate staging and support bases (ISBs) to support to RDO forces
- ISB management
- Synchronization of tailored sustainment with deploying forces
- Procedures and practices to support agile mobile forces

Data was collected, primarily, from the logistics participants and SMEs using automated questionnaires and from the comments and recommendations provided by all participants, various AARs and in-focus sessions. The locations and number of the logisticians follows: plans group 14; operations group 12; SMEs 12; functional component 5; Joint Logistics Management Center 16; and the Joint Experiment Control Group 17.

### **Warfighting Challenge: Ability to Plan for Agile Sustainment**

The warfighting challenge, 'ability to plan for agile sustainment', was postulated because the current force requires a large, vulnerable infrastructure; mountains of materiel in theater; and extensive time to establish. Therefore, it is unable to provide agile sustainment and delivery to highly mobile forces in non-continuous operations. Metrics (tasks, subtasks, questions and data elements), to evaluate this challenge, were developed based on information from several sources, including:

- *Concept Experimentation Strategy (CES) to Deploy and Sustain the Force in Rapid Decisive operations* (RDO, 2/14/01)
- *Focused Logistics: Enabling Early Decisive Operations* (FLEEDO, 10/10/99), *Strategic Deployment* (SD, 5/10/00) and *RDO* (3/1/02) White papers
- *Standing Joint Force Headquarters (SJFHQ) Concept of Employment for MC02* (8/17/01)
- *Deployment & Sustainment in MC02 Concept of Operations* (CONOPS, 3/18/02)
- *Deployment & Sustainment in MC02 Tactics, Techniques and Procedures* (TTPs, 1/9/02)

The MC02 JSOP was also used to generate metrics, and was the basis for data collection plan development. The data collection plan was vetted with the logistics concept developers and other members JFCOM. The high order metrics included:

- Task: Integrate deployment and sustainment planning as an integral part of the effects-based planning process
  - SubTask: Determine the type and span of joint control that best facilitates management of logistics functions
  - SubTask: Reduce the logistics footprint in theater and JOA
- Task: Define the JTF logistics position functions and essential elements of logistics information
  - SubTask: JTF operations positions
  - SubTask: JTF plans positions
- Task: Leverage DST emerging technologies to rapidly process data and create operationally relevant logistics information
  - SubTask: Determine the tool required to provide the JFC and subordinates the knowledge needed to assess the logistics feasibility of operational actions
  - SubTask: Determine the improvements needed to feeder and umbrella information systems
  - SubTask: Employ a logistics display that enhances the JFC's ability to synchronize sustainment
- Task: Employ a networked sustainment distribution structure
  - SubTask: Leverage and tailor Intermediate Staging and Support Bases (ISBs)
  - SubTask: Tailor sustainment for synchronization with deploying and redeployment forces
  - SubTask: Determine the means of reducing the logistics footprint in JOA
  - SubTask: Ensure time-definite delivery

**Finding 1 ► The Log CROP was successful in achieving situational awareness.**

The Log CROP provided logisticians a place to find common information and achieve situational awareness. Participants judged the utility of the log watchboard 'tremendous'.

The Log CROP went beyond enhancing visibility of deployment and sustainment; it encompassed all logistics functions including supply, maintenance, transportation, contracting, and host nation services. The Log CROP is not perfect, but it is going down the right road. Early in the experiment, units had a hard time getting the information they required from the CROP due to a lack of training and familiarization with the tool. As the exercise progressed, however, more personnel, including non-logisticians, were using the CROP to accomplish their missions and gain situational awareness.

One subject matter expert commented, "Use of IWS and the virtual meetings enhanced the logistics community. The tools facilitated the horizontal and vertical coordination and synchronization of logistics issues and missions. The logistics CROP and the watchboard have provided the virtual reporting and status of logistics assets and capabilities that have been needed for years."

Another SME commented, “The Logistics CROP and the watchboard were the model for the rest of the JTF. It was praised virtually every day.”

When asked if the information and the data links on the Logistics CROP were adequate for their needs, over 90 percent of the survey respondents agreed they were adequate (See Figure 252). The surveys also provided some valuable information for future developments in the area of the CROP and watchboard. Two such comments: “Keep working this though, we can do better. Agree and very good. Just need a knowledge manager to oversee the log watchboard for timely and accurate data and police component updates.”

Not all reports were positive as a participant commented that the medical information and data links posted on the Medical CROP needed more work, while another noted that the information and the data links on the Logistics CROP were not adequate to meet the needs of engineer.

Seventy percent of experiment participants surveyed reported they had confidence in the information they obtained (and that it was current) from the Log CROP (See Figure 253). The components successfully accessed the JTF Log CROP to obtain required information, finding all the information they needed. However, the components did question the data on the CROP, stating it was not dynamic, throughout the experiment. Comments included:

- “Information on the CROP is dependent upon when functional sections post their updated data”
- “In some situations, there were redundant reports that were updated at different times by different people”
- “Confidence is only based on knowing the people entering the data are up to speed”
- “Rigor needs to be put into the update process for future operations. Various products such as air and sea schedules, and various SITREPS, have to be maintained by a dedicated knowledge manager”

The respondents were

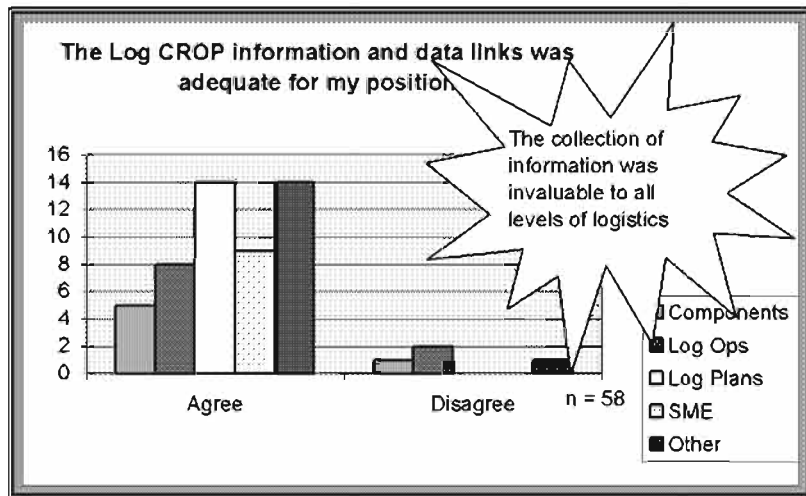


Figure 252: Participants agreed that the collection of information tools and links was useful in executing their mission

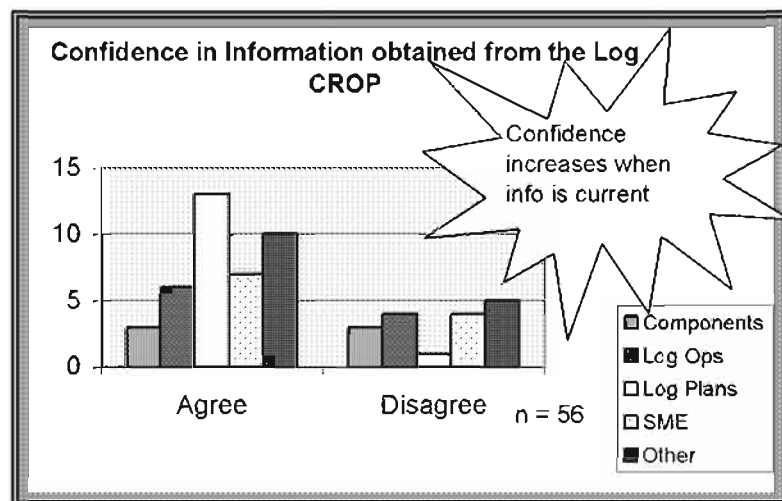


Figure 253: Most had confidence in information obtained from the Log CROP

asked whether the GCCS portal, integrated consumable item system (ICIS), joint logistics (JL) tools, Joint Forces Capability Register (JFCR), and global transportation network were key data sources for their position. Only seventy five percent agreed these programs, or portals, were key to their jobs. Figure 254, below, illustrates that during execution the primary users of these tools (as a part of the CROP) were in the JLMC and at the JTF.

Furthermore, most of the JTF indicated they did not use the logistics tools suite during execution. However, the data and observations indicated that the players used programs or tools specific to their job, but not necessarily all the tools in the suite.

Finally, the players were asked to respond to questions regarding the ease of use and the intuitive nature of the CROP display. This aspect of the CROP also received very good reviews from the users. Comments included:

- “Very intuitive, can only get better, thought it was one of the better SPPS pages used during this exercise” - JFLCC
- “Great display however, it needs to be able to link to the IWS, so that we do not have to use power point slides” - log operations group
- “Very easy to use and very intuitive” - log plans group
- “Very intuitive; it suffered from similar problems of other CROP pages, which is the abundance of info on them, and the time it takes to sort what is there and where it is” - log plans group
- “Links on the CROP should be made back to the ONA to provide logistics back ground information on all service munitions, and equipment types” - SME
- “The CROP has proven to be a valuable asset to my mission. It enhanced my situational awareness vastly and enabled me to make on the spot decisions towards mission accomplishment” Log operations group

The development of the logistics watchboard, for reporting critical supply and equipment requirements, greatly simplified reporting and provided

a good electronic visualization of the status of forces, supplies, and equipment. The information presented in the watchboard was linked to an Excel spreadsheet that provided readiness information on all supply classes in a color code for each functional component of the JTF. The supply-class levels were updated daily and the color change (green/yellow/red) alerted operators to a fall below an established level. This was one of the most controversial areas of the Log CROP, because the processes and procedures took a long time to refine during execution.

The players were surveyed and asked whether the logistics watchboard enhanced awareness and assessment of logistics material and equipment readiness. The chart in figure 255 below shows that over 90 percent of the participants agreed with that statement and praised the

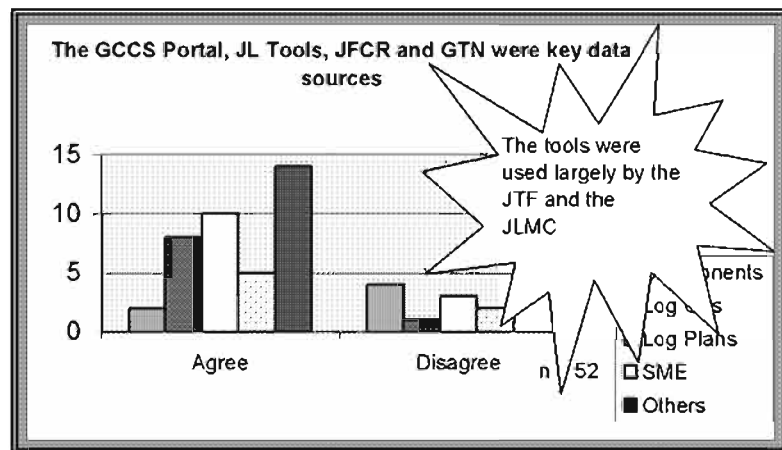


Figure 254: Most agreed that the GCCS portal, JL Tools, JFCR and GTN were key data sources

watchboard. However, most of the users also wanted to see it built around a central data repository that accepted feeds from components, rolled them up, segmented them and provided the data to higher headquarters in multiple, manipulative formats for tracking. Other comments included:

- “The CROP has to be developed to be user friendly. Components had a hard time updating it. Also need to look at what is displayed in the watchboard”
- “Another great tool for visibility. Provides a good "one over the world" look at logistics status across the JTF, but does not provide any significant details on "show stopper" logistics issues”
- “The watchboard is a great start. There needs to be more fidelity in the M&S to generate log data at the service level to properly populate the watchboard. Links need to be established from the Services’ watchboards / reports to automatically populate the watchboard at the JTF and JLMC”
- “The construct of the watchboard spreadsheets had errors which led to some misinterpretation of readiness status. Daily adjustments to stock on hand were based on the requirement rather than the previous day's stock level. One component was also not aware of the option to UPGRADE the commander's assessment rather than going with the rating based on pure numbers”
- “Watchboard needs a lot of work in terms of how the services report data. It needs to be standardized across the board (such as class V). Additionally, requirements need to be articulated on the watchboard further out than 24 hours.”
- “Very useful and had a lot of great information on it. Size of the window where the status board was located could have been bigger, though, in order to see more of it at the same time without scrolling.”
- “To the engineer staff, the logistics watchboard was of little use. Although a civil engineer tab existed it did not include any engineer data.”
- “Need a program that is dynamic and tied to Power Point for slide presentations and also allow users to update simultaneously, in other words, Excel spreadsheets linked to Power Point slides.”

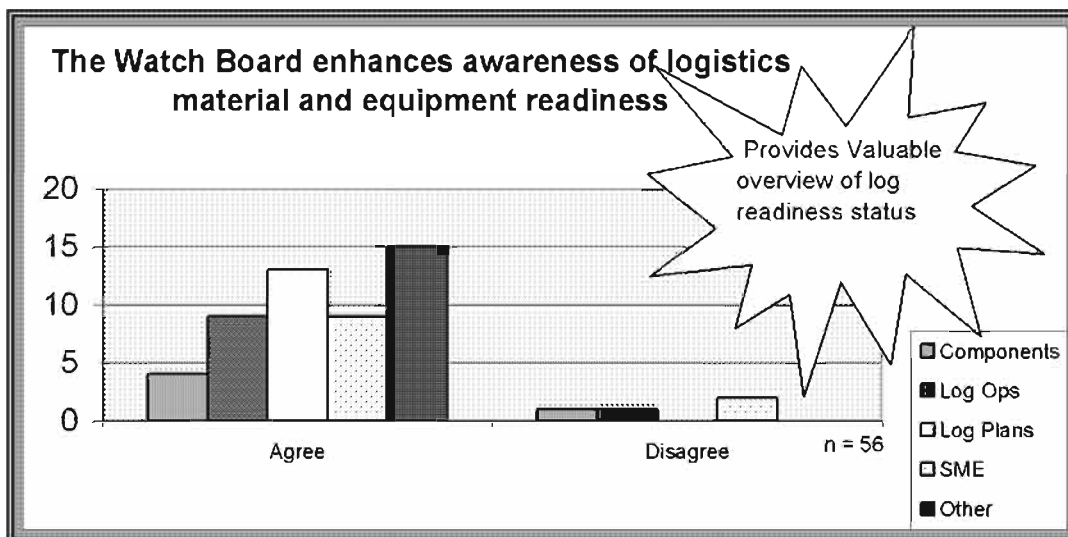


Figure 255: Most agreed that the watchboard enhanced awareness of logistics material and equipment readiness

**Finding 2► The Effects-Based Planning and the deployment and sustainment processes were not effectively integrated.**

Deployment and sustainment was not effectively integrated into Effects-Based Planning by the combatant command-level JLMC and logisticians embedded in the JTF groups. While logisticians made every effort to maintain links to the various planning groups and significantly improved the flow of information, the EBP process did not support the integration of deployment and sustainment. The management and functional structure of the JLMC provided sufficient support to the MC02 upper-end, small-scale contingency. Using the CIE, strategic and operational lift issues were resolved and integration of strategic and theater movement control functions accomplished. An upper end, small-scale contingency was, and can be, logistically supported by augmenting the J4, lead service, executive agency, directive authority for a logistics dominant user, most capable service or a combination of these support options.

Logisticians were asked a series of questions to validate the experimental JTLM concept.

The first question asked if strategic and operational level, joint logistics processes were centralized and controlled at the combatant commander's JLMC, were the processes then carried out with increased effectiveness, improved synchronization, and greater flexibility, with fewer personnel. Just over half of the survey respondents reported that the experimental JLMC did help to increase synchronization and added the following comments:

- Reach-back was effective in several areas, specifically fuels and contracting. For example, contracting support was set up for meals in the Blue portion of the JOA. Additionally, substantial coordination was conducted in the area of aligning fuel supplies at various beddown locations
- The JLMC provided strong support to the JTF. Its support was enhanced by the situational awareness provided by the Log CROP and the CIE
- Those that believed the organization did not increase efficiency mentioned that the LARB collaborative environment increased synchronization
- Although the JLMC improved some sustainment operations, the organizational functions and staffing needs to be spelled out in more detail in the JSOP. One obvious shortfall was the lack of DLA and fuels expertise to effectively work many sustainment issues

However, there were strong opinions that the JLMC structure, as it was designed in the experiment, did not allow synchronization or flexibility (a result of fewer people). In fact, the logisticians in the JTF reported more people were needed in log operations and log plans and that a truly functional J4 type staff was needed to conduct and coordinate operations. Finally, it was thought that the JLMC did not gain the same situational awareness as the JTF and remained in a reactive mode, rather than being proactive as was envisioned.

A second survey question read, 'Given the JTLM coordination was accomplished prior to MC02, during the combatant commander's normal theater engagement activities and documented in Annex D of the CONPLAN, to include the logistics management structure, was the logistics management structure in the CONPLAN sufficient to support the MC02 upper end, small-scale contingency?' A little over half of the respondents believed the structure was about right for the experiment scenario, but some common themes included

- Additional personnel and skill sets are needed to make the JLMC a viable entity
- The modeling and simulation design failed to generate the logistics workload needed to stress the participants



- JTF logistics manning was inadequate in several categories: engineer, personnel, medical, and movements specifically
- The skill sets and positions in the SJFHQ log operations and log plans need to be revisited and refined
- The breadth and depth of all the skills sets needed to operate in a SSC were not adequately demonstrated
- The JTF headquarters needs a designated J4 and all logisticians in that headquarters need to work for him
- Create a chief of support operations, who is directly responsible to the JTF commander for joint logistics functions, that includes the planning and execution of engineer, medical, sustainment and transportation support to the JTF

In the third area of this survey, logisticians were asked if the JTLM responsibility and authority for transportation related activities was accomplished by a Joint Movement Center (JMC) integrated into the JLMC. Was the JLMC able to resolve lift issues and accomplish the seamless integration of strategic and theater movement functions? Fifty-seven percent of the respondents thought the JLMC accomplished the mission and provided the following additional comments:

- The JMC functions must be retained at the JTF level
- In RDO, transportation requirements dramatically increased with less lead-time
- The Joint Planning Center (JPC) needs to work strategic movement and the Joint Operations Center (JOC) needs to work the intra-theater movement
- The CIE was instrumental in keeping situational awareness at the JTF and JLMC
- The creation of the collaborative deployment cell was key in resolving numerous strategic movement issues and helping in prioritizing TPFDD flow items
- There was a lack of a Defense Logistics Agency (DLA) Contingency Support Team (CST) in the JTF
- Procedures between plans and operations in order to watch the handoff and monitor the flow of the TPFDD were not as they should have been
- Big picture oversight of the TPFDD was problematic
- A senior logistician, possibly a logistics director, is needed in the JTF to provide oversight and to fully synchronize operational logistics functions both in planning and operations

In determining the MC02 logistics support options, the following insights were provided:

- Most of the participants said that the MC02 support structure would work for RDO-type operations (upper end, small-scale contingency)

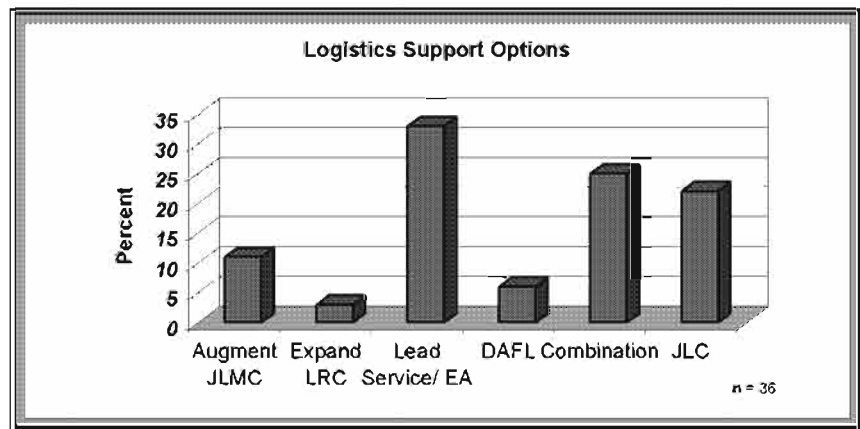


Figure 256: Support options that best supported RDO

- Directed authority for logistics (DAFL), was not specifically delineated in MC02, the JTF logisticians operated under that assumption, directing cross leveling between components, changing lead Service to the most capable component and establishing priorities of support
- Some participants believed that a joint logistics command at the component level should be established and the best terminology for this organization would be joint support command.

The type of logistics support needed for MC02 was a subject of debate for the participating logisticians (JTF, JLMC, components and the Joint Exercise Control Group). Figure 256 above represents the various support opinions the experiment participants thought best supports RDO.

**Finding 3► The JTLM concept reduced the logistics footprint in the JOA.**

Seventy percent of the logistics participants agreed that they saw several signs of cross-service cooperation and that the LARB was the key forum for bringing complex logistics issues to the forefront and working them. Examples follow:

- During collaboration, JSOTF forces were offered to help JFLCC with upcoming missions if the JLFCC equipment did not arrive in time
- Cross-Service use of HSVs in planning, but not in execution
- The LARB was the forum for directing issues to the appropriate level, such as, strategic issues to DLA or TRANSCOM, Theater level issues to the JLMC, and operational issues to the JTF or components. Additionally, it eliminated a large portion of the log RFI process
- The combatant commander J4, JLMC and JTF each contributed assistance /guidance for the allocation of strategic lift assets during the planning for the near simultaneous airborne assault and a retrograde during a LARB session
- The LARB membership encouraged the creation of daily collaborative deployment cell and engineer working groups to provide a single point for planners (deployers) and engineers to gain assistance and resolve intermittent or complex deployment or engineer issues. The medical community also created a working group to resolve their various issues

**Finding 4► Embedding logistics personnel in the operations and plans groups improved situational awareness across the JTF.**

Embedding SJFHQ logistics personnel in the operations and plans groups was a success in improving situational awareness in the JOA, although some participants believed that the overall JTF manning was inadequate and some changes were necessary in some skills sets.

**Log Operations.**

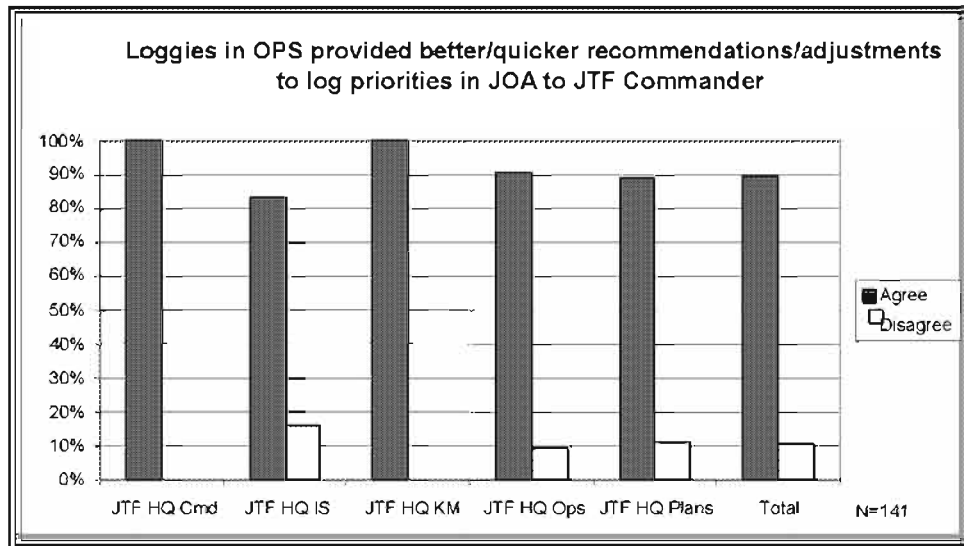
Sixty-five percent of all the logisticians surveyed agreed that the embedding of the logisticians was effective in integrating the deployment and sustainment processes. Those who disagreed based their response on the logistics organization structure issues and not on the fact that the logisticians were embedding in the groups.

Figure 257 below demonstrates the perceived importance of the logisticians embedded in the operations group.

Though most participants agreed that embedded logistics personnel worked very well, there was some feedback indicating that further experimentation may be needed.

Although many of the positions described in the Deployment and Sustainment TTP and the JTF JSOP are common to JTF staffs, the make up of the SJFHQ logistics positions was designed to find the skills that would be of the greatest benefit to the JTF when it was exported.

In Log operations, it was found that some skill sets did not match the functions necessary



to carry out their mission. In the makeup of the experiment organization, it was found the JTF log operations transportation cell did not have the required expertise, functional sections, or numbers of people to perform the mission in RDO.

Figure 257: Most agreed that operators provided better recommendations

Oversight of all common user

transportation assets should be in the JOC to include common user air, sea, helicopter, and common user land movements.

Service representation is necessary for air (AF), sea (Navy), land, and helicopter (Army or Marine). Additionally, procedures were also lacking early to allow for a handoff of responsibility from plans to operations to track and monitor the flow of the TPFDD. The plans shop continues to make changes and modifications to the validated TPFDD, which have impacts upon force flow and subsequently, impacts upon operations. A future JSOP needs to address this issue.

### Log Plans

The JPC was the (logistics) focus of both Spiral 3 and execution. The logisticians in log plans made a valiant effort to support the operations through the logistic action response board and deployment cell collaborative meetings despite limited personnel and a shortage of critical skills. Figure 258 below illustrates the JTF's recognition of the contribution from the logisticians embedded in plans to the success of RDO planning. The suggested changes to the skill set embedded within the JTF log plans area are also provided.

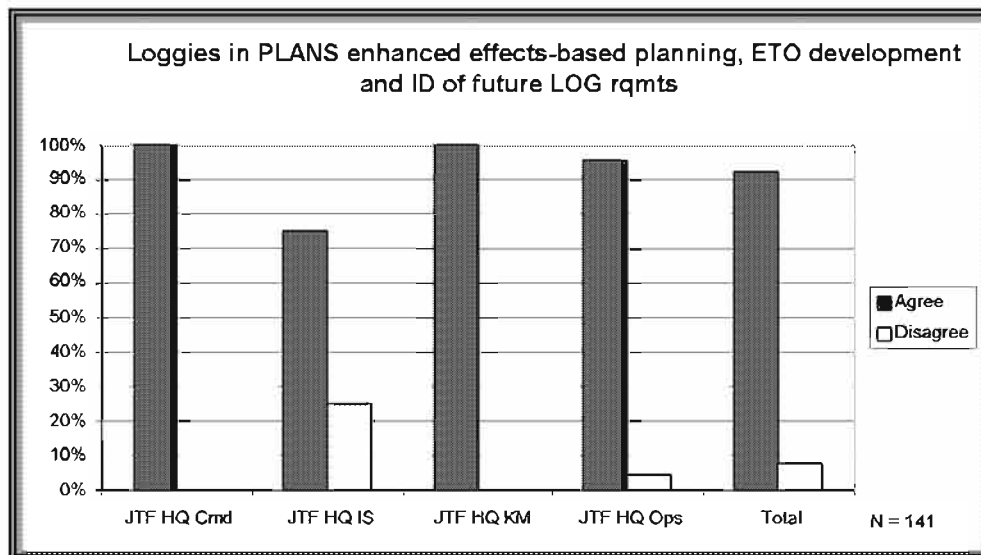
It was suggested more medical and engineer-planning expertise needs to be inserted into, or attached to, the SJFHQ. Additionally, log plans could use an additional transportation plans officer. This individual could assist the current transportation plans officer with TPFDD development tasks. As such, that officer would need detailed JOPES expertise. In addition, according to participants, log plans needs an additional deployment member with sealift expertise. It currently has an air and ground expert, but lacks anyone with sealift experience. Finally, it was noted the core JPC did not include a logistics representative. Issues being discussed off net, within the core JPC room, did not have logistics input, and logisticians outside the room were not aware of the ideas being developed until far too late.

There was some procedural confusion within the plans group on force flow/deployment planning and the TPFDD build. According to the JSOP, Chapter 5, page 5-A-4:

*The deployment cell is responsible for deployment support planning in concert with effects-based planning process. Their effort will lead to the development of a TPFDD associated with the ETO. They help provide a transportation feasibility assessment to support COA development. It is comprised of the JTF Movement Officer, Transportation planner, Strategic Lift planner, Operations and plans group Representatives, Component planners and JOPES/TPFDD technicians.*

This deployment planning process needs to be further clarified in the JSOP and understood by planners to make this work. Operational planners should develop, coordinate, and synchronize the TPFDD. Logisticians execute the TPFDD.

A separate recommendation was made for some type of synchronization tool or template



that the JTF planners could use that linked effects, to forces, and to deployment/employment time lines. The logistics planners were given the task of prioritizing the force despite the fact that the operational planners should have been more involved in this process.

Figure 258: Logistics personnel working in plans cells was a positive

**Finding 5► The organization of the SJFHQ and control of the JTF logistics activities needs refinement to provide more functional specialty expertise.**

A key area of analysis was the impact of the experimental log operations and log plans organization on the JTF. Upon review, it was found that the JTF logistics organization needed to be revisited to provide a more functional look. Numerous comments were made in favor of a logistics support group that put the logistics director in parity with the operations/plans/IS/KM directors.

When surveyed, three of the senior logisticians in the SJFHQ indicated they were successful in MC02, but it was not necessarily because of the organizational structure. They each indicated logistics could better serve the JTF if the entire logistics team was organized as a stand-alone entity, for example as a logistics support group with a log director. This structure would still allocate log planners and operators to the operations and planning groups. Two supporting comments are provided.

“The embedding of the JTF headquarters logisticians in the operations group and the plans group from an operational viewpoint is prudent. In most current JTFs, the J4 has representatives in the JOC and JPG, which is similar to the current configuration of the experimental JTF organization. In current JTFs, the J4 is the senior logistician and ensures that logistics functions are fully synchronized in JTF operations. In the experimental JTF, there appears to be an integration and synchronization of logistics functions problem in the plans and operations groups.

“I feel the plans group has not fully synchronized the logistics tasks across the spectrum of the PEL and ETO. A way to fully synchronize operational logistics functions both in planning and current operations is to have a senior logistician in the headquarters that has oversight of all logistics functions. The logistician would work directly for the JTF commander,” a SME said.

“The SJFHQ logistical relationship with functional components and Services placed a huge workload on the logisticians embedded in the SJFHQ design. As a result, the logisticians, even with augmentation, could not meet both the needs of the plans or operations directors and the requirements of the functional components at the same time. The components were confused on where to go for medical, engineer, contracting, personnel, mobility, request for forces, sustainment, ammunition, and other logistics requirements. The areas constitute a subset of the 21 logistics functions. The SJFHQ design needs to be revised so that there is a fifth cell / director, called ‘logistics support group’. The logistics operations director needs to be moved to head that cell. Additionally, include a medical, personnel and engineer expert,” said the combatant commander’s J4.

Further, whatever organization is adopted, it would be prudent to identify a “gatekeeper” for all Log plans and Log operations to receive and prioritize tasks and distribute the workload. There is a great need for a knowledge manager (KM) type position to manage the Log CROP, handling the information flow, messages, RFI tracking, and other KM responsibilities. Finally, the log operations director position appeared to be misaligned in this construct. This position should be on a level with the plans and operations directors. Some recommendations follow:

- Create a chief of support operations, who is directly responsible to the JTF commander for joint logistics functions, which includes the planning and execution of engineer, medical, personnel, chaplain, contracting, sustainment and transportation support to the JTF
- Change the organization to include a log director (O-6) to manage overall logistics. Then appoint a log operations director (O-5) to manage log operations and have a log plans officer (O-5) to orchestrate logistics plans activities
- It is thought that a logistics support group, led by the senior logistician could be formed to consume the other services/functions overseen by the current J4, as well as to maintain command focus on the sustainment/movement of the JTF warfighters

**Finding 6** ► **The collaborative logistics board, center, cells, and working groups enhanced the performance and situational awareness of all planners and operators across the joint force.**

Several key functional areas created their own collaborative cells and working groups to increase situational awareness at all levels. The collaborative logistics board, center, cells, and working groups enhanced the performance and situational awareness of all planners and operators in the JTF, components, and the JLMC. The LARB was instrumental in the daily JTF and component battle rhythm. Several key functional areas created their own collaborative cells and working groups to increase situational awareness at all levels.

The LARB was designed as a cross-functional, multi-discipline forum. LARBs are supposed to accomplish three things - share information of general interest to the logistics/ deployment/ sustainment support community; conduct logistics and deployment planning in support of ETOs; and address more complex log and deployment issues, especially short-notice (Ops-related) issues, or those that involve coordination between three or more LARB constituents in the joint force. In MC02, the benefit of the LARB to the logistics community was summarized in a quote.

“The LARB continues to be a great medium for logisticians to synchronize the logistics on the battlefield,” said the JTF log operations director. That sentiment was echoed by a component logistician saying, *“The LARB was the most important meeting of the day.”*

The participants were surveyed to compare the perceptions of the LARB from Spiral 3 through execution and to see if the LARB continued to meet the needs of the membership. Table 42 below is a summary of their answers and shows a high level of satisfaction with the conduct of the LARB in terms of products produced, the situational awareness gained, and the contribution to their job daily.

Table 42: Players View of the Logistics Action Response Board

| Responses/ Events                                | Spiral 3*  | MC02*      |
|--------------------------------------------------|------------|------------|
| Products produced were useful                    | 96 percent | 89 percent |
| Performance of tasks was enhanced                | 95 percent | 96 percent |
| Level of trust in LARB was high among players    | 91 percent | 94 percent |
| Time in LARB was useful                          | 96 percent | 89 percent |
| Situational awareness was gained/ increased      | 96 percent | 92 percent |
| LARB contributed to the performance of their job | 92 percent | 81 percent |
| The interval the LARB was held was adequate      | 88 percent | 89 percent |
| The mix of the participants was adequate         | 91 percent | 98 percent |

\* =Percentage of respondents agreeing with statement

Spiral 3 “n” – 20 from Log OPS/PLANS and JLMC

MC02 “n” = 46 from Log OPS/PLANS, JLMC, and SME

The biggest product of the LARB was the facilitation of communication between the components (horizontal) and between the components, JTF, and the JLMC (vertical). This resulted in better logistics planning, fewer logistics, and transportation related missteps, and faster response to log problems among the logisticians.

The LARB provided very good logistics situational awareness, as well as involvement, for all affected parties. Products, that were more tangible, were identified as the development of the concept of support briefs, Class VII Replacement Reporting Procedures, and LARB minutes that could be reviewed by all.

Several participants said there was too much staff coordination and discussion performed in the LARB. Because no other working groups were established to lay the groundwork for synchronization, the senior logistics officers have to hear and help action officers do their staff

work. Lower level collaborative working groups needed to be established to develop options and recommendations for senior officers prior to the LARB, they concluded.

The “products” the LARB provided were interpreted differently, but the following comments summarize its meaning.

The LARB was considered very effective at enhancing the performance and completion of the logistics tasks required by the JLMC, JTF, or component. At an after action review, component representatives stated, the LARB was a very instrumental forum for enhancing their performance. They reported this collaborative session increased their situational awareness of the JTF’s actions and helped resolved issues. A component log director said, “JLMC was a real force multiplier—having a direct line through the LARB to the combatant commander J4 was terrific. It also gave components confidence because they knew that their log issues were being worked at the highest levels.” A few participants mentioned that the LARB worked some issues that were not logistic management issues. An example of this was deployment issues. The discussion of deployment often got into force selection and priority for flow between a few players. The LARB was not the place to solve these issues and eventually this subject was moved to a collaborative deployment cell.

Other LARB suggestions:

- The publishing of LARB minutes and action items enhanced JTF, JLMC, and component performance
- The LARB agenda should present future JTF activities at 24, 48, 72, and 96-hour points with a projection of resources needed at these time points and a comparison with future operations. Quad charts and / or synchronization matrixes were recommended
- The engineer community noted that when their issues or plans needed to be approved, the LARB served as a very good forum. However, they found the majority of the interactions between the JTF, JLMC, and component / service level had to be worked in an “engineer cell” they instituted. The medical community also had a “medical cell” for their day-to-day issues

How effective was your time in the LARB? This was one of the most discussed issues during the spirals and execution and the answer depended upon where you were sitting. Most of the JTF and component players indicated the sessions were not too long, because many issues discussed affected them both directly and indirectly. However, the JTF leadership and the JLMC thought the sessions were too long and often without direction.

One participant thought there was undue concern about the lengths of the meetings. “We continually received pressure to ‘speed up the meeting’, as if shortness of the LARB was a criteria for excellence,” a logistics coordinator said. “This obviously isn’t the case, since a five-minute LARB that accomplishes nothing would not be ‘excellent’. Instead, the LARB was designed as a cross-functional, multi-discipline forum, and as such, there are liable to be any number of issues raised that might not be of interest to 90 percent of the participants. Rushing through the meeting is not the proper solution, but perhaps narrowing the participation in the LARB is, if that is what is desired. But instead, the advantages of having a diverse group of experts participating in the LARB is worth the possibility that LARB meetings will take a little extra time,” he concluded.

Many of the participants in a position to know, reported that the LARB got even better when the logistics operations director instructed that operational issues (log operations) be

discussed early in the agenda before the plans issues. Most believed the timing and interval of the LARB in the battle rhythm was effective. However, many indicated the LARB spent too much time doing action officer coordination. They requested an action officer-working group prior to the LARB to develop options for resolving issues, as well as, recommendations to the log operations director and JLMC director. The logistics coordinator disagreed, stating, "It gets away from the intent of the meeting, which is to provide a forum that goes both vertically and horizontally across command lines and the strategic, operational, and tactical levels of conflict."

The 'participant-mix' in the LARB was a subject of much debate. Comments from JTF members were generally positive, such as 'the mix was excellent' and 'the experience base was outstanding'. In addition, with the broad base of experience and skills, there always seemed to be an expert in the LARB.

The logisticians at all levels indicated a need for the participation of the employment planners in the LARB and deployment cell sessions, especially when planning. In addition, the strategic lift and deployment planner should be in the plans cell and be integrated with the employment planners to understand the lift restraints and constraints of an operation.

Deployment is an operator requirement, but logisticians have been doing it for years. But, while only the operators know what combat power they need to satisfy a mission, it's the logisticians, who know what is needed to support those forces selected. It must be a team effort to insure the right combat/support forces are selected to get the job done.

Another participant said deployment is not a LARB function and should be done in the JPC.

Some valuable LARB recommendations were received through comments and after action reviews. Comments included the following:

- Change the name of the LARB to the 'logistics coordination board'
- Log plans should be using a joint logistics coordination board to coordinate with the combatant commander and the components during planning
- The LARB should be the log operations group forum to resolve real time logistics issues/shortfalls
- The LARB membership is about right, as is the interval the LARB met. The interval is based on a 12-hour experiment day, not a 24-hour experiment day
- Joint rear area coordinator (JRAC) representative should be added as a core member
- The medical planner should remain as a core member and consideration should be given to add an engineer planner as a core member

A separate collaborative logistics cell called the deployment cell developed and matured during MC02. It was established to discuss movement and deployment, TPFDD, and transportation concerns. The key participants included: JLMC log planner, JLMC movement officer, log plans officer, log coordinator, deployment / transportation planner, log operations movement officer, and component log planners. This cell should involve, and be subordinate to the 'core' operational JPC planners whose input is needed for force movement decisions. The deployment cell was very useful for developing the TPFDD and working the strategic deployment / lift / movement issues. Finally, it is recommended the deployment cell be codified in the SJFHQ concept.

Future guidelines were proposed by MC02 participants to define the deployment cell's responsibilities. Two such guidelines included keeping operators involved in the process as planning progresses and that the deployment cell should meet daily, with attendance required by



ALCON until the TPFDD was complete; then, personnel could attend on an “as needed” basis. Deployment cell issues to address would include:

- Movement prioritization
- Force selection for EBO
- Selection/prioritization for theater lift
- The cell leadership would be ready to address “how to do” theater lift
- Identify common-user airlift assets
- Appoint executive agents
- Schedule and prioritize

Table 43: Recommended Deployment/Redeployment Cell membership:

| Strategic               | Theater                 | Components |
|-------------------------|-------------------------|------------|
| Deployment Planner      | Transportation Ops      | JFACC      |
| Strategic Lift Planner  | JTF Movement Off        |            |
| DIRMOBFOR/AMD           | DIRMOBFOR/AMD           | JFLCC      |
| Log OPS Director        | Log OPS Director        |            |
| JLMC Strategic Movement | JLMC Strategic Movement |            |
| Operator (Plans Group)  | Operator (Plans Group)  | JFMCC      |
| Plans Director          | JOC Chief               |            |

The second, collaborative logistics cell created was the engineer cell. It was established because the LARB did not provide the medium to resolve all complex, sophisticated engineer issues. Additionally, the participation in the LARB did not facilitate coordination of engineering support to ETO planning and current operations. As the operation got underway, interaction with the engineers increased, to include information on beddown at ISBs. The engineers used this forum to generate alternative engineer recommendations and actions. The collaborative discussions were helpful in generating recommendations or actions. The functionally coordinated issues or recommendations could then be brought to the LARB for action. This cell provided several valuable recommendations to be considered for future experiments.

Finally, a third collaborative cell established was the medical cell. This cell met daily in the JTF operations/command/support/medical room. The participants were the JTF medical staff in the command / operations / plans groups; Service components; JLMC, and the JECG (onsite and offsite). The purpose of their meetings was to discuss medical issues that may have an impact on the warfighter. Topics included medical surveillance (e.g. Tularemia outbreak), casualty evacuation process, and medical concept of support from the Service components. The information shared within this collaborative environment was taken back to the medical planners and operators for their actions and inclusion into the warfighting plans/operations.

Overall, the logistics boards, centers, cells and working groups operated as envisioned in the TTP and JSOP. Figure 259 summarizes the participation and status of the members in their assigned boards, center, cells, or working group.

In the first bar of the graph in the chart, JTF logistics personnel responded positively to the question, *‘Is your participation in a virtual board, center, or cell, in accordance with applicable TTPs and SOPs?’* Over 75 percent of the JTF clearly understood their role in a collaborative session. A majority of the “no” responses were from assessors and the JLMC.

In the second bar of the graph, JTF logistics personnel responded to the question, ‘*During MC02, has your participation status (active / inactive / other) changed in any board, centers, cells or work groups? If yes, what was the change?*’ Ninety two percent of the logisticians state they did not have an assignment change, indicating the assignment of personnel to the various collaborative sessions was about right. Three JTF players changed status when they were no longer required to monitor an effects assessment cell.

**Finding 7► Logistics decision support tools provided to the JLMC, JTF, and components enhanced planning and decision-making.**

Several logistics tools were provided to the JLMC, the JTF, and the components to enhance planning and decision-making in the determination the logistics feasibility of operational actions. GCSS provided a user-friendly access to logistics information over a broad spectrum of sources; however, many times it lacked detailed information from its queries and drove the “miners” of information to use the actual sources. Fortunately, these sources were available via GCSS links. Most believed these were powerful tools and certainly the way ahead for logistics. However, most of the joint logistics tools required training that is more extensive.

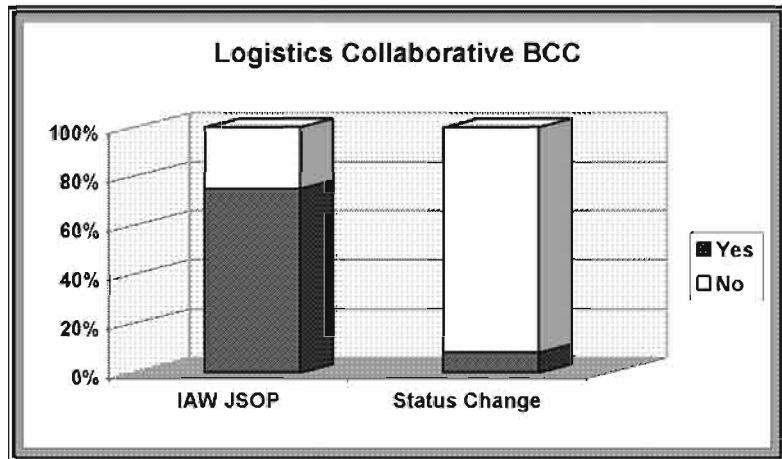


Figure 259: Over 75 percent of the JTF players clearly understood their role in attending the appropriate collaborative session

Additionally, one limitation of both GCSS and JOPES was the need for a SIPRNET PKI certification. The individuals that used these systems were required to obtain the PKI from their respective Service or command. Some Services were not prepared to do this PKI certification prior to the experiment and this limited the number of people that could access the tools. A second limitation was each individual system in the GCSS suite and the logistics Tool suite required a separate password, which could be a big drawback if required to use several of these tools.

**In summary:**

Global Transportation Network Exercise System (GES)

**Value:**

GES provided the JTF the ability to pull the air and sea movement schedules, and allowed the posting of data to the Log CROP for all to see. It also proved to be useful for tracking movements and providing APOD/SPOD summary data. The program should continue to be developed for future exercises.

**Problems:**

The system was down a lot. The participants did not like the fact that GES did not match JOPES and was unable to support TPFDD changes as they occurred.

### Joint Operations Planning and execution System (JOPES)

**Value:**

- MC02 proved the need for a realistic TPFDD in joint exercises. The joint training gained during the experiment was invaluable in improving the joint deployment process.
- JOPES ADP procedures are still the best method for handling the force deployment issues.

**Problems:**

- Working with an operational TPFDD was problematic because certain forces and equipment was selected for movement at the end of Spiral 3. These forces were being moved by the M&S prior to execution and the experiment actually began in D+16. Neither the components nor the JTF could change those movements prior to execution. Once execution began and retasking was required, it had become quite evident that JOPES was just not the flexible tool required for this fast paced, crisis action planning environment.
- The 96-hour validation window was not an M&S effect employed to reposition aircraft.
- Additionally, JOPES skilled personnel were in short supply for the experiment and there is a need to continue training for this skill.
- JTF personnel needed access to manager's tools, displays, and query functions in JOPES. Online JFAST capability would have been helpful as well.

### Joint Total Asset Visibility (JTAV)

**Value:**

- JTF sustainment used JTAV exclusively to determine asset position and availability.
- JTAV was very useful for MC02 planning, particularly for the analysis of prepositioned and munitions.

**Problems:**

- The system could be more user friendly.
- It is a real world system and was not useful in the experiment operations because its experiment inventories did not exist.
- JTF sustainment could not get total asset visibility with this tool.

### National Imagery and Mapping Agency (NIMA)

**Value:**

- Very useful, basic infrastructure information to aid in beddown assessments
- The site was easy to navigate and a great resource for operational planners.
- Provided pictures of aerial ports and seaports making it easier to discuss and determine capabilities at certain areas.

### Port and Airfield Collaborative Environment (PACE)

**Value:**

- It provided good visibility on capacity and capability of potential APOD and SPOD locations.

- It provided very good imagery and was a useful tool.
- It is more user friendly than NIMA.

#### Joint Flow and Analysis System for Transportation (JFAST)

##### Value:

- USTRANSCOM supported MC02 strategic (inter-theater) and tactical (intra-theater) airlift scheduling requirements by using JFAST. JFAST was used to develop TPFDD-based schedules that were fed to the Global Decision Support System for simulated execution. The USTC team provided tremendous support with JFAST and realistic assessments of recommended courses of action.
- The JTF planners found the JFAST products very helpful for TPFDD assessments. MC02 was resourced where JFAST was only available at the JLMC level. Because JFAST is a PC-based application, it could be made available to all levels of planners, with training required.
- The log operations personnel made use of the CROP to display the JFAST output depicting estimated transportation closure for air and sea schedules based on the specific criteria used to develop the schedules. They displayed current movements plus 24 hours by ULN.

##### Problems:

- The JTF players requested access to the program, but did not receive it.
- JFAST operators were assigned at the JLMC level, but did not provide the needed products to log plans.

#### Sustainment Generator (SUSGEN)

##### Value:

- SUSGEN was intended to run a sustainment review and build applicable sustainment packages to apply to the TPFDD after the locking of the Spiral 3 TPFDD. The extended deployment planning precluded the use of planning this sustainment.

##### Problems:

- The program is a part of JFAST and was only available (by exercise design) at the JLMC level. With JFAST being a PC based application, it could be made available to planners at all levels—training was required.

#### Integrated Consumable Item (ICIS)

##### Value:

- ICIS is a must-have tool for petroleum logistics planners from the JTF's service components all the way through the combatant commander's JPO and DESC headquarters. The program takes TPFDD data and computes consumption factors for all troop locations. It was a very useful tool.

##### Problems:

- The program was available to all the users requesting access and those that did have the program got it late in the experiment. The JLMC had the most exposure to the program.

- Future work to make ICIS more user friendly is necessary for the more novice petroleum personnel that may be assigned to the JTF or Service component headquarters.

#### Joint Force Capability Register (JFCR)

See **Assessment Area 2** for details on the JFCR.

#### Capability Assessment (CA)

The capability assessment tool saw very limited use in the experiment. It was deemed to be user-friendly and flexible and provide good capabilities.

#### Joint Electronic Battlebook (JEB)

JEB also saw very limited use in the experiment. A good tool, but the database needs to be expanded to all military units.

#### Sustainment Visibility (SV)

SV also got very limited use in the experiment. It was used by the JTF for sustainment information and was valuable as a back up tool to JTAV.

#### Force Browser (FB)

FB was used to analyze the contents of the TPFDD as it developed. It was viewed as one of the most popular of the JL tools.

### **Other Observations**

“Rapid, collaborative and dynamic planning and execution have reinforced and highlighted the need for improvements in our processes, procedures and philosophy toward the inter-related and inseparable functions of force deployment, employment and sustainment,” said one senior concept developer.

One emerging insight from the experiment was that rear area operations could no longer be considered an economy of force operation. Force protection and force projection were areas that needed to be refined in the assured access concept, according to senior mentors and senior participants. It was noted that the JFLCC commander assumed the oversight role for joint rear area operations in the experiment, but the cell that was established had to come out of the JFLCC staff resources.

The JFLCC commander was well aware that his staff wasn't structured to support the force protection mission. “With regard to force protection, as the JRAC, I recognized I was not structured to do that,” the commander said. “We built the JRAC and small staff out of hide. We all recognize the rear area goes back to CONUS. But in future JTF's, we should think about a functional component that has the resources and the people and not treat JRAC as an afterthought,” he said. Although the JFLCC was able to accomplish the mission of maintaining security of the force, future experiments/missions needs to be resourced appropriately.

Two recommendations were presented from the senior concept developers and the senior participants for the MC02 Interim Report. First, begin an assured access concept that encompasses force protection, employment, deployment, and sustainment from the continental United States to the joint operations area. Second, revise joint doctrine on the essential elements and roles and responsibilities of joint rear area operations.

A second observation was that the experiment's ONA knowledge base did not include Blue force logistics data or information. All of their logistical support data and planning information was available from the Log CROP. The Log CROP was not accessed through the ONA knowledge base; it had a separate portal page on the common experiment server. This was contrary to the ONA concept's suggestion for an integrated intelligence, operational, and logistics information warehouse that supported effects-based planning and ultimately produced an effects tasking order. The suggested relationship was intended to allow routine interaction between the three specialties that would also produce more efficient and effective use of resources. Implementation of the logistic portion of the ONA knowledge base requires further definition.

### **Relationship to Other Objectives**

Assessment Area 11 impacted several other experimental concepts and assessment areas. The ones affected are discussed below.

#### **SJFHQ**

- Functions of personnel in log operations and log plans positions in SJFHQ

#### **ONA**

- Database research for facilities and infrastructure to support logistics operations in JOA

#### **EBO**

- Develop logistics concept of support for Effects-Based Operation(s) and future branches and sequels. Execute logistics operations to sustain forces conducting effects-based operations

#### **Sustainment**

- Plan and provide logistics sustainment for the JTF

#### **Collaborative Information Environment**

- Environment for collaborative planning and coordinating logistics operations, force deployment and sustainment, horizontally and vertically as in the LARB

#### **Interagency Agency**

- Interaction for coordinating host nation support (food, facilities, equipment) and humanitarian assistance

#### **JISR**

- Intelligence on the JOA and adversary activities therein that would adversely impact force deployment and logistics operations

#### **Joint Initiatives**

- Introduction and experimentation of new joint logistics tools

#### **Assured Access**

- Ensuring access into the JOA and facilities therein to support force deployment

### **Relationship to Baseline Analysis**

The JTLM warfighting challenge relates the performances described for three UJTL tasks in the baseline report

- UJTL Task: OP 1.1-Conduct Operational Movement. The deployment branch was not manned to handle assigned responsibilities and the branch staff did not have relevant experience or technical expertise

-MC02 Observation: When MC02 began there was no structured deployment branch of the JTF. As the experiment evolved, a deployment room was established in the collaborative system to coordinate deployment issues. This proved to be very effective

- UJTL Task: OP 4.1-Coordinate Supply of Arms, Munitions, and Equipment in the JOA. The J-4 was not able to adequately track key trigger points throughout the operation, or monitor major changes during the campaign

- MC02 Observation: There were no predictive tools in the experiment to provide trigger points

- UJTL Task: OP 4.4-Coordinate Support for Forces in the JOA. The JTF requested and received directive authority for logistics, enabling the JTF to direct or assign common user items and services to specific components. The resulting continuous flow of support was crucial to mission accomplishment

- MC02 Observation: A combination of logistics support options, including directive authority for logistics, was used in MC02 proved to be adequate

### **DOTMLPF Linkage**

- Organization. The logistics personnel embedded in the groups were successful and increased the situational awareness for all players. A support operations group was recommended, as well, for further evaluation that integrates all logistics and support functions under a single director equivalent to the group directors. Additional research is required to determine if engineer or medical positions are needed in the SJFHQ. There is a need for a joint movement center to maintain visibility over cargo and assets. A deployment cell is needed in the JPC to correctly handle priority of forces and cargo in the TPFDD.

- Training. In-depth training is required for future leaders in conduct planning and operations in a CIE. Wide spread training in JOPES and its products is needed for logistics and operations personnel

### **Recommendations**

1. JLTC, continue to refine the roles and responsibilities of the JLMC positions in the deployment and sustainment TTP and JSOP in future LOEs. ►
2. JLTC, in future LOEs and work shops, investigate the roles and responsibilities for a JTF support operations group that integrates all logistics and support functions under a single director equivalent to the plans and operations group directors. ►

- A change to the SJFHQ organization that elevates the senior logistician (O-6) to log director for overall management of logistics and create an O-5, log operations director to manage log operations and an O-5 log plans officer to orchestrate logistics plans activities.

3. JFCOM/SJFHQ, consider a logistics battle rhythm change that establishes a lower level (action officer) collaborative working group to develop options and recommendations for senior officers prior to the LARB. ►

- The engineer and medical functional areas continue to establish collaborative cells to address their detailed planning and resourcing issues prior to raising issues to the LARB.

- Change the name of the LARB to the logistics coordination board (LCB).

- Change the LARB agenda to present data points in 24, 48, 72, and 96-hour increments to show the projection and status of resources necessary to meet future operations (branch and sequels). This should show a status of resources not a status of airflow.

- A deployment cell be codified in the SJFHQ concept, TTP and JSOP with guidelines, structure and membership and added to the JPC to ensure the priority of forces and cargo flow is correct.

Table 44: Operations and Plans Groups logistics positions

| Recommended Position/Skill                  | LogPlans | LogOPS | JTF Plug |
|---------------------------------------------|----------|--------|----------|
| Deployment Planner – Sealift Experience     | X        |        | X        |
| Transportation Plans Officer                | X        |        | X        |
| Log Director                                |          |        | X        |
| Log OPS Director – O5                       |          | X      | X        |
| Log Plans Director – O5                     | X        |        | X        |
| Joint Movement Center (JMC) – Air Expertise |          |        | X        |
| JMC – Sea Expertise                         |          |        | X        |
| JMC – Land & Helicopter Expertise           |          |        | X        |
| Knowledge Manager                           |          | X      | X        |
| DLA Contingency Team                        |          |        | X        |
| Personnel Planner                           |          |        | X        |
| Medical Planner / Logistician               |          |        | X        |
| Engineer                                    |          |        | X        |

Note: The JTF participants identified the positions and skills shown in table 44 above during MC02 execution. Most of these positions are identified as JTF plugs to fill out the JTF and can be placed in log plans or log operations as required by the Log Director. The skill sets and positions indicated in Log operations and log plans should be revisited and refined by the SJFHQ (P).

4. JFCOM/JLTC, improve logistics decision support tools and logistics tools to meet the agility demands of RDO. ►

- DLA should modify JTAV so that it can be tied to an experiment inventory or a database.

- Refine JOPES procedures to be changed to meet the agility demands of RDO.

- Refine JOPES processes to speed the entry and validation of TPFDD changes.

- Combatant commanders and Services should ensure that trained JOPES operators are available



at all levels.

- Combatant commands and Services should streamline the PKI certification process.

5. JFCOM, develop an assured access concept to encompass force protection, employment, deployment and sustainment from the continental United States to the joint operations area. ►

6. JFCOM, review joint doctrine regarding the essential elements and roles and responsibilities of joint rear area operations. ►

7. JFCOM, experiment with a CONOPS specifically targeting joint rear area operations. ►



Figure 260: Special Forces operations at sea in support of Millennium Challenge 2002

## Assessment Area 12 — Joint Initiatives

The MC02 joint initiatives process was established to provide a systematic, objective review and evaluation of proposed joint initiatives in experimentation from the various governmental and service sponsored proposals. The process provided a multi-level review of initiatives with command-wide involvement supplemented by interagency and service representation. The initiative approval process objectively compared each proposed initiative to the overall experiment objectives as well as applicability to the joint environment. Additionally, the process provided continuous tracking and addressing of associated issues throughout preparation for the event. The joint initiatives process provided a two-way communication between the individual initiative sponsors and the MC02 Experiment planning and integration teams.

The review process provided for three examination sessions with each being progressively more detailed and requiring higher-level endorsement for proceeding. Phase 1 was the initial review by subject matter experts from the functional and experimentation communities

### Joint Experimentation Initiatives Statistics:

- **103 initiatives proposed by 24 separate organizations (combatant commanders/Services/Agencies) for inclusion in MC02 were reviewed.**
- **25 separate initiatives were recommended for integration into MC02**
- **20 of which were incorporated as Joint Experimentation initiatives.**
- **5 of which remained at the Service Level.**
- **79 initiatives were not approved or were withdrawn after initial approval due to failure to meet basic eligibility requirements (did not match objectives, funding, or initiative readiness for experimentation)**

that screened submissions against Rapid Decisive Operations (RDO) objectives and MC02 joint environment objectives. As part of Phase 2, a "Council of Colonels" was formed to review the recommendation of the operational/technical panels and forward its findings to the third stage (Phase 3) – a general officer/flag officer panel.

Many service proposed initiatives were not approved for joint integration due to their singular, service-oriented nature. This prototype initiative process is planned for use in future major experiments to ensure a standard and formal procedure exists for vetting new ideas and technologies into the joint experimentation process. The joint initiatives are discussed in detail in Annex K of this report.

The 20 joint experimentation initiatives are:

- 1 – Collaboration Tool Suite (InfoWorkSpace 2.5 (IWS 2.5))
- 2 - Global C2 System - Integrated Intelligence and Imagery (GCCS-I3)
- 3 - Joint ISR Management Tools (JISR Tools)
- 4 - ONA Tool Suite
- 5 - Logistics Tools Suite (LTS)
- 6 - Theater Medical Integration Planning – Joint (TMIP-J)

- 7 - Joint Fires Initiative (Automated Deep Operations Coordination System) (JFI ADOCS)
- 8 - Automatic Network Information Flow (ANIF)
- 9 - Network Security Management Correlation & Display (NSMC&D)
- 10 - Joint Enroute Mission Planning and Rehearsal System-Near Term (JEMPRS-NT)
- 11 - Maneuver Control System-Tactical Combat Operations (MCS-TCO)
- 12 - Global Strike Task Force (GSTF)
- 13 - Joint Public Affairs Ops Group (JPAOG)
- 14 - National Imagery and Mapping Agency (NIMA) Initiative
- 15 - Command and Control for Space, Information Operations Forces (C2 for Space, IO Forces)
- 16 - Unmanned Sensor Support to Special Reconnaissance (US Support to SR)
- 17 - JSOTF reach-back/Special Operations Mission Planning Environment (SOMPE)
- 18 - Joint Automated Target Folders (JATF)
- 19 - Joint Automated Single Guard Solution (JASGS)
- 20 - Joint Special Technology Operations (STO)

### **Near Term Fieldable Technologies**

Some of the joint technical initiatives submitted for participation in MC02 were identified as having near-term fielding potential in the course of the joint initiatives vetting process conducted by USJFCOM. These technologies were those that supported MC02 objectives and upon fielding, could begin the process of transformation toward MC02 long-term goals. These technologies truly defined a unique MC02 product: near term fieldable technologies (NTFT).

There were six of these technologies: Joint En-route Mission Planning and Rehearsal System, Near Term (JEMPRS-NT), Automated Deep Operations Coordination System (ADOCS), Maneuver Control System-Tactical Combat Operations (MCS-TCO) interface, Automatic Network Information Flow (ANIF), Network Security Management Correlation and Display (NSM C&D), and Joint Automated Single Guard Solution (JASGS)/Interdomain Transfer System (ITS). JEMPRS-NT, ADOCS, ITS and MCS-TCO were assessed during the course of the MC02 spirals and in the execution event itself using the USJFCOM Joint C4ISR Battle Center (JBC) assessment process. ANIF, NSM C&D, and JASGS were assessed by the JBC just prior to MC02 initiative selection. ANIF was integrated into the MC02 infrastructure along with NSM C&D and ITS, while JASGS was demonstrated in stand-alone mode. All of these technologies were recommended for near-term fielding with DOTMLPF packages prepared and submitted to USJFCOM joint interoperability and integration (JI&I) for presentation to the Joint Requirements Oversight Council (JROC).

The assessment results for these technologies are summarized in the near-term fieldable technologies annex, along with the full report of the JBC MC02 Task Force that did the preliminary analysis and technical maturity/feasibility assessment on all of the joint initiative submissions in support of the USJFCOM joint initiative vetting process.

## Assessment Area 13 — Joint Intelligence, Surveillance, and Reconnaissance (JISR)

### Overall Assessment Results

The JISR concept displayed great potential, but requires further development and experimentation. This was significant given that the concept and the supporting tools were considered relatively immature. They had not undergone any previous experimentation. There were areas where JISR clearly and significantly improved the JTF performance, but its effectiveness in others could not be adequately measured. The concept should be more fully developed and given increased scrutiny in a limited objective experiment.

### Methodology

More than 196 experiment participants selected by their duty positions in relation to the JISR concept evaluated JISR via survey. The participants received a series of 48 questions for evaluation. In addition to the questionnaires, other sources evaluated the utility of JISR. Subject matter experts reported on the performance of JISR on a daily basis. Senior concept developers discussed JISR and provided comments. Experiment participants submitted observations and recommendations, 36 comments were collected. Technical collection to assess the use of the ISR Database was included in the collection plan.

Difficulties arose that prevented proper analysis of the complete JISR concept process. The task of information collection and some subsequent tasks could not be assessed due to the modeling and simulations environment not providing the ISR data at the level needed or in the formats required. Just days into the experiment, a 51-page document on work-a-rounds had to be published to keep MC02 running.

The planning aspect of the JISR concept could not be conclusively determined to be the cause for the improvement in reaction to emergent targeting, reaction to emergent information requirements, and planning because of the large number of ISR assets provided in the scenario. Senior concept developers, JECG personnel, and participants agreed that the scenario was excessively ISR asset-rich.

### Warfighting Challenge: Ability to provide relevant intelligence to the commander

Task: Plan and direct ISR operations

Subtask: Link collaborative planning and execution

Subtask: Apply JISR management

Subtask: Synchronize operations and ISR

Task: Collect information

Task: Exploit information

Subheading: Improve reaction to emergent targeting

Subheading: Improve reaction to emergent information requirements

### Overall Assessment Results

- JISR displayed great potential (but) it requires further development and experimentation...
- JISR improved synchronization of ISR and other operations...
- (Some) desired additional personnel to perform collection management...
- The key to the successes and the performance of JISR was collaboration...

Task: Produce operational intelligence  
 Task: Disseminate operational intelligence

**Finding 1► JISR improved integration of ISR with operations.**

In surveys to the members of the Joint Operations Center, the Joint Task Force and the component commands, over 80 percent of those expressing an opinion, agreed that there was improved synchronization due to JISR (See Figure 261).

“There was mutual sharing of information,” said one participant. “Collection for planned operations and TST events appeared to be well synched,” according to another. “JISR was seated directly behind the BWC and provided a comprehensive, accurate and precise picture to the BWC. JISR fed directly into JFE and NFN-EX, and, as a result, both of those initiatives were very effective.”

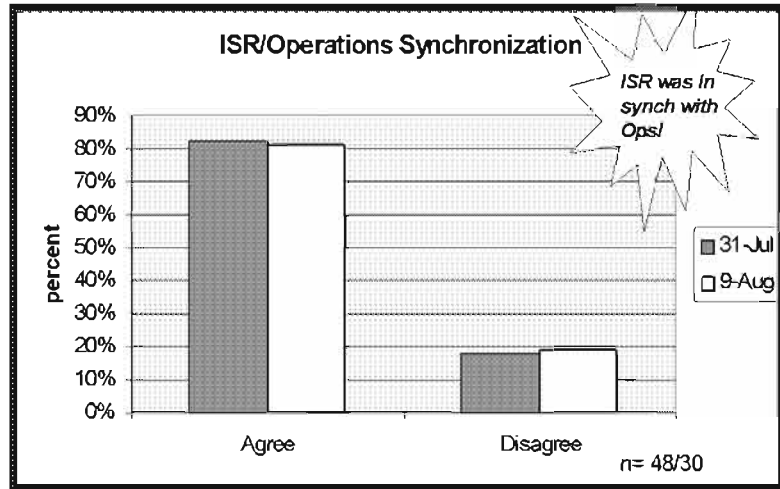


Figure 261: ISR and operations were synchronized

**Finding 2► JISR improved ISR support to operations.**

Again, this data comes from members of the JOC, from the JTF and components. Over 90 percent of those expressing opinions and over 70 percent overall agreed that JISR had increased ISR support to operations (See Figure 262). One member of the JOC commented that while the JISR worked well, the model lacked the necessary fidelity to produce meaningful intelligence information. While two others noted, “Coverage was wonderful. JISR is invaluable in providing the detection and tracking of TCTs.”

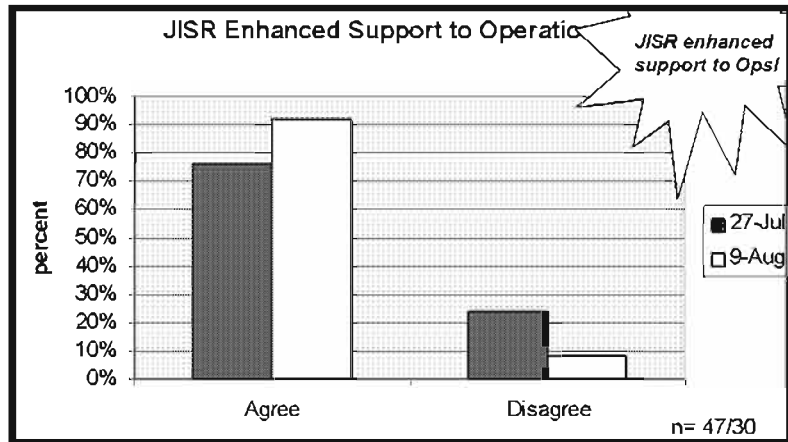


Figure 262: JISR enhanced operations

**Finding 3► Collaboration was the key to JISR’s successes and performance.**

Three-fourths of the JISE personnel with an opinion thought that interactive multiple intelligence source collaboration was effective. JISR collaboration aided in the answering of urgent information, according to more than 80 percent of JTF and component personnel selected from the JOC that expressed opinions (See Figure 263). Additionally, it was declared that JISR

collaboration enabled targeting, according to over 75 percent of those expressing an opinion agreed.

Seventy percent of those in the Joint Collection Management Center (JCMC) indicated that JISR collaboration was effective. This number grew to 81 percent by August 6. However, the number of ISR assets available makes it unclear whether the concept or the number of assets caused this to occur.

The JCMC personnel initially did not consider JISR collaboration efficient—60 percent concluded (See Figure 264). The vote changed, however, to 60 percent agreement later in the experiment. The swing probably reflects the learning curve with the tools considering the large number of new, inexperienced personnel that had not participated in earlier Spirals.

There was great confidence in the CIE tools by participants. This was best expressed by a participant when he was looking at a manning problem and stated, “We need additional personnel, but may not necessarily need them at the JTF. If I have reach-back to a [Theater] J2 staff and JIC, much or what I need can get accomplished in the rear.”

**Finding 4► A lack of collection management experience detracted from JISR integration.**

Almost 70 percent of participants said that additional training in the collection management discipline and on the JISR concept was required due to a lack of background, service education, or failure to attend previous MC02 training.

An Air Force player considered ‘training’ a Service problem that needs resolution, “Speaking from an Air Force and AOC perspective, collection managers require highly-specialized training. The growing complexity of ISR assets and enemy capabilities demands that we should be given advanced training,” he said, adding, “it is a severe oversight that the Air Force doesn’t have a collection management training course to train its collection managers to use AF ISR platforms, let alone a career path.”

Many others considered skill sets, education, and lack of prior attendance a detriment. One participant said that since Spiral 3, his group had a large turnover, “66 percent of my group

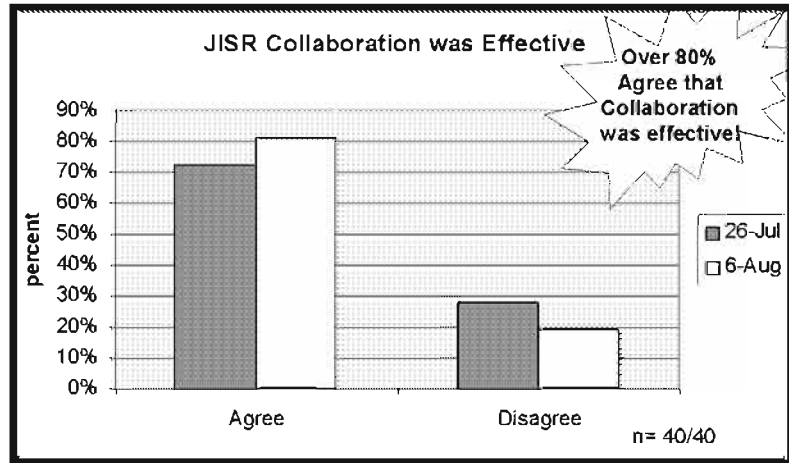


Figure 263: JISR collaboration was effective

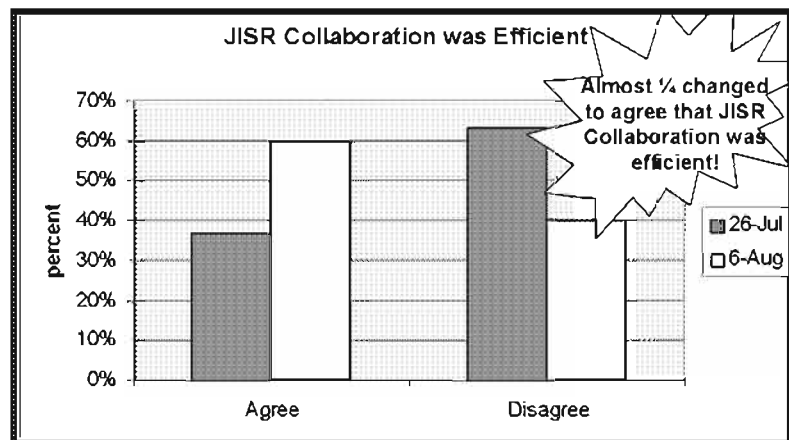


Figure 264: JISR collaboration efficiency improved over the course of the experiment

were new players. Many of the MC02 execution JISR players were not here for Spiral 3 and had zero exposure to concepts or tools. I had to train two officers at the JTF JOC.”

“Many component players needed instruction on IWS, JISR-M, SPPS, and ADOCS DTL were some subject areas,” said another.

**Finding 5► Tool functionality as emulated did not support the JISR concept.**

Software tools, for manipulating the JISR, was the subject of widest discussion among experiment participants. In general, the participants saw the need for a more user friendly, more functional, and comprehensive tool suite. As described in figure 265 below, by the end of the experiment, 90 percent of the JCMC personnel surveyed agreed that additional tools or tool functionalities were required.

Said one, “In order to perform effective JISR, we desperately need a suite of advanced collection tools. The JISR process, as envisioned, does not have any tools that support it. The process is way ahead of the system development timeline.”

One participant provided a shopping list, “we need comprehensive, flexible visualization tools that show tracks, swaths, targets, coverage, and accesses. We need a tool that will take multiple inputs (submissions), fuse them, and provide optimization, de-confliction, and synchronization options.”

General, negative comments included:

- “JISR tools were horrible--essentially JISR was the ‘Pong’ of available ISR tools, they provided no value to the JISR process”
- “JISR visualization capability does not exist. Collection management tools were insufficient”

The same comments came from the senior concept developers and were also less than complimentary.

“The tools were inadequate in their ability to demonstrate planned ISR activity with that which was actually flown,” said one. Others complained of poor displays, inability to work with ADOCS and TBMCS. Lastly, a participant noted that the collection manager had to resort to using an EXCEL spreadsheet because the tools were either unsatisfactory or not available to meet his needs.

**Finding 6► No clear defining system to establish priorities was available to Collection Management**

Confusion as to what the priorities were for collection caused problems determining the collection focus. We asked participants if priority intelligence requirements (PIR) were the priority for collection. We also asked if effects were the priority for collection. Initially, 70 percent of participants agreed with effects and 65 percent agreed with PIR. When asked again a few days before the end of the exercise, these numbers had both dropped. Effects were down to

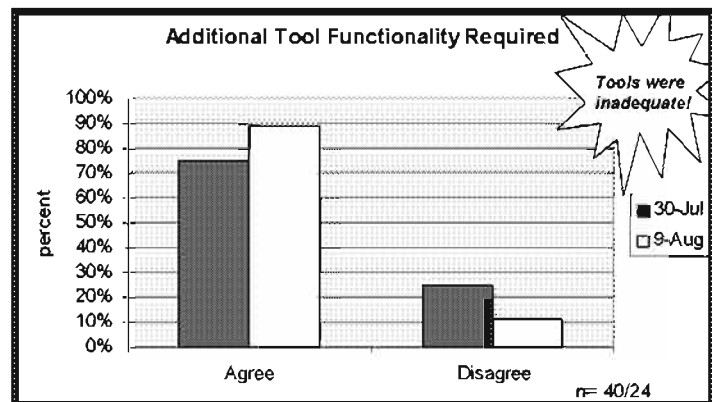


Figure 265: Most agreed that additional tool functionality was required



60 percent agreeing with an increase in “don’t know” responses. PIR was down to 58 percent with an increase in “disagree” responses (See Figure 266).

The uncertainty is demonstrated by a comment from an exercise participant who said, “it was very difficult for our analysts and others to consistently link their requirements to effects—in most cases it was left to the collection managers to pair targets to effects. We did the best we could with what we were given.”

Another noted that he had problems with the process as it was employed saying, “I do not think it is possible to make a good collection plan based on the PEL alone; no I&W.” He added, “I do think it should be possible

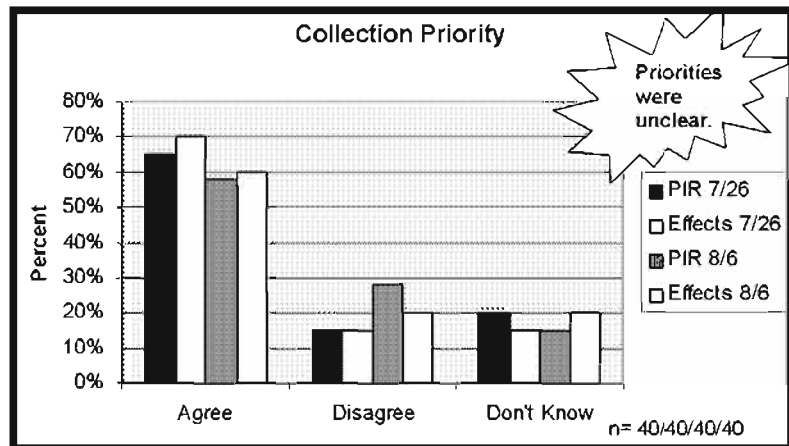


Figure 266: Collection priorities weren't clear

to make a solid plan based on the PIRs, SIRs, and IRs because they should encompass the PEL and the I&W deck. I also think the PIRs should be prioritized—III CORPS treats them as all equal. You can't prioritize based on all equal and when your PIRs are really broad, you'll end up with an incredibly large deck of all PRI 1s.”

Others said that a more clear relationship was needed between PIRs and the PEL and how they affected the collection plan. They also suggested that the commander needed to settle on which was to be the foundation for establishing priorities. “I struggled with the linkage between the CJTF priority intelligence requirements, verbal guidance, and the PEL,” the JTF collection manager stated.

The key ISR SME said, “The commander is changing priorities on the fly, and intelligence is making adjustments.” The senior concept developers noted during the experiment that, “JTF ISR staff right now is frustrated attempting to apply ISR capability against requirements devoid of a broader context. The PEL is not a sequenced prioritization. The prioritization must take into account sequencing and the enabling effects, in order to reach the higher effect/objectives.”

### Other Observations

#### Observation 1: All ISR personnel should be assigned to the Information Superiority group.

This was illustrated in the August 9 JTF JISR after action review. The panelist identified the break-up between operations ISR and the ISG as a significant problem. There was an inability to get feedback from operations even though there were tremendous accolades from the group with regard the performance of operations ISR in TST and dynamic re-tasking. It was a violation of the unity of effort and command principle, in the panel’s opinion, to have this position reacting to operations rather than the ISG. There had been a similar problem with plans, but the ISG had managed to pull the position and make it an ISG ISR planner working in plans. ISR personnel deemed this a major success. The ISR planner remarked, “By splitting the team into two sections, we degraded our collection efficiency,” he said, “something that was not

readily apparent because of the breadth and depth of collection capability, and the inadequacy of the simulation drivers.”

The issue came up again in the August 12 ISG after action review. The group thought that the intelligence personnel in plans and operations should be ISG personnel. This would allow these personnel to have reach-back and provide the ISG essential feedback to keep intelligence synchronized between the three groups. The panelists also noted that the Blue-Red cell should be in the ISG, as it was producing intelligence documents and was relying on intelligence personnel in plans to support them. An ISG member pointed out that the Blue-Red cell role is actually a traditional intelligence role in the Army.

### **Relationship to Other Objectives**

- Collaboration was the major factor in the success of JISR, according to many of those providing experiment comments, and that provides links to Assessment Area 9, the CIE. EBO's lack of definition with regard to its position in the hierarchy of planning caused confusion on collection priorities. There are indications that there needs to be an increase in ISR personnel in the SJFHQ

### **Relationship to Baseline Analysis**

The following entries are relevant to major observations made during MC02.

- Baseline entry: Intelligence collection requirements should drive national and theater posture and focus, as well as tactical assets that belong to the JTF

- MC02 observation: The JISR concept utilizing a joint collection management cell brought all information requirements, tactical to theater, together for tasking determination

- Baseline entry: A collection manager, with direct interface with the theater is essential. Functions that collection managers are responsible for must include collection planning for all requirements, collection tasking, and synchronization

- MC02 observation: The joint collection management cell brought all collection managers from component to theater, together for collection planning, tasking and synchronization

- Baseline entry: Well-planned and orchestrated collection management is one of the keys to the success of intelligence support of operations. The theater collection management plan must be completed and disseminated

- MC02 observation: The joint collection management cell brought all collection managers from component to theater, together for collection planning, tasking and synchronization. This drove the requirement for dissemination of collection plans horizontally and vertically in a timely manner

- Baseline entry: The planning cells should contain representation from all components to better provide a complete analysis of the situation

- MC02 observation: The joint collection management cell brought all collection managers from component to theater, together for collection planning, tasking and synchronization
- Baseline entry The JTF must ensure that procedures are in effect to provide intelligence information to the personnel that require that information
- MC02 observation: Over 90 percent of those expressing opinions and over 70 percent overall agreed that JISR had increased ISR support to operations. Comments included, "Coverage was wonderful. JISR is invaluable in providing the detection and tracking of TCTs"

**DOTMLPF Linkage**

- It is anticipated that the results from this assessment area will influence the development of a future JISR DOTMLPF package

**Recommendations**

1. JFCOM, make the emulated tools user-friendlier with increased functionality. ►
2. JFCOM, conduct a limited objective experiment in an ISR asset constrained environment with modeling and simulations that adequately supports a continuing series of ISR experiments. ►
3. JFCOM/SJFHQ, move all ISR personnel to the IS group. ►

(This Page Blank)

## **Chapter 8 — Summary and Conclusions**

Based on the analysis from a series of experiments culminating in Millennium Challenge and previous national level guidance, we feel our efforts are on track. We believe that many of the RDO enabling tools we advocated and examined in MC02 — effects-based philosophy, Operational Net Assessment, Standing Joint Force Headquarters, Collaborative Information Environment, and enhanced interagency collaboration — have relevance across the range of political-military-economic operations, including homeland defense and anti-terrorism, as well as to major theater war and SSCs. Several war games, seminars, and experiments culminated in Millennium Challenge 2002, which spotlighted RDO in this decade. The future includes the Olympic Path series, which will focus on implementing the SJFHQ and the Pinnacle Path series, which will transition RDO into a broader joint warfighting concept and investigate our ability to execute this concept in the next decade.

However, we cannot afford to wait until our long-term plan is accomplished to begin making important recommendations to our political and military leaders. In fact, field commanders are using some of USJFCOM's basic concepts even as they are being refined. Nevertheless, we are not satisfied with the status quo. We expect to further refine what is now in experimentation, and make both near- and long-term recommendations for even more innovative ways to transform the U.S. Armed Forces for operations in a chaotic world.

We are facing a new environment where adaptive adversaries have learned to avoid our strengths, anticipate our well publicized moves and to challenge us asymmetrically with means such as terrorism, cyber warfare, advanced surface to air missiles, anti-space weapons, WME, and WMD. RDO responds to these challenges by providing a conceptual vision of a transformed way of operating — one that emphasizes superior knowledge and integrates all instruments of our national power.

The RDO Concept is a smart way to think about joint warfare regardless of the strategic environment in which we operate and the threats we face. The concept described here, exercised, and experimented with in MC02, is an evolving construct for conducting RDO in a high-end SSC in the next decade. It is a vehicle for transforming "Jointness" and for realizing the JV 2020 vision. It provides a joint context for Service experimentation efforts. Concepts and doctrine drive organization, which should, in turn, drive the development and acquisition of combat, support, and lift systems and platforms.

The development of an effective capability for future joint operations is a journey rather than a discrete objective and Millennium Challenge was a step taken down that road. There is now a limited capability to conduct RDO. Improvements in doctrine, training, and organizations, as documented in MC02, will further improve the speed and effectiveness of RDO and expand the scenario sets in which it can be achieved. The establishment of an experimental standing joint command and control element is the next initiative to help realize joint force transformation. Development of collaborative planning tools and a functional CROP, as well as enhanced ISR and a truly integrated and accessible intelligence system, will significantly enhance decision superiority. Strategic mobility concepts, such as "ready off the ramp," and new deployment means, will enhance rapid force deployment. These and other joint and Service technologies, processes and concepts, will enhance RDO as they come on line.

Our experimentation efforts to date and the version of the RDO Concept demonstrated in MC02 focused on a high-end SSC. Future versions of this concept will move toward a joint

warfighting concept applicable to the entire range of joint operations. Millennium Challenge has played out its role in joint transformation.

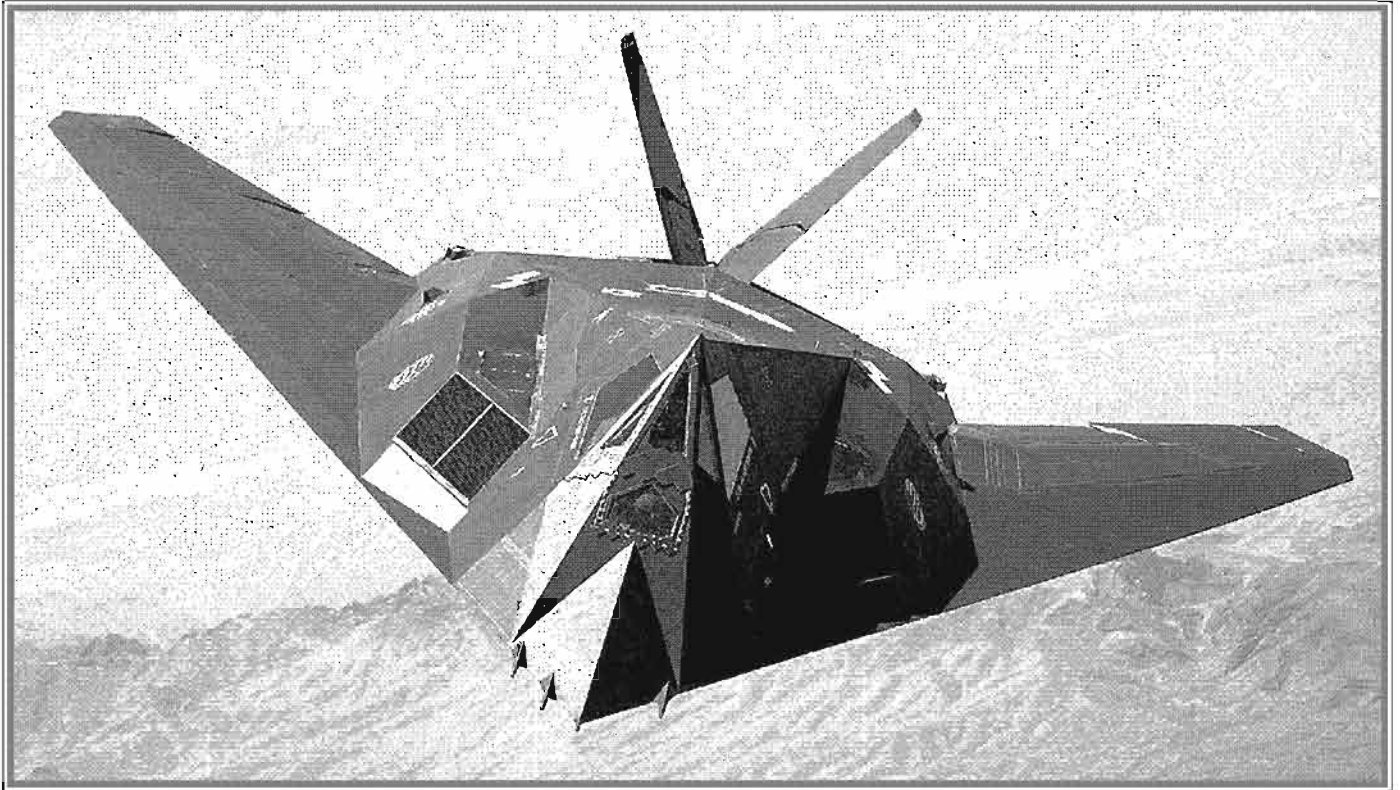


Figure 267: NELLIS AIR FORCE BASE, Nev. (AFIE) -- An F-117 Stealth Fighter flies over the Nevada desert Aug. 6 during Millennium Challenge 2002.



## Annex A — Glossary/Acronyms

These definitions are taken from Joint Pub 1-02, various USJFCOM J9 Experimentation Directorate concept papers, and other references supporting MC02.

|                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adaptive Joint Command and Control (AJC2)             | The ability to adjust to a given situation and exercise authority and direction by a properly designated commander over assigned and attached joint forces in the accomplishment of the mission.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Assured Access (AA)                                   | Access to the battlespace in all dimensions by U.S. forces and allies contributes to the joint force commander's freedom of action. This does not necessarily mean that the battlespace is accessible from any direction, but that sufficient air and sea lines of communications for movement of forces and sustainment packages exist and can be protected successfully from interdiction.                                                                                                                                                                                                                                                                                     |
| Asymmetric Warfare                                    | The waging of unbalanced or un-proportioned armed or unarmed war against the enemy.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Augmentees                                            | Additional personnel who enhance existing capabilities of the SJFHQ. Personnel could come from the supported combatant commander staff or components, and supporting combatant commander staff and components.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Automated Deep Operations Coordination System (ADOCS) | A situation awareness tool, which integrates a broad number and type of Service C <sup>4</sup> ISR systems, enabling horizontal and vertical integration and C2 actions. It makes the same information available to all users regardless of echelon and allows them to filter the information to their specific mission environment.                                                                                                                                                                                                                                                                                                                                             |
| Battle Damage Assessment (BDA)                        | The timely and accurate estimate of damage resulting from the application of military force, either lethal or non-lethal, against a predetermined objective. Battle damage assessment can be applied to the employment of all types of weapon systems (air, ground, naval, and special forces weapon systems) throughout the range of military operations. Battle damage assessment is primarily an intelligence responsibility with required inputs and coordination from the operators. Battle damage assessment is composed of physical damage assessment, functional damage assessment, and target system assessment. See also bomb damage assessment and combat assessment. |
| Boards                                                | Formal, non-standing organizations with designated membership that meet as required to conduct their business. Boards provide input to centers and the CJTF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bomb Damage Assessment      | The determination of the effect of all air attacks on targets, such as bombs, rockets, or strafing. See also battle damage assessment and combat assessment.                                                                                                                                                                                                                                                                                                                                                         |
| Cascading Nature of Effects | Indirect effects can ripple through an enemy target system, often influencing other target systems as well. Typically, this can influence nodes that are critical to multiple target systems. Most often, this cascading of indirect effects flows from higher to lower levels of war. As an example, when destroying an enemy central headquarters, the effects cascade down through the enemy echelons to ultimately disrupt numerous tactical units on the battlefield.                                           |
| Cells                       | Formal, non-standing, functionally oriented organizations that meet on a regular basis to provide input to boards and centers.                                                                                                                                                                                                                                                                                                                                                                                       |
| Centers                     | Formal, standing organizations that meet and conduct major planning or operations business with the JTF Headquarters on a regular basis. Once established, centers normally operate on a 24-hour basis.                                                                                                                                                                                                                                                                                                              |
| Centers of Excellence (COE) | Institutions possessing special knowledge or expertise in a particular area of concern and incorporated into the collaborative environment to facilitate development of the products supporting SJFHQ and JTF functions and operations, such as academia, industry, banking.                                                                                                                                                                                                                                         |
| Centers of Gravity (COG)    | Those characteristics, capabilities, or localities from which a military force derives its freedom of action, physical strength, or will to fight. Critical capabilities are resources and means that support the center of gravity. From among these are identified critical vulnerabilities. They link to the center of gravity via casual links, such that destroying, degrading, or denying a critical vulnerability will cause a substantial degradation of one or more of the adversary's center of gravities. |
| Civil Affairs (CA)          | Designated Active and Reserve component forces and units organized, trained, and equipped specifically to conduct civil affairs activities and to support civil-military operations. See also civil affairs activities; civil-military operations.                                                                                                                                                                                                                                                                   |
| Civil Affairs Activities    | Activities performed or supported by civil affairs that (1) enhance the relationship between military forces and civil authorities in areas where military forces are present; and (2) involve application of civil affairs functional specialty skills, in areas normally the responsibility of civil government, to enhance conduct of civil-military operations.                                                                                                                                                  |



|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Civil-Military Operations                   | The activities of a commander that establish, maintain, influence, or exploit relations between military forces, governmental and nongovernmental civilian organizations and authorities, and the civilian populace in a friendly, neutral, or hostile operational area in order to facilitate military operations, to consolidate and achieve operational U.S. objectives. Civil-military operations may include performance by military forces of activities and functions normally the responsibility of the local, regional, or national government. These activities may occur prior to, during, or subsequent to other military actions. They may also occur, if directed, in the absence of other military operations. Civil-military operations may be performed by designated civil affairs, by other military forces, or by a combination of civil affairs and other forces. |
| Collaborative Information Environment (CIE) | The information backbone that provides warfighters the ability to enhance organizational effectiveness and reduce hierarchical, serial planning timelines through information and idea sharing and parallel planning.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Collateral Nature of Effects (CNE)          | Collateral effects are unintentional or incidental direct or indirect effects causing injury or damage to persons or objects. Evaluation for potential collateral effects should normally include a consideration of second- and third-order levels of damage, such as the collateral effect of jamming or destroying a communications facility that disrupts civilian air traffic control or disrupts power to a local hospital. Collateral effects can become a major factor in determining whether or not to attack a target. Collateral effects can be further defined as additional and collateral damage.                                                                                                                                                                                                                                                                        |
| Combat Assessment (CA)                      | The determination of the overall effectiveness of force employment during military operations. Combat assessment is composed of three major components, battle damage assessment, munitions effects assessment, and reattack recommendation. The objective of combat assessment is to identify recommendations for the course of military operations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Command and Control (C2)                    | The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Commander's Intent                          | The stated purpose or desired end state of a commander in the accomplishment of the assigned mission.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Common Operational Picture (COP)           | A single identical display of relevant information shared by more than one command. A common operational picture facilitates collaborative planning and assists all echelons to achieve situational awareness.                                                                                                                                                                                                                                                                                                                                 |
| Common Relevant Operational Picture (CROP) | A presentation of timely fused, accurate, and relevant information that can be tailored to meet the requirements of the joint force commander and the joint force and is common to every organization and individual involved in a joint operation.                                                                                                                                                                                                                                                                                            |
| Computer Network Attack (CNA)              | Operations to disrupt, deny, degrade, or destroy information resident in computers and computer networks, or the computers and networks themselves. Electronic attack (EA) can be used against a computer, but it is not CNA. CNA relies on the data stream to execute the attack while EA relies on the electromagnetic spectrum.                                                                                                                                                                                                             |
| Computer Network Defense (CND)             | Defensive measures to protect and defend information, computers, and networks from disruption, denial, degradation, or destruction.                                                                                                                                                                                                                                                                                                                                                                                                            |
| Computer Network Exploitation (CNE)        | Intelligence collection and enabling operations to gather data from target adversary automated information systems (AIS) or networks.                                                                                                                                                                                                                                                                                                                                                                                                          |
| Computer Network Operations (CNO)          | Comprised of computer network attack (CNA), computer network defense (CND), and computer network exploitation (CNE), collectively.                                                                                                                                                                                                                                                                                                                                                                                                             |
| Concept of Operations Plan (CONPLAN)       | A verbal or graphic statement, in broad outline, of a commander's assumptions or intent in regard to an operation or series of operations. The concept of operations is frequently embodied in campaign plans and operation plans; in the latter case, particularly when the plans cover a series of connected operations to be carried out simultaneously or in succession. The concept is designed to give an overall picture of the operation. It is included primarily for additional clarity of purpose. Also called commander's concept. |
| Course of Action (COA)                     | 1. Any sequence of activities that an individual or unit may follow. 2. A possible plan open to an individual or commander that would accomplish, or is related to the accomplishment of the mission. 3. The scheme adopted to accomplish a job or mission. 4. A line of conduct in an engagement. 5. A product of the Joint Operation Planning and execution System concept development phase.                                                                                                                                                |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cumulative Nature of Effects                          | Cumulative effects result from the aggregate of many direct or indirect effects. This may occur at the same or at different levels of war as the contributing, lower-order effects are achieved. However, cumulative effects typically occur at higher levels of war. As an example, increased operational-level air superiority would be the cumulative effect of destroying numerous surface-to-air-missile (SAM) sites at the tactical level. |
| Decision Superiority                                  | The ability of the commander, based upon Information Superiority and situational understanding, to make effective decisions more rapidly than the adversary, thereby allowing one to dramatically increase the pace, coherence, and effectiveness of operations.                                                                                                                                                                                 |
| Decisive Operations                                   | Those operations assigned to or undertaken by the U.S. military in which there is a firm or conclusive resolution.                                                                                                                                                                                                                                                                                                                               |
| Defeat Mechanisms                                     | The best arrangement of ways and means to destroy the adversary's coherency and achieve our Rapid Decisive Operations campaign objectives.                                                                                                                                                                                                                                                                                                       |
| Deficiency Analysis                                   | Analysis of the tools or means employed in Effects-Based Operations.                                                                                                                                                                                                                                                                                                                                                                             |
| Desired Effects                                       | Physical, functional, or psychological outcomes, events, or consequences which a commander desires that result from specific military or non-military actions to achieve a specific strategic, operational or tactical end state.                                                                                                                                                                                                                |
| Desired Operational Capability (DOC)                  | A concept based statement of the ways and means to satisfy a JFC's capabilities requirements. A fully articulated DOC identifies subordinate tasks, associated conditions, and criteria for measurement.                                                                                                                                                                                                                                         |
| Diplomatic, Information, Military and Economic (DIME) | Areas of national power that are leveraged in "Effects-Based" Operations against an adversary's vulnerabilities identified by Operational Net Assessment, and targeted against his will and capability to conduct war.                                                                                                                                                                                                                           |
| Direct Effects                                        | Direct effects are immediate, first-order effects, the results of military actions with no intervening effect or mechanism between act and outcome, and are usually easily recognizable.                                                                                                                                                                                                                                                         |

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dominant Maneuver (DM)         | The ability of joint forces to gain positional advantage with decisive speed and overwhelming operational tempo in the achievement of assigned military tasks. Widely dispersed joint air, land, sea, amphibious, special operations and space forces, capable of scaling and massing force or forces and the effects of fires as required for either combat or noncombat operations, will secure advantage across the range of military operations through the application of information, deception, engagement, mobility, and counter-mobility capabilities.                         |
| Effect                         | The physical, functional, or psychological outcome, event or consequence that results from specific military or non-military actions.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Effects Tasking Order (ETO)    | Formalizes output of JTF virtual collaborative planning. It is the means to task and synchronize the actions and orders required to achieve the commander's intent. ETOs replace the current operations orders (OPORDs) and fragmentary orders (FRAGOs) issued as required to support current and future operations. They do not replace component execution planning and execution orders.                                                                                                                                                                                             |
| Effects-Based Operations (EBO) | A process for obtaining a desired strategic outcome or "effect" on the enemy, through the synergistic, multiplicative, and cumulative application of the full range of military and nonmilitary capabilities at the tactical, operational, and strategic levels                                                                                                                                                                                                                                                                                                                         |
| Effects-Based Planning (EBP)   | An operational planning process to conduct EBO within RDO. EBP is results-based vice attrition-based. EBP closely mirrors the current joint planning process, yet focuses upon the linkage of actions to effects to objectives. EBP changes the way we view ourselves and the enemy, and what is included and emphasized in the planning process. EBP uses a flexibly structured battle rhythm that leverages a collaborative knowledge environment and capitalizes on the use of fewer formal joint boards. It employs virtual, near-simultaneous planning at all echelons of command. |
| Effects-Based Strategy         | The coherent application of national and alliance elements of power through effects-based processes to accomplish strategic objectives.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Effects-Based Targeting         | The focus of the targeting process is to produce COAs that will change the enemy's behaviors and compel him to comply with our will. The behavioral changes we attempt to create are the result of effects that flow from the employment of our lethal and non-lethal capabilities. Thus, effects-based targeting is distinguished by the ability to generate the type and extent of effects necessary to create outcomes that facilitate the realization of the commander's objectives.                                      |
| Effects-Based Warfare           | The application of armed conflict to achieve desired strategic outcomes through the effects of military force.                                                                                                                                                                                                                                                                                                                                                                                                                |
| Electronic Warfare (EW)         | A component of information operations (IO). Any military action that involves the use of electromagnetic and directed energy to control the electromagnetic spectrum or to attack the adversary. The SJFHQ should ensure coordination among EW and other IO, intelligence, and communications support activities for maximum effect and to reduce electronic fratricide. This coordination is necessary to ensure effective exchange of information, eliminate undesirable duplication of effort, and provide mutual support. |
| End State                       | What the POTUS and SECDEF want the situation to be when operations conclude – both military operations as well as those where the military is in support of other instruments of national power.                                                                                                                                                                                                                                                                                                                              |
| Expeditionary Aerospace Force   | The U.S. Air Force concept of an expeditionary force capable of carrying out assigned air missions from forward deployed bases or long-range missions from home bases.                                                                                                                                                                                                                                                                                                                                                        |
| Field Experiment                | Wargames conducted in the actual environment with actual military units and equipment. As such, these experiments have the highest applicability of results to real situations. Good field experiments, like good military exercises, are the closest thing to challenges of actual operations; the ability to isolate the true cause of any detected change will suffer.                                                                                                                                                     |
| Flexible Deterrent Option (FDO) | A planning construct intended to facilitate early decision by laying out a wide range of interrelated response paths that begin with deterrent-oriented options carefully tailored to send the right signal. The flexible deterrent option is the means by which the various deterrent options available to a commander (such as economic, diplomatic, apolitical, and military measures) are implemented into the planning process.                                                                                          |
| Focus Area                      | That area of the commander's AOR identified for the SJFHQ to focus its efforts in ONA development, based on ambiguous indications of potential crisis.                                                                                                                                                                                                                                                                                                                                                                        |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Focused Logistics (FL)       | The ability to provide the joint forces the right personnel, equipment, and supplies in the right place, at the right time, and in the right quantity, across the full range of military operations.                                                                                                                                                                                                                      |
| Force Health Protection      | The health and medical portion of agile sustainment operations.                                                                                                                                                                                                                                                                                                                                                           |
| Fragmentary Order (FRAGO)    | An abbreviated form of an operation order, usually issued on a day-to-day basis, which eliminates the need for restating information contained in a basic operation order. It may be issued in sections.                                                                                                                                                                                                                  |
| Full Dimensional Protection  | The ability of the joint force to protect its personnel and other assets required to decisively execute assigned tasks. Full dimensional protection is achieved through the tailored selection and application of multi-layered active and passive measures, within the domains of air, land, sea, space, and information across the range of military operations with an acceptable degree of risk.                      |
| Full Spectrum Dominance      | 1. The ability of U.S. forces, operating unilaterally or in combination with multinational and interagency partners, to defeat any adversary and control any situation across the full range of military operations. 2. The interdependent application of DM, PE, FL, and full dimensional protection used in order for the joint force to accomplish its mission.                                                        |
| Functional Components        | Composed of two or more military departments that may be established across the range of military operations to perform particular operational missions that may be of short duration or may extend over a period.                                                                                                                                                                                                        |
| Global Information Grid      | The worldwide information network currently being developed by the U.S. that will link all data and communications networks together in a seamless environment. The globally interconnected, end-to-end set of information capabilities, associated processes, and personnel for collecting, processing, storing, disseminating, and managing information on demand to warfighters, policy makers, and support personnel. |
| Hierarchy of Experimentation | Shows the general hierarchical flow as a warfighting concept moves from inception to maturity.                                                                                                                                                                                                                                                                                                                            |
| Indirect Effects             | Indirect effects are second- and third-order systemic effects that are the results created through an intermediate effect or mechanism to produce the outcome, which may be physical or psychological in nature. Indirect effects tend to be delayed, may be difficult to recognize, and are often a cumulative or cascading result of many combined direct effects.                                                      |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Information                             | 1. Facts, data, or instructions in any medium or form.<br>2. The meaning that a human assigns to data by means of the known conventions used in their representation.                                                                                                                                                                                                                                               |
| Information Environment                 | The aggregate of individuals, organizations, or systems that collect, process, or disseminate information; also included is the information itself.                                                                                                                                                                                                                                                                 |
| Information Operations (IO)             | Those actions taken to affect an adversary's information and information systems while defending one's own information and information systems.                                                                                                                                                                                                                                                                     |
| Information Superiority (IS)            | That degree of dominance in the information domain, which permits the conduct of operations without effective opposition. The capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same.                                                                                                                               |
| Information Superiority Campaign        | The desired outcome of the Information Superiority (IS) campaign is to create an imbalance of knowledge in our favor, in order to understand the adversary while denying him the ability to gather and exploit information on friendly forces.                                                                                                                                                                      |
| Information Superiority Group           | The group responsible for coordinating activities that contributes to building information and knowledge superiority within the JTF, enabling informed decision-making. The group conducts an initial assessment of the information environment and the ability to achieve and maintain Information Superiority.                                                                                                    |
| Information System                      | The entire infrastructure, organization, and components that collect, process, store, transmit, display, disseminate, and act on information.                                                                                                                                                                                                                                                                       |
| Information Workspace (IWS) Version 2.5 | A virtual collaborative tool engineered for groups that work in multiple locations. It is based on a virtual environment. Each virtual building can represent an actual location or group of users. Within each building are floors, which contain several rooms. These rooms can be organized as required to facilitate access to information and people. Part of the Collaborative Information Environment (CIE). |
| Integration Matrix                      | Part of an effects tasking order that synchronizes component and interagency community actions in time, space and outcome.                                                                                                                                                                                                                                                                                          |
| Intelligence                            | The product resulting from the collection, processing, integration, analysis, evaluation, and interpretation of available information concerning foreign countries or areas. In addition, information and knowledge about an adversary obtained through observation, investigation, analysis, or understanding.                                                                                                     |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Interagency Community (IAC)</p>                              | <p>Overall, term applied to those appropriate government and non-government organizations that are critical to conducting “effects-based operations” from deliberate planning to execution operations and transition operations. These interagency organizations would be part of the “collaborative environment.”</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>Intermediate Staging and Support Base (ISSB)</p>             | <p>A temporary location used to both stage forces and to locate sustainment and maintenance support when anti-access conditions and/or infrastructure in the JOA preclude early entry.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>Joint Effects Area (JEA)</p>                                 | <p>An area of land, sea, airspace defined by a geographic Combatant commander or Subordinate Unified Commander, in which a JTF commander (JFC) integrates the military actions required to conduct the full range of Diplomatic, Information, Military, and Economic (DIME) actions necessary to achieve the effects required to achieve a specific operational mission. The JFC does not have to own an asset to exploit its employment within the JEA, i.e., have COCOM, OPCON. Operations by forces and capabilities assigned to the JFC are informed by, and inform, those actions conducted by non-assigned organizations or agencies operating within the JEA to achieve the same operational mission. A Primary Area of Military Operations (PAMO) may be established within the JEA to define and confine the area of primary military action w/o restricting the actions required outside this area to achieve the commander’s intent and mission.</p> |
| <p>Joint Experimentation</p>                                    | <p>Application of scientific experimentation procedures to assess the effectiveness of proposed (hypothesized) joint warfighting concept elements to ascertain whether elements of a joint warfighting concept cause changes in military effectiveness.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p>Joint Force Commander (JFC)</p>                              | <p>A general term applied to a combatant commander, sub unified commander, or joint task force commander (CJTF) authorized to exercise combatant command (command authority) or operational control over a force.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>Joint Intelligence Preparation of the Battlespace (JIPB)</p> | <p>The analytical process used by joint intelligence organizations to produce intelligence assessment, estimates and other intelligence products in support of the joint force commander’s decision making process. It is a continuous process that includes defining the total battlespace environment; describing the battle space’s effects; evaluating the adversary; and determining and describing adversary potential courses of action.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Joint Interactive Planning (JIP)                 | Planning between the different Service commanders in a joint environment that takes place through the utilization of multiple electronic or communications systems in which responses are direct and continual.                                                                                                                                                                                        |
| Joint Mission Force                              | That military force that shares a common mission or goal that will allow for the overall attainment or success in completion of the assigned task.                                                                                                                                                                                                                                                     |
| Joint Network Control Officer (JNCO)             | A member of the SJFHQ Information/knowledge management group who establishes the systems architecture to support RDO, based on the JTF commander's operational architecture. The JNCO is also responsible for coordinating network management activities for the SJFHQ.                                                                                                                                |
| Joint Support Base (JSB)                         | A tailorable, temporary location on land or sea, designated by the JFC, used for the staging, sustainment, succor or maintenance of forces inserting into, extracting from, or conducting operations in a designated area.                                                                                                                                                                             |
| Joint Tactical Actions (JTA)                     | Specific actions/engagements planned and executed by a joint force commander (CJTf, JFACC, JFLCC, JFMCC) intended to achieve an effect that requires the capabilities of more than one Service or agency. JTAs are executed by mission-tailored joint force packages normally formed as short-term formations.                                                                                         |
| Joint Tactics, Techniques, and Procedures (JTTP) | The actions and methods that implement joint doctrine and describe how forces will be employed in joint operations. They will be promulgated by the Chairman of the Joint Chiefs of Staff, in coordination with the combatant commands, Services, and Joint Staff.                                                                                                                                     |
| Key Enabler                                      | That crucial element that supplies the means, knowledge, or opportunity that allows for the success of an assigned task or mission.                                                                                                                                                                                                                                                                    |
| Knowledge                                        | 1. Familiarity, awareness, or understanding gained through experience or study. 2. The sum or range of what has been perceived, discovered, or learned.                                                                                                                                                                                                                                                |
| Knowledge Network                                | A set of concepts related to providing critical information to the warfighter. It enables the most effective use of the information in a collaborative manner to conduct multi-level planning, execution, and assessment of military operations. It includes the Common Relevant Operational Picture (CROP), joint interactive planning (JIP), and adaptive joint command and control (AJC2) concepts. |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Leveraged Events                | A leveraged event is an experiment, exercise, or demonstration “owned” by some other organization. Service experiments, training exercises, or wargames frequently provide these opportunities. While the event owner’s objectives are always the primary event driver, there frequently are opportunities within those events to address JFCOM’s experimental objective.                                                                                                                                                                                               |
| Liaisons                        | Personnel responsible for maintaining contact or intercommunication between elements of military forces or other agencies to ensure mutual understanding and unity of purpose and action. Liaisons may be provided from and to government agencies, nongovernmental organizations, international organizations, and coalition partners or allies.                                                                                                                                                                                                                       |
| Low-Fidelity Experiments        | A low-fidelity experiment is one where there is an unknown or little-trusted knowledge level in the execution or outcome of the experiment.                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Measures of Effectiveness (MOE) | Measures of effectiveness are most often subjective indicators that the outcomes of the “tactical actions” have achieved, or contributed to achieving the desired effect. MOE articulate where to look and what to measure in order to determine if the desired effect has been achieved.                                                                                                                                                                                                                                                                               |
| Measures of Performance (MOP)   | The objective metrics of the “outcomes” of “tactical actions,” MOP are assessed at the component level as a result of the “tactical actions” performed to achieve a desired effect, i.e., were the targets hit and what level of damage was achieved.                                                                                                                                                                                                                                                                                                                   |
| Military Deception              | A component of information operations. Actions executed to deliberately mislead adversary military decision makers as to friendly military capabilities, intentions, and operations, thereby causing the adversary to take specific actions (or inactions) that will contribute to the accomplishment of the friendly mission.                                                                                                                                                                                                                                          |
| Mission                         | <ol style="list-style-type: none"> <li>1. The responsibility of the component commander assigned by the ETO as the supported commander, who in coordination with supporting component commanders, will conduct operations to achieve the JFC’s intent and desired effect.</li> <li>2. The task, together with the purpose, that clearly indicates the action to be taken and the reason therefore. The component commander assigns his tactical units joint tactical actions in coordination with the tactical units of the supporting component commanders.</li> </ol> |
| Non-Contiguous Operations       | Operations where one or more of the subordinate operations do not share a common boundary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective                        | The physical object of the actions taken, e.g., a definite tactical feature, the seizure or holding of which is essential to the commander's plan. For purposes of RDO and the description of effects-based philosophy, the term objective is used in the broader sense of end state rather than physical objective.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Objective Force                  | The strategically responsive force that will result from the Army's transformation process. The objective force, capable of dominating at every point on the spectrum of conflict, will be characterized by its responsiveness, deployability, agility, versatility, lethality, survivability, and sustainability.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Open-Source Intelligence (OSINT) | Information of potential intelligence value that is available to the public. See also intelligence                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Operational Level of War         | The level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations. Activities at this level link tactics and strategy by establishing operational objectives needed to accomplish the strategic objectives, sequencing events to achieve the operational objectives, initiating actions, and applying resources to bring about and sustain these events. These activities imply a broader dimension of time or space than do tactics; they ensure the logistic and administrative support of tactical forces, and provide the means by which tactical successes are exploited to achieve strategic objectives. See also strategic level of war; tactical level of war.                                                                                                                                                                                                                                                                                              |
| Operational Net Assessment (ONA) | A continuously updated operational support tool that provides a JTF commander visibility of effects-to-task linkages based on a "system-of-systems" analysis of a potential adversary's political, military, economic, social, infrastructure, and information (PMESII) war-making capabilities. The ONA informs decision-makers from strategic to tactical levels regarding the complementary effects and supporting missions and tasks that can be considered when applying the full range of diplomatic, information, military and economic (DIME) actions to achieve specific effects on an adversary's will and capability in support of national objectives. ONA is a critical enabler for achieving rapid decisive operations. It is an integrated, collaborative product of Department of Defense and other appropriate government and non-government organizations. Its purpose is to identify key links and nodes within the adversary's systems and to propose methods that will influence, neutralize or destroy them and achieve a desired effect or outcome. |
| Operational-Level Effects        | Operational effects influence activities at the operational level of war and focus on campaigns and operational objectives.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operations Order (OPORD)                                                        | A directive issued by the commander to subordinate commanders for affecting the coordinated execution of an operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Physical Attack                                                                 | Refers to the use of “hard kill” weapons against designated information-related targets as an element of an integrated IO effort.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Plug                                                                            | A cell of personnel that provide a specific mission capability not organic to the SJFHQ.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Political, Military, Economic, Social, Infrastructure, and Information (PMESII) | Vulnerabilities identified by the ONA. These are researched as “systems of systems” networks that can be exploited by effects-based operations to affect an adversary’s war-making/warfighting will and capability.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Precision Engagement (PE)                                                       | The ability of joint forces to locate, surveil, discern, and track objectives or targets; select, organize, and use the correct systems; generate desired effects; assess results; and reengage with decisive speed and overwhelming operational tempo as required, throughout the full range of military operations.                                                                                                                                                                                                                                                                                                                                         |
| Primary Area of Military Operations (PAMO)                                      | An area defined and confined as that area in which primary military action is conducted without restricting the actions required outside this area to achieve the commander’s intent and mission.                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Psychological Operations (PSYOP)                                                | A component of information operations. PSYOP are actions taken to convey selected information and indicators to foreign audiences. They are designed to influence emotions, motives, reasoning, and ultimately, the behavior of the adversary. Examples of PSYOP include distribution of leaflets, loud-speaker broadcasts, radio and television broadcasts, and other means of transmitting information that encourages adversary forces to defect, desert, flee, or surrender.                                                                                                                                                                              |
| Public Affairs (PA)                                                             | Those public information, command information, and community relations activities directed toward both the external and internal publics with interest in the Department of Defense. PA activities expedite the flow of accurate and timely information to the internal audience (the SJFHQ and the JTF) and the external audience (the public). Increasing availability of this information to these audiences may have a significant effect on national will, political direction, and national security objectives and policy. PA activities will not be used in support of military deception capability or to provide disinformation to either audience. |

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rapid Decisive Operations (RDO)           | Rapid Decisive Operations is a concept for future operations. A Rapid Decisive Operation will integrate knowledge, C2, and operations to achieve the desired political/military effect. In preparing for and conducting a rapid decisive operation, the military acts in concert with and leverages the other instruments of national power to understand and reduce the regional adversary's critical capabilities and coherence. The U.S. and its allies asymmetrically assault the adversary from directions and in dimensions against which he has no counter, dictating the terms and tempo of the operation. The adversary, suffering from the loss of coherence and unable to achieve his objectives, chooses to cease actions that are against U.S. interests or has his capabilities defeated. |
| Relevant Information                      | The full range of necessary information about friendly forces, the enemy, the battlespace, and anything else that affects operational decision-making.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| SharePoint Portal Server (SPPS)           | An enhanced information management tool, part of the virtual Collaborative Information Environment (CIE), streamlining document management for the JTF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Ship-to-Objective Maneuver (STOM)         | The concept of maneuvering landing forces directly to objectives ashore in order to avoid the necessity of establishing a beachhead and avoiding enemy defensive efforts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Standing Joint Force Headquarters (SJFHQ) | Intended to provide each warfighting theater combatant commander with a trained and equipped standing, joint command and control (C2) capability specifically organized to reduce the lag time involved in setting up a JTF headquarters ready to rapidly and decisively conduct operations in small-scale contingencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Strategic-Level Effects                   | Strategic effects influence activities at the strategic level of war and focus on national and multinational military objectives. Rarely will attacking a single target directly result in the desired strategic effect. The limited exceptions to this rule involved such exceptional circumstances as a successful action against a uniquely irreplaceable center of gravity.                                                                                                                                                                                                                                                                                                                                                                                                                         |
| System                                    | Any organized assembly of resources and procedures united and regulated by interaction or interdependence to accomplish a set of specific functions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| System of Systems                         | A grouping of organized assemblies of resources, methods, and procedures regulated by interaction or interdependence to accomplish a set of specific functions. For example, a "system of systems" could include the economic entities in a nation such as the banking system, production system, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                               |                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tactical-Level Effects                        | Tactical effects influence activities at the tactical level of war and focus on battles and engagements to accomplish military objectives.                                                                                                                                                                                                                                                                 |
| Target                                        | An area, complex, installation, force, equipment, capability, function, or behavior identified for possible action to support the commander's objectives, guidance, and intent.                                                                                                                                                                                                                            |
| Targeting                                     | The process to detect, select, and prioritize targets; match the appropriate action; and assess the resulting effects-based on the commander's objective, guidance, and intent. Targeting is both a joint- and component-level command function that selects targets, which meet military objectives, determines desired effects, and selects or tasks the means to achieve those effects.                 |
| Technologies                                  | 1. The application of science, especially to industrial or commercial objectives. 2. The scientific method and material used to achieve a commercial or industrial objective.                                                                                                                                                                                                                              |
| Time-Phased Force and Deployment Data (TPFDD) | Units to be deployed to support the operation plan with a priority indicating the desired sequence for their arrival at the port of debarkation.                                                                                                                                                                                                                                                           |
| Time-Sensitive Targets (TST)                  | Those targets which require immediate response because they pose (or will soon pose) a clear and present danger to friendly forces or are highly lucrative, fleeting targets of opportunity.                                                                                                                                                                                                               |
| Transformation                                | The creation of a force that is dominant across the full spectrum of military operations – persuasive in peace, decisive in war, preeminent in any form of conflict.                                                                                                                                                                                                                                       |
| Unified Vision (UV) 01                        | UV 01 was a major concept-refinement experiment run by the Joint Experimentation Directorate, U.S. Joint Forces Command in May of 2001.                                                                                                                                                                                                                                                                    |
| Virtual Simulation                            | Virtual experiments employ human-in-the-loop simulations. The prototype virtual simulation is the flight simulator. In a command and control virtual simulation experiment, a sensor operator might receive real-time simulated sensor inputs and makes real-time decisions to launch simulated weapons against simulated targets.                                                                         |
| White paper                                   | A white paper is the principal tangible product of concept development and describes the concept in sufficient detail for experimentation. It describes the desired capabilities necessary to implement the concept. The white paper states the concept's hypothesis for assessment through experimentation. It contains a fully developed operational concept and an associated experimentation strategy. |

|               |                                                                                                                                                            |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Working Group | Informal, non-standing organizations that are mission-tailored for a specific event or action. Working groups provide input to centers, boards, and cells. |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|

## ***Acronyms***

### A

|         |                                                                     |
|---------|---------------------------------------------------------------------|
| AAD     | Area Air Defense Commander                                          |
| AAMDC   | Army Air and Missile Defense Command                                |
| ABCS    | Army Battle Command System                                          |
| ABLS    | Airborne Laser Simulation                                           |
| ACC     | Air Combat Command                                                  |
| ACE     | Analysis Control Element                                            |
| ACO     | Airspace Control Order                                              |
| ACT     | Analysis Control Team                                               |
| ACTD    | Advanced Concept Technology Demonstration                           |
| ADA     | Air Defense Artillery                                               |
| ADOCS   | Automated Deep Operations Coordination System                       |
| ADP     | Air Defense Plan                                                    |
| ADS     | Advanced Distributed Simulation                                     |
| ADSI    | Air Defense Systems Integrator                                      |
| AE      | Army Experiment                                                     |
| AEC     | U.S. Army Evaluation Center                                         |
| AECP    | Army Experimentation Campaign Plan                                  |
| AFAMS   | Air Force Agency for Modeling and Simulation                        |
| AFATDS  | Advanced Field Artillery Tactical Data System                       |
| AFC2TIG | Air Force Command and Control Training Innovation Group             |
| AFFOR   | Air Force Forces                                                    |
| AFIWC   | Air Force Information Warfare Center                                |
| AFRL    | Air Force Research Library                                          |
| AFSERS  | Air Force Synthetic Environment for Reconnaissance and Surveillance |
| AFSPC   | Air Force Space Command                                             |
| AIA     | Air Intelligence Agency                                             |
| AJCOM   | Advanced Joint Combined Operations Model                            |
| ALERT   | Attack and Launch Early Reporting to Theater                        |
| ALSP    | Aggregate Level Simulation Protocol                                 |
| AMDWS   | Air and Missile Defense Workstation                                 |
| ANIF    | Automatic Network Information Flow                                  |
| AOC     | Air Operations Center                                               |
| AODA    | Attack Operations Decision Aid                                      |
| AOR     | Area of Responsibility                                              |
| APL     | Applied Physics Lab                                                 |
| APOD    | Aerial Port of Debarkation                                          |
| ARFOR   | Army Forces                                                         |
| ARSPACE | Army Space Command                                                  |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|           |                                               |
|-----------|-----------------------------------------------|
| ARSST     | Army Space Support Teams                      |
| ASAS      | All Source Analysis System                    |
| ASI/IMCN  | AOC Simulation Interface                      |
| ASOC      | Air Support Operations Center                 |
| ASPO      | Army Space Program Office                     |
| ASSET     | Automated Scripted Simulator Exercise Trainer |
| AST       | ATEC System Team                              |
| ASTAB     | Automated Status Board                        |
| ASW       | Anti-Submarine Warfare                        |
| ATACMS    | Army Tactical Missile System                  |
| ATCCS     | Army Tactical Command and Control Systems     |
| ATD       | Advanced Technology Demonstration             |
| ATEC      | U.S. Army Test and Evaluation Center          |
| ATECP     | Army Transformation Experiment Campaign Plan  |
| ATEX02    | Army Transformation Experiment 2002           |
| ATI       | AWSIM-TBMCS Interface                         |
| ATLOS     | Acoustic Transmission Loss Sensor             |
| ATO       | Air Tasking Order                             |
| AUTODIN   | Automatic Digital Network                     |
| AUTO SIGS | Auto Synthetic Imagery Generation System      |
| AWACS     | Airborne Warning and Control System           |
| AWE       | Advanced Warfighting Experiment               |
| AWSIM     | Air Warfare Simulation                        |

B

|       |                                                     |
|-------|-----------------------------------------------------|
| BCC   | Battle Control Center                               |
| BCD   | Battlefield Coordination Detachment                 |
| BCT   | Brigade Combat Team                                 |
| BDA   | Battle Damage Assessment                            |
| BFA   | Battlefield Functional Area                         |
| BFTT  | Battle Force Tactical Trainer                       |
| BMDN  | Ballistic Missile Defense Network                   |
| BMDO  | Ballistic Missile Defense Office                    |
| BOS   | Battlefield Operating Systems                       |
| BRITE | Broadcast Remote Intelligence Technology Experiment |

C

|                    |                                                   |
|--------------------|---------------------------------------------------|
| C2                 | Command and Control                               |
| C3                 | Command, Control, and Communications              |
| C <sup>2</sup> IPS | Command and Control Information Processing System |
| C <sup>2</sup> PC  | Command and Control Personal Computer             |
| C <sup>2</sup> W   | Command and Control Warfare                       |



U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                    |                                                                                             |
|--------------------|---------------------------------------------------------------------------------------------|
| C <sup>4</sup> IGW | Command, Control, Communications, Computers, Intelligence Gateway                           |
| C <sup>4</sup> ISR | Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance |
| CAOC               | Combined Air Operations Center                                                              |
| CART               | Crisis Action Response Team                                                                 |
| CAS                | Close Air Support                                                                           |
| CATT               | C <sup>2</sup> W Analysis and Targeting Tool                                                |
| CCDA               | Command Center Decision Aids                                                                |
| CE                 | Civil Environment                                                                           |
| CEM                | Civil Environment Model                                                                     |
| CEOI               | Communications – Electronics Operating Instructions                                         |
| CGS                | Common Ground Station                                                                       |
| CIE                | Collaborative Information Environment                                                       |
| CIS                | Combat Intelligence System                                                                  |
| CIWS               | Close In Weapons System                                                                     |
| CJTF               | Commander Joint Task Force                                                                  |
| CMO                | Central MASINT Organ                                                                        |
| CND                | Computer Network Defense                                                                    |
| CNO                | Computer Network Operations                                                                 |
| COCOM              | Combatant Command                                                                           |
| COMINT             | Communications Intelligence                                                                 |
| COMWX              | Computered MASINT Weather                                                                   |
| CONOPS             | Concept of Operations                                                                       |
| COP                | Common Operational Picture                                                                  |
| CORBA              | Common Object Request Broker Architecture                                                   |
| COTS               | Commercial-Off-The-Shelf                                                                    |
| CPX                | Command Post Exercise                                                                       |
| CRC                | Control and Reporting Center                                                                |
| CRE                | Control and Reporting Element                                                               |
| CROP               | Common Relevant Operational Picture                                                         |
| CSIL               | Commercial Satellite Imagery Library                                                        |
| CSP                | Communication Support Processor                                                             |
| CSSCS              | Combat Service Support Control System                                                       |
| CST                | Common Operation Picture (C) Synchronization Tool                                           |
| CSTAR              | Combat Synthetic Training Assessment Range                                                  |
| CT                 | Capability Test                                                                             |
| CTAPS              | Contingency Theater Automated Planning System                                               |
| CTDB               | Compact Terrain Database                                                                    |
| CUSP               | Coupled Urban Dispersion Model (UDM) and SCIPUFF                                            |
| CWHS               | Carrier Weapon Handling System                                                              |

D

|      |                               |
|------|-------------------------------|
| DACP | Division Assault Command Post |
| DAG  | Data Authentication Group     |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                 |                                                                         |
|-----------------|-------------------------------------------------------------------------|
| DAMA            | Demand Assigned Multiple Access (DAMA)                                  |
| DBCC            | Dynamic Battle Control Cell                                             |
| DBM             | Database Manager                                                        |
| DBST            | Digital Battle staff Sustainment Trainer                                |
| DCARS           | Digital Collection, Analysis, and Review System                         |
| DCE             | Dynamic Communications Environment                                      |
| DCGS            | Distributed Common Ground Station                                       |
| DCSCD           | Deputy Chief of Staff for Combat Developments                           |
| DCTS            | Defense Collaborative Tool Suite                                        |
| DCE             | Division Capstone Exercise/Digital Force Coordination Cell              |
| DIA             | Defense Intelligence Agency                                             |
| DICE            | Distributed Information Warfare Constructive Environment                |
| DIS             | Distributed Interactive Simulation                                      |
| DISN            | Defense Information Systems Network                                     |
| DJFN            | Digital Joint Fires Network                                             |
| DLRC            | Digital Leader Reaction Course                                          |
| DM              | Dominant Maneuver                                                       |
| DMPI            | Desired Mean Point of Impact                                            |
| DMTIX           | Dynamic Moving Target Information Exploitation                          |
| DNBI            | Disease and Non-Battle Injury                                           |
| DoD             | Department of Defense                                                   |
| DOTMLPF         | Doctrine, Organization, Training, Material, People, and Leadership      |
| DP              | Dimensional Protection                                                  |
| DS <sup>3</sup> | Distributed Sensor Simulation System                                    |
| DSICS           | Distributed Signal Intelligence Collection System                       |
| DSN             | Defense Switching Network                                               |
| DTC             | U.S. Army Developmental Test Command                                    |
| DTDL            | Deployed Theater Downlink                                               |
| D-TES           | Division – Tactical Exploitation System                                 |
| DTF             | Digital Target Folders                                                  |
| DTLMOS          | Doctrine, Training, Leader Development, Material, Organization, Soldier |
| DTS             | DIS Tool Set                                                            |
| DTSS            | Digital Topographic Support System                                      |
| DTSS-D          | Digital Topographic Support System - Deployable                         |

E

|        |                                 |
|--------|---------------------------------|
| EA     | Effects Assessment              |
| EAB    | Echelons Above Brigade          |
| EAC    | Echelon Above Corps             |
| EADSIM | Extended Air Defense Simulation |
| EBO    | Effects-Based Operations        |
| EC     | Electronic Combat               |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|             |                                               |
|-------------|-----------------------------------------------|
| ECC         | Exercise Coordination Cell                    |
| ECS         | Engagement Control Station (Patriot)          |
| EFX         | Expeditionary Force Experiment                |
| EIW – Light | Enhanced Imagery Workstation — Light          |
| ELINT       | Electronic Intelligence                       |
| EMPRS       | Enroute Mission Planning and Rehearsal System |
| EMT         | Expert Missile Tracker                        |
| EPLRS       | Enhanced Position Location Reporting System   |
| ESC         | Electronic Systems Command                    |
| ESG         | Expeditionary Sensor Grid                     |
| ESM         | Electronic Support Measures                   |
| ETC         | Exercise Technical Control                    |
| ETF         | Electronic Target Folders                     |
| ETO         | Effects Tasking Order                         |

F

|                      |                                                                             |
|----------------------|-----------------------------------------------------------------------------|
| FAADC <sup>3</sup> I | Forward Area Air Defense Command, Control, Communications, and Intelligence |
| FBCB <sup>2</sup>    | Force XXI Battle Command Brigade and Below                                  |
| FBE                  | Fleet Battle Experiment                                                     |
| FCTC                 | Fleet Combat Training Center                                                |
| FDDI                 | Fiber optic Distribution Data Interface                                     |
| FDO                  | Flexible Deterrent Options                                                  |
| FID                  | Federation Implementation Document                                          |
| FIRESIM              | Fire Simulation                                                             |
| FMS-D                | Flight Mission Simulator – Digital (Patriot)                                |
| FOM                  | Federation Object Model                                                     |
| FON                  | Freedom of Navigation                                                       |
| FT                   | Functional Test                                                             |

G

|                     |                                                                           |
|---------------------|---------------------------------------------------------------------------|
| GALE-L              | Generic Area Limitation Environment - Lite                                |
| GAWSGIAC            | Analytical Workstation                                                    |
| GBS                 | Global Broadcast Service                                                  |
| GCCS                | Global Command and Control System                                         |
| GCCS-A              | Global Command and Control System – Army                                  |
| GCCS-I <sup>3</sup> | Global Command and Control System – Intelligence, Imagery and Information |
| GCCS-M              | Global Command and Control System – Maritime                              |
| GCN                 | Ground Communications Node                                                |
| GCSS                | Global Combat Support System                                              |
| GDS                 | Generic Data Server                                                       |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

GEED Geophysical Environmental Effects Distributor  
GES Global Transportation Network Exercise System  
GIAC Graphical Input Aggregate Control  
GISR-C GCCS Intelligence Surveillance Reconnaissance Component  
GLCM Ground Launched Cruise Missile  
GPS Global Positioning System  
GSM Global System for Mobile Communications  
GSTF Global Strike Task Force  
GTN Global Transaction Network/Global Transportation Network

H

HIMAD High and Medium Altitude Missile Air Defenses  
HLA High Level Architecture  
HRSS High Resolution Systems Simulator  
HSV High Speed Vessel  
HUMINT Human Intelligence

I

IADS Integrated Air Defense System  
IAS Intelligence Analysis Station  
IBIS Integrated Battlefield Intelligence System  
ICC Information and Coordination Central (Patriot)  
ICD Interface Control Document  
ICE Interactive Constructive Environment  
ICIS Integrated Consumable Item Support  
IDM Improved Data Modem  
IDS Intrusion Detection System  
IIR Initial Imagery Report  
IM Integration Milestone  
IMETS Integrated Meteorological and Environmental Terrain System  
IMETS – L Integrated Meteorological System - Light  
IMINT Information Management Intelligence  
IMO Information Management Officer  
IMPACT Integrated Modeling Platform for Advanced Computational Technologies  
INTEL Intelligence  
IO Information Operations  
IO Input/Output  
IOS USMC Integrated Operations System (TCO & IAS)  
IPIR Initial Photographic Interpretation Report  
IPL Image Product Library  
IPRNET Internet Protocol Router Network  
IRDM Information Retrieval and Delivery Management

|                   |                                                                 |
|-------------------|-----------------------------------------------------------------|
| IS-C <sup>2</sup> | Information Superiority Command and Control                     |
| IWEG              | Information Warfare Effects Generator                           |
| J                 |                                                                 |
| JASGS             | Joint Automated Single Guard Solution                           |
| JBC               | Joint C <sup>4</sup> ISR Battle Center                          |
| JBMI              | Joint Battle Management Integration                             |
| JCAS              | Joint Command and Control Attack Simulation                     |
| JCATS             | Joint Conflict and Tactical Simulation                          |
| JCC               | JTASC Control Center                                            |
| JCF               | Joint Contingency Force                                         |
| JCSE              | Joint Continuous Strike Environment                             |
| JDCAT             | JBC Data Collection Analysis Tool                               |
| JDISS             | Joint Deployable Intelligence Support System                    |
| JDPI              | Joint Deployment Process Improvement                            |
| JECEWSI           | Joint Electronic Combat-Electronic Warfare Simulation           |
| JECG              | Joint Exercise Control Group                                    |
| JECMT             | Joint Experimentation Collection Management Tool                |
| JEFX              | Joint Expeditionary Force Experiment                            |
| JEMIS             | Joint Event Management Information System                       |
| JESNET            | JTASC Exercise Support Network                                  |
| JETF              | Joint Electronic Target Folder                                  |
| JFACC             | Joint Force Air Component Commander                             |
| JFC               | Joint Force Commander                                           |
| JFI               | Joint Fires Initiative                                          |
| JFL               | Joint Futures Lab                                               |
| JFLCC             | Joint Force Land Component Commander                            |
| JFMCC             | Joint Force Maritime Component Commander                        |
| JGG               | Joint Ground Game (JQUAD+)                                      |
| JHU               | Johns Hopkins University                                        |
| JIACG             | Joint Interagency Coordination Group                            |
| JICO              | Joint Interface Control Officer                                 |
| JIMM              | Joint Interim Mission Model                                     |
| JIOC              | Joint Information Operations Center                             |
| JIPB              | Joint Intelligence Preparation of the Battlespace               |
| JISR              | Joint Intelligence, Surveillance, and Reconnaissance            |
| JISRM             | Joint Intelligence, Surveillance, and Reconnaissance Management |
| JMedSAF           | Joint Medical Simi-Automated Forces                             |
| JMEWS             | Joint Medical Work Station                                      |
| JNETS             | Joint Networks Simulation                                       |
| JNIC              | Joint National Integration Center                               |
| JOISIM            | Joint Operations Information Simulation                         |
| JOTBS             | Joint Operational Test Bed System                               |
| JOVE              | Joint Operations Visualization Environment                      |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|         |                                                            |
|---------|------------------------------------------------------------|
| JPOTF   | Joint Psychological Operations Task Force                  |
| JQUAD   | The System Consisting of: JCAS, JECEWSI, JNETS, and JOISIM |
| JRAC    | Joint Rear Area Coordinator                                |
| JSAF    | Joint Semi-Automated Forces (NAVFOR simulation)            |
| JSF     | Joint Strike Fighter                                       |
| JSOP    | Joint Standard Operating Procedure                         |
| JSOTF   | Joint Special Operations Task Force                        |
| JSS     | JSTARS Simulation                                          |
| JST     | JWFC Support Team                                          |
| JSTARS  | Joint Surveillance Target Acquisition Radar System         |
| JSWS    | JSTARS Work Station                                        |
| JTA     | Joint Tactical Action                                      |
| JTAV    | Joint Total Asset Visibility                               |
| JTAGS   | Joint Tactical Ground Station                              |
| JTASC   | Joint Training, Analysis and Simulation Center             |
| JTC     | Joint Training Center                                      |
| JTF     | Joint Task Force                                           |
| JTIDS   | Joint Tactical Information Distribution System             |
| JTMD    | Joint Theater Missile Defense                              |
| JTT – B | Joint Tactical Terminal – Briefcase                        |
| JWFC    | Joint Warfighting Center                                   |
| JWICS   | Joint Worldwide Intelligence Communications System         |

L

|        |                                               |
|--------|-----------------------------------------------|
| LAN    | Local Area Network                            |
| LAWS   | Land Attack Warfare System                    |
| LEAPS  | LOCAAS Engagement Analysis Program Simulation |
| LOGSIM | Logistics Simulation                          |
| LRSD   | Long Range Surveillance Detachment            |
| LVRS   | Lightweight Video Reconnaissance System       |

M

|        |                                                                               |
|--------|-------------------------------------------------------------------------------|
| M&E    | Mapping and Enumerations                                                      |
| M&S    | Modeling and Simulation                                                       |
| MAGTF  | Marine Air Ground Task Force                                                  |
| MAIS   | Material Acquisition Integrated System/Mobile Automated Instrumentation Suite |
| MARCI  | Multi-host Automation Remote Control and Instrumentation                      |
| MARFOR | Marine Corp Forces                                                            |
| MASINT | Measurements and Signatures Intelligence                                      |
| MATT   | Multi-Mission Advanced Tactical Terminal                                      |
| MCE    | Modular Control Element (AN/TYQ-23)                                           |
| MCM    | Mine Countermeasures                                                          |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

MCS Maneuver Control System  
MDS/RPM Mission Database System  
MDST Missile Defense Space Warning Tool  
METOC Meteorological Operations  
MIDB Modernized Integrated Database  
MISREP Mission Report  
MLST<sup>3</sup> Multi Link System Test and Training Tool  
MOUT Military Operations in Urban Terrain  
MSC Mission Support Center  
MSEL Master Scenario Events List  
MSIM Master Simulation  
MSTP MAGTF Staff Training Program  
MTI Moving Target Indicator  
MTO Maritime Tasking Order  
MTIX Moving Target Information Exploitation  
MUSE Multiple UAV Simulation Environment  
MUST Multi-mission UHF Satellite Transceiver

N

NAVFOR Naval Forces  
NJI Naval JSTARS Interface (GCCS-M)  
NMC Network Management Center  
NRO National Reconnaissance Office  
NSC National Simulation Center  
NTDS Navy Tactical Data System  
NUWC Naval Undersea Warfare Center  
NWARS National Wargaming System  
NWDC Naval Warfare Development Command

O

OASES Ocean Atmosphere Space Environmental Services  
OMFTS Operational Maneuver from the Sea  
ONA Operational Net Assessment  
OPCON Operational Control  
OPFOR Opposing Force  
OSD Operational Sequence Diagram  
OTB OneSAF Testbed Baseline  
OTH-G Over-The-Horizon, Gold

P

PAC2 Patriot Anti-tactical missile Capability, Phase 2

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|           |                                                                                          |
|-----------|------------------------------------------------------------------------------------------|
| PAC3      | Patriot Anti-tactical missile Capability, Phase 3                                        |
| PATRIOT   | Phased Array Tracking to Intercept of Target                                             |
| PC-SWAT   | Personal Computer Shallow Water Acoustic Tool Kit                                        |
| PDU       | Protocol Data Unit                                                                       |
| PE        | Precision Engagement                                                                     |
| PEL       | Prioritized Effects List                                                                 |
| PEGEM     | Post-Engagement Effects Model                                                            |
| POC       | Point of Contact                                                                         |
| POL       | Petroleum, Oils, and Lubricants                                                          |
| PSM+NAV   | Portable Space Model Enhanced/Navigation                                                 |
| PTW+      | Precision Targeting Workstation                                                          |
| Q         |                                                                                          |
| QC        | Quality Check                                                                            |
| R         |                                                                                          |
| RBECS     | Revised Battlefield Electronic CEOI System                                               |
| RC        | Response Cell                                                                            |
| RDO       | Rapid Decisive Operations                                                                |
| RECCE     | Reconnaissance                                                                           |
| RECCEXREP | Reconnaissance Exploitation Report                                                       |
| RJMT      | Rivet Joint Mission Trainer                                                              |
| RPM       | Route Planning Module                                                                    |
| RRF       | Ready Room of the Future                                                                 |
| RTI       | Run Time Infrastructure                                                                  |
| RTOS      | Reconfigurable Tactical Operations Simulator                                             |
| RTSS      | Real Time Software System                                                                |
| RTV       | Rapid Terrain Visualization                                                              |
| S         |                                                                                          |
| S507L     | Blue Unit Report                                                                         |
| SA        | Situational Awareness                                                                    |
| SAA       | Situational Awareness and Analysis                                                       |
| SABRE     | Synthetic Aero Battle Research Environment (AWSIM simulation in an HLA/RTI architecture) |
| SAC       | Simulation Analysis Center (@ USJFCOM J9 Building)                                       |
| SALUTE    | Size, Activity, Location, Unit, Time, Equipment (Report)                                 |
| SATS      | Stand-Alone TENCAP Simulator                                                             |
| SBIRS     | Space-Based Infrared System                                                              |
| SCIF      | Sensitive Compartmented Information Facility                                             |
| SDF       | Simulation Data Flow                                                                     |
| SDFD      | Simulation Data Flow Diagram                                                             |
| SHF       | Super High Frequency                                                                     |



U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|         |                                                                |
|---------|----------------------------------------------------------------|
| SIGS    | Synthetic Imagery Generation System                            |
| SIPRNET | Secret Internet Protocol Router Network                        |
| SITREP  | Situation Report                                               |
| SJFHQ   | Standing Joint Force Headquarters                              |
| SLAMEM  | Simulation of the Location and Attack of Mobile Enemy Missiles |
| SMART   | Secure Messaging and Routing Terminal                          |
| SMAT    | Space Missile Analysis Tool                                    |
| SMDBL   | Space and Missile Defense Battle Lab                           |
| SME     | Subject Matter Expert                                          |
| SMV     | Space Maneuver Vehicle                                         |
| SOJ     | Standoff Jammers                                               |
| SOTVS   | Special Operations Tactical Video System                       |
| SPJ     | Self-Protection Jammers                                        |
| SPOD    | Sea Port of Debarkation                                        |
| SPPS    | SharePoint Portal Server                                       |
| STAMPS  | Stand Alone Message Processing System                          |
| STO     | Special Technical Operations                                   |
| STOM    | Ship-to-Objective Maneuver                                     |
| STRED   | Standard Tactical Receive Equipment Display                    |
| STRICOM | Simulation, Training, and Instrumentation Command              |

T

|         |                                                                       |
|---------|-----------------------------------------------------------------------|
| TACCSF  | Theater Air Command and Control Simulation Facility                   |
| TACELIN | Tactical Electronic Intelligence                                      |
| TACFIRE | Tactical Fire Direction System                                        |
| TACON   | Tactical Control                                                      |
| TACREP  | Tactical Report                                                       |
| TACSAT  | Tactical Satellite Terminal                                           |
| TADIL   | Tactical Digital Interface Link                                       |
| TADIL-J | Tactical Digital Interface Link-J                                     |
| TAIS    | Tactical Air Intelligence System/Tactical Airspace Integration System |
| TAOC    | Tactical Air Operations Center                                        |
| TBA     | Theater Battle Arena                                                  |
| TBM     | Theater Ballistic Missiles                                            |
| TBMCS   | Theater Battle Management Core System                                 |
| TBMD    | Theater Ballistic Missile Defense                                     |
| TCO     | Tactical Combat Operations                                            |
| TCT     | Time Critical Targeting                                               |
| TDDS    | TRE/TRAP Data Dissemination System                                    |
| TEL     | Transporter, Erector, Launchers                                       |
| TENCAP  | Tactical Exploitation of National Capabilities                        |
| TES     | Tactical Exploitation System                                          |
| TES-N   | Tactical Exploitation System - Naval                                  |
| TIBS    | Tactical Information Broadcast Service                                |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

TIMF TIBS Inter-computer Message Format  
TIRT Tactical Imagery Rendering Tool  
TIU/PC TIBS Interface Unit/Personal Computer  
TLAM Tomahawk Land Attack Missile  
TM Test Manager  
TOC Tactical Operations Center  
TPFDD Time Phased Force Deployment Data  
TPS-75 Air Defense radar (USAF)  
TR Trouble Report  
TRAP TRE and Related Applications  
TRE Tactical Receiving Equipment  
TSIU Tactical Simulation Interface Unit  
TST Time Sensitive Targeting  
TTP Tactics, Techniques, and Procedures  
TCAV Tactical Unmanned Aerial Vehicle  
TV Technical Verification  
TWS Tactical Weather System  
TXC<sup>4</sup>I Targeting Experimental C<sup>4</sup>I

U

UAV Unmanned Aerial Vehicle  
UAVSIM Unmanned Aerial Vehicle Simulation  
UGS Unattended Ground Sensor  
UHF Ultra High Frequency  
UMS Unattended MASINT Sensor  
USJFCOM U.S. Joint Forces Command  
USMTF U.S. Message Text Format

V

VHF Very High Frequency  
VIEW Virtual Interactive Environment World Space  
VLAN Virtual Local Area Network  
VLF Very Low Frequency  
VMF Variable Message Format  
VPN Virtual Private Network  
VSSGN Virtual Submarine  
VSTARS Virtual Surveillance Target and Attack Radar System JSTARS  
VT Vignette Test  
VTC Video Teleconference  
VV&A Verification, Validation and Accreditation

W

WALTS Weapons Analysis and Lethality Toolkit

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|     |                             |
|-----|-----------------------------|
| WAN | Wide Area Network           |
| WG  | Work Group                  |
| WOC | Wing Operations Center      |
| WS  | Work Station or Workstation |

X

XC<sup>4</sup>I Experimental Command, Control, Communications, Computers, Intelligence

(This Page Blank)

## **Annex B — Baseline Report**

*This Annex is available from USJFCOM/J9 to eligible DoD and other government agencies only.*

(This Page Blank)

## Annex C — Assessment Plan

This annex depicts the Assessment Plan developed prior to MC02 Spiral 3. It was executed as written, except in the area of data collection from live tactical actions. Live tactical data was subsequently deemed unnecessary for the analysis of MC02 concepts and objectives, and was not collected.

### HQ, U.S. JOINT FORCES COMMAND NORFOLK, VA 23551-2488

Annex U to MC02 EXDIR Assessment and Reporting

#### References:

- a. U.S. Joint Forces Command Experiment Analysis Plan, MC02
- b. U.S. Joint Forces Command J9 Joint Futures Lab, RDO White Paper Version 2.0, *A Concept for Rapid Decisive Operations* (Final Draft), dated 25 October 2001.
- c. Chairman, Joint Chiefs of Staff Manual 3500.04B, *Universal Joint Task List Version 4.0*, dated 1 October 1999
- d. Chairman, Joint Chiefs of Staff Memorandum, *Guidance for USJFCOM Joint Experimentation*, dated 2 November 2001

#### 1. General

a. Purpose. This Annex presents the Joint Forces Command (JFCOM) plan for assessing the joint field experiment on Rapid Decisive Operations (RDO) in 2007, Millennium Challenge 2002 (MC02). This Annex provides an overview of the intent, scope, concept, and methodology for assessment of the joint field experiment to meet JFCOM's joint experiment objectives. A detailed assessment plan, the JFCOM Experiment Analysis Plan (JEAP), reference (a), will be published to document the detailed methodology, data requirements, and reporting plan for MC02. The Services and the Special Operations Command (SOCOM) will develop assessment plans for their experiment objectives as appropriate.

b. Background. The Defense Authorization Act for FY 2001 (Public Law 106-399) required the Secretary of Defense to conduct a joint field experiment in fiscal year 2002 to explore critical warfighting challenges at the operational level of war in this decade. MC02 fulfills this requirement.

#### 2. Experiment Description

a. Experiment Overview. JFCOM, in conjunction with the Services and SOCOM, SPACECOM, and TRANSCOM will conduct the MC02 joint field experiment from 24 July through 15 August 2002 using computer simulation and live forces to determine the extent to which the joint force will be able to execute RDO in this decade. The experiment will assess the impact of three primary RDO enablers: Standing Joint Force Headquarters (SJFHQ), Operational Net Assessment (ONA), and Effects-Based Operations (EBO) on future joint warfighting operations. MC02 will also provide evidence to support doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) change recommendations that will enable the joint force to meet future warfighting challenges at the joint operational level of war.

#### b. Experiment Hypothesis

*If an Enhanced Joint Force Headquarters is informed by an Operational Net Assessment and employs Effects-Based Operations, which use the full range of our national capabilities,*

*then the 2007 joint force will be able to conduct Rapid Decisive Operations against a determined 2007 adversary.*

c. RDO Concepts. The “if” portion of the experiment hypothesis describes an enhanced Joint Force Headquarters (JFHQ). The experiment will assess the three primary aspects of the RDO concept for an enhanced joint headquarters: Standing Joint Force Headquarters (SJFHQ), Operational Net Assessment (ONA), and Effects-Based Operations (EBO). Additional aspects of the enhanced joint headquarters will also be assessed: an experimental Collaborative Information Environment (CIE), interagency (IA) collaboration, Joint Theater Logistics Management (JTLM), and Joint Intelligence, Surveillance, and Reconnaissance (JISR). These RDO concept enablers are fundamental to the joint force’s ability to accomplish the RDO warfighting tasks. Workable concepts for an SJFHQ, ONA, and EBO are the three primary experiment deliverables that will support the enhanced JFHQ. Each of the concept enablers will be represented in MC02 in an experimental form with aspects of the individual capability emulated because of difficulties representing 2007 capabilities in 2002. However, each of the seven concepts will potentially yield DOTMLPF recommendations. The RDO concept enablers are as follows:

(1) Standing Joint Force Headquarters. The joint field experiment will examine the strengths and weaknesses involved in providing a pre-established SJFHQ knowledge element to augment a deploying Joint Task Force Headquarters (JTF HQ). The SJFHQ is intended to provide each warfighting theater combatant commander a trained and equipped standing, joint command and control (C2) capability organized to reduce the time involved in setting up a JTF headquarters ready to rapidly and decisively conduct operations. The SJFHQ will provide continuity to the combatant commander's staff in planning and operations necessary to support EBO and RDO. This 55-person cell will provide specific plugs and augmentees to the designated JTF to enable it to support EBO planning and assessment quickly.

(2) Operational Net Assessment. ONA provides the foundation of knowledge and understanding about an adversary needed for RDO. It provides knowledge in sufficient detail to apply integrated diplomatic, information, military, and economic (DIME) friendly actions decisively against an adversary’s political, military, economic, social, infrastructure, and information (PMESII) systems. This knowledge base includes systems analyses that identify critical adversary vulnerabilities and potential friendly DIME actions with the goal of causing desired effects. It is a product of collaboration among a wide variety of organizations and informs decision makers from strategic to tactical levels. The ONA provides a joint task force commander and components visibility of effects-to-task linkages supporting effects-based operations.

(3) Effects-Based Operations. The joint experiment will examine if the joint force can plan, execute, and assess the results of EBO. The EBO concept defines a process for obtaining a desired outcome or “effect” through the synergistic and cumulative application of the full range of military and non-military capabilities at all levels of conflict. An effect is the physical, functional, or psychological outcome, event, or consequence that results from specific military or non-military actions. The EBO concept envisions more comprehensive insight into the adversary, ourselves, and the environment to facilitate the determination of desired effects, the consideration of the full range of potential results of the appropriate application of power from the full spectrum of military and non-military capabilities, an assessment of the resultant outcomes, and rapid adaptation by the joint force.



(4) Collaborative Information Environment. An experimental CIE will be assessed that includes use of collaboration tools and an enhanced situational awareness through a Common Relevant Operational Picture. The JTF headquarters depends on collaboration and maximized use of collaborative tools in order to fully realize a truly "distributed" JTF C2 network linking the JTF, components, combatant commander, interagency, and centers of excellence. This C2 network will use reach-back capabilities to access fixed base support and other resources, which should reduce the need for a large forward C2 footprint. The results of this experiment will support follow-on experimentation to identify a uniform organization; a baseline joint command and control system; standard operating procedures (SOPs); and tactics, techniques, and procedures (TTPs) to support Combatant commanders in the establishment of a SJFHQ element within their regions (reference (d)).

(5) Interagency. A Joint Interagency Coordination Group (JIACG) will be constituted on-site at JFCOM with secure, virtual collaboration to JIACG interagency participants in Washington, D.C. JIACG participants will coordinate in four areas: (1) strategic guidance and a regional assessment, (2) political-military plan, (3) operational planning issues and crisis response, and (4) interagency coordination during execution to support crisis response and transition planning. Information to support interagency planning will be provided by the ONA. The ONA will include collaboration with civilian and military departments and agencies engaged in the collection, analysis, and production of estimates and assessments that support the National Security Council (NSC).

(6) Joint Theater Logistics Management. The MC02 organization for JTLM operates at two tiers. At the combatant commander level is a Joint Logistics Management Center (JLMC) within the combatant commander J4 staff. The JLMC will operate in a CIE with the logistics elements of the combatant commander's Service components, host nations, DLA, TRANSCOM, coalition forces, other combatant commander "J codes," the country team, and the logistics element of the JTF staff and those of the JTF functional components. At the JTF level, a collaborative Logistic Action Response Board (LARB) is convened as required and is composed of logisticians and other key personnel integrated into the plans and operations Groups of the JTF staff as well as those in the functional component staffs. This experimental organization concept is intended to provide distributed command and control for logistics and transportation to carry out joint logistics processes with increased effectiveness, better synchronization, and greater flexibility with fewer personnel.

(7) Joint Intelligence, Surveillance, and Reconnaissance. JISR is a joint mission to produce relevant information from all sources in a dynamic, comprehensive, responsive, timely manner enabling Information Superiority. JISR functions within the EBO processes and includes ISR sensor management, collection operations, and the level of processing and analysis necessary to support initial phase exploitation of collected information, and the dissemination of this intelligence to the user.

d. Experiment Objectives. The following five experiment objectives reflect what the joint force needs to accomplish in MC02 in order to conduct RDO as reflected in the "then" portion of the experiment hypothesis.

Objective 1: Establish and maintain information/knowledge superiority.

Objective 2: Rapidly set the conditions for decisive operations by seizing and exploiting the initiative, posturing the joint force, establishing the nature of operations, and shaping the environment.

Objective 3: Assure access into and through the battlespace to provide sufficient freedom of action.

Objective 4: Conduct decisive effects-based operations.

Objective 5: Sustain itself, specifically to deliver sustainment to combat units in synchronized non-contiguous operations.

e. Joint Initiatives. JFCOM issued a call for joint initiatives that supported the RDO concept. Each initiative is a potential future RDO enabler for overcoming one or more warfighting challenges associated with conducting RDO in this decade. Appendix U-1 presents the 27 sponsored joint initiatives.

f. Potential Change Recommendations. MC02 is expected to be the culminating event for a number of potential DOTMLPF change recommendations. The findings of the experiment, along with findings from previous experiments and other events, will determine which of the potential changes have sufficient evidence to support a formal change recommendation. JFCOM is in the process of developing approximately 20 potential change recommendation packages that may have sufficient evidence after the completion of MC02 to support a formal change recommendation.

3. Experiment execution. The MC02 joint field experiment combines a military computer-assisted headquarters event and a military field event that includes both live and simulated forces, set in the 2007 time frame, focused on those joint warfighting concepts that enable RDO. The setting is a small-scale contingency (SSC) against a determined, locally numerically superior 2007 adversary. The experiment includes four preparatory events (Spirals) and the concluding field experiment.

a. Spiral 0. Initial technical testing conducted 3 to 14 December 2001.

b. Spiral 1. A technical event, conducted from 28 January to 8 February 2002, to test the core and ancillary models as well as the C<sup>4</sup>I systems fed by the simulations.

c. Spiral 2. An academic event, conducted from 18 to 29 March 2002, to discuss U.S. Joint Doctrine and RDO Concepts, as well as Effects-Based Planning, operations, and assessment. The academic event will be followed by a practical exercise, and continued technical integration and testing.

d. Spiral 3. Conducted from June 3-14 2002. The JTF will develop the Effects Tasking Order and component headquarters will develop the supporting component orders. The JTF will conduct a rehearsal during the final two days.

e. Joint Field Experiment. The field experiment will be conducted from 24 July to 15 August 2002. The joint field experiment will include computer-simulation and live forces to determine the extent to which the joint force will be able to execute RDO in this decade. It will also include opportunities for Service-related experimentation. The MC02 joint field experiment is designed to permit as realistic an operational warfighting environment as possible. It includes a robust, adaptive, independent 2007 adversary, which will have its own objectives and campaign plan. Both the Blue force and the adversary will be minimally constrained to enforce the scenario boundaries. The control cell will ensure validity of all Blue-adversary actions and engagements. The intent is to assess the concepts against a robust, adaptive, and independent 2007 adversary before making any recommendations. In order to keep the experiment from terminating too soon, if one side or the other gets "too far" ahead, the control cell will make adjustments, but only after the assessors have noted the successes and failures and their causes. The control cell may have to "resurrect" or "protect" some adversary or Blue entities to continue the experiment until all experimental objectives are achieved. The intent is to minimize the

intervention of the control cell and promote maximum free play for Blue and the adversary within the scenario boundaries.

4. Assessment Strategy

a. JFCOM Assessment Focus. The JFCOM assessment and reporting will focus at the joint operational level of warfighting. Accordingly, JFCOM data collection will focus on the combatant commander HQ (response cell), the JTF Headquarters, and the Functional Component Headquarters: JFLCC, JFMCC, JFACC, JPOTF, and JSOTF. A representative sample of data will be collected at the tactical level during the live tactical actions to examine accuracy of situational awareness at the joint operational level. The Services and SOCOM will execute and report on their component-level experiments through their own reporting chains.

b. JFCOM Assessment priorities. The JFCOM assessment is organized into four assessment tasks: two primary assessment tasks and two secondary assessment tasks.

(1) Primary Assessment Tasks

(a) TASK 1: Assess the capability of the experimental RDO concepts to impact JTF HQs planning processes and coordination processes. This assessment task examines the “if” component of the experiment hypothesis and answers the question: To what extent did the concept enhancements to the joint force headquarters facilitate the Joint Task Force Headquarters command and control processes and products?

(b) TASK 2: Assess the capability of the experimental RDO concepts to impact Joint Task Force actions against a determined 2007 adversary. This assessment task examines the “then” component of the experiment hypothesis and answers the question: to what extent did the experimental concepts affect joint force actions (influence, deter, coerce, compel, and defeat) against a determined 2007 adversary?

(2) Secondary Assessment Tasks

(a) TASK 3: Assess the strengths and weaknesses of the RDO sponsored joint initiatives in supporting the JTF planning processes and products.

(b) TASK 4: Provide lessons learned on joint field experimentation for the next joint field experiment.

c. Warfighting challenges, Tasks, and Measures. JFCOM Joint Futures Lab Concept Development Department has identified 22 potential warfighting challenges, which are presented in the following paragraphs. Eleven are related to the JTF HQs planning process and 11 related to the ability of the joint force to accomplish the five MC02 objectives in 2007. Planning tasks have been developed for each warfighting challenge for the JTF HQ and operational execution tasks were developed for the joint force as a whole. Many of these tasks have been taken directly or adapted from reference (c), Universal Joint Task List (UJTL) Version 4.0. Measures of task accomplishment have been developed for each task. When applicable, the measures have been adapted from the measures provided in the UJTL. The 23 warfighting challenges are provided below. The associated tasks along with the qualitative and quantitative measures for each of the warfighting challenges are provided in Appendix 2 to this Annex.

(1) Assessment Task 1: Assess the impact of the primary RDO Concept enablers on JTF Headquarters process and products. Appropriate warfighting challenges have been developed for each of the three primary RDO concepts (SJFHQ, ONA, and EBO) and the four supplemental components of an enhanced joint headquarters (CIE, interagency, JTLM, and JISR). These warfighting challenges are provided below. The answers to these challenges will indicate how each concept affected the planning process.

**Standing JFHQ**

*Warfighting Challenge:*

Quickly achieve cohesive C2 of a joint force

**Operational Net Assessment (ONA)**

*Warfighting Challenges:*

Analyze adversary PMESII systems for tangible/intangible strengths and weaknesses

Use ONA to enhance decision-making

**Effects-Based Operations (EBO)**

*Warfighting Challenges:*

Conduct effect-based planning

Conduct effects assessment

**Collaborative Information Environment**

*Warfighting Challenges:*

Establish a valid COP/CROP

Maintain collaborative capabilities

**Interagency**

*Warfighting Challenges:*

Ability to quickly achieve and maintain cohesive relationships with the interagency community

Ability to improve interagency campaign planning and execution

**Joint Theater Logistics Management**

*Warfighting Challenge:*

Plan for agile sustainment.

**Joint Intelligence, Surveillance, and Reconnaissance (JISR)**

*Warfighting Challenge:*

Provide relevant intelligence to the commander

Appropriate tasks and subtasks were developed for each of the warfighting challenges. Each task and subtask has associated measures that serve as indicators of task accomplishment. These are provided in Appendix U-2. Comments from the senior mentors, SMEs, and JTF warfighters, and data provided from the model federation, will help determine why the task could or could not be accomplished.

(2) Assessment Task 2: Assess the capability of the Joint Task Force to execute the RDO Objectives. Warfighting challenges have been developed for each of the five MC02 objectives. These warfighting challenges represents an issue question pertaining to the ability of the joint force to execute operations against a determined 2007 adversary.

**Objective 1. Establish and maintain information/knowledge superiority**

*Warfighting Challenges:*

Provide situational awareness of JOA throughout the JTF

Use the CROP and collaboration to enhance JTF operational timelines

**Objective 2. Rapidly set the conditions for decisive operations by seizing and exploiting the initiative, posturing the joint force, establishing the nature of operations, and shaping the environment**

*Warfighting Challenges:*

Establish advantageous positions for decisive operations

Decrease joint force vulnerability to disruption, especially ISR and logistic infrastructure

**Objective 3. Assure access into and through the battlespace to provide sufficient freedom of action**

*Warfighting Challenges:*

Provide selective dimensional superiority

Provide sufficient operational reach

Enhance force protection

**Objective 4. Conduct decisive effects-based operations**

*Warfighting Challenges:*

Synchronize the application of the full range of joint capabilities in order to engage decisive points in time and space

Integrate full joint capabilities against tactical level objectives

Integrate execution of information operations into EBO

**Objective 5. Sustain the force, specifically to deliver sustainment to combat units in synchronized non-contiguous operations**

*Warfighting Challenge:*

Provide agile sustainment

The assessment strategy for Task 2 is similar to that for Task 1. Tasks with associated measures were developed for each warfighting challenge. These are also provided in Appendix U-2. If the tasks mapped to the warfighting challenges under a particular objective are accomplished, it indicates that the joint force could execute that objective and that the pre-identified potential warfighting challenge to that RDO objective could be overcome in 2007 provided the task enablers are available in 2007. If, on the other hand, a substantial proportion of the tasks under a particular RDO objective could not be accomplished, then this would indicate the potential warfighting challenge associated with that the experimental RDO concept enablers might not alleviate RDO objectives.

Comments from the SMEs and JTF warfighters plus model data will provide assistance in determining the extent that the experimental concepts facilitated, or did not facilitate, the ability of the joint force to execute its operational tasks. Senior mentors, (retired senior military commanders) will also assess the extent to which the joint force accomplished each RDO objective and accomplished the combatant commander mission objectives over the course of the campaign. Additionally, the adversary team will be monitored to assess the extent to which the joint force was able to influence threat capabilities and options over the course of the campaign. Each objective task has been mapped to a concept. If the tasks mapped to a concept are accomplished, it is evidence that the concept contributed to task completion and that causality will be explored by the analysts, senior mentors, and SMEs.

(3) Assessment Task 3: Provide “warfighter comment” observations on the RDO Concept Sponsored Initiatives. The sponsored initiatives will be assessed primarily through warfighter and SME comments on operational functionality. Additional comments and observations may come from the senior mentors. The sponsored joint initiatives will be mapped to the tasks that support the warfighting challenges. The assessment will use SME and warfighters comments to determine the extent that these initiatives facilitated JF Headquarters’ planning tasks.

(4) Assessment Task 4: Provide lessons learned on joint field experimentation for the next joint field experiment. Data will be collected from all participants and experiment control personnel to document the lessons learned in the planning, execution, and reporting of this joint field experiment. The lessons learned will be used to improve joint field experimentation.

d. Data Collection Strategy

(1) Exercise Baseline Data. JFCOM J7 is developing an exercise database that will provide baseline information on selected JTF tasks. This database encompasses over 100 exercise and real-world operations reports over the last six years. The reports have been entered as individual task records corresponding to UJTL task identifiers. This baseline will provide a history of task accomplishment or difficulty.

(2) Experiment Data

(a) JTF Warfighter Observations. Warfighters in the combatant commander response cell, the JTF HQ, and the Functional Component Headquarters (JFLCC, JFMCC, JFACC, JPOTF, and JSOTF) will submit observations on specific processes and procedures. They will be required to complete periodic surveys to capture their specific observations on the strengths and weaknesses of the RDO concept capabilities employed to facilitate their warfighting tasks.

(b) SME Observations and Ratings. Manual, over-the-shoulder data collection will be accomplished by SME data collectors. A majority of these SMEs are from the pool of the Observer/Trainers and After Action Review Analysts from JFCOM J7 who are experienced in conducting observations and collecting data during Joint Task Force training events. Service and SOCOM functional experts will augment the JFCOM SMEs and will be trained in the experiment concept. To the maximum extent possible, the SME teams assigned to the functional components headquarters and to the live Service events will consist of functional experts from multiple Services.

(c) Ground Truth for Situational Awareness. Ground-truth data are required for comparison to the CROP/COP databases in GCCS to assess the validity of the CROP/COP at the JTF Headquarters and at the Functional Component Headquarters (JFLCC, JFMCC, JFACC, and JSOTF). The majority of the “ground-truth” data will be taken from the experiment simulation federation where the majority of the RDO campaign will take place. Limited ground truth on a sampling basis will be taken from selected live operations. The resolution of ground-truth data will be at the level necessary to assess the accomplishment of effects and their associated tasks.

(d) Joint Force Operations Outcomes (Simulated Forces). The primary quantifiable data to support the joint force task accomplishment under the five Experiment Objectives will be based on the achievement of effects-based operations and achievement of campaign objectives as portrayed will be obtained from the simulated forces in the experiment simulation federation.

(e) Assessment Organization. The assessment team will be organized to accomplish data collection and quality control of data consistent with the battle rhythm established for the

experiment. Service and SOCOM analysts will be integrated into the JFCOM analysis team to assist with the quality control of the data and interpreting the results.

(f) Model-Experiment-Model. A Model-Experiment-Model (M-E-M) process as a proof-of-principle will determine the utility of using a constructive, analytical model to overcome some of the limitations of conducting a large field experiment. The M-E-M methodology will also establish the foundation of a continuous experimentation environment to support future joint experimentation. Since MC02 joint field experiment does not have an “on-the-ground” baseline to determine effectiveness gains, the focus in M-E-M is to build a constructive baseline for comparison to a constructive RDO variation that has been calibrated to the results of the field experiment. If the calibration of constructive to live is successful and time permits in the post-experiment modeling phase, we also expect to conduct some sensitivity runs on the major field findings. There will not be sufficient time for full-scale pre-experiment modeling. The post-experiment modeling will calibrate the constructive models using the results and insights gained from the field experiment to determine to what extent a constructive simulation can replicate the MC02 2007 Blue force executing the same joint field Experiment SSC. If the model can be calibrated to the field experiment results, a baseline excursion will be attempted to determine if a 2007 Blue force executing a SSC without the RDO Concept enablers can be modeled. Whenever possible, service high-resolution models, and study results will be used in support of this proof-of-principle modeling effort. This M-E-M effort will not be used to shape the experiment design or execution, but will be used to determine the process and potential of doing so for future experiments.

5. JFCOM Reporting

a. JFCOM Joint Field Experiment Report. JFCOM will develop and staff the JFCOM joint experiment report for review and comment with Services and SOCOM. Services and SOCOM will be requested to provide analysts to assist JFCOM in developing the joint experiment report to provide insight and expertise pertaining to the functional components. The report will focus on the results of the two primary assessment tasks. It will identify the degree to which the primary RDO Concept enablers (SJFHQ, ONA, and EBO) were implemented in the joint force headquarters and the contribution of these enablers to the joint force achieving the five RDO experiment objectives. The report will identify the strengths and weaknesses of these RDO enablers to support future joint DOTMLPF considerations. For the additional RDO sponsored initiatives, the report will provide functionality “insights.” The JFCOM Experiment Report will be made available in draft for Service and SOCOM review with anticipation for the final signed report available for distribution in February 2003. The Services and SOCOM will submit separate reports for component experiment-specific findings and recommendations through their chain of command as appropriate.

b. Formal Joint DOTMLPF Recommendation Submissions. Based on the findings in the JFCOM Experimentation Report, JFCOM will develop separate formal DOTMLPF Recommendation Submissions to JCS who will staff them with the combatant commanders, Services, and Agencies for review.

Appendixes:

- 1 – MC02 Joint Initiatives Integration Recommendation List
- 2 – Objectives, Warfighting Challenges, Tasks, Subtasks Matrix

HQ, U.S. JOINT FORCES COMMAND  
 NORFOLK, VA 23551-2488

Appendix 1 To Annex U To MC02 EXDIR  
 MC02 JOINT INITIATIVES INTEGRATION RECOMMENDATION LIST

Table 45: Summary of Joint Initiatives by Group

| GROUP TITLE                                      | ACRONYM        | INITIATIVE NAME                                                              | DESCRIPTION                                                                                                                 | SPONSOR               |
|--------------------------------------------------|----------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Experimental C <sup>4</sup> I Systems Group      | MSCTS/IWS2.5   | Defense Collaborative Tool Suite                                             | Integrates collaborative tools, decision support tools, M&S, and CROP.                                                      | USJFCOM (J9)          |
| Experimental C <sup>4</sup> I Systems Group      | GCCS-I3        | Global C2 System - Integrated Intelligence and Imagery                       | Fused assessment and battlespace visualization.                                                                             | USJFCOM (J29)         |
| Experimental C <sup>4</sup> I Systems Group      | JDISRM         | Joint Dynamic ISR Management                                                 | ISR Management Tool that feeds the CROP.                                                                                    | USJFCOM (J28)         |
| Experimental C <sup>4</sup> I Systems Group      | ONA Tool Suite | ONA Tool Suite                                                               |                                                                                                                             | USJFCOM (J9)          |
|                                                  | GENOA          | GENOA                                                                        | Structured argumentation methodology for decision support                                                                   |                       |
|                                                  | AnalNB         | Analyst Notebook                                                             | Visual investigative analysis software                                                                                      |                       |
|                                                  | ArcView/IMS    | ArcView/IMS                                                                  | Multi-user geo-database storage and management                                                                              |                       |
| Experimental C <sup>4</sup> I Systems Group, Log | LTS            | Logistics Tools Suite                                                        | Suite of decision support tools that provide the ability to develop, assess, monitor and visually display logistics support | USJFCOM (J9)          |
| Experimental C <sup>4</sup> I Systems Group, Log | TMIP           | Theater Medical Integration Planning                                         | Automated medical record data capture and medical intelligence gathering.                                                   | USJFCOM (J9)          |
| Joint Fires Group                                | JFI (ADOCS)    | Joint Fires Initiative (Automated Deep Ops Coord Sys and ADOCS Presentation) | Coordinates Joint assets on time sensitive targets, integrates C <sup>4</sup> ISR.                                          | USN (NWDC) USA (JPSD) |
| Federated Exploitation Group                     | TES-EJT        | Tac Exploit Sys (TES) Enhanced Joint                                         | Direct target nomination to both Army and Navy indirect fire systems.                                                       | USA (USAMDC)          |



U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| GROUP TITLE                    | ACRONYM    | INITIATIVE NAME                                                    | DESCRIPTION                                                                                             | SPONSOR            |
|--------------------------------|------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------|
|                                |            | Targeting                                                          |                                                                                                         |                    |
| Network Operations Enhancement | ANIF       | Automatic Network Information Flow                                 | Dynamic reapportionment of bandwidth                                                                    | USJFCOM (JBC)      |
| Network Operations Enhancement | NSMC&D     | Network Security Management Correlation & Display                  | Central database for correlation, analysis and reporting of network status.                             | USJFCOM (JBC)      |
| Stand Alone                    | JEMPRS-NT  | Joint Enroute Msn Planning and Rehearsal Sys-Near Term (JEMPRS-NT) | Collaborative capability for enroute SOCOM and Navy.                                                    | USJFCOM (JBC)      |
| Stand Alone                    | MCS-TCO    | Maneuver Control System-Tactical Combat Operations                 | Interfacing of Army and Marine C2 systems                                                               | USJFCOM (J8)       |
| Stand Alone                    | SAC        | Signal Analysis Comparison (classified)                            | Comparison of emerging national capabilities vs. legacy capabilities in support of tactical operations. | USA (USASMDC)      |
| Stand Alone                    | Avalanche  | Avalanche - (classified)                                           | Software that provides an intelligent agent to perform data mining functions                            | USSOCOM            |
| Concept Initiative             | GSTF       | Global Strike Task Force                                           | Air Force rapid-reaction force package to meet anti-access challenges.                                  | USAF (AC2ISR)      |
| Procedural Initiative          | JPAOG      | Joint Public Affairs Ops Group                                     | A centralized PA office at the JTF HQ representing all Services.                                        | USJFCOM (PAO/APAC) |
| Procedural Initiative          | NIMA-CART  | NIMA Crisis Action Response Team (CART)                            | Reach-back to NIMA data, products and Subject Matter Experts.                                           | NIMA               |
| Procedural Initiative          | C2SpaceCno | Command and Control for Space and Computer Network Ops             | Space cell embedded in JTF HQ for reach-back to USSPACECOM                                              | USSPACECOM         |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| GROUP TITLE           | ACRONYM              | INITIATIVE NAME                                                  | DESCRIPTION                                                                | SPONSOR               |
|-----------------------|----------------------|------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------|
| Procedural Initiative | UGS-TBM              | Unattended Sensors support to Theater Ballistic Missiles         | Small concealable sensors help SOF locate TBM targets                      | USSOCOM               |
| Procedural Initiative | JSOTF-JCTP           | JSOTF Reach-back Msn and SOF Joint Collaborative Planning Tool   | Link CONUS Subject Matter Experts to SOF Warfighters                       | USSOCOM               |
| Tools for Showcasing  | JATF                 | Joint Automated Target Folders                                   | Automated interoperable targeting tool.                                    | USJFCOM (J9)          |
| Tools for Showcasing  | JASGS                | Joint Automated Single Guard Solution                            | JTF and Multinational viewing of multi-level imagery, sensor data and GMI. | USJFCOM (JBC)         |
| Service Initiative    | HSV                  | High Speed Vehicle                                               | 4000 ton, 3000 mile, Catamaran, Live ship                                  | USN (NWDC)<br>USSOCOM |
| Service Initiative    | PEO-IP               | Program Executive Office-Interchange Proposal                    | Fused assessment and battlespace visualization for time critical targets.  | USA (PEO C3S)         |
| Service Initiative    | SB-BFT               | Space Based Blue Force Tracking Mission Architecture Integration | Space based system for tracking and reporting on status of friendly units. | USSPACECOM            |
| Service Initiative    | COMWX                | Computered MASINT Weather (COMWX) ACTD (classified)              | High-level weather gathering capability.                                   | NRO/EUCOM             |
| Service Initiative    | UAV-Interoperability | UAV Interoperability                                             | UAV C2 and product dissemination from ground stations.                     | USJFCOM (J28)         |

Prioritization Legend:

Prioritization is the perceived level of importance to the joint experimental objectives and major focus areas (e.g. SJFHQ, ONA, EBO, RDO).

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

1. Primary (need or want): Closer to the primary objective of RDO. This would significantly impede the execution of MC02 if removed.
2. Secondary (enhancers): High interest capabilities that appear to be strong enhancers of the concepts and objectives, but may not be as key as the previous category. Enhances the experiment but would not significantly impede the execution of MC02 if removed.
3. Tertiary (nice but not critical): All have merit in their own right, but probably would not influence the joint experiment to the same degree. It will not change any of the constructs of the experiment if removed.

**HQ, U.S. JOINT FORCES COMMAND  
NORFOLK, VA 23551-2488**

Appendix 2 To Annex U To MC02 EXDIR

OBJECTIVES, WARFIGHTING CHALLENGES, TASKS, SUBTASKS MATRIX

1. General

a. Assessment Strategy for Each Assessment Task. The Concepts Department of USJFCOM has identified potential warfighting challenges facing RDO operations in 2007. For each warfighting challenge, a number of JTF tasks and subtasks have been identified. These are provided in Tab 1 to this Appendix. Many of the tasks and subtasks have been taken directly or adapted from reference (a), Universal Joint Task List (UJTL) Version 4.0. Measures have been associated with each of the tasks and subtasks. Where applicable, the measures have been adapted from the measures provided in the UJTL.

Tab 1:

General. This Tab contains the tasks, subtasks, and related measures for each experiment warfighting challenge, organized by JTF HQ planning process and MC02 experiment objectives.

**Objective #1: Establish And Maintain Information Superiority**

*Warfighting Challenge: Ability to provide Situational Awareness of JOA throughout the JTF*

-Task: Maintain and distribute a timely and accurate relevant integrated picture of JTF units, locations, status, and actions

Number of times each organization/staff is unable to obtain needed location information on friendly forces from the CROP

Number of times each organization/staff is unable to obtain needed status information on friendly forces from the CROP

Rating of Blue Forces ability to maintain and distribute a timely and accurate relevant integrated picture of JTF units, locations, status, and actions

Instances in which organization/staff is unable to obtain needed location information on adversary forces from the CROP

-Task: Use information to prevent surprises by the adversary

Instances in which organization/staff is unable to obtain needed adversary forces operational capabilities information from the CROP

Instances in which organization/staff is unable to obtain needed adversary anticipated course of action information from the CROP

Instances in which organization/staff is unable to obtain needed adversary intentions information from the CROP

Rating of Blue Forces ability to determine and disseminate timely and accurate information on relevant adversary's operational capabilities, location, courses of action, and intentions

*Warfighting Challenge: Ability to use the CROP and collaboration to enhance JTF operational instances in which organization/staff is surprised by adversary actions, instances in which Blue Force organizations raise issues that "challenge" the situation, rating of Blue Forces ability to use information to prevent surprises by the adversary*

-Task: Use shared awareness and collaboration to maintain operational tempo  
Instances in which Blue Force commanders delayed making operational decision in order to obtain additional information  
Instances in which JTF submits RFIs to higher HQ for information  
Instances in which approved ETOs or Op Orders are modified after they are approved  
Rating of Blue Forces ability to maintain operational tempo  
Number of unopened e-mails at HQ level

-Task: Use shared awareness and collaboration to facilitate synchronization of forces  
Rating of Blue Forces ability to synchronize joint forces  
Instances in which Blue Forces action are assessed as not synchronized

## **Objective #2: Rapidly Set Conditions For Decisive Operations**

*Warfighting Challenge: Ability to establish advantageous positions for decisive operations*

-Task: Position combat-configured joint forces for decisive operations.

- Subtask: Use joint force deployment planning procedures  
Rating of effectiveness of joint force deployment planning procedures  
Rating of effectiveness of the JSOP on deployment planning procedures  
Number of deployment requirements adjusted within seven days of movement by air and why  
Rating of effectiveness of tailoring initial and follow-on logistics packages to reduce lift and minimize footprint  
Rating of effectiveness of logistics procedures to develop and approve COAs (quicker) compared to current procedures  
Rating of the effectiveness of the experiment procedures and systems for sourcing, tailoring, and validating the time-phased force and deployment data (TPFDD)
- Subtask: Determine the impact of various Prep alternatives on the ability to rapidly close a force  
Rating of the effectiveness of Prep alternatives on the ability of the force to close rapidly
- Subtask: Reduce JRSOI processing time  
Rating of the effectiveness of the JTFs ability to shorten the JRSOI process by rapidly moving and integrating the force compared to current RSOI process
- Subtask: Assess deployment distribution structure  
Rating of the effectiveness of ISBs to rapidly move and integrate deploying forces compared to the current support concept  
Rating of the effectiveness of different ISB locations  
Rating of the effectiveness of information systems to synchronize deployment and redeployment flow  
Rating of the effectiveness of communications systems to synchronize the deployment and redeployment flow  
Rating of the effectiveness of tools (DSTs) to synchronize the deployment and redeployment flow

Rating of the JFC's (JTLM) capability to divert assets based on the visibility of units, equipment, and sustainment provided by the Logistics CROP

-Task: Conduct operational maneuver.

- Subtask: Position joint forces for operational formations  
Percent of forces allocated to the JTF for planning that are actually deployed to theater  
Instances of forces deployed to theater, but not used by the JTF
- Subtask: Assemble forces in the joint operations area (JOA)  
Percent of effects packages in designated assembly areas according to planned timelines  
Percent of effects packages detected prior to reaching their designated assembly area  
Percent of effects packages attacked prior to reaching their designated assembly area
- Subtask: Provide operational mobility  
Instances of friendly operational maneuver delayed, disrupted, canceled, or modified due to enemy emplaced obstacles  
Hours that enemy obstacles delay movement of friendly forces
- Subtask: Provide operational counter-mobility  
Instances of enemy major operations no longer feasible due to friendly counter-mobility actions

*Warfighting Challenge: Ability to decrease joint force vulnerability to disruption*

-Task: Prevent hostile observation and disruption to operational forces

Instances of enemy or terrorist activity at APODs or SPODs

Instances of friendly operations delayed, disrupted, canceled, or modified due to enemy or terrorist activity at APODs or SPODs

Instances of enemy or terrorist activity at supply or ammunition receiving/staging sites

Instances of friendly operations delayed, disrupted, canceled, or modified due to enemy or terrorist activity at supply or ammunition receiving/staging sites

Instances of friendly operations delayed, disrupted, canceled, or modified due to enemy or terrorist exploitation of ISR.

Rating of the joint force ability to decrease joint force vulnerability to disruption

### **Objective #3: Assure Access Into And Through The Battlespace**

*Warfighting Challenge: Ability to provide selective dimensional superiority*

-Task: Isolate and suppress adversary anti-access capabilities.

Rating of adequacy of enemy strategy to prevent friendly access to the theater

Rating of adequacy of friendly assessment of the enemy's anti-access strategy

Rating of adequacy of friendly strategy to counter enemy anti-access strategy

Instances of the movement of supplies or equipment to the enemy from outside JOA

Instances of enemy DIME support from outside the JOA

-Task: Achieve operational sanctuaries of space and time necessary to execute RDO.

Friendly aircraft losses to enemy defenses (and enemy system engaging)  
Friendly naval losses to enemy defenses (and enemy system engaging)  
Friendly ground forces losses (forces in action) to enemy activity (and enemy system engaging)

*Warfighting Challenge: Ability to provide sufficient operational reach*

-Task: Provide sufficient forces, capabilities, and sensor positioning mix to maximize operational reach

- Subtask: Optimize positioning to maximize operational reach (i.e., finding the adversary)

Percent of JTF units employed from their in-place theater locations

Percent of JTF units employed from staged locations

Instances of force positioning that does not take advantage of a units operational reach and reason why

- Subtask: Employ stealth capabilities (i.e., extending operational reach)

Percent of JTF air assets with stealth capability

Percent of enemy PMESII nodes attacked with stealth air assets

- Subtask: Maximize sensor and weapon ranges (e.g., use of space)

Percent of information requirements covered by space assets

Instances of airborne sensor employment that does not take advantage of the asset's operational reach and why instances of enemy PMESII nodes being attacked by a weapon when a longer range and equally capable weapon was available

Instances of Blue stand off weapons use

*Warfighting Challenge: Ability to enhance force protection*

-Task: Provide protection for operational forces, means, and noncombatant in the JOA.

Friendly losses (troops and/or equipment not in action) resulting from enemy forces (ground or naval), partisans, or terrorists

Damage to critical friendly infrastructure resulting from enemy forces (ground or naval), partisans, or terrorists

Instances of friendly operations delayed, disrupted, canceled or modified due to attacks from enemy forces (ground or naval), partisans, or terrorists

Percent of friendly ground forces assigned to rear area security

-Task: Protect systems and capabilities in the JOA.

Instances of compromise of friendly intentions causing joint operations to be delayed, disrupted, canceled, or modified

-Task: Provide operational air, space, and missile defense.

- Subtask: Provide integrated air and missile defense

Time to establish an integrated friendly air and missile defense

Instances of friendly operations delayed, disrupted, canceled or modified due to enemy offensive air or missile attacks

- Subtask: Process/allocate operational aerospace targets  
Percent of enemy offensive air threats engaged  
Percent of enemy offensive missile threats engaged  
Percent of friendly sorties devoted to air defense  
Friendly support aircraft damaged or destroyed by friendly or enemy fires  
Percent of enemy offensive air threats destroyed or neutralized  
Friendly losses resulting from enemy offensive air attacks
- Subtask: Conduct JOA missile defense  
Percent of enemy offensive missiles destroyed in flight  
Friendly losses resulting from enemy missile attacks
- Subtask: Conduct tactical warning and attack assessment in the JOA  
Percent of enemy offensive air threats detected  
Percent of enemy offensive missile launches detected

**Objective #4: Conduct Decisive Effects-Based Operations**

*Warfighting Challenge: Ability to synchronize the application of the full range of joint capabilities in order to engage decisive points in time and space*

-Task: Conduct joint force targeting to support EBO.

- Subtask: Use reach-back capabilities to enhance the targeting process  
Rating of adequacy of the Joint Automated Target Folders (JATF)  
Instances of issues concerning the relationship of the PEL to the JIPTL  
Instances of issues concerning the cyclical targeting cycle and the non-cyclical ETO process  
Instances of the usage of a High Payoff Target List (HPTL) and any issues over its relationship to the PEL, JIPTL, and TST priority list  
Rating of reach back capability in support of the targeting process  
Rating of collaboration capability in support of the targeting process
- Subtask: Establish joint force targeting guidance  
For each desired effect in the ETO, the percent of available enemy PMESII nodes from the ONA that are identified for "attack"
- Subtask: Develop operational targets  
Instances of enemy critical nodes discovered and attacked during ETO execution  
Instances of joint force operations delayed, disrupted, canceled or modified awaiting operational firepower support
- Subtask: Conduct operational combat assessment  
Percent of targets for which combat assessment is available  
Percent of targets assessed as killed that are actually mission capable



Percent of targets unnecessarily reattacked

Average time to provide full combat assessment of attacks to JTF HQ

-Task: Attack operational targets to achieve desired effects.

Percent of enemy PMESII nodes successfully attacked (MoPs)

Instances of friendly actions having unintended effects that violate ROE or SECDEF guidance

Instances of collateral damage and fratricide

Percent of enemy nodes selected for attack that can be attacked using non-kinetic weapons

Percent of enemy nodes that are attacked using non-kinetic weapons

Percent of attacks using non-kinetic weapons that achieve desired effect

- Subtask: Conduct precision engagement against time sensitive targets

Percent of TSTs detected, identified, and engaged by friendly assets

Percent of TSTs successfully neutralized or destroyed by friendly assets

Average target detection time

Average target ID and nomination time (time from initial detection to transmission of targetable location data)

Average engagement time (time from target ID and nomination to engagement)

- Subtask: Document specific aspects of the TST process

Percent of TSTs detected, identified, and engaged by SOF assets

Percent of TSTs successfully neutralized or destroyed by SOF assets

Percent of TST BDA provided by SOF assets

Instances of TST missions being canceled by the JTF HQ

Instances of TST resource (sensor/weapon) issues that needed to be adjudicated by the JTF HQ

Instances of joint force operations delayed, disrupted, canceled or modified due to TST mission

Document the TST guidance issued by the JTF commander

Instances of the usage of TST priority categories and their impact on TST operations

Emerging joint collaborative planning lessons and requirements for future TST operations

Rating of collaboration processes for JTF and component planning of TSTs

Instances of degraded TST capability during transfer of TST responsibility from one functional component to another

Rating of TST procedures used for MC02

Rating of functions of ADOCS as common targeting toolset

-Task: Coordinate and integrate joint / multinational and interagency support for EBO.

Percent of enemy nodes selected for attack that can be attacked using DIE actions

Percent of enemy nodes that are attacked using DIE actions

Percent of attacks using DIE means that achieve desired effect

*Warfighting Challenge: Ability to integrate full joint capabilities against tactical level objectives*

-Task: Synchronize and employ joint capabilities against key tactical objectives.

Instances of operational branches formerly closed to BLUE as options now feasible and acceptable due to disrupted adversary

Instances of operational branches formerly open to adversary no longer feasible, suitable, or acceptable due to disrupted adversary

Instances of adversary capability sufficiently disrupted to allow BLUE control of timing and tempo of campaign or major operation

Instances of operational branches formerly open to BLUE no longer feasible, suitable, or acceptable

- Subtask: Conduct operations in the JOA

Instances of adversary surprised at initiation of BLUE actions

Instances of Blue surprised at initiation of adversary actions

Time for Blue to detect adversary's attack from execution of adversary action

Time for Blue to decide a new plan is required following detection

Time to prepare and disseminate the new plan following decision to act

Time for Blue to reposition to counter adversary's attack from plan dissemination

- Subtask: Conduct Joint Tactical Actions (JTAs)

Percent of effects packages that are Joint Tactical Actions (JTAs)

Number of effects packages, which include support from, or support to, non-DoD organizations

Percent of JTA packages detected prior to concentration at decisive point

Percent of JTA packages attacked prior to concentration at decisive point

Percent of JTA packages executed by each functional component commander as the supported commander

Percent of JTA packages executed by each functional component commander as the supporting commander

Percent of functional component specific effects packages executed by each functional component commander

-Task: Dynamically re-task effects packages for follow-on actions

Instances of effects packages, previously committed to action, not redeployed in response to newly developing situation

Instances of JTF assets being double tasked

Number of effects packages supported by "forward presence" forces on or after C-Day

Number of effects packages supported by forces "transiting" the AOR on or after C-Day

Number of effects packages supported by "long range strike forces from the CONUS / other AOR" on or after C-Day

Percent of effects packages under direct JTF HQ supervision

*Warfighting Challenge: Ability to integrate execution of information operations into I&BO*

-Task: Execute offensive information operations, to include PSYOP and military deception.

Instances where appropriate IO resources and capabilities are not factored into operational plans and actions

Time to get approval for proposed operational IO plans and actions

Instances of unintended IO actions causing disruption or delay of operational plans and objectives

Instances of operational IO actions being delayed, defeated, or disrupted due to adversary offensive IO actions  
Instances of operational IO actions discarded due to timeliness of approval concerns  
Percentage of operational IO cell nominated "targets" struck during the timeframe planned for in the ETO  
Average time to provide full combat assessment of attacks to IO "targets"  
Percentage of operational IO cell nominated "targets" restructured when called for after combat assessment of initial strike  
Percentage of preplanned targets successfully attacked  
Percentage of operational IO objectives verifiably achieved

**Objective #5: Sustain The Force**

*Warfighting Challenge: Ability to provide agile sustainment*

-Task: Rapidly process data and generate logistics knowledge by integrating sustainment as an integral part of effects-based operations

Rating of effectiveness to collect, process and display full visibility of operations and logistics information

Rating of effectiveness of displaying complex logistics information

Rating of effectiveness of DSTs to ensure a "predictive" capability for logistics

Rating of effectiveness of how well DSTs assisted and synchronized the deployment flow in accordance with the directions of the supported commander

Rating of effectiveness of the ability to acquire critical logistics information from the Logistics CROP for planning and analysis and dissemination to subordinate logistics commanders

-Task: Employ a networked sustainment distribution structure to satisfy the JFC sustainment requirements for RDO

- Subtask: Tailor sustainment for synchronization with deploying forces

Rating of effectiveness of tailoring sustainment for synchronization with deploying forces

Rating of effectiveness of a networked sustainment distribution structure to satisfy the JFC sustainment requirements for RDO

- Subtask: Shape the logistics footprint in JOA to extend operational reach

Rating of effectiveness of shaping the logistics footprint in JOA to extend operational reach

Rating of effectiveness of the RDO procedures and practices to ensure time-definite delivery, improve throughput and support agile mobile forces

Rating of effectiveness of using strategic lift to augment theater distribution

Rating of effectiveness of the combination of delivery platforms to ensure time-definite delivery, improve throughput and support agile mobile forces

Rating of effectiveness of employing a combination of delivery platforms to improve throughput and provide the agility needed to sustain mobile forces while ensuring time-definite delivery

- Subtask: Employ a combination of delivery platforms to ensure time-definite delivery, improve throughput and support agile mobile forces

Rating of effectiveness of the combination of delivery platforms to ensure time-definite delivery, improve throughput and support agile mobile forces

Rating of effectiveness of using strategic lift to augment theater distribution

-Task: Gain and maintain knowledge of force health status

- Subtask: Track patients throughout the theater of operations and to CONUS

Rating of effectiveness of the ability to track patients throughout the theater of operations and to CONUS

Rating of effectiveness of medical SITREP

Rating of effectiveness of the ability to monitor DNBI / combat casualty rates as related to force readiness

Rating of effectiveness of the chemical / biological early detection and early warning

-Task: Provide battlefield medical care

Rating of effectiveness of advanced life support far forward

Rating of effectiveness of the ability to provide blood services in the JOA

Rating of effectiveness of the ability to transport seriously injured and unstable casualties

Rating of effectiveness of the ability to provide joint medical theater logistics management

### **Concept: Standing Joint Force Headquarters**

*Warfighting Challenge: Ability to quickly achieve cohesive C2 of a joint force*

-Task: Quickly establish a JTF HQ ready to conduct RDO.

Time required for the JTF HQ to commence effects-based planning.

Instances of difference between Battle Rhythm proposed by JSOP and that observed

Rating of SJFHQ value-added in surmounting the JTF HQ learning curve.

Subtask: Establish a Standing element of a Joint Force Headquarters

Difference between JSOP proposed SJFHQ structure to that observed.

Time SJFHQ was actually established and actually functioning as its mission was defined.

Percent of SJFHQ positions filled.

Amount of change to SJFHQ membership.

Rating of adequacy of scope of responsibility for SJFHQ positions

- Subtask: Employ the SJFHQ to conduct pre-crisis planning

Comparison of JSOP proposed SJFHQ pre-crisis activities and products to those observed.

Instances of intentionally omitted pre-crisis SJFHQ activities or products.

Rating of pre-crisis SJFHQ product adequacy

Assessment of info available to allow development of pre-crisis products.

Rating that ADP tools were sufficiently available/capable to develop pre-crisis products.

Rating of workload within SJFHQ groups.

Rating of SJFHQ pre-crisis product utility.

Instances where JTF HQ needed/desired additional products from SJFHQ pre-crisis planning.

Rating of SJFHQ pre-crisis planning adequacy.

- Subtask: Integrate the SJFHQ into the JTF HQ to perform RDO planning and execution  
Rating of SJFHQ responsibility distribution as a result of integration.  
Instances of recommended improvements to SJFHQ organization and positions.  
Rating of the adequacy of SJFHQ support.  
Rating of SJFHQ contribution to JTF HQ accomplishment of key elements of effects-based planning and operations.  
Instances of process help Corps needed/desired/requested from the SJFHQ.

-Task: Provide continuity in planning and operations from pre-crisis through execution and transition.

Rating of SJFHQ contribution to continuity in planning and operations from pre-crisis through execution and transition.

- Subtask: Establish cell-organized JTF HQ around the SJFHQ structure and processes.  
Rating of the ability to form JTF HQ according to JSOP.  
Instances of JTF HQ organization and function differing from JSOP.  
Rating of effectiveness of new JTF HQ organization.

- Subtask: Use a SJFHQ architecture to establish a joint force C2 structure  
Instances of differences between JSOP prescribed Component participation on virtual boards/ cells/ centers/ working groups and that observed.  
Assessment of affect Group/ Board/ Center/ cell/ WG structure had on Component participation.  
Instances of differences between JSOP prescribed combatant commander participation on virtual boards/ cells/ centers/ WGs and that observed.  
Assessment of affect Group/ Board/ Center/ cell/ WG structure had on combatant commander participation.

- Subtask: Employ the SJFHQ to assist deployment of forward headquarters  
Rating of utility of SJFHQ to support deployment of forward HQ.  
Instances of difference from JSOP forward deployment process.

- Subtask: Employ the SJFHQ to assist in the conduct of staff operations.  
Rating of SJFHQ contribution to JTF HQ performance of key operational C2 functions.  
Rating of the utility of the SJFHQ to JTF C2 functions over the course of the contingency.

- Subtask: Employ the SJFHQ to assist in coordination and integration of interagency support.  
Rating of the utility of the SJFHQ habitual relationship on JTF-IAC interaction.  
Instances of difference between JSOP-envisioned IAC participation in virtual boards and cells and that observed.  
Rating of SJFHQ-IAC relationship over the course of the contingency.

**Concept: Operational Net Assessment**

*Warfighting Challenge: Ability to analyze adversary PMFSII systems for tangible and intangible strengths and weaknesses*

-Task: Develop an ONA information knowledge base  
Rating of the adequacy of how Blue DIME capabilities versus Red/adversary PEMSII systems comparative analyses are captured in ONA knowledge base  
Rating of Blue information adequacy included in ONA knowledge base  
Rating of the adequacy of how the ONA knowledge base provides a shared awareness of the JOA  
Rating of the adequacy of how the ONA knowledge base supports ETO development

-Task: Analyze Red's PMESII systems (for tangible and intangible strengths and weaknesses)  
Rating of Red PMESII systems comprehensiveness included in the ONA knowledge base  
Number of adversary nodes included in ONA knowledge base that adversary felt were critical/high value  
Number of adversary nodes included in ONA knowledge base that adversary felt were vulnerable  
Rating of the adequacy of PMESII analyses to promote understanding of adversary's goals  
Rating of the adequacy of PMESII analyses to promote understanding of the adversary's (self) perceived strengths  
Rating of the adequacy of PMESII analyses to promote understanding of the adversary's (self) perceived weaknesses

-Task: Continually update the ONA to reflect battlespace change  
Number of times ONA updated after JTF formation  
Rating of ONA update currency  
Time required updating ONA knowledge base

-Task: Employ automated tools to virtually and collaboratively access, manipulate, and maintain the ONA knowledge base  
Rating of automated tools adequacy used for information retrieval from ONA knowledge base  
Rating of automated tools adequacy used for ONA knowledge base maintenance  
Frequency of ONA knowledge base information access

*Warfighting Challenge: Ability to use ONA to enhance decision-making*

-Task: Determine if the ONA products compliment JTF staff actions  
Time needed by ONA users to find desired information in ONA knowledge base  
Rating of adequacy of ONA use for board/center/cell preparation and other staff action  
Number of instances information desired by ONA users but not included or not found in ONA knowledge base  
Rating of adequacy of ONA use in PEL development  
Rating of adequacy of ONA use in ETO development

-Task: Identify adversary's vulnerabilities, intentions, and keynotes  
Comparison of ETO focus of adversary's vulnerabilities with ONA depiction of vulnerabilities  
Comparison ETO focus of adversary's intentions with ONA depiction of intentions  
Comparison of ETO focus of adversary's key nodes with ONA depiction of key nodes

-Task: Identify potential second and third order effects for contemplated actions  
Percent of ETOs developed with second and third order effects identified for tasked actions  
Number of instances JFC and staff used second and third order effects in there decision process

-Task: Prioritize and select potential courses of action  
Number of instances JFC and staff used ONA knowledge base as reference source to prioritize COA, branches, and sequels  
Rating of the adequacy of the ONA knowledge base as reference source to select COA, branches, and sequels

-Task: Use ONA to operate within adversary's decision cycle  
Number of instances ONA-supported Blue action interrupted adversary's ability to command and control its force  
Number of adversary actions considered successful by JFC and staff  
Number of adversary actions unexpected by JFC and staff  
Percent of time JFC and staff thought they was operating within the adversary's decision cycle  
JFC and staff's rating of ONA effectiveness in support of operating inside of the adversary's decision cycle

- Subtask: Assess the operational situation using the CIE

**Concept: Effects-Based Operations (Planning And Assessment)**

*Warfighting Challenge: Ability to conduct effects-based planning*

-Task: Conduct operational mission analysis to support EBO.  
Documentation of mission, intent, and planning guidance given to the JTF commander by the combatant commander  
Documentation of the Mission Analysis Brief  
Rating of CROP value to effects-based planning  
Rating of collaborative environment value to effects-based planning  
Rating of the additional demands on the planners' time resulting from effects-based planning and collaboration.  
Rating of the additional demands on the commander's time resulting from effects-based planning and collaboration.  
Number of IAC, COE, NGO, or other non-traditional participants in the mission analysis process  
Instances of non-traditional participant contributions to mission analysis

- Subtask: Identify desired effects  
Assessment of ability of planners to state desired effects in terms of adversary action or behavior to be changed, created, or prevented  
Assessment of ability of planners to state desired effects in terms of the desired level of change  
Assessment of ability of planners to state desired effects in terms of the desired scope and distribution of the effect  
Assessment of ability of planners to state desired effects in terms of the intended timing of the effect

Percent of desired effects that were in the baseline ONA

Instances where prioritization of effects assisted or restricted COA development and adaptation

- Subtask: Identify key nodes and vulnerabilities using the ONA and JIPB

Instances of ONA/JIPB contributing to identification of key nodes in adversary systems

Instances of ONA/JIPB contributing to identification key links in adversary systems

Instances of ONA/JIPB contributing to the conduct of center of gravity and critical vulnerability analysis

Instances of ONA/JIPB contributing to identification of adversary leadership decision making process(es)

Instances of ONA/JIPB contributing to identification of friendly strengths and weaknesses relative to the adversary

-Task: Use effects-based planning to develop and analyze COA.

Documentation of the initial planning guidance given by the CJTF to his staff

Documentation of any warning orders issued by the JTF

Documentation of approved PEL, CONOPs, and COAs

- Subtask: Conduct predictive analysis (examine anticipated potential outcomes of actions); model adversary critical systems to identify and analyze anticipated direct and indirect effects of actions

Rating of effectiveness of the process for consideration of the adversary's potential COAs and potential responses to friendly action

Rating of effectiveness of the process for examination of intended and unintended potential outcomes

Rating of effectiveness of the process for examination of causal linkages through which actions create effects

Rating of effectiveness of the process for consideration of indirect effects

Rating of effectiveness of the process for consideration of outcomes outside of the local area

Number of indirect effects that were in the baseline ONA

Rating of the utility of modeling and simulation tools used in the identification of the pros, cons, and alternatives to tactical actions

Assessment of the use of influence models to assist in the production of a better-reasoned plan

Rating of the utility of the ONA/JIPB to predictive analysis

Instances where predictive analysis assists in the production of a better reasoned COA

Rating of the value of predictive analysis

- Subtask: Integrate input from JIACG

Rating of utility of non-traditional players to the production of a better reasoned COA

Instances of valuable contributions by non-traditional participants to the COA development process

Rating of whether all aspects of PMESII were addressed during development of the COA

Instances where military and non-military (DIME) effects were not synchronized in time and space

Instances where the capabilities of all elements of national power (DIME) were not considered during COA development



- Subtask: Components refine concept of operations and COA using the CIE  
Rating of effectiveness of actions selected based on their impact against adversary pressure points  
Rating of collaborative environment value to cross component COA development  
Percent of PMESII nodes identified for attack that were contained in the baseline ONA  
Instances where measures of performance (MoP) were not developed for each component level task and/or action

- Subtask: Identify assessment requirements  
Instances where actions are not traceable back to higher-level strategy  
Instances where measures of effectiveness (MoE) were not developed for each JTF level desired effect  
Assessment of whether MoE were meaningful, reliable, and observable

- Subtask: Collaboratively analyze COA  
Rating of effectiveness of the Blue/Red cell contribution to the COA analysis process  
Instances where potential Red reactions to Blue actions were considered  
Rating of the wargaming process to produce branches and sequels

-Task: Prepare, synchronize, and issue effects tasking order (ETO)

- Subtask: Prepare ETO  
Rating of clarity of effects-based mission orders to the components  
Rating of clarity of supported / supporting command relationships to the components  
Number of effects given to each functional component commander for planning as the supported commander  
Number of effects given to each functional component commander for planning as the supporting commander  
Rating of utility of collaboration processes for component planning of joint tactical actions

- Subtask: Issue and synchronize ETO  
Instances where military actions of the components were not synchronized in time and space  
Document who facilitated/directed the component planning process  
Rating of how the integration matrix enhanced the component planning process

*Warfighting Challenge: Ability to conduct effects assessment*

-Task: Assess the progress of achieving the full range of operational effects (DIME).  
Percent of time the JTF correctly assesses the effects achieved by their actions  
Instances of effects that were not anticipated by the JTF  
Average time to provide full effects assessment to the JTF  
Instances of incorrect effects assessment due to missing or poorly constructed MoE  
Rating of the collaboration capability in support of the effects assessment process  
Rating of the interagency community (IAC) and centers of excellence (COE) contribution to the effects assessment process

Instances of the JFC receiving different views of the success of the operation  
Rating of CROP tool adequacy for displaying progress toward desired effects  
Rating of the effectiveness of the process by which Combat Assessment is passed to the EAC  
Rating of the usefulness of combat assessment to effects assessment  
Rating of usefulness of MoP in assessing MoE

- Subtask: Integrate effects assessment information requirements into the JISR collection plan  
Percent of MoEs covered by at least one asset in the JISR collection plan  
Rating of the additional workload created by the effects assessment process on the intelligence organizations

-Task: Adapt COA based on effects assessment.

Instances of the JTF changing the set of tactical actions employed to achieve a desired effect as a result of deficiency analysis  
Instances of the COA being adapted to respond to an unanticipated effect or enemy action discovered during effects assessment  
Average time to adapt the COA and produce a change to the ETO  
Rating of the value of effects assessment to the planning process  
Instances of the ETO being adapted during execution due to an unanticipated effect or enemy action discovered during effects assessment  
Instances of military actions that were not maintained in synchronization with non-DoD actions during COA adaptation  
Rating of the CIE impact on daily battle rhythm  
Rating of the ability of the players to recognize changes to the ETO  
Rating of the JTF's ability to maintain the initiative relative to the enemy

-Task: Assess the contribution of effects to achieving the desired end state

Document the process to support the assessment of combatant commander/JTF objectives  
Rating of CROP tool adequacy for displaying progress toward combatant commander/JTF objectives  
Rating of collaboration processes adequacy for collective accomplishment of NCA assigned objectives and/or effects  
Number of operational objectives achieved by Blue actions  
Number of operational objectives achieved by Blue actions within prescribed time lines  
Number of operational objectives achieved by adversary actions

**Concept: Collaborative Information Environment (CIE).**

*Warfighting Challenge: Ability to establish a valid COP and build the CROP in a CIE*

-Task: Develop the Common Operational Picture (COP)

- Subtask: Collect, Process Fuse, and Disseminate Information On Opponent Force  
Percent of enemy ground forces correctly located and identified in the COP  
Percent of enemy naval forces correctly located and identified in the COP  
Percent of enemy air forces correctly located and identified in the COP

Timeliness of enemy ground force situation display in the COP

Timeliness of enemy naval situation display in the COP

Timeliness of enemy air situation display in the COP

Timeliness of status on enemy communication systems in the COP

Accuracy of status on enemy communication systems in the COP

Timeliness of status on enemy sensors in the COP

Accuracy of status on enemy sensors in the COP

- Subtask: Generate Service-specific Friendly Integrated Tactical Picture

Timeliness of each Service's friendly single integrated tactical picture

Accuracy of each Service's friendly single integrated tactical picture (unit locations@ time)

- Subtask: Merge/Fuse Component Tactical Pictures into a COP and disseminate to all Echelons of the joint force

Timeliness of the fused picture disseminated to each echelon

Accuracy of the fused picture (unit locations & status) disseminated to each echelon

Rating of usefulness of the fused picture disseminated to each echelon

- Subtask: Enable supporting/background data to be associated with tracks and cut and paste between applications

Percent of attempts successful

- Subtask: Manage track database to support valid/viable COP

Rating of adequacy of process and procedures used to maintain track database

-Task: Establish the "Virtual Warehouse" of information for the CROP

- Subtask: Manage system enabling exchange of relevant information IAW the IM Plan

Rating of adequacy of process and procedures used to exchange relevant information

Timeliness of friendly unit status information (personnel/equipment/supply) posted on CROP (update schedule vs. actual time update complete)

Accuracy of friendly unit status information (personnel/equipment/supply) posted on CROP (posted status vs. ground truth)

Timeliness of information regarding status of friendly information systems/communications nodes

Accuracy of information regarding status of friendly information systems/communications nodes

Timeliness of information regarding status of friendly sensor systems

Accuracy of information regarding status of friendly sensor systems

Timeliness of enemy OOB status information (readiness/posture) posted on CROP (update schedule vs. actual time update complete)

Accuracy of enemy OOB status information (readiness/posture) posted on CROP (posted status vs. ground truth)

Document methods employed to collect, store and retrieve information

- Subtask: Coordinate/manage collection, processing, and dissemination of information to be "pushed" IAW commander's policy

Number and content of information products "pushed" to users during each 24-hour period  
Timeliness of weather information posted on CROP (time updates available vs. actual time update disseminated)

Ratings of usefulness of weather information posted

Timeliness and awareness of operational information (Mission, Commander's Intent, ROE, ONA, ETO, ATO) posted on CROP (update availability time vs. actual time update disseminated vs. actual time update)

Timeliness and awareness of operational targeting information (Tgt Number, shooting platform, time of engagement, effects assessment) posted on CROP

Timeliness and awareness of operational maneuver/attack information (Units participating, supported/supporting relationships, objectives, time of action) posted on CROP

Ratings of the CROP for indicators of "richness"

- Subtask: Coordinate/manage collection, processing, and dissemination of information to be subscribed to IAW commander's policy

Number and content of information products "pulled" by users during each 24-hour period

Rating of usefulness of tools and processes used to collect, store, and retrieve information from the CROP

- Subtask: Implement a standard desktop configuration for the "joint" level of the CROP and enable limited user tailoring

Ratings of accessibility/usefulness of standard CROP desktop configuration

- Subtask: Enable users to be able to publish available information to the CROP IAW the IM Plan

Ratings of ability to publish to the CROP

- Subtask: Enable users ability to advertise available information to the CROP IAW the IM Plan

Ratings of ability to advertise to the CROP

Ratings of ability to alert affected organizations to time sensitive information in the CROP

- Subtask: Enable users to "search" for specific information requirements

Ratings of the adequacy of "search" tools in the CROP

*Warfighting Challenge: Ability to plan collaboratively*

-Task: Conduct Planning, execution, and Assessment in a Collaborative Environment

- Subtask: Establish a persistent Collaborative Environment Across Echelons of Command, Interagency Participants, and centers of Excellence enabling formal and informal collaboration sessions as well as large auditorium sessions

Number of collaborative sessions across echelons of command, interagency participants, and centers of excellence

Length (time) of collaborative sessions across echelons of command, interagency participants, and centers of excellence

Ratings of quality of Products produced by collaborative sessions across echelons of command, interagency participants, and centers of excellence

Ratings of usefulness of collaborative sessions across echelons of command, interagency participants, and centers of excellence

Ratings of impact of differences in culture among participants in collaborative sessions across echelons of command, interagency participants, and centers of excellence

Ratings of ability to overcome problems encountered during collaborative planning sessions

Number of times (Instances) that misunderstandings occurred regarding current situation

Ratings of participants shared awareness provided by information available

Number of times that specified means of collaboration were observed

Number of times that specific types of collaboration occurred

Ratings of participants' confidence in information received via collaboration systems

- Subtask: Conduct Joint Enroute Planning and Mission Rehearsal

Time required completing enroute planning

Ratings of effectiveness of joint enroute planning

- Subtask: Conduct Command and control of on-going operations using collaborative tools/capabilities

Number of collaborative C2 sessions across echelons of command, interagency participants, and centers of excellence

Length (time) of collaborative C2 sessions across echelons of command, interagency participants, and centers of excellence

Ratings of usefulness of C2 planning sessions across echelons of command, interagency participants, and centers of excellence

Ratings of standing procedures for compensating for system problems encountered during C2 collaborative planning sessions

### **Concept: Enhance Interagency Perspective Within The JFHQ**

*Warfighting Challenge: Ability to quickly achieve and maintain cohesive relationships with the interagency (IA) community*

-Task: Establish Joint Interagency Coordination Group (JIACG)

Percent of JIACG manned IAW concept

-Task: Establish Interagency Collaborative Information Environment (IACIE)

Tool Availability Rate: time C<sup>4</sup>I tool used divided by the time tool required

Rating of adherence to the published C<sup>4</sup>I tool business rules.

-Task: Develop secure process and protocols among interagency participants to provide effective collaboration.

- Subtask: Establish interagency planning mechanisms that will guard internal security information.

Frequency of Instances where IA security processes had an effect on IA collaboration

- Subtask: Establish interagency planning mechanisms that will guard internal protocols  
Frequency of Instances where IA protocol processes had an effect on IA collaboration

*Warfighting Challenge: Ability to improve interagency campaign planning & execution*

-Task: Implement Political-Military Plans

- Subtask: JIACG coordinates with OSD and Joint Staff strategic planners.  
Frequency of expanded coordination with NSC system (DC/PC/PCC) during parallel operational planning and implementation.  
Rating of effectiveness of the ability of the JIACG to coordinate with OSD and Joint Staff strategic planners

- Subtask: JIACG informs combatant commander/JTF staffs of PCC's pol-mil guidance  
Rating of effectiveness of the implementation of pol-mil guidance

- Subtask: JIACG coordinates with other departments' and agencies' campaign planners  
Frequency of expanded coordination with departments and agencies in parallel campaign planning.  
Rating of effectiveness of the JIACG to coordinate with other departments and agency campaign planners

-Task: Provide continuity in coordinated planning and operations from pre-crisis thru execution and transition with the Joint Interagency Coordination Group

- Subtask: JIACG provides IA perspective on proposed flexible deterrent operations  
Rating of participation by JIACG/IA departments and agencies providing perspective on FDOs during the deterrent phase of operation.  
Rating of effectiveness of the JIACG to provide IA perspective on FDOs

- Subtask: JIACG coordinates potential desired effects with other departments and agencies  
Frequency of the combatant commander/JTF collaboration process with departments and agencies  
Rating of effectiveness of the JIACG to coordinate potential desired effects with other departments and agencies

- Subtask: JIACG provides combatant commander/JTF staffs IA operational concerns/ recommendations during execution of compel/defeat actions  
Frequency of the combatant commander/JTF collaboration process with departments and agencies during execution of compel/defeat actions  
Rating of effectiveness of the JIACG to provide combatant commander/JTF staffs IA operational concerns/ recommendations during execution of compel/defeat actions

**Concept: Joint Theater Logistics Management**

*Warfighting Challenge: Ability to plan for Agile Sustainment*

-Task: Integrate deployment and sustainment planning as an integral part of the effects-based planning process.

- Subtask: Determine the type and span of joint control that best facilitates management of logistics functions

Rating of effectiveness of the RDO construct to facilitate management of logistics functions

Rating of effectiveness of the logistics C2 battle rhythm

- Subtask: Reduce the logistics footprint in theater and JOA

Rating of the effectiveness of (how) JTLM to reduce logistics footprint in theater and JOA

-Task: Define the JTF Logistics Position Functions and Essential Elements of Logistics Information

Rating of the effectiveness of TTP and JSOP prescribed functions and processes for the logistics operations positions

Rating of the effectiveness of TTP and JSOP prescribed high order logistics EEI for the logistics operations positions

Rating of the effectiveness of TTP and JSOP prescribed boards, centers, cells, and working group for the logistics operations positions

Rating of the effectiveness of TTP and JSOP prescribed functions and processes for the Logistics plans Positions

Rating of the effectiveness of TTP and JSOP prescribed High order Logistics EEI for the Logistics plans Positions

Rating of the effectiveness of TTP and JSOP prescribed boards, centers, cells, and Working Group for the Logistics plans Positions

-Task: Leverage Decision Support Tool (DST) emerging technologies to rapidly process data and create operationally relevant logistics information

- Subtask: Determine the tools required to provide the JFC and subordinates the knowledge needed to assess the logistics feasibility of operational actions

Rating of effectiveness of tools to provide the JFC and subordinates, the information required determining the logistics feasibility of operational actions

- Subtask: Determine the improvements needed to feeder and umbrella information systems
- Rating of the effectiveness of feeder and umbrella information systems to improve asset visibility

Rating of effectiveness of feeder and umbrella information systems to increase the capacity of the logistics system, including both supply and transportation

Rating of effectiveness of feeder and umbrella information systems to improve control of supply and transportation assets

- Subtask: Employ a logistics display that enhances the JFC's ability to synchronize sustainment

Rating effectiveness of a logistics display to synchronize sustainment in support of rapid decisive operations

-Task: Determine and employ a networked sustainment distribution structure

- Subtask: Leverage and tailor Intermediate Staging and Support Bases

Rating effectiveness of tailoring Intermediate Staging and Support Bases (ISBs) to support to RDO forces

Rating of the effectiveness of the ISB management

- Subtask: Tailor sustainment for synchronization with deploying and redeploying forces

Rating of effectiveness synchronization of tailored sustainment with deploying forces

- Subtask: Determine the means of reducing the logistics footprint in JOA

Rating of effectiveness of the reducing the logistics footprint in JOA

- Subtask: Ensure time-definite delivery

Rating of effectiveness of the procedures and practices to ensure time-definite delivery

Rating of effectiveness of the procedures and practices to improve throughput

Rating of effectiveness of the procedures and practices to support agile mobile forces

### **Joint Initiatives**

#### **Ability to employ joint initiatives to facilitate the planning coordination and execution of Rapid Decisive Operations (RDO).**

-Task: Employ Collaborative Tool Suite, IWS 2.5 to facilitate collaboration.

Rating of the ease of use of IWS 2.5 (i.e. file sharing, posting to the whiteboard, holding sidebars)

Rating of the effectiveness of IWS 2.5 tool suite in support of distributed collaborative planning.

Rating of IWS 2.5's ability to help maintain an accurate CROP by the use of its various tools (i.e. whiteboard, file sharing, audio collaboration, etc.).

Document user recommendations on the collaborative tool suite for XC<sup>4</sup>I functionality improvement.

-Task: Employ Global C2 System Integrated Imagery and Intelligence (GCCS-I3) to facilitate assessment and battlespace visualization.

Rating of GCCS-I3 ability to access the collaborative tool via the web browser to validate critical nodes in ONA.

Rating of GCCS-I3 ability to access information in the Image Management Database, Reference Database, and the Naval Intelligence Database.

Rating of GCCS-I3 ability to access the required databases to collaborate with the ETO (and ONA) development group using standard collaboration tools and the COP.



Rating of GCCS-I3 ability to access the Imager Manager and the Video Ingestor and/or the Java Image Video

Exploitation capability to collaborate on combat assessment using saved or live streaming video and imagery files.

Rating of GCCS-I3 ability to access required databases and networks to collaborate with the targeting tools and Electronic Targeting Folders.

Rating of GCCS-I3 ability to search, view and share information drawn from required databases to demonstrate the capability to collaborate with targeteers and the ETO assessment development.

Document user recommendations on GCCS-I3 for XC<sup>4</sup>I functionality improvement.

-Task: Employ Joint Dynamic ISR Management (JDISRM) to enhance the passing of control of assigned unmanned sensors between the military Services.

Rating of the ability of JDISRM to facilitate functional components in conducting mission planning.

Rating of the ability of JDISRM to facilitate functional components in the development of Operational Net Assessments.

Rating of the ability of JDISRM to facilitate functional components in maintaining enemy situational awareness.

Rating of the ability of JDISRM to facilitate functional components in executing the planned mission.

Rating of the ability of JDISRM to facilitate functional components in receiving or providing targeting information.

Rating of the adequacy of established unit TTPs (how's, when's, what's, and where's) on coordinating the transfer or receiving of sensor control between sensors/Services.

Rating of the ability of JDISRM to facilitate functional components in coordinating with the other functional components.

Document user recommendations on JDISRM for XC<sup>4</sup>I functionality improvement.

-Task: Employ ONA SUITE (Genoa, AnalNB, ArcView/IMS) to facilitate structured argumentation methodology for decision support, visual investigative analysis software, and multi-user geo-database storage and management.

Rating of the ONA Suite's ability to enable assessments of strategies to counter crisis progression.

Rating of the ONA Suite's ability to be used as a multimedia knowledge management tool for organizing, presenting, and sharing diverse information in a notebook-centric paradigm.

Rating of the ONA Suite's capability to provide metadata search and editing of objects within a Windows file system.

Rating of the ONA Suite's capability to perform as a structured tool for providing early warning and situation assessments.

Rating of the ONA Suite's capability to function as a collaborative structured argument tool for planning and analysis of uncertain situations.

Document user recommendations on the ONA Suite for XC<sup>4</sup>I functionality improvement.

-Task: Employ Logistics Tool Suite (LTS) to facilitate logistics support.

Rating of effectiveness of tools to provide the JFC and subordinates, the information required determining the logistics feasibility of operational actions.

Rating of effectiveness of displaying complex logistics information.

Document user recommendations on the LTS for XC<sup>4</sup>I functionality improvement.

-Task: Employ Theater Medical Information Program (TMIP) to facilitate automated medical record data capture and medical intelligence gathering.

Rating of the effectiveness of the ability to provide joint medical theater logistics management.

Document user recommendations on the TMIP for XC<sup>4</sup>I functionality improvement.

-Task: Employ joint fires initiative (JFI) Automated Deep Operations Coordinating System (ADOCS) to facilitate the coordinating of joint assets on time sensitive targets.

Rating of ADOCS ability to timely and accurately exchange information between the SJFHQ and the Component Services.

Rating of ADOCS ability to timely and accurately plan/coordinate the joint battlespace needs of the SJFHQ (Airspace Deconfliction, ACO Visualization, Limited/Protected Targets, and Kill Box Management).

Rating of ADOCS ability to timely and accurately execute time sensitive targeting for the SJFHQ (Weapon Target Pairing, Predictive BDA, Counter Fire COP).

Rating of the ADOCS ability to timely and accurately perform joint targeting missions for the SJFHQ (ELINT Display/Analysis, Terrain Analysis, 3D Visualization, Radar Exploitation).

Documentation of how ADOCS was used for warfighting tasks.

Rating of utility of ADOCS for warfighting tasks accomplished.

Document user recommendations for ADOCS functionality improvement.

-Task: Employ Tactical Exploitation System - Enhanced Joint Targeting (TES-EJT) to facilitate direct target nomination to both Army and Navy indirect fire systems.

Rating of the components capability to support the JTF when TES-EJT connectivity is lost.

Rating of the TES-EJT ability to view real-time pictures from another Service's system using the Remote Terminal Console (RTC).

Rating of the ability of the JTF HQ to monitor tasking and reassign work priority (tasks) between TES and TES-N.

Rating of the TES-EJT ability to accept and transfer data from another component's sensor data (including UAV digital imagery).

Rating of the TES-EJT ability to "reach back" for additional ISR information from another component's system to support missions.

Rating of the TES-EJT ability to hand-off the tracking of critical targets between component's systems.

Rating of the TES-EJT ability to hand-off targets for nomination to another Service's fire control system.

Rating of the ability to share ISR information between TES and TES-N overall.

Documentation of how TES-EJT was used for warfighting tasks.

Rating of utility of TES-EJT for warfighting tasks accomplished.

Document user recommendations for TES-EJT functionality improvement.

-Task: Employ Automatic Network Information Flow (ANIF) to facilitate the dynamic reapportionment of bandwidth.

Rating of the ANIF ability to dynamically reapportion bandwidth.

Instances of significant difficulties with functionality of system as a Stand Alone.

Instances of significant difficulties with integration, transmitting, receiving of information to/from the MC02 JDN (Joint Data Network).

Instances of significant difficulties with the speed and reliability of the system.

Instances of significant difficulties with availability of external support (e.g. Service, JFCOM, Program Office, Contractor).

Instances of significant difficulties with any additional interoperability or integration problems.

Instances of Unexpected IERs (Information Exchange Requirements) or KPP (Key Performance Parameter) requirements.

Rating of the usefulness of ANIF towards helping JTF HQ in completing its mission.

Documentation of how ANIF was used for warfighting tasks.

Rating of utility of ANIF for warfighting tasks accomplished.

Document user recommendations for ANIF functionality improvement.

-Task: Employ Network Security Management Correlation & Display (NSMC&D) to facilitate the central database for correlation, analysis, and reporting of network status.

Rating of the NSMC&D ability to monitor the Service Components' and JFHQ's intrusion detection/firewall sensors throughout the JTF enterprise, to cover the Computer Network Defense aspects of the CROP.

Instances of significant difficulties with functionality of system as a Stand Alone.

Instances of significant difficulties with integration, transmitting, receiving of information to/from the MC02 JDN (Joint Data Network).

Instances of significant difficulties with the speed and reliability of the system.

Instances of significant difficulties with availability of external support (I.e. Service, JFCOM, Program Office, Contractor).

Instances of significant difficulties with any additional interoperability or integration problems.

Instances of Unexpected IERs (Information Exchange Requirements) or KPP (Key Performance Parameter) requirements.

Rating of the usefulness of NSMC&D towards helping JTF HQ in completing its mission.

Documentation of how NSMC&D was used for warfighting tasks.

Rating of utility of NSMC&D for warfighting tasks accomplished.

Document user recommendations for NSMC&D functionality improvement.

-Task: Employ Joint Enroute Mission Planning & Rehearsal System - Near Term (JEMPRS-NT) to facilitate the use of collaborative tools enroute to AOR.

Rating of the collaborative capability between the JTF Forward HQ element and the components as it transitions to the area of operations.

Rating of the communications data rates in support of reach-back communications.

Rating of the information flow and process support capability to allow the warfighters to perform required tasks without additional bandwidth demand.

Documentation of how JEMPRS-NT was used for warfighting tasks.

Rating of utility of JEMPRS-NT for warfighting tasks accomplished.

Document user recommendations for JEMPRS-NT functionality improvement.

-Task: Employ Maneuver Control System - Tactical Combat Operations (MCS-TCO) to facilitate Army and Marine Corps Interface Command and Control / Situational Awareness systems.

Rating of the ability to establish connectivity between the MCS and TCO.

Rating of the ability to accept situational awareness data from the other Service's system.

Rating of the ability to display graphics from the other Service's system.

Rating of the ability to populate ones system's databases with data from the other Service's system via Auto-Post/Auto-Fill.

Documentation of how MCS-TCO was used for warfighting tasks.

Rating of utility of MCS-TCO for warfighting tasks accomplished.

Document user recommendations for MCS-TCO functionality improvement.

-Task: Employ Global Strike Task Force (GSTF) to facilitate Air Force rapid reaction force package to meet anti-access challenges.

Rating of the GSTF's ability to disseminate information to support the JTF ONA build.

USAF looking at additional Service specific measures.

Documentation of how GSTF was used for warfighting tasks.

Rating of utility of GSTF for warfighting tasks accomplished.

Document user recommendations for GSTF functionality improvement.

-Task: Employ Joint Public Affairs Operations Group (JPAOG) to facilitate the planning, and command and control of PA units.

Rating of the JPAOG's ability to timely and accurately collect PA actions for the SJFHQ.

Rating of the JPAOG's ability to timely and accurately collect and classify field reports for public release.

Rating of the JPAOG's ability to interface with mobile secure and non-secure sources.

Rating of the JPAOG's ability to collaborate with military and civilian/NGOs on issues/requests for information.

Rating of the JPAOG's effectiveness in command and control of the various PA units in the pre-deployment to early entry phases of the operation.

Documentation of how JPAOG was used for warfighting tasks.

Rating of utility of JPAOG for warfighting tasks accomplished.

Document user recommendations for JPAOG functionality improvement.

-Task: Employ National Imagery & mapping Agency Crisis Action Response Team (NIMA-CART) to facilitate the reach back to NIMA data, products, and subject matter experts.

Rating of the NIMA-CART ability to establish and maintain communications with NIMA centers.

Rating of the NIMA-CART ability to transfer and process imagery/geospatial information in support of preliminary assessment analysis.

Rating of the ability of NIMA CART to support and update ONA developments.

Rating of the ability to use NIMA CART to collaborate on combat assessment and target selection using saved imagery files.

Rating of the NIMA-CART ability to enhance the capabilities of the SFJHQ.

Documentation of how NIMA-CART was used for warfighting tasks.

Rating of utility of NIMA-CART for warfighting tasks accomplished.  
Document user recommendations for NIMA-CART functionality improvement.

-Task: Employ Command and Control for Space and Computer Network Operations (C2SpaceCNO) to facilitate the synchronization and coordination of Space/CNO/IO with other fires.

Rating of the C2SpaceCNO ability to timely and accurately coordinate an exchange of information between the Joint Task Force HQ and the USSPACECOM reach back element.  
Rating of the C2SpaceCNO plans group's ability to provide relevant and timely information for the Operational Net Assessment.

Rating of the input from the space and information operations element (SIOE) in support of maintaining the CROP.

Rating of the responsiveness of the SIOE in providing space computer network operations and information operations support to the JTF Headquarters.

Documentation of how C2SpaceCNO was used for warfighting tasks.

Rating of utility of C2SpaceCNO for warfighting tasks accomplished.

Document user recommendations for C2SpaceCNO functionality improvement.

-Task: Employ Unattended Ground Sensors support to Special Reconnaissance of Theater Ballistic Missiles (UGS-TBM) to facilitate small concealable sensors help SOF locate TBM targets.

Rating of the UGS/TBM ability to provide accurate and timely notification and location of Theater Ballistic Missiles to the JFACC and JTFHQ.

Rating of usability of the UGS/TBM system.

Documentation of how UGS-TBM was used for warfighting tasks

Rating of utility of UGS-TBM for warfighting tasks accomplished.

Document user recommendations for UGS-TBM functionality improvement.

-Task: Employ JSOTF-Joint Collaborative Planning Tool (JSOTF-JCTP) to facilitate reach back capabilities.

Rating of the JSOTF-JCTP ability to facilitate functional components in conducting mission planning.

Rating of the JSOTF-JCTP ability to facilitate functional components in developing courses of action.

Rating of the JSOTF-JCTP ability to facilitate functional components in developing targeting plans.

Rating of the JSOTF-JCTP ability to facilitate functional components in the military decision making process (MDMP).

Rating of the ability of the JSOTF-JCTP to facilitate functional components in the development of Operational Net Assessments.

Rating of the ability of the JSOTF-JCTP to facilitate functional components in executing the planned mission.

Rating of the ability of the JSOTF-JCTP to target enemy locations, key terrain, facilities, and infrastructure.

Documentation of how JSOTF-JCTP was used for warfighting tasks.

Rating of utility of JSOTF-JCTP for warfighting tasks accomplished.

Document user recommendations for JSOTF-JCTP functionality improvement.

-Task: Employ Joint Automated Target Folder (JATF) to facilitate Electronic Targeting Folder Development for Time Critical Targeting

Rating of the JATF ability to facilitate functional components in developing courses of action.

Rating of the JATF ability to facilitate functional components in prioritizing enemy target list.

Rating of the JATF ability to facilitate the functional components in developing, maintaining, and providing a common operational rating picture.

Rating of the JATF ability to facilitate the functional components to execute rapid targeting/retargeting.

Rating of the JATF ability to facilitate the functional components to modify or adjust planned missions, to include positioning/repositioning forces.

Rating of the JATF ability to facilitate the functional components to command and control assigned units.

Instances of significant difficulties with integration, transmitting, receiving of information to/from the MC02 JDN (Joint Data Network).

Instances of significant difficulties with the speed and reliability of the system.

Instances of significant difficulties with availability of external support (i.e. Service, JFCOM, Program Office, Contractor).

Instances of significant difficulties with any additional interoperability or integration problems.

Instances of Unexpected IERs (Information Exchange Requirements) or KPP (Key Performance Parameter) requirements.

Documentation of how JATF was used for warfighting tasks.

Rating of utility of JATF for warfighting tasks accomplished.

Document user recommendations for JATF functionality improvement.

-Task: Employ Joint Automated Single Guard Solution (JASGS) to facilitate the exchange of information securely between networks of different classifications.

Rating of the JASGS ability to process unformatted information from the MC02 unclassified net to users on the MC02 Secret net.

Rating of the JASGS ability to process unformatted releasable information securely from the TS SCI JWICS network to users on the MC02 Secret network.

Rating of the shared view of multi-level security data such as imagery, track and sensor data, and general military intelligence.

Documentation of how JASGS was used for warfighting tasks.

Rating of utility of JASGS for warfighting tasks accomplished.

Document user recommendations for JASGS functionality improvement.

### **Concept: Joint Intelligence, Surveillance, and Reconnaissance (JISR)**

*Warfighting Challenge: Ability to provide relevant intelligence to the commander*

-Task: Plan and direct Intelligence Surveillance, and Reconnaissance (ISR) operations.

Instances of adversary Command, Control, Communication, Computers, Intelligence, Surveillance, and Reconnaissance nodes, links, and vulnerabilities in ISR prioritization

Instances of ISR planning addressing counter ISR and deception measures

Instances of Joint Intelligence Preparation of the Battlespace/Operational Net Assessment providing sufficient detail to plan and implement ISR operations  
Instances of additional resources needed to perform JISR planning, analysis, and oversight  
Instances of Universal Joint Task List task changes needed to accomplish ISR functions  
Instances of additional training required to conduct JISR

- Subtask: Link collaborative planning and execution.

Instances of efficient collaborative ISR planning  
Percent of Component Priority Intelligence Requirements (PIR)/Essential Elements of Information (EEI) covered in JTF collection plan  
Percent of Priority Effects List Measures of Effect (MOE) receiving ISR coverage  
Instances of ISR planner involvement in MOE development  
Instances of effective ISR collaboration  
Instances of Named Area of Interest (NAI) overlay improving collection planning  
Instances of NAI overlay improving situational awareness  
Instances of sensor coverage overlay improving collection planning  
Instances of sensor coverage overlay improving situational awareness

- Subtask: Apply JISR Management.

Instances of ISR planners contributing to increased capability of ISR  
Rating of ICSAS utility for JISR management  
Rating of Automated Deep Operations Coordination System (ADOCS) utility for JISR management  
Rating of SharePoint Portal Server (SPPS) utility for JISR management  
Rating of InformationWorkSpace (IWS) utility for JISR management  
Number of times Integrated Collection Situational Awareness System (ICSAS) used to determine sensor suitability  
Instances of prioritization of coverage deviating from CDRs PIR and intent  
Rating of Blue ISR Database adequacy  
Number of times Blue ISR Database accessed

- Subtask: Synchronize operations and ISR.

Instances of ISR supporting the operational plan  
Number of retaskings to support current operations  
Percent of ISR requirements not receiving coverage  
Percent of ISR requirements receiving redundant sensor type coverage  
Instances of unfulfilled component requirements in ISR plan.  
Instances of insufficient ISR assets available to support operations  
Instances of National, Joint, and Commercial ISR asset integration

-Task: Collect Information on the operational situation.

Percent of threat forces located  
Percent of PIRs/EEIs collected in time to meet operational needs

-Task: Exploit information to improve credibility and reliability

- Subtask: Improve reaction to emergent targeting.

Percent of time ISR asset managers monitoring Joint operations Center

Instances of ISR collaboration providing positive input to emergent targeting

Percent of emergent targets affected

Percent of emergent targets identified

Number of Priority Effects coverage lost due to retasking for emergent target

Number of NAIs losing coverage due to retasking for emergent target

- Subtask: Improve reaction to emergent information requirements.

Instances of ISR collaboration providing positive input to emergent information requirements

Percent of emergent information requirements answered by latest time information is of value

Number of Priority Effects coverage lost due to retasking for emergent information requirements

Number of NAIs losing coverage due to retasking for emergent information requirements

-Task: Produce operational intelligence.

Number of cross cueing ISR assets from other intelligence sources

Instances of interactive multiple Intelligence source collaboration being effective

Number of cross cueing ISR assets from other Services

-Task: Disseminate operational intelligence.

Rating of adequacy of processes for updating the Common Operational Picture (COP) from JISR Assets

Rating of adequacy of JISR input to COP for joint fires capability

Instances where JISR input was useful

Rating of ISR coverage and priorities reflected in the Common Relevant Operational Picture

Instances where JISR provided increased knowledge of the Battlespace

Rating of JISR contribution to view of the Battlespace



## **Annex D — Near Term Fieldable Technologies**

*This Annex is available from USJFCOM/J9 to eligible DoD and other government agencies only.*

(This Page Blank)

## **Annex E — Exercise Control Description**

### **Purpose**

This plan describes the concept, organization, functions, responsibilities, and procedures for control of the MC02 experiment.

The MC02 experiments were conducted within the framework of an exercise to provide the structure required to support and control the experiment. This approach took advantage of the experience and abilities found in the training and exercise communities, while freeing the experiment to focus on critical events required to assess the concept.

### **Experiment Overview**

MC02 was one of a series of experiments designed to assess concepts for transformation of forces into the Joint Vision 2010 and 2020 precepts and time frame. These experiments include the Unified Vision, Millennium Challenge, and Global Challenge exercises. Congressional language in the FY01 Defense Authorization Act directed JFCOM, the Services, and U.S. Special Operations Command to demonstrate rapid, decisive operations in 2002, with elements representative of their future force concepts.

MC02 was to assess U.S. capability to carry out Rapid Decisive Operations (RDO) in this decade. A number of related and supporting technical and conceptual experiments were included in the exercise design, along with integration of Service live experiments conducted concurrently with MC02.

An essential element for conduct of RDO is development and sustainment of an Operational Net Assessment (ONA), which encompasses input from the entire U.S. Government, and issuance of effects-based orders. The ONA for MC02 was drafted during meetings and seminars held among the interagency members in Washington, D.C., prior to the beginning of execution, and were to be updated throughout the exercise. Additionally, updated technology in the form of the CROP was to enhance rapid dissemination of information, coordination between participants, and visualization of the battle space.

MC02 staged a high-end, small-scale contingency that had the potential to escalate into a major theater of war. It overlaid a real-world military threat for which robust and realistic databases are available to develop an operational net assessment. Both simulated and actual forces participated in the conduct of the experiment. These forces operated on a terrain database, which superimposed terrain from the contingency area over the western USA.

The total experiment was conducted through a series of limited objective experiments (LOE), Spirals (1 – 3) and a three-week execution phase. Spiral 3 was conducted for 10 to 12 hours per day, while execution, although originally planned for a 12-hour play day, was run on a 24-hour play day. Spiral 3 provided academic instruction for the JTF and components, an opportunity for planning and orders development, and culminated in a full-up rehearsal of all exercise elements. Technical testing of communications, C<sup>4</sup>I systems, and simulations took place throughout the Spiral. Execution encompassed the major simulation supported experiment, and Service experiments using live forces that were partially integrated into the overall scenario.

### **Control Overview**

Exercise Control consists of a set of procedures used to guide the play toward achievement of the exercise and experiment objectives. The Joint Experiment Control Group

(JECG) controls the experiment through use of a Master Scenario Events List (MSEL), responses to requests for information, the observer/trainer and data collection networks, role players, and functional area controllers. Secure telephone and intercom, local and wide area networks, VTC and periodic meetings provide the primary means for communicating instructions and coordinating the efforts of all controllers. Controllers ensure tracking events are satisfying objectives and participant reaction to MSEL and other injects, and then steering the experiment as required retaining the focus on objectives. The goal was to have a realistic and consistent story line and sequence of events so that control would be virtually transparent to the exercise participants.

Primary control was located at the Joint Warfighting Center in Suffolk, VA with component response cells and simulations located with each of the components. An integration cell from the JECG was located within each Service Experiment control organization, with reciprocal Service representation in the JECG, who were knowledgeable of the Service experiment. The Senior Simulation Controller and Simulation Tech Control controlled simulation forces at the JTASC.

The JECG was responsible for guiding the experiment and did so by orchestrating events, and ensuring objectives were met. The chief controller was overall responsible for ensuring satisfaction of the exercise and experiment objectives, and was the final approving authority for all information flowing to the experiment participants from the JECG. He controlled the experiment tempo and direction by injection of data and information as specified by the MSEL, through responses to RFI's, and through information developed by role players in the JECG. Each Service was responsible for designing, manning, and operating the control structure for its own Service experiments, to include representation on the JECG.

The overall joint experiment force structure was an integrated organization including live (Service experiment) and simulated forces. Central control of Service experiment live forces, to



Figure 268: NELLIS AIR FORCE BASE, Nev. (AFIE) -- An HH-60G Pave Hawk from 66th Rescue Squadron here refuels from an MC-130E Combat Talon from the 711th Special Operations Squadron at Duke Field, Fla., on Aug. 5 during Millennium Challenge 2002.

include OPFOR, was restricted to agreed upon joint events. Outside of those events, Services had full control over live forces. Control over all simulated forces (included in the joint experiment) remained with the JECG.

Live forces were located primarily on ranges in the western United States (Fort Irwin, Camp Pendleton, China Lake, and Nellis AFB) and the San Nicholas Sea Ranges off California. In addition, component response cells with their simulations were located at Fort Bragg, Camp LeJeune, Hurlburt Field, and Fleet Combat Training Center Pacific in San Diego. The component commands were located at Camp LeJeune, NC, at Nellis AFB, NV, onboard the USS *Coronado*, and at Naval Amphibious Base *Coronado* with a forward element on board the JFMCC command ship. The JTF was located at the USJFCOM JTASC in Suffolk, VA with a forward element aboard USS *Coronado*.

The Senior Simulation Controller and Simulation Tech Control at the JTASC centrally controlled all simulation forces. The JTASC also controlled certain live forces participating in certain key joint events supporting specific experiment objectives. However, central control over live OPFOR and live forces during joint events did not extend to control over these forces during Service specific experiments and events.

### Joint Experiment Control Group (JECG).

The JECG provided the experiment and exercise structure, provided close coordination between operations and data collection on the experiment, and provided the control necessary for overall direction of the exercise. The JECG also assured full integration of the separate Service experiments into the joint experiment. Figure 269, displays the senior level of the control and analysis structure, while Figure 270 Exercise Control Architecture, provides a more detailed breakout of the principal elements of the Joint Exercise Control Group.

Subordinate component headquarter elements were represented in a response cell responsible for operating the simulations and portrayed all organizations required by the scenario. The players located in these cells interpreted the output from the simulations to provide necessary reports to the component headquarters, and received direction/orders for input into the

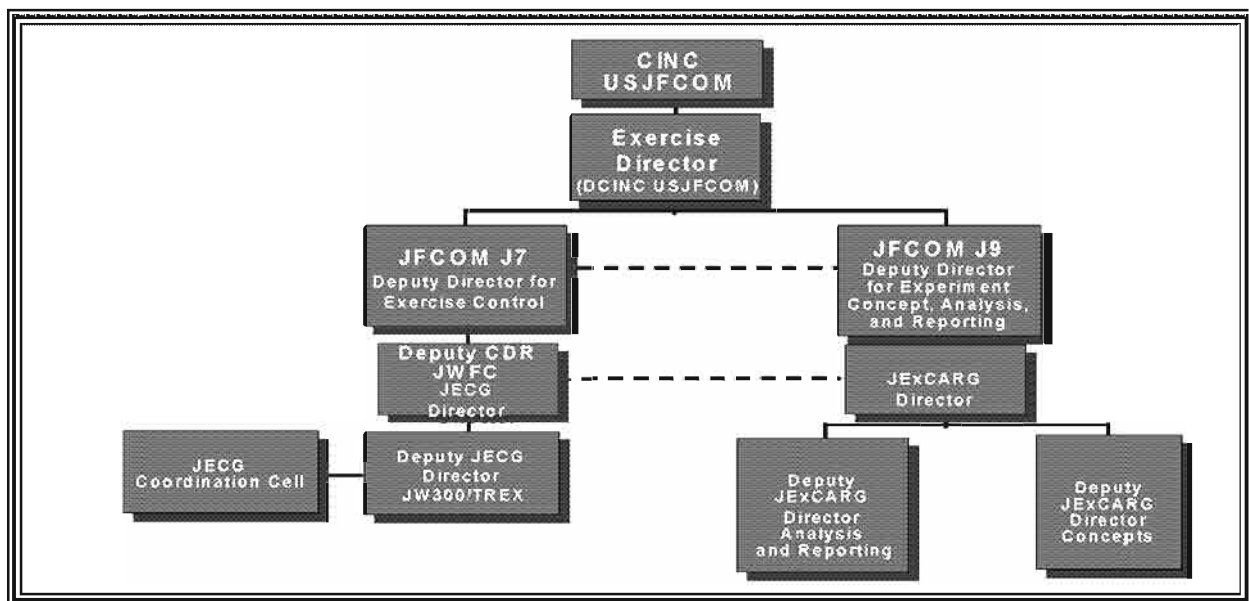


Figure 269: Experiment Control Organization

simulations. The group was a conduit for inserting events, and for monitoring the experiment. The size and composition of each response cell depended on the nature and robustness required to meet experiment objectives, such as planning activities, reports generation, size, and organization of the forces represented.

A coordination cell, working directly for the JECG Chief Controller, provided a view of what was taking place in the simulations and live force elements. The cell was responsible for maintaining a status of forces, making recommendations on play changes to assure joint events took place in a seamless fashion, and providing a capability to give overview briefings to distinguished visitors.

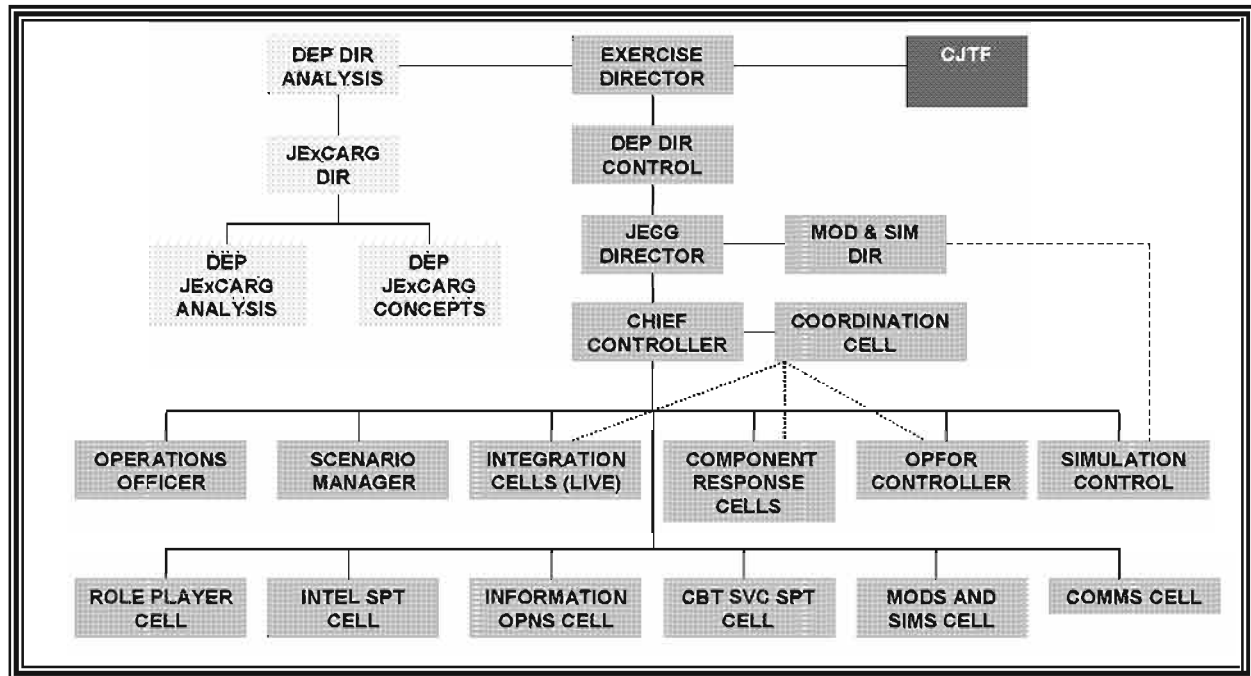


Figure 270: Experiment Control Architecture

Overall, coordination of OPFOR activities took place in the JECG for all events requiring both live and simulated OPFOR forces. The Senior OPFOR Controller in the JTASC personally controlled those OPFOR forces represented in the simulation. The Service experiment representatives in the JTASC provided the channel for coordination of Live OPFOR activities with the Service experiments. Service experiment senior controllers and Integration cell personnel provided current information to the JECG regarding the location and activity of live Blue and OPFOR forces. The OPFOR effort was enhanced by the DoD Red Team, which focused on potential asymmetrical threat capabilities.

### Role Players

Sufficient role players, response cells and control functions to provide the necessary input to the experiment audience at the strategic level, and guide the activities of component Response cells at the tactical level were provided to the JECG. The cells varied in size depending on the number of SME's needed to run the various functions/organizations. Examples of such organizations include defense and other national agencies, other governments and their militaries, and ambassadors. In addition, SMEs were needed to work in the areas of normal

control functions such as scenario/MSEL, OPFOR, simulations, operations, intelligence, information operations, and combat service support.

The MSEL cell maintains, modifies, provides injects, and executes events in the MSEL, the exercise roadmap. Each event in the MSEL is harmonized across the entire exercise. The MSELs act in concert, as catalysts to guide experiment player actions and evoke desired responses. Within guidance from the Chief Controller, and in conjunction with other JECG cells, the MSEL cell developed and coordinated additional scripted events to maintain the focus of the experiment and assure objectives were met.

The CSS cell served as the focal point for all experiment logistics control and response issues. CSS ensured that logistics play, to include medical, transportation, engineer and sustainment issues, was realistic and controlled to support achievement of objectives.

The intelligence support cell provided the background information (to include the database for the terrain, enemy forces and country infrastructure) leading up to the exercise, and supported the experiment throughout with information on enemy activities.

Appropriate primary simulations were operated in a distributed fashion at each Component Response cell site (Army – EAGLE/ONESAF, Navy – JSAF, Marine Corps – JCATS, Air Force – AWSIM), with senior simulation control and technical control centralized at the JTASC. The Services used additional models to support specific initiatives. The output of the models, representing tactical actions on the part of the Service, were fed to the experiment audience through appropriate Service command and control systems, or were provided via scripted message prepared by Service role players. The role players injected orders from Component headquarters into the models. Integration of Service experiment live-force operations with model outputs took place at the Component level. The primary avenue for control of experiment audience actions was through the control cell that was an integral part of each component Response cell, and via injections inserted at that level, or through crafting of the information provided up to the Component HQ. The size and composition of each Component HQ and the component Response cell was driven by the level of fidelity required in orders and reports that had to be prepared by those elements, the functional specialties that must be represented, and the number of simulation stations the component had to operate.

Control is both a top-down and bottom-up process. The JECG inputs strategic and operational information through scripting and role-playing down to the experiment participants. This information consisted of initial and follow-on military information and event guidance and orders from higher headquarters such as JCS and information from foreign governments, non-governmental organizations, and international organizations. At the same time, tactical information from the simulations, from scripting, and from role-playing were injected from the component response cells as if it were coming from tactical units.

### **Control Communications**

Primary JECG communications was through the Common Relevant Operational Picture (CROP), secure telephone to include teleconferencing, secure intercom, and video teleconferencing. To some extent, the audio/video capability available through the CROP eliminated the need for frequent video teleconferences, and possibly the secure intercom. All communications provided for the JECG were separate and distinct from, and not accessible by, the experiment audience. Regular, structured conferences, between the Component Response cell Site Managers and the Service Experiment Senior Controller and integration cells, were used to assure all controllers had a common understanding of what had taken place, the direction the

experiment was following, and the significant upcoming events that were to be initiated. Each service experiment control cell was responsible for providing current information regarding live Blue and OPFOR forces to the JECG.

Automated feeds from the models through Service C<sup>4</sup>I systems to the COP provided the representation for simulated forces. The communications structure replicated all normal communications available to the experiment audience, plus some experimental systems.



## **Annex F — Adaptive Adversary**

This annex summarizes the opposition force (OPFOR) organization, objectives, and success in addressing RDO weaknesses. The credibility of the Red adversary is also analyzed in terms of how it was fought, constraints placed upon it, and its ability to act as an adaptive opponent for the RDO experiment.

The intent of the OPFOR assessment during MC02 was to support the JFCOM Experiment Assessment Plan (JEAP) Primary Task 2. This was, “Assess the Capability of the Experimental RDO Concepts to Impact Joint Task Force Actions against a Determined 2007 adversary.” To address this task fully, assessments were required on both the Blue and the Red sides.

The overall objective of the MC02 OPFOR was to provide a 2007-based, realistic, adaptive opponent that would test the vulnerabilities of the RDO concept. In concert with the MC02 scenario, the multi-faceted adversary portrayed to the Blue JTF provided a realistic 2007 threat environment in which the RDO concept could be explored. This allowed exploration of ONA, EBO, SPACE, IAC, SJFHQ, and other supporting concepts/objectives. The JFCOM J7 Joint Warfighting Center Support Team (JST), in coordination with the J9 world-class adversary (WCA) Team, provided the OPFOR.

Analysts from the J9 Analysis Division and subject matter experts (SMEs) from J7 assessed the OPFOR organization and campaign during MC02. This allowed for an in-depth understanding of the successes and failures of Blue Effects-Based Operations. The assessment team met with OPFOR senior leaders daily to review their operations, response to Blue efforts, and self-assessment data.

The OPFOR senior leadership team included a senior member of the J7 JST, who played the role of Joint Task Force – South (JTF-S) military commander, and a retired lieutenant general, who initially played the JTF-S commander before assuming a role as an advisor six days into the experiment. In addition, a former U.S. ambassador served as the Supreme Leader for the Government of Red (GOR).

The MC02 scenario called for an upper level, small-scale contingency (SSC). As such, the OPFOR organized into a multi-faceted group that included government, military, terrorist, pirate, subversive, militant, and criminal elements. Each of these elements had their own objectives and did not always work cooperatively. As such, they posed a considerable challenge for the Blue JTF. Blue could only achieve success by taking full advantage of interagency capabilities and looking beyond the JTF’s internal assets.

Limited staffing was a problem for the OPFOR during MC02. Total staff support for all OPFOR operations was approximately 90 personnel. At times, the small staffing level limited the OPFOR’s ability to be a fully adaptive adversary. The most obvious shortfall was a lack of an intelligence staff. Total staffing for OPFOR intelligence operations was limited to four analysts, who worked two on each shift.

To help maximize effectiveness for experimental play, the OPFOR divided into three functional groups: GOR, JTF-S, and another non-governmental group that included terrorists, pirates, and militants. This allowed separate, non-coordinated responses to be injected into the scenario as needed. Each of the OPFOR elements is described in detail below.

### **OPFOR Organization**

JTF-S. The military organization faced by Blue. This was a joint organization with air, land, and maritime assets sized to reflect a high level SSC. It was not controlled by the government but by a rogue military commander (CJTF-S).

Government of Red. This represented all governmental organizations for the country of Red and provided an interface for all diplomatic communications. A former U.S. ambassador who had a staff of one led the GOR.

Terrorist Network. The terrorists represented an international terrorist organization that had ties with JTF-S and a regional militant group. The terrorist network provided an asymmetric force capable of conducting “on-call” missions throughout the Blue AOR. Types of missions included suicide bombings, assassinations, and threats against regional/world leaders.

Pirate Group. The group was a maritime criminal element that included members of an international crime consortium. The pirates were linked to smuggling, narcotics, and arms trading criminal organizations. Connections were also established with corrupt provincial government officials. Funds generated through these criminal activities were laundered through commercial business elements.

Fisheries Company (Private Company). A small, privately held company that operated within the country of Red, was an affiliate of a larger corporation—Southern Fisheries Corp. The business operated in collusion with corrupt officials within the country of Red’s Ministry of Industries. The company also provided money-laundering connections for the pirates and terrorists.

Charitable Medical Non-Governmental Organization (NGO). A charitable medical organization based in the region. This NGO provided medical relief to civilians throughout the region. Skilled medical specialists were made available to countries if requested by the government. The organization also took advantage of its trusted position to conduct surreptitious biological operations against Blue and its allies.

Militant Group. A militant cell dedicated to the welfare of related minority groups worldwide. They established an international educational system for their followers throughout the region while their philosophical center was in a city in the country of Red. Ideologically, they were aligned with JTF-S. They were connected to subversive elements in the terrorist network, the charitable medical NGOs, and were supported by funds from criminal activities.

Criminal Clan. The criminal group was a large, powerful clan with a criminal history. They controlled a large region in the country of Red and neighboring countries. As a part of their operations, they were able to provide a transportation network that was used for arms smuggling, trading, and narcotics trafficking among other criminal activities. They routinely circumvented, challenged, and coerced law enforcement officials in the country of Red and neighboring areas.

### **OPFOR Campaign Objectives**

The OPFOR Campaign Plan was written by the JWFC OPFOR to protect and expand the Red regime. Signed by the CJTF-S, the campaign plan was the basis for actions by JTF-S forces. However, since the various OPFOR related groups were not under a centralized command and control scheme, they each had their own interests and objectives. In general, these objectives were contrary to Blue’s interests but were not always executed in a synchronized fashion. At times, the OPFOR groups would take actions counter to each other’s efforts. Given the multi-player scenario, this was not extraordinary.

Joint Task Force-South (JTF-S). Initial stated campaign objectives for JTF-S were finalized during Spiral 3. The objectives were based on the pre-hostilities situation following the earthquake. The achievement of these objectives was founded on strong military and information capabilities with little economic and diplomatic influence. There were seven campaign objectives for the JTF-S, one of which had three components. The first four objectives were the same as for the GOR, but the JTF-S commander had different interests than those of GOR. During the course of the experiment, the JTF-S commander rated his effectiveness in achieving each national objective.

Overall, the JTF-S was prevented from meeting all of its predefined objectives (See Figure 271) but did find success in the following unstated objectives:

- Prevented Blue from free use of the Straits
- Used WME as bait to damage Blue units
- Accepted a fight for the disputed islands in an effort to bloody Blue's forces vs. just peacefully returning the islands as offered by GOR
- Successfully kept the CJTF-S alive until 5 August
- Forces on the mainland were attrited but generally kept intact organizationally
- Fought Blue, absorbed damage, and improved regional status
- Successfully launched first strike against Blue

| <b>JTF-S Objectives</b> |                                                             |
|-------------------------|-------------------------------------------------------------|
| ➤                       | <b>Preserve the regime - Deter Blue military deployment</b> |
| ➤                       | <b>Preserve the regime - Limit Blue war aims</b>            |
| ➤                       | <b>Preserve the regime - Restore internal cohesion</b>      |
| ➤                       | <b>Reduce Blue presence in the region</b>                   |
| ➤                       | <b>Develop regional influence</b>                           |
| ➤                       | <b>Speed economic recovery</b>                              |
| ➤                       | <b>Champion ideals in Red</b>                               |
| ➤                       | <b>Control western access to natural resources</b>          |
| ➤                       | <b>Gain Red stature</b>                                     |

JTF-S Objective 1: Preserve the regime. The JTF-S focus was to preserve the strength and unity of the country of Red through military strength and regional influence. The three components of this objective were to “deter Blue military deployment,” “limit Blue war aims,” and to “restore internal cohesion.” The JTF-S felt it possible that his military strength would deter Blue from deploying its military. However, when Blue gave him an ultimatum, it became clear to the JTF-S commander that he could not prevent Blue deployment. So he felt it necessary to make a preemptive strike against Blue to help in achieving the second part of this objective, limit Blue war aims. The successes he had with his preemptive strike caused him to increase his rating in all three components of this objective to “neutral,” “somewhat effective,” and “very effective” respectively. Once Blue started its military campaign against the JTF-S, his rating on deterring deployment fell to “ineffective” throughout the remainder of the experiment. His rating of Blue war aims was also lowered to “ineffective” and remained low through the end of the experiment (some daily military successes temporarily raised the rating to somewhat ineffective). The JTF-S commander tended to be a little more optimistic about restoring internal cohesion. He felt the success of his preemptive strike and the pullback of Blue at WME site 1 helped to raise the morale and cohesion of the people, giving him the confidence to rate this part of the objective as “very effective.” Once it became apparent to JTF-S commander, that Blue was on the ground, he lowered his rating of internal cohesion to “somewhat ineffective.” This rating remained at that

level until five days before the end of the experiment, when he felt he had lost much of his military capability to oppose Blue.

JTF-S Objective 2: Reduce Blue Presence. The JTF-S objective was to remove Blue from the region and to declare itself victorious in its ability to reduce Blue presence. Initially, the JTF-S commander believed his military was strong enough to deter and reduce Blue's presence in the region. Once Blue entered the region, he lowered his rating to "ineffective." After his preemptive strike, he had some hope of reducing Blue presence and so raised his rating to "somewhat ineffective." Once Blue started the ground campaign, he no longer had confidence in his ability to reduce Blue presence and therefore lowered his rating back to "ineffective" where it remained through the end of the experiment.

JTF-S Objective 3: Develop regional influence. The JTF-S objective was to establish the GOR and JTF-S as a strong regional power. The JTF-S actions to establish shipping tolls and to control the flow of natural resources in the region were intended to further its regional strength.

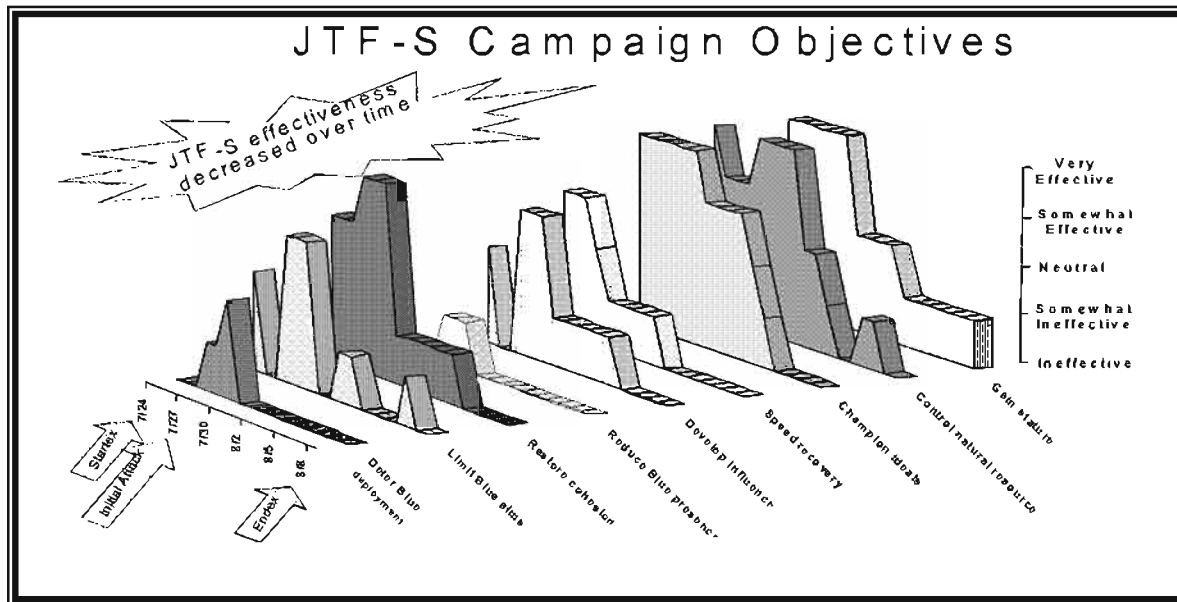


Figure 271: JTF-S effectiveness chart showed that over time the adversaries became less and less effective.

Initially, the JTF-S commander believed the earthquake recovery was hindering their ability to develop regional influence. Although he rated this objective as "somewhat ineffective" at the end of Spiral 3, the additional earthquake recovery time at execution led him to believe there was improvement and therefore rated this objective as "neutral" on the first day of execution. The regional sister-state council demarche on the second day of the experiment denouncing the JTF-S actions caused him to feel "ineffective" in his ability to develop regional influence. However, two days later the JTF-S preemptive strike gave him confidence his military successes would aid in developing regional influence. He rated the objective as "somewhat effective" until Blue's air and ground campaign started to limit JTF-S capabilities.

JTF-S Objective 4: Speed economic recovery. The earthquake had caused considerable damage to infrastructure and economic capabilities in Red. The shipping tolls and control of

natural resources were used to help speed economic recovery, however, future actions were focused primarily on military control and not on economic recovery. Over the course of the experiment, as the JTF-S commander lost capabilities and his ability to speed economic recovery, he lowered his objective rating to “ineffective.”

JTF-S Objective 5: Champion ideals in Red. An additional objective for the JTF-S and not the GOR, the JTF-S commander’s desire was to further the ideals of Red and to strengthen the importance of Red in the region. The JTF-S commander initially felt “very effective” in championing the ideals of Red. This decreased over time to ineffective as he lost diplomatic, military, and information capabilities.

JTF-S Objective 6: Control western access to natural resources. An additional objective for the JTF-S and not of the GOR, the JTF-S commander desired to control natural resources in the region in order to help achieve its other objectives of economic recovery and championing ideals in Red. Initially the JTF-S commander was confident he could very effectively control western access to natural resources with military and economic capabilities. His preemptive strike encouraged him to continue to control natural resources in the region, as did the mining and blockage of a strategic canal. Once the canal was re-opened, he began to lower his rating of this objective. This decline continued as he lost military and economic capabilities due to the Blue JTF actions.

JTF-S Objective 7: Gain Red stature. An additional objective to the JTF-S and not of the GOR, the JTF-S commander desired to gain Red stature in order to strengthen its military and economic powers in the region and the world. He initially believed he had the power and capability to gain stature based on the natural resources reserves and regional position of Red. However, once the air and ground campaign started to decrease his military capabilities, he began to reduce his rating for this objective. This objective ended the experiment as somewhat ineffective; indicating some hope, that Red’s strengths would help to gain stature in the future.

- |                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Government of Red Objectives</b></p> <ul style="list-style-type: none"><li>➤ <b>Preserve the regime</b></li><li>➤ <b>Reduce Blue presence in the region</b></li><li>➤ <b>Develop regional influence</b></li><li>➤ <b>Speed economic recovery</b></li></ul> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Government of Red (GOR). The GOR focus was to gain control of the country of Red and to restore its internal cohesion, without Blue intervention. Their long-term objective was to gain additional status within the region. The Supreme Leader of Red and his staff defined four national objectives for MC02 execution. These objectives are described below. During the course of the experiment, the GOR rated itself daily on its effectiveness in achieving each national objective. Overall, the GOR maintained its ability to achieve most of its objectives (See Figure 272).

GOR Objective 1: Preserve the regime. The GOR focus was to restore the strength and unity of the country of Red through diplomatic and economic intervention. The three components of this objective were to “deter Blue military deployment,” “limit Blue war aims,” and to “restore internal cohesion.” The GOR quickly found it was incapable of achieving the first part of this objective; deter Blue military deployment. On the third day of the experiment, GOR believed Blue had deployed in the country of Red and therefore rated their ability to achieve this objective as ineffective. The GOR did feel somewhat effective or confident that through diplomatic means, they could limit Blue war aims throughout the experiment. In the last week of the experiment, the GOR had proposed a peaceful solution to the island situation and hoped this

would deter Blue from using force to take over the islands. When Blue quit discussions with the GOR, they started to rate their ability to limit Blue war aims as somewhat ineffective. After the island attacks had occurred and Blue began a transition to let the GOR resume control, they raised their rating to very effective in limiting Blue war aims. The third component of this objective, restore internal cohesion, was rated by the GOR as somewhat effective to very effective during the entire experiment. The main concern at the beginning of the experiment was that the JTF-S commander might attempt to permanently take over the southern region. Once Blue deployed in the region and started to attack the JTF-S forces, the GOR was no longer concerned with CJTF-S and therefore raised its rating to 'Very Effective' in restoring cohesion.

GOR Objective 2: Reduce Blue presence in the region. The GOR desired to keep Blue out of the region and to restore its regional power without Blue intervention. While Blue remained in the region, the GOR would be limited in what actions it could take within the country of Red and the region. At the end of Spiral 3, the GOR knew Blue was already in the region and therefore rated this objective as neutral. This rating continued from the first day of the experiment until the GOR believed Blue had gained access to the country of Red. On the second day of the experiment, the GOR lowered its rating of the objective to somewhat ineffective. Two days later, after the JTF-S commander had initiated an attack on Blue, the GOR raised its rating to neutral with the belief that JTF-S action would impact Blue's ability to stay in the region. This rating of neutral continued throughout the remainder of the experiment with the belief that GOR could not control Blue's presence in the region.

GOR Objective 3: Develop regional influence. The GOR objective was to establish itself as a strong regional power. The GOR, with its regional location as leverage, desired to gain influence in the region by playing a strong role in the flow of natural resources. At the beginning of the experiment, the GOR felt it was capable of developing regional influence through its strong natural resources reserves. On the second day of the experiment, the GOR lowered its

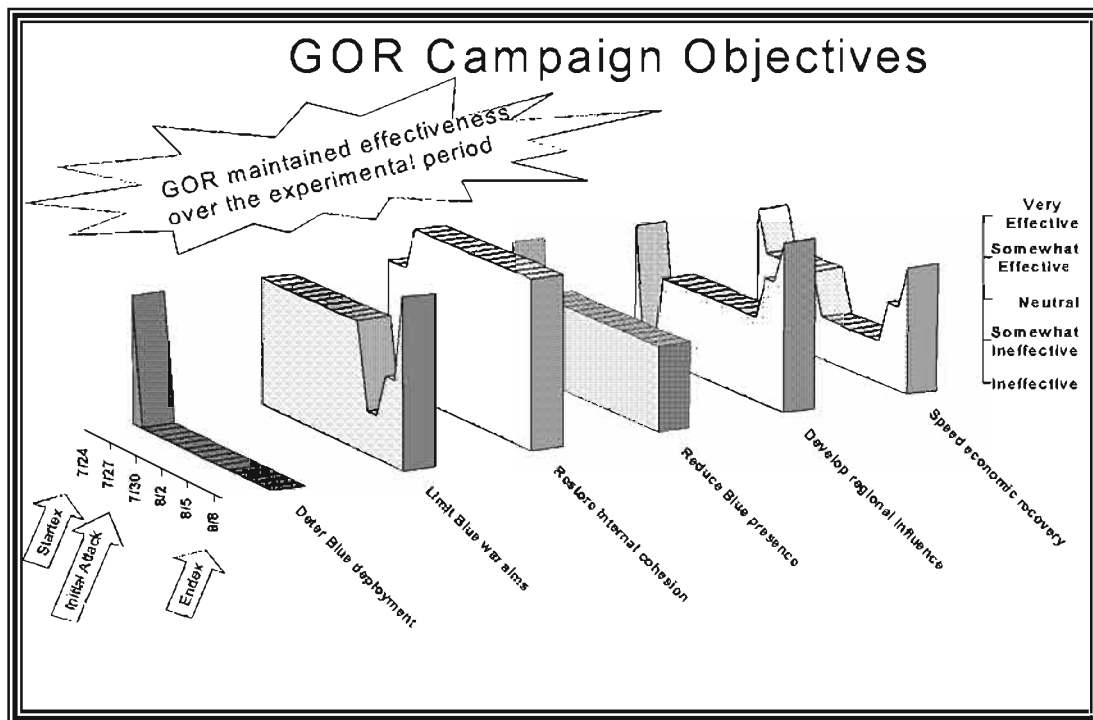


Figure 272: GOR Campaign Objectives

rating on this objective to ineffective as Blue issued an ultimatum to the JTF-S commander. Once the JTF-S commander attacked Blue on the third day, the GOR raised its rating back to neutral with the expectation Blue would not intervene with Red. In addition, GOR began diplomatic talks with Blue that helped to alleviate concerns by the GOR on Blue's long-term intentions. Towards the end of the experiment, the GOR had received a letter from the President of the U.S. that indicated the GOR was recognized as a regional influence. In addition, the GOR was successful in negotiating a profitable contract for future natural resources sales. These two indicators caused the GOR to finish the experiment rating this objective as very effective.

GOR Objective 4: Speed economic recovery. The earthquake had caused considerable damage to infrastructure and economic capabilities. The GOR desired to re-establish its communications and transportation links between the north and south in order to speed economic recovery and to continue to influence the flow of natural resources in the region. Initially, the GOR felt it was capable of improving economic conditions in the southern region. However, once it appeared Blue would intervene with military action, the GOR lowered its rating to neutral and then to somewhat ineffective as infrastructure damage resulted from Blue military actions. Towards the end of the experiment, the GOR was more positive that Blue would not stay in the region and that economic assistance may come from European countries. By the end of the experiment, the GOR rated this objective as somewhat effective based on the new natural resources contract and expected assistance.

Terrorists. The terrorist organization was working along with the JTF-S commander to achieve similar goals. Specifically, the terrorist organization was interested in promoting the spiritual ideals and unity of the religious element. The terrorists had three objectives in order to achieve this goal: deny Blue access to the region, attack opposing political and religious organizations, and disrupt Blue operations. The terrorist organization used asymmetric attacks to help achieve their campaign objectives and as can be seen in figure 273, believed they were somewhat effective in achieving those objectives.

- |                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><b>Terrorist Objectives</b></p> <ul style="list-style-type: none"><li>➤ <b>Deny Blue access</b></li><li>➤ <b>Attack opposing political and religious organizations</b></li><li>➤ <b>Disrupt Blue operations</b></li></ul> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Terrorist Objective 1: Deny Blue access. Throughout the entire experiment, the terrorist organization conducted asymmetric attacks against Blue to deny them access to the region. Although they were not successful in keeping Blue out of the region, they were able to successfully limit Blue's ability to enter the region. Attacks included mining, a small boat bomb against a Blue allied naval vessel, an attack against a U.S. navy oiler in port, the shoot down of a commercial and a military aircraft, and the sinking of vessels near the entrance of a strategic canal causing the canal to close for a period of time. Initially, the terrorists felt they were very effective in denying Blue access to the region. As Blue began to establish itself, their rating of this objective decreased to somewhat ineffective. This was temporarily raised to neutral on 3 August with the success of the two aircraft shoot downs, but again lowered to somewhat ineffective two days later. On the last day of the experiment, the terrorist organization attacked targets in the continental U.S. and so felt they still had capability to achieve this objective. The rating at the end of the experiment was somewhat effective.

Terrorist Objective 2: Attack opposing political and religious organizations. The terrorist organization attacked not just Blue, but also other countries that supported Blue and opposed

their political and religious beliefs. This included the assassinations of the Foreign Minister of Purple and the Deputy Prime Minister of Green; the attempted assassination of the President of Purple, demonstrations within Purple and Green, a truck bomb at the royal palace in Brown, and personnel attacks in Grey. The terrorists initially rated themselves as very effective in achieving this objective and slowly decreased its rating to neutral as Blue began to attack their organization and to take additional security measures. At the end of the experiment, the terrorists rated themselves as somewhat effective, continuing to believe they had the capability to oppose political and religious organizations.

**Terrorist Objective 3: Disrupt Blue operations.** The actions to deny Blue access to the region also disrupted Blue operations. Other actions included an attack on water treatment equipment, the scuttling of a ship carrying chlorine and ammonia, drive by shootings, and car bomb attacks. The terrorists felt very effective in disrupting Blue operations, but lowered their rating to somewhat ineffective towards the end of the experiment. On the last day of the experiment, they raised their rating back to very effective as they saw Blue end their military campaign against the JTF-S commander. Blue did not take away their capability to disrupt Blue operations.

**Pirates.** The pirates operated in conjunction with the Fisheries Company with the sole objective of making money. Prior to Blue intervention, the pirates attacked shipping in the region and looted the cargo on the vessels. As shown in the terrorist objectives (figure 273), the pirates rated themselves as very effective in making a profit. Once Blue began vessel escorts and had a major presence in the region, opportunities for attacked vessels decreased. The pirates stayed in port, thus rating the objective as ineffective. On 6 August, Blue stopped vessel escorts and focused on the island attacks. The pirates took this as an opportunity to attack vessels waiting for

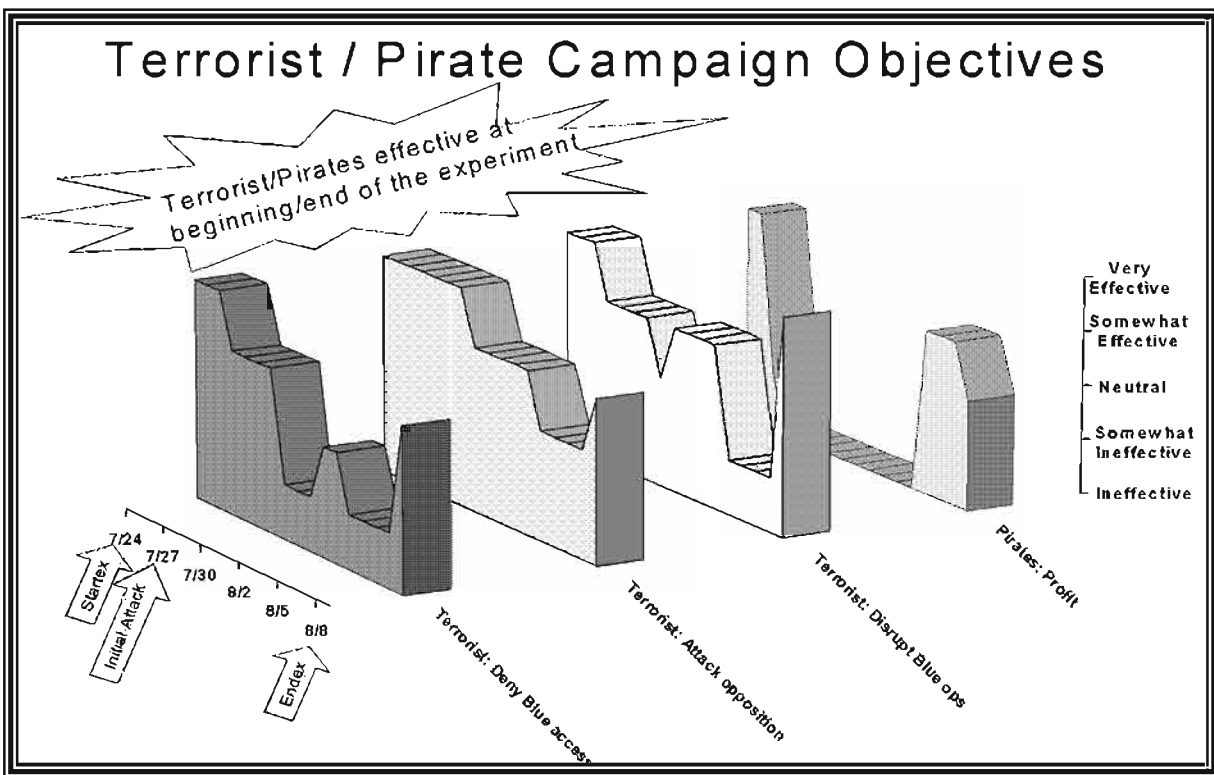


Figure 273: Terrorist/Pirate Campaign Objectives



transit. They increased their rating to somewhat effective when Blue halted vessel escorts. At the end of the experiment, the pirates rated their future ability to make a profit as neutral; believing there would continue to be Blue control over shipping but also believing there would be opportunities to attack shipping.

Charitable Medical NGO. This organization was a religious, fundamentalist aid organization that operated in collusion with anti-western organizations and terrorists to prevent or remove western influence from the region. Their goals were to provide humanitarian assistance to the regional populous and others in times of natural or man-made disasters, support disaster preparedness activities, and to assist in the supply, transportation, and treatment of refugees and victims of man-made or natural disasters. This organization established tent camps on the islands for temporary housing and to provide trauma and medical assistance, established field sanitation centers and water purification facilities, encouraged dedicated religious faithful to volunteer as aid workers and to provide funding, equipment, training, and facilities, to these volunteers. They have also been known to provide research on effects of biological, chemical, and radiological systems on the victims of such events and to develop antidotes or treatment modalities to counter or cure the effects of CBR warfare. During the experiment, no objectives were measured for this organization. Even though they played a role in helping the island inhabitants, their role in attacking Blue was limited to information operations and some biological operations against island inhabitants.

Other OPFOR groups. Other groups included a militant, conservative, religious group with an extreme interpretation of religious law, and criminal clans. The involved criminal clan was one of seven major criminal clans in the southeastern border area that controlled the coastal area of Red. Their goals were to gain upward mobility for the regional followers in the southern provinces of Red and to use illicit activities to fund social programs. No objectives for any of these additional OPFOR groups were measured.

### **OPFOR Credibility**

The OPFOR was tasked to be a credible adversary against the Blue force. This required an OPFOR that was aggressive, adaptive, and capable of achieving its own objectives through a variety of diplomatic, information, military, and economic actions. Resources and exercise rules of engagement limited the OPFOR capability. Though the experiment was limited in the robustness of some OPFOR operations, the impact on the actual concept assessments appeared to be minimal. Throughout most of MC02, the OPFOR was successfully able to identify and test failure modes of Blue operational concepts. Success at stressing Blue was measured both as the OPFOR attacked RDO concept vulnerabilities and as the OPFOR responded to Blue actions.

Daily Time Constraints. While the experiment ran around the clock, significant military activity was limited to the period between 0900 and 2100 hours. The reduction in hours was a result of limited manpower levels among the components. The OPFOR was allowed to re-position forces at night, but not allowed to execute a major attack. This restricted the OPFOR from conducting 24/7 operations, but had minimal impact on stressing the Blue staff ability to execute the concepts during the scheduled exercise period.

Rules of Engagement (ROE). Exercise ROE limited the type of Red/Blue activities. Modifications to the ROE were published by the JECG several times during the experiment.

**Operational Limits.** The ROE did constrain the OPFOR from using unconventional warfare weapons such as WME in order to keep the experiment play within measurable parameters. Though the ROE limited the OPFOR from using all its weapon capabilities, it did not appear to unduly skew results or hinder the experimental hypothesis.

**ROE Updates.** As is common during exercises, the ROE was changed twice — early on. These changes brought about some confusion and potentially provided Blue operational advantages.

**July 29, 2002 ROE update included:**

- **“Red forces will not initiate combat but Blue may.”**
- **“Red may conduct night [Defensive Counter Air] DCA but not [Offensive Counter Air] OCA.”**
- **“Red will not ‘stalk’ Blue Ships or reposition so that Blue Ships at rest come in range.”**

**Master Scenario Event List (MSEL).** Some of the experimental events were pre-determined and documented into a MSEL. This list helped to direct the OPFOR play, set the conditions to test the experimental hypothesis and achieve the overall objectives. The MSEL was a living document that required many injects to be created during the experiment. The injects helped guide the exercise play, while MSEL injects, that deviated from experimental objectives, were not executed. The MSEL injects allowed for more free play early in the experiment than toward the end. By the end of the experiment, the MSEL injects scripted the endgame situation, allowing transition operations to be examined and bring some closure to the exercise. Major MSEL injects were adjusted to reflect scenario deviations by either Blue or OPFOR forces. By the end of MC02, 688 MSEL injects were executed.

**White Cell.** The Joint Experiment Control Group (JECG) or White cell served as the experimental control that monitored game play by both Blue and OPFOR, assessed the impacts or effects of various actions, and determined what feedback was provided back to Blue and OPFOR units. Following each significant engagement the White cell would adjudicate the results to counter experiment artificialities and to ensure the experimental assessment could continue. At times, this adjudication resulted in selected forces being reinstated to the playing field on both sides.

**Game limitations and artificialities.** Certain limitations or artificialities existed during MC02 that required work-arounds in the OPFOR to ensure successful game play. These work-arounds are common during large-scale exercises. The most significant adjustments included lack of anti-access play, simulating time constraints with the models, determining detection capabilities by the OPFOR, and effects assessment. At the start of MC02, when the simulations were initiated, the first 15 days of Blue force flow had already arrived in the JOA. This artificiality prevented the OPFOR from fully exercising its anti-access campaign to stem the initial flow of Blue resources into the region. Much later in the exercise, the OPFOR was authorized by the JECG to launch some limited anti-access efforts. The delay was attributed to real-world commitments associated with TRANSCOM’s TPFDD processing system.

**Free play.** The OPFOR was initially allowed a greater degree of free play in its warfighting operations, including being allowed to strike first and to follow-up an initial strike with a second wave. Subsequent to those efforts, OPFOR operations became more directed.

These limitations occurred primarily to support the simulation interface for Blue live play operations and to ensure the experiment had an opportunity to explore all the objectives. Two examples are described below.

**Live Airborne Drop.** To ensure the live airborne operation could proceed, the JTF commander required that the battlefield be prepared properly. This required elimination of OPFOR air defense assets along an air corridor and in the vicinity of the objective. The OPFOR was directed by the JECG to position its air defense assets in the area such that they could be destroyed by Blue. Those that were not destroyed were then directed not to engage Blue assets passing through their area. Had this live event not occurred so early in the scenario these actions may not have been required.

**Live Ship to Objective Maneuver (STOM).** During the July 30 STOM attack, Blue had not properly prepared the simulated battlefield before emplacing troops. This resulted in the attacking force being fixed by OPFOR ground elements and subsequently attrited to a combat ineffective state. OPFOR was directed by the JECG to cease its attacks and allow the Blue element to be extracted. The involved Blue forces were then regenerated for future use to support experimental objectives.

As the exercise progressed, the OPFOR free-play was eventually constrained to the point where the end state was scripted. This scripting ensured a Blue operational victory and established conditions in the exercise for transition operations.

**Model Limitations.** Generally, the models appeared to operate well from the OPFOR perspective. Most instances of anomalous results were adjudicated by the JECG. Some unusual results were allowed to stand as modeled and resulted in a reduced OPFOR capability. One example was that the Blue models did not always appear to see incoming OPFOR missiles, but were still successful in shooting them down. This limitation is considered to have minimal impact on the experimental results.

**Organizational Structure.** The OPFOR staff consisted of approximately 90 personnel. This reduced intelligence collection, planning, and analysis capability was not equal to the over 350-person Blue JTF. One significant shortcoming faced by OPFOR was the lack of an economic player to help explore Blue's ability to influence the economic element of national power. This ended up not being a serious shortfall in that Blue interagency efforts were more focused on organization than actual scenario play. Maintaining close coordination with the JECG generally compensated for these organizational shortfalls.

**OPFOR Persona.** The JTF-S commander and the Supreme Leader of the Government of Red were expected by the JECG to play scenario-based personas. A lack of clarity in the definitions of these personas caused some confusion during game play. The JFCOM J9 had developed the leadership backgrounds for these roles and placed it in the ONA. OPFOR leaders with regional expertise were hired to play these roles, but at times were considered by the JECG to have stepped out of their defined roles.

**Blue Post-2007 capabilities.** Though MC02 was based in a 2007 timeframe, the Blue force played a variety of post-2007 capabilities. OPFOR capabilities were held to the 2007 standard. While this did not have an adverse effect experimentally, it did have the potential to unduly influence exercise play. Most of these post-2007 capabilities were required for Service experiments. Some examples of post-2007 capabilities played included the Next Generation (DDX) land attack destroyers, guided missile carrying (SSGN) submarines, high speed vessels, an advanced deployable system theater-deliverable acoustic surveillance system, Standard Missile-3 Block 1B, Theater High Altitude Air Defense (THAAD), and airborne laser (ABL).

The inclusion of these systems may have given Blue additional operational capabilities for exercise purposes, but it did not hinder the assessment of planning and executing RDO in a 2007 environment.

**Real World System Links.** Several simulation models were tied to real-world systems. At times, this could have hindered the OPFOR ability to employ its systems freely. One example was the limitation on theater ballistic missile (TBM) play. All simulated TBM play was restricted to specific pre-defined time frames so it could be coordinated through the Global Command and Control System at USSPACECOM/NORAD. This methodology, used since 1996, was not viewed as a limiting factor by the JFCOM JWFC support team.

**Blue/Neutral Country Infrastructure.** The lack of modeling for Blue and neutral country infrastructure limited OPFOR's ability to directly attack these facilities and disrupt Blue operations throughout of the JOA. Additionally, not including other country systems prevented playing all diplomatic and economic effects of Blue actions.

**Simulating Time Constraints.** The models did not accurately reflect timelines associated with some actions. Two examples are discussed below.

**OPFOR Communications.** The OPFOR was able to maintain communications through non-standard, non-electronic methods such as couriers, face-to-face meetings, smoke, flags, and religious sermons. Timelines associated with these forms of communications could not be reflected in the game models during MC02, but were approximated by game participants.

**Logistical Resupply.** Blue maritime missile resupply timelines were not modeled. These assets faced no capability degradation after firing a full load of missiles.

### **RDO Vulnerabilities Addressed**

The MC02 Joint Experiment Analysis Plan (JEAP) documented two primary assessment tasks that contained 23 warfighting challenges. The first task (contains 12 warfighting challenges) focused on JTF HQ planning processes; none that could be impacted by the OPFOR. The second assessment task (Assess the capability of the experimental RDO concepts to impact JTF actions against a determined 2007 adversary) encompassed the remaining 11 warfighting challenges within the five MC02 objectives. The OPFOR confronted Blue forces in an ambiguous, non-cohesive, and determined manner that stressed the operational concepts by attacking critical RDO vulnerabilities within these 11 warfighting challenges of the five MC02 objectives. The vulnerabilities decreased Blue's strengths, increased Blue's weaknesses, or increased the OPFOR's ability to hinder Blue. The OPFOR conducted 114 actions that were measured against those RDO vulnerabilities (See Figure 274). Several of these are discussed below.

**Decrease Blue Information Superiority.** One of the premises of RDO and an objective of the MC02 experiment was to establish and maintain Information Superiority over the adversary. Information superiority is critical to maintaining an accurate ONA and to developing effective and efficient operations. The OPFOR campaign plan addressed actions to gain its own Information Superiority and to deny information to Blue, thereby attacking this vulnerability. During the experiment, the OPFOR executed 24 actions that were measured to hinder Blue in achieving Information Superiority. Some significant events were:

**Use of satellite windows.** The OPFOR observed time windows when satellite coverage was not available and made every attempt to execute movement and firing of missiles during those windows of opportunity. This made it difficult for Blue to initially see or detect incoming missiles while also giving the OPFOR time to hide missile launchers following the attacks.

Movement of WME. The OPFOR moved WME weapons from storage sites to disperse the warheads and to make it difficult for Blue to find and destroy the inventory. This dispersal required Blue to establish Information Superiority in order to detect the warhead locations. By the conclusion of MC02, not all WME assets had been located by Blue.

Decrease Blue Access. A premise of RDO and MC02 experiment objectives was to assure access into the battlespace to provide sufficient freedom of action. The OPFOR focused its efforts to decrease Blue's access to the battlespace through asymmetric attacks and access denial capabilities. Although Blue access to the region was scripted and conducted prior to STARTEX, the

OPFOR still was able to take 37 actions against Blue to limit their access in the region. Some significant events include:

- Mining Commercial Waterways. The OPFOR placed mines in the straits prior to execution and then continued to mine during MC02. This hindered Blue and White shipping that operating in the mined areas and resulted in several ships striking mines. This included mining of a strategic canal, which resulted in temporary blockage and limited access to the straits by the Blue navy.

- Terrorist Attacks. Numerous terrorist attacks against Blue hindered access to include fuel contaminations and disruptions, strategic lift aircraft shoot downs, the attack on a Blue oiler in port, and regional attacks on public officials.

Increase Blue Dynamic Tasking. The RDO concept requires Blue to have Information Superiority on its adversary. This may require Blue to dynamically task its resources to take maximum advantage over the OPFOR's vulnerabilities. OPFOR actions that caused dynamic tasking of Blue resources impacted the operations and knowledge elements of RDO and Blue's ability to achieve MC02 experiment objectives. Dynamic tasking requires integrated planning and execution to effectively accomplish high priority missions. During the experiment, the OPFOR took 31 actions that provided Blue the opportunity to dynamically re-task resources. Some significant events were:

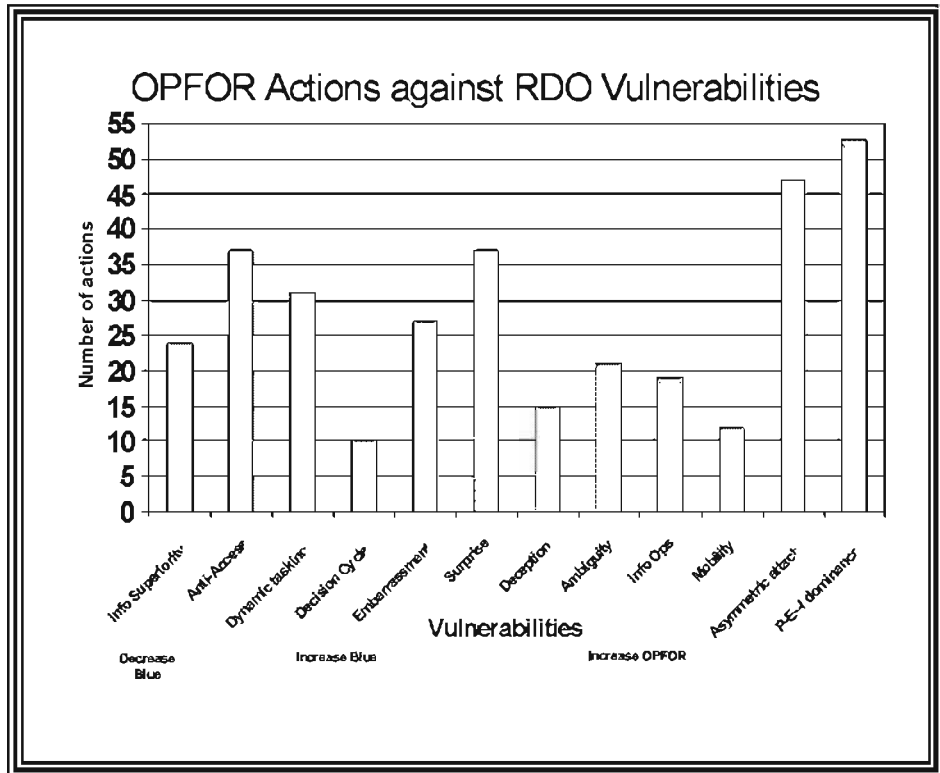


Figure 274: Each RDO Vulnerability was addressed by multiple OPFOR actions

- Swarm Boat Attacks. Swarm boat tactics were employed by JTF-S forces to attack Blue naval vessels and hinder Blue operations when possible. Fast moving boats would attack when the opportunity existed but were vulnerable to Blue air and naval assets.
- Missile Attacks. Red missile attacks on Blue naval vessels and the country of Green required rapid dynamic tasking of defensive weapons to shoot down the incoming missiles. This action sometimes left Red mobile launchers vulnerable to counter-attack when Blue resources were dynamically re-tasked.

Increase Blue Decision Cycle. The RDO concept requires Blue to think and act faster than its adversary. To be successful, the Blue decision cycle needs to be shorter than the OPFOR. Actions by the OPFOR to hinder or disrupt the Blue decision cycle attack RDO vulnerability. The decision cycle impacts the operations element of RDO and the ability to accomplish MC02 experiment objectives. During the experiment, the OPFOR took 10 actions against Blue's decision cycle. Some significant events included:

- Reinforcement. The OPFOR was able to move ground forces to position themselves to defend against Blue attacks on WME sites. The OPFOR also took advantage of its central position to use interior lines for repositioning forces in country. This action hindered Blue in establishing superior operational maneuver and in positioning joint forces for decisive operations.
- Movement. Daily movement of the JTF-S commander made it difficult for Blue to pinpoint his location and set conditions to attack the OPFOR leadership. This resulted in several attempts to locate the CJTF-S and one unsuccessful attack on the JTF-S command train. That attack resulted in significant damage to a major tunnel and the primary rail lines leading into the southern part of Red.

Increase Blue's Embarrassment. The OPFOR extensively used diplomatic, information, military, and economic actions to embarrass Blue and to dissuade the public from further Blue intervention. OPFOR actions that resulted in embarrassment impacted the operations element of RDO and Blue's ability to achieve MC02 experiment objectives. During the experiment, the OPFOR took 27 actions to embarrass Blue resulting in a credible information operations campaign against Blue. Some significant events were:

- Deception. The OPFOR publicized the secondary effects of Blue taking out the power grid in one locale to include the accidental release of a fatal chemical gas and the total loss of power in area hospitals, both resulting in extensive loss of life. Though this was a deceptive effort, the information warfare opportunity was exploited.
- Exploitation. The OPFOR maneuvering of troops around WME site #1 resulted in heavy fighting and the eventual withdraw of assets by Blue. The OPFOR used information operations to advertise the success of the JTF-S commander and their ability to stop Blue.
- Misinformation. The OPFOR information campaign painted Blue as preventing supplies from reaching the islands resulting in suffering and death. When the JTF-S commander successfully sent a supply boat to the island, he publicized his success at breaching the blockade and providing humanitarian relief to the island inhabitants.

Increase Surprise on Blue. The OPFOR ability to surprise Blue is contrary to Effects-Based Operations and accomplishment of MC02 experiment objectives. With superior knowledge and proper planning, Blue should be able to minimize surprise and be able to more often anticipate OPFOR actions. During the experiment, the OPFOR conducted 37 actions in an

attempt to surprise Blue. In some cases, the OPFOR was successful in their actions. Some significant events were:

- Initial Attack. The initial air and missile attack on Blue was a total, operational-level surprise that resulted in the defeat of Blue naval assets. This action was taken by the OPFOR in response to the ultimatum that Blue had given the CJTF-S. Additional missile attacks later in the experiment also had some element of surprise, however, they were not as successful in reaching their intended targets.
- Attack on Blue Ally. The small boat attack on one Allied warship and its success surprised Blue. This action did seem to increase Blue's vessel security and render some future small boat attacks unsuccessful.
- Air Attack. The last air attack by the OPFOR appeared to surprise Blue. Blue may not have thought OPFOR could repair their runways in time to launch such an attack. Although unsuccessful, with all but one OPFOR aircraft shot down, this was a surprise attack on Blue.

Increase OPFOR Deception. Deception attacks the knowledge element of RDO and hinders the achievement of MC02 experiment objectives. Deception leads to false information in the ONA and may ultimately lead to indecisive operations. The OPFOR use of jamming, camouflage, decoys, and concealment were all taken in an attempt to deceive Blue. During the experiment, 15 OPFOR events were observed that attempted to deceive Blue. Some significant events were:

- Information Operations. The information operations campaign claiming Blue's action to cut electrical power resulted in a chemical release killing thousands. This campaign continued until Blue was able to refute it with evidence to show there was no release of hazardous gas and no deaths from this.
  - Decoys. The OPFOR used decoys with CDCM launchers, convoys, and emitters with limited success, as the decoys were all destroyed by Blue.
- Signature Reduction. The OPFOR gave daily orders to reduce the electronic signature of military hardware in an attempt to deceive Blue.

Increase OPFOR Ambiguity. Ambiguity impacts the knowledge element of RDO and the ability of Blue to achieve MC02 objective 1. Ambiguity adds to the fog of war by placing uncertainty with Information Superiority and in use of the ONA. The OPFOR took actions to increase ambiguity in not only tactical operations but also in effects assessment. During the experiment, 21 events were recorded where the OPFOR acted to increase information ambiguity. Some significant events were:

- GOR and JTF-S Relationship. The relationship between the GOR and the JTF-S commander was ambiguous in that the GOR would tell Blue their desires to rid themselves of the CJTF-S, but then support the CJTF-S when he was successful against Blue.
- GOR Forces. The GOR mobilization of forces along the northern border of the southern region was presented to Blue as preparations for taking control of the southern region. However, GOR had indicated some interest in supporting the CJTF-S if Blue did not clarify its intent regarding the disputed islands.
- Terrorist Relationships. The relationship between the JTF-S, the Fisheries Company, and the terrorist organization were ambiguous and not clearly defined to hinder Blue in understanding how to attack their command and control.

Increase OPFOR information operations. The OPFOR conducted an extensive information operations campaign against Blue to impact its operations and ability to achieve MC02 experiment objectives. Through diplomatic and information capabilities, the OPFOR was able to stress Blue capabilities within the JOA. During the experiment, 19 events were recorded where the OPFOR conducted information operations. Some have already been discussed with other RDO vulnerabilities (chemical release, power grid, retreat of Blue at WME #1). Some additional events were:

- Misinformation. The JTF-S media claimed that Blue used WME against them on two occasions. One incident involved reports of Blue troops around public wells with local citizens getting sick afterwards. The second report was related to the chemical release and the claim that Blue has used WME instead.
- Media Exploitation. The JTF-S media reported that several Blue Special Forces personnel were captured and were to be tried as spies. The JTF-S media also reported that Blue military forces were raping and murdering citizens as they went through the country and encouraged citizens to resist Blue.

Increase OPFOR Mobility. OPFOR mobility makes it difficult for Blue to maintain Information Superiority and to target high value assets. OPFOR mobility impacts the knowledge and operations elements of RDO and affects Blue ability to accomplish MC02 experiment objectives. During the experiment, 12 events were recorded where the OPFOR increased its asset mobility. Some significant events were:

- Nightly Movement. The OPFOR moved assets, C2 nodes, and the CJTF-S nightly to avoid detection by Blue and to stay ahead of Blue in their Information Superiority. This included movement of TBM assets (actual and decoy), WME warheads, and the senior JTF-S leadership. The OPFOR was able to extend the life of these high value assets and made it difficult for Blue to find and attack time sensitive targets.
- Counterattack Forces. Major military units moved at night to reposition themselves for counter-attack against Blue. The OPFOR was able to move two brigades over 200 km to take up positions near WME sites. This movement occurred without attrition.

Increase OPFOR Asymmetric Attack. OPFOR asymmetric attacks disrupted Blue's ability to set the conditions of the JOA, assure unimpeded access to the region, and to carry out effects-based operations. Asymmetric attacks negatively impacted the operations element of RDO and MC02 experiment objectives. During the experiment, 47 OPFOR asymmetric events were recorded against Blue's conduct of RDO. Military attacks included missile shots against Blue and neighboring country assets, however most attacks were terrorist in nature aimed at disrupting rear area operations. Some significant events were:

- Oiler Attack. The explosion aboard a boat near a Navy oiler at a port in Green damaged the Blue vessel and hindered refueling operations for several days.
- Air Transport Attacks. The shoot down of a 747 and a C-5 by MANPADS stopped military airlift for a short period, as well as limited future operations.
- Biological Warfare. A biological agent was inserted at a Blue airbase that hindered future operations at the site.

Increase OPFOR DI&E Dominance. Blue's overwhelming military capability could not be matched by the OPFOR, so dominance in the diplomatic, information, and economic arenas



needed to be achieved to minimize Blue's military usefulness. The OPFOR seemed to divide the D, I, and E between its components where the GOR conducted most of the diplomatic play while the JTF-S conducted most of the military and information play. There was little economic play by the OPFOR (or Blue) primarily because there was no one on the OPFOR staff that was available to present the economic impacts of Blue actions. It should also be noted that the experimental design for the JIACG effort focused on testing the concept and defining associate processes during MC02 play. During the experiment, 53 OPFOR events were recorded in the diplomatic, information, or economic areas to further OPFOR dominance in those systems. Some significant events were:

- Diplomatic. The GOR played the diplomatic realm to limit Blue's attack on the country of Red. In these efforts, it attempted to minimize Blue's destruction of Red infrastructure, was able to negotiate the safe escort of one of JTF-S kilo subs, and was working to negotiate a peaceful settlement of the islands.
- Information. The JTF-S led media did an excellent job in the information realm criticizing Blue for every inappropriate action they took. They used deception and lies to make Blue look bad to the people of Red, regional sister-states and to the world.

Appropriateness of OPFOR Actions to Blue Actions. The RDO white paper portrays the OPFOR as a highly adaptive, forward thinking regional power that has asymmetric capabilities to attack BLUE forces, allies, and interests. To accurately assess RDO and its supporting concepts, the OPFOR must appropriately respond to Blue actions consistent with its capabilities and the scenario. The response must take into account exercise constraints and work-arounds to ensure a credible adversary.

- Timeliness. OPFOR actions were evaluated to ensure they were timely to current events and to the scenario. All 114 actions recorded on the OPFOR were determined to be timely to the experiment.
- Realistic. OPFOR actions must be realistic to the scenario in terms of its culture, doctrine, and capabilities. Maintaining realism during the experiment is essential to ensuring the OPFOR acts as a credible adversary. The Threat Impacts Analysis team evaluated each OPFOR action for realism. OPFOR actions were generally viewed as being realistic for the scenario though there was some confusion over the application of desired personas vs. expected actions as viewed by regional experts.

OPFOR Mandates. With any experiment, the direction of play is controlled by the JECG in order to meet experimental objectives. Sometimes this required the JECG to mandate or limit certain actions by the OPFOR. Examples include the prohibition on the use of chemical weapons and the pullback of forces against the Blue STOM attack. Mandates were primarily directed through the ROE for both the OPFOR and Blue.

## **Conclusion**

The OPFOR acted as a credible adversary by taking actions to attack the vulnerabilities of RDO. Of the 114 actions observed by the assessors, the OPFOR attacked RDO the most with political, information, and economic dominance. The least attacked RDO vulnerability was against Blue's decision cycle.

There are fundamental differences between exercise and experimental play. Exercises should be conducted in a free play environment in order to maximize training opportunities.

Experiments require a greater degree of control to direct play towards testing experimental concepts. MC02 had a combination of exercise and experimental objectives that required careful control of the scenario play. Some actions were needed to set the stage for exercise play while resource adjudication was required to experiment on RDO concepts.

The Government of Red was successful in achieving its campaign objectives, while the JTF-S commander was not able to meet his objectives. The GOR was able to retain most of its DIME capabilities though there was some degradation to GOR PMESII systems, particularly involving infrastructure and economic systems. The JTF-S DIME and PMESII were degraded across all areas of capability and systems.

Future experiments should provide more time to test DI&E elements of national power in order to fully test RDO concepts and capabilities. The early scheduling of live military exercise operations forced the scenario to develop into a military campaign without fully exploring the DI&E elements of national power.

There are some issues with the OPFOR (such as ROE, 2007 capabilities, and IO) that are addressed, but that had minimal impact on the ability to examine the RDO concepts.

## **Annex G — Range Integration Results**

Since 1998, DoD has issued a number of policy documents directing Joint Forces Command to find ways to improve distributed joint training. The Joint Warfighting Center (JWFC) demonstrated this concept during MC02, in the form of an integrated multi-Service test and training range network of live force activity on selected Service ranges. The intent was to tie instrumented live force activity into one comprehensive picture shared by each range site and USJFCOM. The main objective of the MC02 range integration effort was to define user requirements for future linking of test and training ranges in support of test, training, and experimentation objectives. This in turn supported the USJFCOM role to "... articulate the joint operational requirements to support the creation of a joint battlespace environment to support training, experimentation and testing."

The specific MC02 exercise objectives considered are:

- Demonstrate potential linkage of western ranges to show feasibility for the purposes of joint training and experimentation.
- Demonstrate integration of live and simulated actions in an environment that feeds situational awareness at the operational level.

JFCOM's Joint Warfighting Center and an MC02 western range consortium, consisting of participating ranges, pursued the concept development and systems design of a range integration package to demonstrate a Joint Experiment Control Group (JECG) view of the live forces participating in MC02. This effort supported the commander's intent that "...the live portion of the event will... demonstrate the ability to link existing ranges within a joint event..."

The instrumented data fusion points at each range delivered participant track data to software gateways. The software gateways, which were developed to standardize the various data formats, fed the data through a computer network to the JTASC, where the live data was fused with the picture from the model federation and COP data derived from the components. This process was designed to provide a seamless, "ground truth" picture of the combined live and virtual joint forces participating in the event. This display, available at the JTASC or any other designated site on the network, provided the capability to view live action at any range, with any instrumented participant viewable selectively through a CROP-type display (See Figure 275). Additionally, collaboration tools to coordinate range activities were included in the design. The exercise objectives were mapped to required operational capabilities, which were used to draw a system architecture.

The system components fell into three categories:

- Instrumentation (live range sensors) and testing
- Connectivity (network infrastructure)
- Software

To the greatest extent possible, the design leverages existing range instrumentation and connectivity capabilities, as well as ongoing efforts at providing data standards and data exchange capabilities. Network connectivity was accomplished by leasing commercial (DISA acquired) T-1 circuits. The circuits came through the Defense Research and Engineering Network (DREN).

This effort provided the following legacy products:

- An initial integrated range capability, with dedicated assets, suitable for reuse during follow-on experimentation and joint training events
- A proof-of-concept of live and constructive event control, providing the first steps toward a Joint National Training Center (JNTC) capability and the resulting requirements
- The potential capability to support future joint interoperability testing, training, and experimentation events
- Insight and lessons learned on requirements and how to engineer more comprehensive live and live/simulated joint force training events and experiments

Communications is critical to the success of range integration. USJFCOM envisions that in order to properly develop the joint warfighter, a full integration of modeling and simulation, experimentation, live training, distributed education, and test and assessment is required to achieve the expected level of joint readiness. In order to ensure this capability, a robust, networked data communications system is required. Test and training ranges provide an impressive array of live and simulated event scenarios to the warfighter, and therefore are critical in their contribution to a realistic training environment. Fully cognizant of the expense required to establish a networked training communications system, USJFCOM advocates leveraging

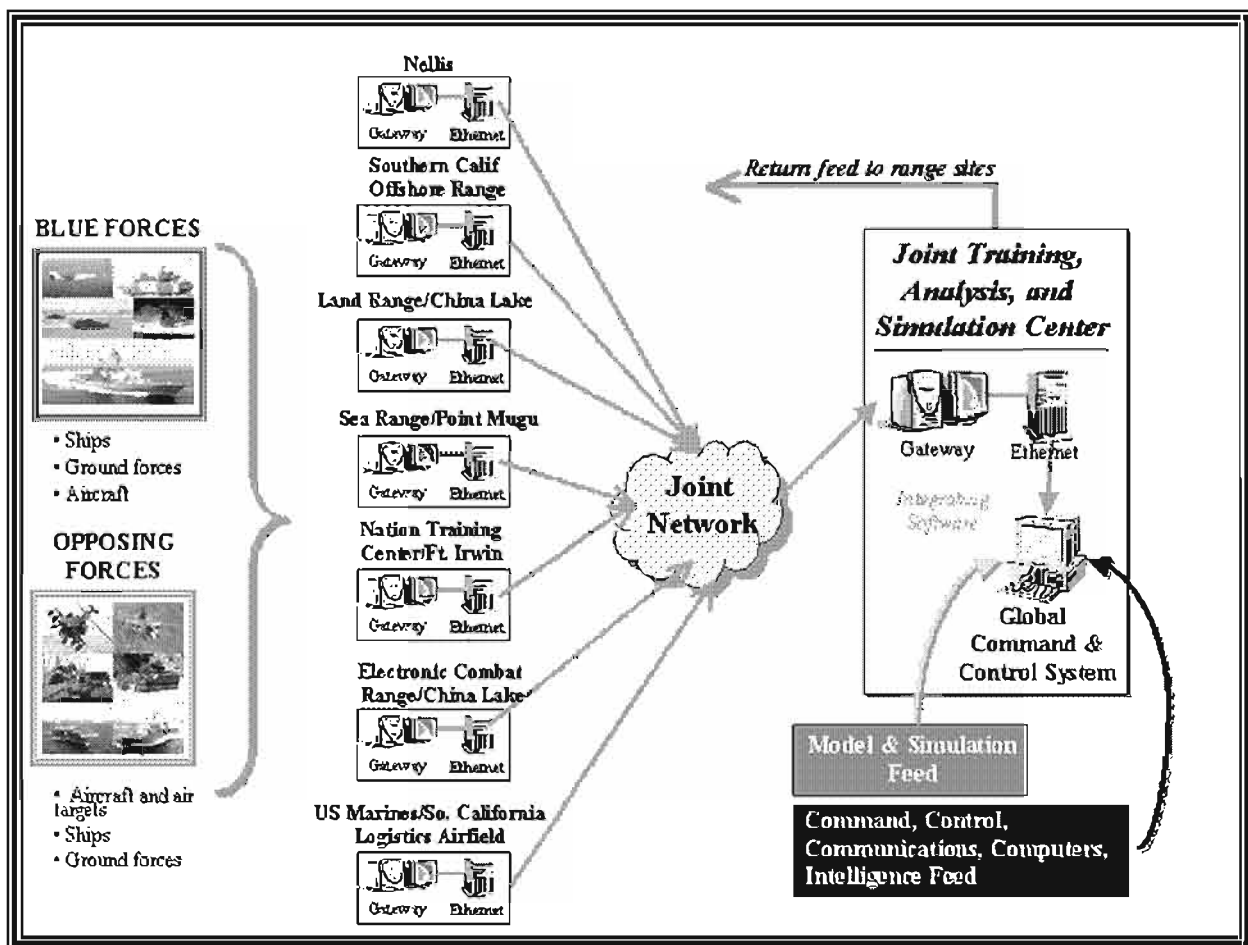


Figure 275: Network connectivity of the Range Integration demonstration during MC02 rehearsals and the final execution. There were actually two parallel networks. The first was provided by DISA – commercially acquired circuits, and the second was a network asset

existing communications or data systems operating outside operational military command and control networks—these include those communications and data systems currently used by the test and training community. By combining existing or emerging networks within the training, research and development, and experimentation community, ranges will be able transmit range data through a high capacity environment and provide services to training and experimentation without interfering with real world, operational networks.

The integration of ranges is vital to the successful development of a joint training program that incorporates the full spectrum of live and virtual systems. Once developed, this system will enhance joint force readiness.

### **Background and Concept of Operations**

As described earlier in Chapter 5, MC02 was conducted over four development and integration test spirals and an execution event. The integration and test spirals progressively included more systems and maturity of the respective systems in MC02 and examined progressively greater levels of scenario complexity, integration, and interoperability.

The MC02 Range Integration Team included participants from the JFCOM J791, NAWC-WD, and FI2010. The NAWC-WD staff led the development of the test plan for MC02 range integration and spiral testing. The live range integration CONOPS support requirements from the JFCOM analyst community and training after action review

There are several views of the Range Integration CONOPS:

- The requirements development, engineering and integration perspective
- The execution perspective
- The post execution analysis or after action review perspective

### **Requirements Development and Integration CONOPS**

The initial requirements development and integration concept of operations was to have the participating ranges' representatives provide a coherent design, integration and test plan to integrate the respective range sensors and data into a common format for distribution among the range facilities and the JTASC, and supporting coordination of range instrumentation assets from the JTASC MC02 JECG cell. Initial contact was made with the JFCOM analyst community, but few analysis requirements were levied on the live range integration effort. This was largely due to relatively less focus on the live activities than on the joint headquarters activities at the JTASC. Most of the live activities were Service- focused events within the MC02 context. While the role providing a combined cooperative live ground truth and operational sensor perception “picture” on a common system was identified for support to JECG live operations, most of the range integration CONOPS focused on providing an initial proof of concept for range data integration and distribution. The result of this focus was that less dialog and insight was established between the operational participants, the JECG staff and the range integration staff than was desirable. The limited understanding and coordination resulted in a proof of concept that was technically very successful, but severely underused by the event operational control staff and analytic staff. A lesson learned from hindsight here is that the live forces integration requirements and capabilities followed the “chicken and egg” syndrome. Had the operational staff been more involved in the requirements process, the range integration systems would have been used to a greater extent. Moreover, had the range integration staff been more proactive in involving the operations staff, the operations staff would have understood the range integration

capabilities and may have been more involved. Clearly, more dialog must occur between the event operations staff and the range integration providers, and it should occur as frequently as possible.

While the technical capabilities could support range systems control and coordination from the JECG, the execution operations did not occur as anticipated. The JECG did not use these capabilities to any effect — although on balance, the proof of principal was established and these capabilities could be used operationally in the future, given that they are incorporated into the JECG operations.

### **Execution CONOPS**

The execution concept of operations differed the most between the initial expectations and the actual event. Initially, the execution CONOPS was that the ranges would coordinate to provide with the Services on schedule and provide instrumentation assets, and “truth data” in the common distribution format. Additionally, the ranges would take advantage of video and other targets of opportunity to provide other data sources to the JTASC JECG. Initially, relatively little emphasis was given to providing “real-time” briefings and to support various visitors and event observers at the JTASC and at other locations. The initial execution CONOPS included provisions to coordinate range systems operations via voice-over-IP (VoIP) capabilities designed into the range integration architecture. The live range data provided to the JTASC was intended to be concurrently merged with live operational sensor data and simulation “truth” data on a common display in the JECG — providing the JECG insight into the live participants’ physical position and dynamics “truth” and the operations sensor perceptions of those participants.

As it turned out, relatively few of the actual live participants were instrumented. Data obtained from the instrumented participants was good, but there were significantly fewer participants reported through the range integration network than were actually in the scenarios. This was due to the methods used to instrument the live participants (only one aircraft of a flight may be instrumented, many aircraft (C130, AWACS, tankers, helicopters, etc.) were never planned to carry instrumentation. The lack of understanding of percentage of instrumented participants (and thus available for range integration reporting) and the affects on the range integration system implementation was due largely to the limited dialog between the range integration staff and the operational planning staffs. In addition, alternate methods (versus fixed range sensors, aircraft IFF transponders, and participant tracking pods) to obtain cooperative instrumentation on a greater percentage of participants (LINK-16 PPLI reporting, Army forces VMF reporting, etc.) were not investigated in the scope of the MC02 effort. In addition, coverage from fixed range sensors were not comprehensively analyzed against the MC02 operations scenarios. This resulted in some data dropouts for reasons such as terrain masking, and range sensor coverage. This resulted in a difference in operating “philosophy” between the test ranges, assets and the training community operations; where test missions are usually much smaller in scope and much more controlled for participants’ routes and maneuvers, while training events are relatively more dynamic and not as subject to rigid geography constraints within general boundaries.

### **Post execution and Analysis CONOPS**

This phase of the operation held to the initial expectations. There was no post event analysis conducted other than a “self critique.” Consequently, post event range integration

operations were conducted as expected. During the event, all range integration participants kept notes and logs of anomalies, problems, and ideas to improve the process.

### **Range Integration CONOPS Findings and Recommendations**

Future joint interoperability events involving live participants and live range integration would benefit from early and continuous involvement with analysts and operations staff. This involvement is critical during range integration requirements definition and should be continued during testing to allow the development of a clear understanding of range integration capabilities and how to use them during execution.

Establish clear RI naming conventions and protocols for radio sites, chat program names, and voice communications and chat protocols. Not much formality is needed but enough to look professional and emphasize the site and function rather than the person.

Establish and maintain good working relationships with the local sites' communications, networking and security staff—always a good idea. Have these staff names and contact information in the event the POC list is not available to the range integration staff, so that all understand who to call for help when it's needed.

Determine “quick look” measures for analysis of the on-going operations. Put the results of these “quick look” analyses in the daily logs or chat/whiteboard files and be ready to brief them to analyst staff. Distributed operations always have a flavor of “real time” analysis – this is a big plus for this type of operation.

During testing phases and execution, use a network chat and/or whiteboard to publish and maintain: 1) the next day's plans/schedules, and 2) a running status of any metrics gathered. This allows each distributed site to easily report and provide impromptu briefings and discussions to visitors and to better coordinate among themselves. This also alleviates the need for daily status reports—as the daily status reports are just cut and paste from the running status log. Establish this format before the event. The form for the “next days plans” should migrate to the current day's status on a daily basis—also making status reporting easier. Make this available for manager and other functional staff to access so their understanding of the systems' capabilities and operations are enhanced by direct use to obtain information.

Coordination with event operations (Air Tasking Order - ATO distribution, land forces operations distribution, maintaining operational entity naming conventions, etc.) is critically important to the range integration operations, as this information may be very fluid over the course of the event. This is a key recommendation because this was a significant omission in MC02.

The audio coordination tool was used to good effect, but an on-line chat service would have been beneficial (this is similar to chat tools used in other live and simulation events like JCIET, JEFX). The chat tool provides persistence of the coordination messages, (people don't have to be on audio all the time), provides a “running log” of the operations, and is a convenient way to document anomalies and problems. The chat tool can be very helpful in reconstructing sequences of events and in coordinating actions and operations.

Establish a POC log and have it distributed to all range integration staff and placed on-line.

Establish a clear POC responsibility understanding by all participants. Annotate the POC log (phone book) with responsibilities.

Establish an on-line repository (with at least file transfer protocol – FTP - capabilities) for log files and code distributions.

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

Establish a clear, daily schedule of preparations and log them: get current ATO, put relevant section on the chat/whiteboard, put any DV time on the whiteboard, discuss / document any changes to the system and fixes made during the night.

Document any changes to the systems, networks, and configurations on the chat and whiteboard.



## Annex H — Model and Simulation Federation

### Preface

The Millennium Challenge 2002 modeling and simulation (M&S) federation is the largest, most complex high level architecture (HLA) federation ever attempted. Technical and operational tests have proven that large HLA events are possible, albeit with difficulty. A dedicated band of developers and users, working in concert over the months of design, development, and testing surmounted the challenges. The purpose of this annex is to provide a small flavor of the complexity of the federation and an understanding of the functionality of the federation and its component parts. It will also provide an appreciation for the richness and robustness of the virtual battlespace environment.

There are three basic components of the federation. First are the core simulations (See Figure 276). These simulations comprise the minimum essential set of simulations required to create a full and robust environment sufficient to meet the experimental objectives of MC02. The second piece consists of the Services' tactical and operational simulations necessary to also satisfy their unique experimental requirements, while still participating within the overall framework of the MC02 battlespace. Finally, there are a set of special-purpose, stand-alone simulations, simulators, and tools, which fulfilled a variety of necessary supporting roles, for both joint and Service experimentation.

This virtual environment will support over 30,000 battlespace entities distributed over 17 operating locations coast-to-coast, including one site afloat on the USS *Coronado*.

A bottom-up, requirements-driven, development process, with Service-input, was used to create the simulation environment. The Services selected the best simulations to represent their capabilities; USJFCOM funded the improvements and integration necessary to form the HLA federation. All participating simulations have adopted some changes, which resulted in a significant leave-behind capability to support future Service events. While requirements drove the build process, some ideas were too late to the table; the primary focus was therefore concentrated on the high priority capabilities vital to success of the overall MC02 experiment.

Actual development, including code changes, was completed within a year, while members of the development team (drawn from joint, Service, agency, and industry partners) supported other Service exercises in the process. Over 400 trouble reports were opened and closed during the ensuing year of testing.

The federation provided superb battlespace functionality based on predicted 2007 joint and Service capability. It included similarly enhanced supporting environments for terrain, JISR, jamming and communications, logistics, TBM, and infrastructure. The federation represents a cooperative effort by a diverse uniformed, civilian, and industry cross-discipline team that fully supported both the joint and Service experimentation objectives.

### **Air Force Synthetic Environment for Reconnaissance and Surveillance (AFSERS)**

SPONSOR: Air Force Agency for Modeling and Simulation (AFAMS)

The AFSERS provides multiple UAV simulations. This is a human in the loop (HIL) simulation, which can produce both video (RS170 format) and reconnaissance exploitation reports (RECCEXREP). RECCEXREP contain information from any air breather flown in AWSIM. AFSERS is DIS-compliant. AFSERS is the Air Force specific version of the Multiple UAV Simulation Environment (MUSE). AFSERS Video will be provided to the CAOC floor.

**Air Warfare Simulation, AWSIM**

SPONSOR: Air Force Agency for Modeling and Simulation (AFAMS)

AWSIM is the official U.S. Air Force theater-level wargaming model. The purpose of AWSIM is to provide a training capability for the air warfare environment. In fulfilling this purpose, AWSIM represents the air component of commander-level battle staff training for Air Force conducted exercises, and the air portion of joint training exercises. AWSIM is an interactive and prescriptive, computer-driven, time-stepped simulation of a theater air warfare environment. AWSIM is latitude and longitude based and simulates day and night operations, and limited weather conditions over a smooth earth (no terrain). It supports a two-sided scenario where opposing sides define, structure, and control their forces. Modeled features include aircraft, air bases, surface-to-air missiles, short-range air defense systems, ships, and radar sites. AWSIM results include success of individual aircraft missions, munitions consumption, and the systematic playing out of a scenario based on kill algorithms that determine the outcome of many separate aircraft interactions.

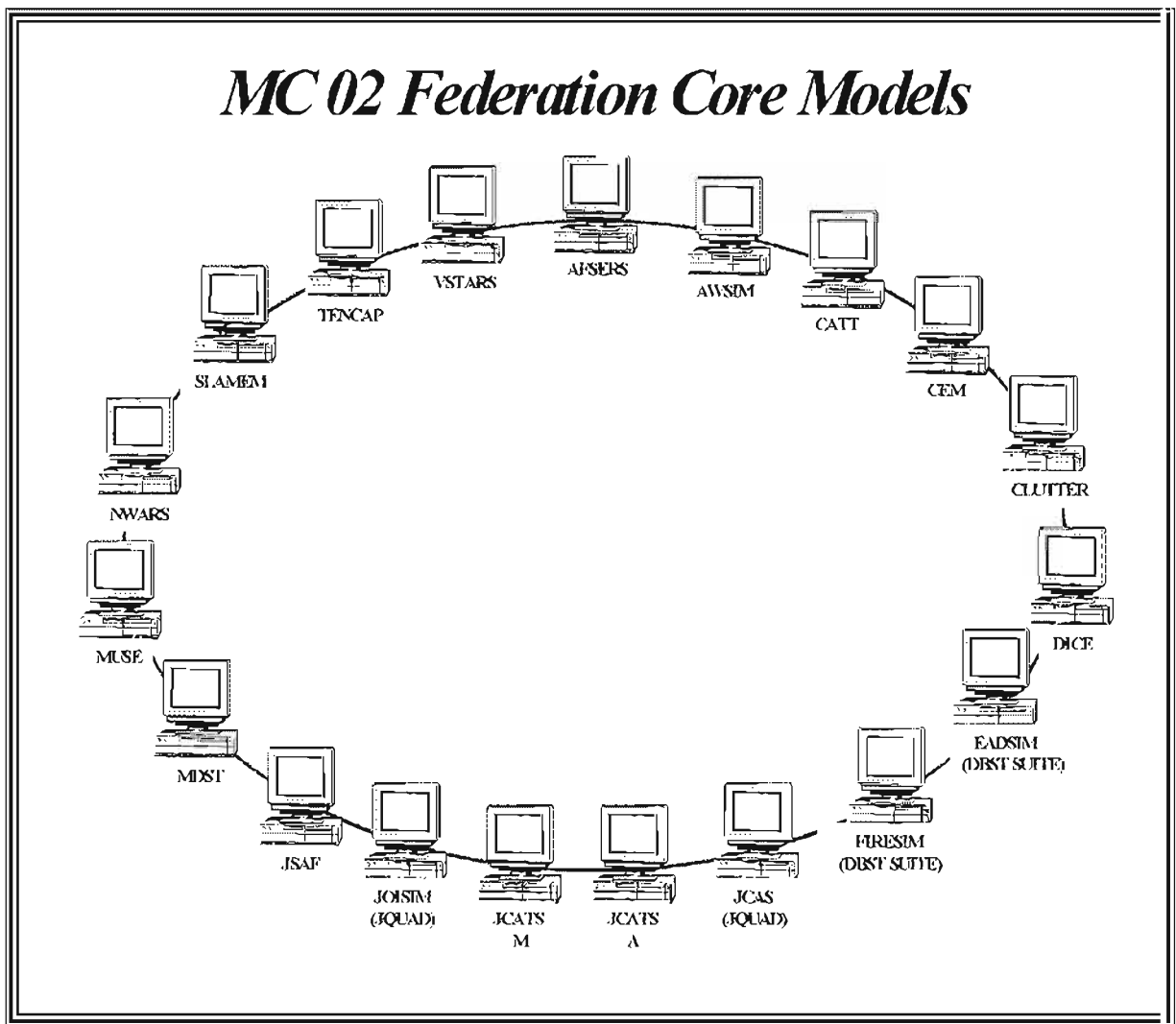


Figure 276: MC02 Federation Core Models

### **C2 Analysis and Targeting Tool (CATT)**

SPONSOR: Air Force Information Warfare Center (AFIWC)/453 EWS

CATT is a high fidelity simulation of an Integrated Air Defense System (IADS). It is capable of simulating all levels of the IADS. CATT's uniqueness is its ability to implement the C2 algorithms of an IADS and to provide operator-in-the-loop capabilities with manned consoles or unmanned operation with synthetic operators. The Air Force Flight Test Center (AFFTC/EW) and the Air Force Information Warfare (AFIWC/453 EWS) Center jointly developed CATT. It is currently undergoing validation by the AFFTC.

### **Civil Environment Model (CEM)**

SPONSOR: U.S. Air Force ESC/CXC

CEM is a model that is being developed as part of the National Air and Space Model (NASM), and was used in MC02 to produce effects of attack on strategic civil targets and infrastructure. The CEM is the part of JSIMS that simulates the flow of commodities to the battle space.

### **Clutter/JSAF**

SPONSOR: USJFCOM, J9

Clutter provides a large number of entities from a relatively few number of boxes. Three thousand moving entities on a 733 MHz machine with 750 Mb ram is normal. Clutter was used to represent civilians, and background military traffic. Its focus was to confuse sensors and provide background clutter in the simulation for things like collateral damage play and road clogging. Varying types of vehicles available: Blue/Red/Green, military combat and supply, civilian.

### **Digital Battle staff Sustainment Trainer (DBST)**

SPONSOR: National Simulation Center (NSC)

DBST is a federation of constructive Distributed Interactive Simulations (DIS) and other state-of-the-art-technology that, collectively, simulate military operations. Primary models used in DBST are FIRESIM and EADSIM. It uses information produced by the simulations to stimulate C<sup>4</sup>ISR systems in a unit's tactical operations center. DBST facilitates battle staff collective training by requiring the staff to react to incoming digital information while executing the commander's tactical plan. The targeted training audience is brigade and battalion battle staffs, including functional command post (CP) training and full CP training. Battle staffs of higher echelons may also employ DBST to achieve limited training objectives. DBST is a system of systems simulation federation that includes a ground maneuver simulation (JCATS and/or JANUS, SELS), interfaces from simulation to tactical systems (EPIU, ETSIU), a field artillery simulation (FireSim), and an air defense model that incorporates sensors modeling (EADSIM). Because DBST uses standard simulation protocols, HLA/DIS, any of the models in the Federation can link with other simulations using these protocols. The DBST sensors being played in EADSIM can "sense" the presence of other entities from any federate on the simulation LAN. For MC02, DBST stimulated various Army Tactical systems by sensing entities from entities in the MC02 Federation.

### **Distributed IW Constructive Environment (DICE)**

SPONSOR: Air Force Information Warfare Center (AFIWC)/453 EWS

DICE simulates threat integrated air defense system sensors, weapons, and communications. DICE provides an RF environment as input for intelligence collection simulations.

**Extended Air Defense Simulation (EADSIM)**

SPONSOR: Space and Missile Defense Battle lab.

EADSIM was used in the DBST Federation to provide air defense models, radars, fixed wing aircraft and various ground and air based sensors. EADSIM is linked to a tactical simulation interface unit (TSIU) to provide C<sup>4</sup>I messages.

**Fire Simulation (FIRESIM)**

SPONSOR: Depth and Simultaneous Attack Battle lab (DSABL)

The DBST Federation used FIRESIM to provide high-fidelity field artillery simulation for Red and Blue, including artillery battlefield radar systems. It is linked to the Army Field Artillery Tactical Data System (AFATDS) via a protocol interface unit and receives fires from C<sup>4</sup>I systems, provides feedback and is a primary simulation of the DBST suite.

**JQUAD (JCAS and JOISIM)**

SPONSOR: USJFCOM Joint Information Operations Center (JIOC)

Joint C2W Attack Simulation (JCAS) simulates and produces bomb damage assessment (BDA) on a wide array of fixed targets using the Joint Munitions Effectiveness Manual (JMEM) data, with the required designated mean point of impact (DMPI) level fidelity. Joint operations information simulation (JOISIM) simulates the collection and reporting of intelligence information from various air and space-based sensors.

**Joint Conflict and Tactical Simulation (JCATS) (A = Army / M = Marines/SOF)**

SPONSOR: USJFCOM, Joint Warfighting Center (JWFC), JW500 (M&S)

JCATS is a multi-service, multi-sided, interactive, entity-level, object oriented simulation used by military and security organizations as a tool for joint training, analyses, experimentation, planning and mission rehearsal. Current limits tested up to 25,000 plus entities on configurations as large as 60 workstations. DIS links with VSTARS, CGS, DBST's FIRESIM, EADSIM, and TSIU for U.S. Army Tactical C<sup>4</sup>I and operational information systems.

**Joint Semi-Automated Forces (JSAF)**

SPONSOR: USJFCOM, J9/Naval Warfare Development Center (NWDC)

Entity-based simulation of military units (all ground / sea / air and some space)

JSAF is a simulation system that generates entity level platforms, interactions, and behaviors in a robust synthetic natural environment. All interactions within the battlespace are resolved at entity level, whether the entity in question is an infantryman, a tank, a ship, an airplane, munitions, a building, a sensor, or terrain modifications like tank ditches. The individual entities are task organized into appropriate units for a given mission and controlled as units or individual entities using a simulation interface.

**Missile Defense Space Warning Tool (MDST)**

SPONSOR: Air Force Agency for Modeling and Simulation (AFAMS)

MDST simulates current and future space-based launch detection. It includes the capability to receive threat input messages from external simulations and to generate output messages in operational formats to external sites for exercise purposes.

### **Multiple Unified Simulation Environment (MUSE)**

SPONSOR: Maritime Battle Center – Naval Warfare Development Center (NWDC)

The MUSE/AFSERS model consists of a payload visualization system, air vehicle and data link simulation, and a configurable ISR ground station surrogate with tactical messaging capability. The six-degree-of-freedom (6-DOF) air vehicle and data link model simulates the dynamics of the ISR air vehicle and associated sensors controlled by operators at the surrogate or tactical ground station. Tactical unmanned aerial vehicle (TUAV) generates 3D graphics display of an unmanned aerial vehicle electro optical sensor output based on multiple data feeds from various simulations. The generated image is exported as video for distribution to other C<sup>4</sup>ISR systems.

### **National War Gaming System (NWARS)**

SPONSOR: National Reconnaissance Office (NRO)

NWARS simulates the collection, reporting, and dissemination of intelligence from national assets by providing realistic reporting on simulated ground truth. NWARS was developed in 1989 to allow the warfighter to exercise the use of NRO systems without expenditure of valuable, real world resources.

### **Simulation of the Location and Attack of Mobile Enemy Missiles (SLAMEM)**

SPONSOR: National Reconnaissance Office (NRO)

SLAMEM is a simulation designed to study C<sup>4</sup>ISR and attack effectiveness for locating and destroying mobile surface targets.

SLAMEM was designed for analysis. It can model attributes and interactions of the battle-space: Mobile and stationary targets, geographical features, sensors, and attack platforms. However, for MC02, SLAMEM was used to model a notional 2007 national architecture and simulated the entire Tasking, Collection, Processing, Exploitation, and Dissemination (TCPED) intelligence cycle. SLAMEM operators received tasking from the collection management cell and loaded it into SLAMEM where a NRO developed notional 2007 architecture collected on the MC02 federation targets.



Figure 277: Sailors unhook a battlespace planning autonomous underwater vehicle (BPAUV) during mine hunting and ocean mapping exercises conducted during the Navy's portion of Millennium Challenge 2002.

SLAMEM uses classification matrices jointly developed by NRO and NIMA to determine probability of detection and target identification. SLAMEM then generates target identification and geo location messages in USMTF format for dissemination to the end user.

### **Tactical Exploitation of National Capabilities (TENCAP)**

SPONSOR: Army Space Program Office

The TENCAP MUSE simulation system is part of a collaborative effort with the Army and the Air Force to create a virtual ISR simulation. The Department of Defense uses it for command and staff level training for joint services and stand-alone Army warfighting exercises. The TENCAP MUSE can operate as an embedded or stand-alone ISR system trainer communicating directly with the actual ISR ground system. The simulation can also emulate or feed other Service TES-like systems such as the Navy's TES-N and the AF ISR-M, modeling each of the Service's inherent ground system capabilities such as mission planning, dynamic re-tasking, imagery exploitation, and dissemination of reports and exploited imagery of the ISR platforms being exercised. The simulation allows exploration of different CONOPs to enhance the capabilities of ISR platforms available to a theater commander. The model uses the Service standard National Imagery and Mapping Agency (NIMA) products as the primary source data for terrain visualization. The TENCAP MUSE derives target entities from the constructive simulation and translates these entities in its libraries to create a virtual view of the battlefield. While primary emphasis is on ground targets, cooperation between the Services is creating a data library including aircraft, fixed structures, and naval vessels.

### **MC02 Technical Integration Database (MC02 TID):**

SPONSOR: USJFCOM, J9

The MC02 technical integration database (TID) is a distributed web-enabled administrative database developed by the Joint Forces Command (JFCOM) Joint Futures Lab (J9) Experimentation Engineering Department (EED) during MC02 to assist with configuration management (CM) and development of the MC02 C<sup>4</sup>I, XC<sup>4</sup>I and M&S federation. The unclassified version of the database is located at URL <http://mc02db.je.jfcom.mil>. A classified version of the database was located on the MC02 experimentation local area network (LAN) and could be accessed remotely by MC02 participants during the experiment. The core modules of the database are systems, sites, and points of contact. These modules link systems to sites to points of contact for each system and site used during MC02. Additional modules added to the database include:

- Trouble report module, which provides a collaborative environment for OPFOR testers, C<sup>4</sup>I, XC<sup>4</sup>I and M&S developers, and systems/simulation users to identify and document federation development issues/problems
- Change request module, which is used by the configuration control group to manage federation changes
- Platforms, munitions, and firing matrix modules, which are used for enumerations development
- Rules and workarounds module, which is used by the OPFOR testers to describe rules and workarounds for order of battle scenario play beyond the capabilities of the federation models

Personnel and personnel groups modules are used to capture joint manning document (JMD) personnel information to produce an electronic personnel locator and phone directories.

### **Virtual Surveillance Target and Attack Radar System JSTARS (VSTARS)**

SPONSOR: Air Force C2TIG

The VSTARS workstation "stands in" for the JSTARS aircraft on the virtual battlefield. It provides the same coverage area and radar model specifications as the real JStars aircraft. The VSTARS receives DIS protocol data units (PDUs) over a computer network, processes through the radar model, and creates MTI reports. The VSTARS can interface with other nodes through simulated SCDL, NATO-EX protocol, and a limited set of JTIDS messages over a local area network (LAN).

### **Airborne Laser Simulation (ABL)**

SPONSOR: ABL Program Office

The ABL Operator in the Loop (OTL) simulation ran from the Theater Air Command and Control Simulation Facility (TACCSF), Kirtland AFB, NM.

### **Automated Scriptor Simulator Exercise Trainer (ASSET)**

SPONSOR: National Reconnaissance Office (NRO)

ASSET allows an operator in the control group to script friendly and enemy force movement and then simulate signals intelligence (SIGINT) and imagery intelligence (IMINT) collection against those forces based upon the scenario script. The ASSET system enables users to graphically specify the activity of fictitious military forces and associate intelligence events with them. ASSET transforms intelligence events into messages of a standard protocol and provides chronologically based injections of messages directly into tactical data processors (TDPs) or through the tactical related applications (TRAP) data dissemination system (TDDS).

### **ATLOS**

SPONSOR: U.S. Naval Research Laboratory (NRL)

ATLOS simulation uses real-time ocean environment and acoustic propagation to model short & long-range performance of sonar's.

### **Airborne Warning and Control System (AWACS)**

SPONSOR: Theater Air Command and Control Simulation Facility (TACCSF)

The AWACS simulator models all surveillance and control functions of the AWACS. The AWACS MTC is a warfighter-in-the-loop, virtual simulator that offers a realistic operator interface, simulated TADIL-J data link implementation with distributed capability, and TADIL-J Theater Missile Defense (TMD) message receive capability. The AWACS fleet maintains simulator currency.

### **Battle Force Tactical Trainer (BFTT)**

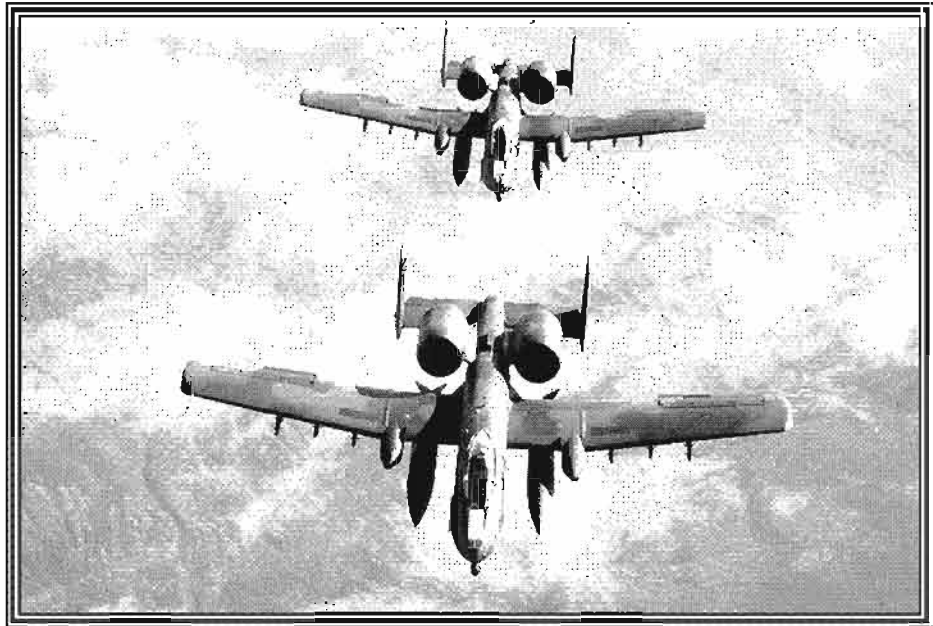
SPONSOR: PMS-430

The BFTT system provides simulation-based training support for Navy shipboard personnel. BFTT connects fleet training facilities ashore with ships stationed in various homeports, allowing them to train in a realistic tactical environment on actual shipboard combat systems. It uses distributed network connectivity to provide this simulated environment to ships

via the DIS. At each ship, the BFTT shipboard component, simulator/stimulator/on-board trainer (OBT), serves as an interface between this DIS simulated data and input signals that drive shipboard combat direction and fire control systems. Its functions include system control, problem geometry, tactical data simulation, signal generation, environmental simulation, and performance monitoring/fault localization. The BFTT operator processor console (BOPC) normally provides simulation management for the BFTT system. JSAF provided the primary simulation engine for BFTT during MC02/FBE-J.

The BFTT simulator/stimulator/OBT sends and receives a wide range of DIS PDU's. These include standard DIS PDU's such as entity state, fire, detonation, and collision. BFTT specific PDU's (such as BFTT Chaff, BFTT Jammer Data) and various experimental PDU's. Processing these PDU's, the shipboard system can generate simulated radar targets, clutter, and ECM displays for air and surface search radars. As the shipboard user operates controls in the actual equipment, the BFTT shipboard system models the resulting actions and updates the primary simulation of the action via the DIS protocol.

The FBE HLA federation was the primary simulation engine driving the simulator/stimulator OBT during MC02/FBE-J. Because this federation uses the HLA protocol, an HLA-DIS gateway translated between the two simulation protocols.



### **Cobra Ball**

SPONSOR:

U.S. Air Force

The Cobra Ball simulator combines sensor and reporting technologies, which can be applied to TMD. The advanced sensor is interfaced via DIS to the simulated environment. This sensor system provides sensor detection and tracking data via TIBS to the CAOC. The BIG SAFARI Program Office manages the COBRA BALL simulator.

Figure 278: The first production A-10A was delivered to Davis-Monthan Air Force Base, AZ., in October 1975. It was designed specially for the close air support mission and had the ability to combine large military loads, long loiter and wide combat radius, which proved to be vital assets to America and its allies during Operation Desert Storm. In the Gulf War, A-10s, with a mission capable rate of 95.7 percent, flew 8,100 sorties and launched 90 percent of the AGM-65 Maverick missiles.

### **CV-22**

SPONSOR: U.S. Special Operations Command (USSOCOM)

Bell-Textron, Fort Worth, TX, operates the CV-22 virtual simulator. It will fly high fidelity missions in support of special operations forces (SOF), primarily to assist the Blue Force



Tracking initiative. The CV-22 is DIS compliant, and is integrated into the larger MC02 M&S federation via a T-1 to TACCSF in Kirtland AFB, NM. The CV-22 Tactics Development simulator incorporates all unique, specified enhancements over the MV-22. Enhanced situational awareness displays allow the crew to penetrate a high threat environment at terrain following altitudes down to 100' AGL in adverse weather. Exercise national asset and simulated broadcast threat inputs and are fed via T-1 line to the aircrew for NRT planning, threat avoidance, and mission execution/re-tasking.

### **Carrier Weapon Handling System (CWHS) [WARCON]**

SPONSOR: U.S. Navy

CWHS models the build-up and transport of weapons within a Nimitz Class aircraft carrier. Like the FDO model, it is a discrete event simulation implemented in Pro-Model. It is responsible for publishing the state of all individual weapons and for handing over weapons to the FDO model.

### **Dynamic Communications Environment (DCE)**

SPONSOR: Air Force Information Warfare Center (AFIWC)

The DCE system models the communications environment for an experiment or exercise, and interfaces with IWEG to represent the effects of both lethal and non-lethal attacks on the communications infrastructure. DCE maintains a mapping between logical communications networks and the physical infrastructure. The DCE operator monitors "game truth" inputs, and maintains status of the physical communications infrastructure. The IWEG system evaluates the effects on the physical systems when physical attack or non-lethal engagements are detected. The IWEG issues appropriate commands to CATT and/or DICE to alter communications within their logical networks in response to such engagements.

### **Information Warfare Effects Generator (IWEG)**

SPONSOR: U.S. Air Force

The IWEG system models the communications environment for an experiment or exercise, and represents the effects of both lethal and non-lethal attacks on the communications infrastructure. IWEG uses a Dynamic Communications Environment (DCE) to maintain a mapping between logical communications networks and the physical infrastructure. IWEG interoperates with CATT, DICE, JQUAD, and RJMT via DIS protocols. The DCE operator monitors game truth inputs and maintains a status of the physical communications infrastructure. When physical attack or non-lethal engagements are detected, the IWEG system evaluates the effects on the physical systems and issues appropriate commands to CATT and/or DICE to alter communications within their logical networks. CATT and DICE react to the network change and RJMT can exploit and report these changes.

### **Flight Deck Operations (FDO) [WARCON]**

SPONSOR: U.S. Navy

FDO represents operations on a Nimitz class flight deck. The model is a discrete event simulation implemented using the commercial Pro Model modeling package. It is federated into the overall WARCON Joint Synthetic Battlespace using the DoD HLA. It receives weapons from and returns weapons to the CWHS. It also launches aircraft, which are created and flown in JSAF, and receives them back when they land.

### **Integrated Modeling Platform for Advanced Computational Technologies**

SPONSOR: Defense Threat Reduction Agency (DTRA)

IMPACT uses weather, terrain database and agent release inputs to model dispersion of the chemical/biological cloud across a geographic area overtime.

### **LOCAAS Engagement Analysis Program Simulation (LEAPS)**

SPONSOR: Naval Undersea Warfare Center, Division Newport RI

LEAPS is a real-time, distributed interactive simulation (DIS) system that simulates the operational concept of the LOCAAS weapon system delivered to the threat area via TACMS. LEAPS consist of three major simulation components: 1) mission planner, 2) launcher interface, and 3) vehicle simulation. The mission planner (MP) provides the operator with a fast and easy way to plan LOCAAS missions in response to planning requests received from LAWS. It contains maps, threat and tactical overlays, terrain analysis tools, point-and-click interfaces, and 3-D flight preview capability. Within the MP, an automated mission generator calculates the recommended dispense location, vehicle formation, search location and pattern, and threat attack priorities. The operator can modify and/or approve the suggested mission. MP also doubles as a target contact receiver capable of receiving and displaying LOCAAS target reports and images. The second component, the launcher interface (LI), stores the LOCAAS missions sent by the MP and automatically signals carrier missile launches to the third component, the vehicle simulation (VSIM), upon receipt of firing reports from LAWS. The VSIM provides real-time simulation and visualization of the carrier missiles and LOCAAS vehicles displayed on a virtual 3D battlefield. VSIM combines aerodynamics, communications, and visual modules to accurately simulate multiple vehicles operating simultaneously in all phases of flight, including carrier missile fly-out, LOCAAS dispense, stabilization, search, redirection, and endgame attack. Of the three LEAPS components, only the MP requires an operator.

### **Logistics Simulation (LOGSIM)**

SPONSOR: Air Force Agency for Modeling and Simulation (AFAMS)

LOGSIM is a computerized logistics model designed to place realistic constraints on the operations tempo of the air warfare simulation (AWSIM) during computer-assisted exercises (CAX). The United States Air Forces Europe (USAFE) Logistics Directorate conceived LOGSIM for use in JFACC and JTF training exercises at the Warrior Preparation Center (WPC) in Einsiedlerhof, Germany. LOGSIM was designed using actual Air Force historical data and responds to maintenance requirements during exercises, much like operational Air Force wings, repairing aircraft as critical resources allow. In AWSIM, aircraft break or incur damage and, using LOGSIM, require maintenance and spare parts as in actual flying operations. Mission planners take into account losses and delays due to maintenance. Logistics personnel monitor aircraft and equipment status, including spare part stocks, while providing status reports to their leadership. LOGSIM continually updates a comprehensive set of reports that detail the current maintenance status of AWSIM aircraft and equipment in LOGSIM. LOGSIM can operate in a stand-alone mode allowing use in exercises where AWSIM is not employed. In this mode, LOGSIM retains its original capabilities, but does not actively constrain air operations in an air model. LOGSIM functions primarily as a report generator, but also continues to offer those processes such as aircraft problem identification and equipment failure and repair, which are unique to LOGSIM.

### **Multi-LINK System Test and Training Tool (MLST3)**

SPONSOR: Naval Warfare Development Command (NWDC)

Link System Test and Training Tool (MLST3). The output of the MLST3 provides MIL-STD LINK-11A/B (TADIL B) and LINK-16 (TADIL J) digital outputs. The TADIL input/output is suitable for input/output to a Class II joint tactical information distribution system (JTIDS) terminal. The ability to inject simulated representations based on the reporting of live assets over a LINK 16 network is also possible. Link data can be transmitted from the simulation to C<sup>4</sup>I systems over SIPRNET or via serial connection. The link picture will be an aggregated air and surface picture based on the location of both real and simulated radar assets. All link tracks will display a common joint unit (JU) as the originating C2 unit. As discussed, Link data will be produced and injected into the exercise GCCS-M. Live link information will be used by C3F ships, supporting live flight operations. The simulated Link-16 and live link 16 will be interfaced, so that the experiment audience will see a merged picture consisting of both real and constructive tracks. The Link 16 air and surface picture will be produced and forwarded in an aggregated state to the GCCS-M, representing the forwarding of a Link 16 air and surface picture from constructively simulated Link units. The operational or experimental staff assigned JU identification numbers to all units. Additionally, all constructively generated simulation units were marked with an easily identifiable set of IFF codes (provided via the experiment ATO). C3F provided the codes so that the simulated units were easily identified on GCCS-M. Specific track block numbers were assigned to the simulated Jus IAW the OPTASK LINK.

### **Ocean Atmosphere Space Environmental Services (OASES)**

SPONSOR: Defense Modeling and Simulation Office (DMSO)

OASES distributes 4D meteorological state data, to include clouds, wind, air and ocean temperatures, sea state, salinity, and currents to the HLA federation. OASES is an HLA federate that consists of a suite of applications for creating and updating run-time objects that encapsulate the state of the ocean, atmosphere and space environments. Five separate applications comprise the OASES system.

### **Environmental Data Ingestor (EDI)**

The EDI imports environment forecast and now-cast data provided in either the World Meteorological Organization (WMO) gridded binary (GRIB) format or the synthetic environment data representation and interchange specification (SEDRIS) transmittal format, as generated by a numerical atmosphere, ocean or space model. The EDI converts the input model data to the common geodetic coordinate system used internally by OASES, standardizes the units of the data, and stores the data in a run-time-optimized format that is used by all of the OASES applications.

### **Environmental Data Transformer (EDT)**

The EDT uses a configurable and extensible set of transformation algorithms to augment an existing OASES database with the derived environmental parameters required by client simulations, but not provided directly by a numerical ocean, atmosphere or space model. The EDT supports chaining of transformation algorithms such that the outputs of one transformation may be the inputs to another transformation within the same program execution.

**Environmental Tailoring System (ETS)**

The ETS is a GUI-based application for editing the contents of an OASES database. The ETS provides two editing algorithms: 1) replacement at a point with Gaussian spatial and temporal blending, and 2) the pressure field modification (PFM) algorithm for editing atmospheric environments while preserving correlation between temperature, pressure, wind and relative humidity.

**Personal Computer - Shallow Water Acoustic Toolkit (PC-SWAT)**

SPONSOR: Naval Warfare Development Command (NWDC)

PC-SWAT uses real-time ocean environment and acoustic propagation to model short and long-range performance of sonar.

**Portable Space Model Enhanced/Navigation (PSM+/NAV)**

SPONSOR: U.S. Air Force

PSM+/NAV links through point-to-point interface with the JCAS portion JQUAD. PSM+/NAV will inject simulated GPS data into the impact location, if GPS-guided munitions are launched in AWSIM. PSM+/NAV constellation status, exercise weather, space environment, and jamming events. PSM+/NAV data is based on the satellite-based navigation accuracy performance model (SNAPM) GPS model augmented with total atmosphere-ocean-space services (TAOS) weather and space environment information.

**Rivet Joint Mission Trainer (RJMT)**

SPONSOR: U.S. Air Force

RJMT will provide a high fidelity ground trainer for RC-135 RIVET JOINT reconnaissance compartment personnel, using aircraft hardware and software. The trainer will be equipped with signal generators to create and display a full range of radar and communications signals to the reconnaissance crew. A complex, synchronized signal environment is presented to the crew, permitting coordination, and exploitation of these signals. The trainer is equipped with Link-11, Link-16, and TIBS data links to train aircrew to effectively interact with other battle management assets. The trainer is distributed interactive simulation-capable, permitting RIVET JOINT participation in large-scale exercises such as MC02.

**Simulation C<sup>4</sup>I Interchange Module for Plans, Logistics, & Exercises (SIMPLE)**

SPONSOR: Space and Missile Defense Battle lab

The MC02 DBST architecture uses the sim-C<sup>4</sup>I interchange module for plans, logistics and exercises (SIMPLE) to provide database synchronization between the tactical digital systems and the DBST federate simulations. SIMPLE provides the unit level logistics roll-up and provides the JVMF logistics message threads to CSSCS and FBCB2. SIMPLE also provides K05.1 position reports for Blue situational awareness to the MCS and FBCB2. The SIMPLE operator can manually inject other JVMF messages.

**Unattended MASINT Sensor (UMS)**

SPONSOR: Air Force Technical Application Center (AFTAC)

Unattended ground sensors are simulated by UMS. The DIS compliant, UMS simulation was used to support time-critical targeting. UMS output was distributed onto the TIBS network

via STU III dial-up to the TIU/PC located at the AFC2TIG, Hurlburt Field, FL. The UMS model was located at the AFC2TIG.

### **Virtual Submarine (VSSGN)**

SPONSOR: Naval Undersea Warfare Center, Newport, RI

The virtual SSGN functioned as a sensor, mensuration, and fires node in support of the joint digital fires network. It was used to explore and support submarine provided preplanned and time critical join fires during rapid decisive operations. The Warfare System Presentation Facility (WSPF), located at the Naval Undersea Warfare Center, Newport, Rhode Island developed vSSGN. A modernized trident control room (CR), navigation center (NC), and missile control center (MCC) mock up was created there. It was equipped with a range of tactical system capabilities, and manned by a military crew of approximately 10 submarine-qualified officers and enlisted men.

The vSSGN crew has the following tactical information system capabilities: LAWS, GCCS-M, GISRC, RPM, PC-MDS, TTWCS, IKA, electronic officer of the deck log, Virginia Onboard Team Trainer (OBTT).

The vSSGN used the interfaces inherent in the provided systems. One notable exception was the unique Tomahawk route message generated by the vSSGN, which includes both over-water and over-land waypoints. The uniqueness is in the fact that the vSSGN is providing it, and how it is processed in LAWS and in the JSAF simulation and not in the message format itself. The vSSGN entity simulation was linked to the JSAF simulation through the NWDC HLA/DIS gateway and connected to the FBE Architecture through an encrypted SDREN network link.

### **Weapons Analysis Lethality Toolset (WALTS)**

SPONSOR: Defense Threat Reduction Agency (DTRA)

WALTS is a HLA federate that models damage of weapons impacts based on government-defined munitions models using physics-based calculations. It consists of two components: the virtual interactive target (VIT) and the attribute server. The virtual interactive target, or WALTS physics engine, provides a physics-based simulation of weapons effects, by calculating structural damage to targets and weapons of mass destruction (WMD) expulsion. These effects are passed to the CUSP simulation for downwind propagation. The attribute server provides the HLA interface to the VIT module. The module receives weapons impact data from weapon fly-out simulations (i.e. JSAF), and publishes WALTS results to the federation. WALTS-VIT runs on a Silicon Graphics Octane computer with a 300 MHz IP30 processor and at least 640 MB of RAM. The WALTS attribute server runs on an Intelx86 platform with 800mhz processor, with 512MB memory and an OpenGL accelerator graphic card w/ 32MB on board memory. During FBE-J, WALTS interacted primarily with OASES, CUSP, and JSAF. In a typical scenario, OASES published weather information, while JSAF published entity information. CUSP subscribes to weather information and any entity information with regards to sensor objects. JSAF also publishes munitions detonation information, which WALTS subscribes to with regards to targets that it is modeling. WALTS then publishes agent release information. CUSP subscribes to this agent release information, and upon receiving an agent release interaction, begins to model the dispersion of the agent. When a consumer exists, CUSP will provide updates for sensor models, 2D, and 3D visualization.

## **Tools & Stand-Alone Models:**

### **C<sup>4</sup>I Gateway (C<sup>4</sup>IGW)**

SPONSOR: Naval Warfare Development Command (NWDC)

The C<sup>4</sup>I Gateway acts as a communication gateway between JSAF and multiple C<sup>4</sup>I systems via USMTF and OTH Gold message formats. It provides two-way communication through direct TCP/IP socket connections and via e-mail, allowing JSAF to stimulate real C<sup>4</sup>I systems such as LAWS and GCCS-M, as well as allowing these systems in turn to stimulate JSAF entities to perform actions directed by the C<sup>4</sup>I systems. The C<sup>4</sup>I gateway is a JSAF-based application that interfaces JSAF with real-world C<sup>4</sup>I systems using USMTF and OTH Gold formatted messages. It simulates the function of reporting units entering reports into the GCCS-M C<sup>4</sup>I system. It establishes a two-way interface with the LAWS weapon-target pairing tool, simulates reporting unit functions for injection of mine detection and neutralization MCMREP reports into MEDAL, and simulates reporting unit functions for dissemination of TACELINT reports. To interface with these systems, C<sup>4</sup>IGW produces USMTF and OTH Gold format messages, such as extended contact reports (XCTC), firing reports, and TACELINT reports. The C<sup>4</sup>I Gateway communicates with JSAF via a TCP/IP connection to a JSAF Proxy machine.

The JSAF proxy machine contains "headquarters" emulating entities, which act as a communications conduit for C<sup>4</sup>I messaging. Other Blue JSAF entities communicate over simulated radio communications with the headquarters entities within the JSAF simulation. The JSAF proxy then forwards these radio messages to the C<sup>4</sup>I gateway for injection into real-world C<sup>4</sup>I systems. Asset tasking into the C<sup>4</sup>I gateway follows a similar path where the C<sup>4</sup>I gateway injects the message into the JSAF Proxy and the simulated headquarters unit transmits the message to the intended recipient over simulated radio communications. The C<sup>4</sup>I gateway communicates with GCCS-M via TCP/IP, and with LAWS via SMTP. Each Blue surface and subsurface entity issues a XCTC report reflecting that unit's position. XCTC reports update friendly/Blue surface, subsurface, and tactical Tomahawk unit positions in GCCS-M. The TACELINT reports are generated based on simulated flight paths and sensors of reconnaissance aircraft. TACELINT reports are injected into the tactical data dissemination system (TDDS) broadcast and tactical information broadcast service (TIBS) or sent directly to GCCS-M via socket connections.

### **Chicken Little-Global Positioning System (CL-GPS)**

SPONSOR: U.S. Air Force

CL-GPS is a PC used to convert GPS position data from Nellis range vehicles into DIS entity state PDUs that can be used by VSTARS and AFSERS UAV simulations to detect vehicles on the Nellis range complex.

### **Compact Terrain Database (CTDB)**

SPONSOR: USJFCOM J9

In simulation federations, a number of players such as JSAF use CTDB data that is typically a polygonal terrain surface and is constructed in a real world (curved earth) spatial reference frame (SRF). In MC02 a critical federation member is JCATS, which typically uses a surface derived from bilinear interpolation of gridded elevation data in augmented UTM space. In order to achieve high levels of correlation, a series of developments in both the terrain database production process and in the simulation environment were required. A set of data products integrating the requirements for JCATS and CTDB correlation were produced, a

regularly triangulated terrain surface for the CTDB and a series of elevation posts in the same SRF for JCATS, and near perfect terrain correlation was achieved. Special methodologies were developed to ensure that the representation of features in both data sets were as consistent as possible, further enhancing interoperability. The special terrain was integrated with the larger CTDB for the entire MC02 play box. A seamless database with its special high correlation insert became the foundational data product for the federation. A series of surrogate DTED data was produced from the combined terrain surface. This process ensured that terrain representation was consistent across participants, and that users outside of JCATS and JSAF remain highly correlated.

### **Digital Collection, Analysis, and Review System (DCARS)**

SPONSOR: U.S. Army Electronic Proving Ground

DCARS is a collection, fusion, and delivery system of data coming from simulations, C<sup>4</sup>I systems, and live systems. Its purpose is to provide near real-time availability of data from target systems and analysis tools to compare and/or analyze them. Capabilities include normalizing data, graphical and textual displays, and database ready files. DCARS roles include exercise/event STARTEX condition confirmation, in process reviews, incident analysis, and post event analysis.

### **High Level Architecture / Distributed Interactive Simulation Gateway**

SPONSOR: Defense Modeling and Simulation Office (DMSO)

HLA is a standard framework that supports simulations composed of different simulation components. Traditional simulation models often lack two desirable properties, reusability, and interoperability. The HLA provides a common high level simulation architecture to facilitate the interoperability of all types of models and simulations among themselves and with C<sup>4</sup>I systems. The main purpose of HLA is to provide interoperability between systems for the reuse of existing simulations. HLA is composed of three parts: HLA rules, an HLA interface, and the object model template. DIS gateway - A federate that provides an interface to DIS simulation components, especially interfaces to C<sup>4</sup>I systems such as MLST3.

### **High Level Architecture Results**

SPONSOR: USJFCOM, J9

HLA is a federation data collection, playback, and analysis system. Further, it is a comprehensive data management system used to collect, store and understand federation data. It provides all the functionality included in the standard HLA data collection tool (DCT), plus interfaces to additional database vendors and playback support. HLA provides a very comprehensive playback capability for the federation. It can create playback tracks that contain only the data wanted to support integration testing, analysis, and demonstrations. HLA easily switches between tracks that cover the periods, data types, and data with specific values needed to support the playback requirements. It is also designed to offer federation analysis during execution, and provides for a complete analysis capability.

### **Joint Medical Semi Automated Forces (JMEDSAF)**

SPONSOR: Space and Naval Warfare Systems Command (SPAWAR) / USJFCOM, J9

The joint medical operations-telemedicine (JMO-T) ACTD has enhanced the joint semi automated forces (JSAF) simulation environment to include medical capabilities for a medical

mission planning and rehearsal capability. It is also referred to as JMEDSAF. A comprehensive representation of Army, Air Force, Marine, and Navy medical treatment behaviors, it provides medical mission planning and rehearsal capabilities. It works at the component/Joint Task Force/regional commander-level. Specific capabilities developed include:

Medical entities: hospital ships, a variety of medical treatment facilities, host nation facilities, refugee/IDP camps, ambulances, helicopters, and individuals capable of being wounded or sick.

Medical behaviors: combat injuries based on weapon/casualty type pairings and defined medical patient codes, disease and non-battle injuries determined on percentage of population at risk, medical facilities with staff, equipment, holding capacities, and evacuation assets. Casualty evacuation based on patient condition, time to treat, and nearest facility with the appropriate assets.

Medical C2 reporting: a medical C2 message interface to the medical command and control systems –naval medical watchboard (NMW) and medical disease surveillance system (MDSS). These systems use the simulation data to provide Annex Q reports (medical reports section of an OP Order), disease trend analysis, and detailed patient information.

JMEDSAF has been previously demonstrated at Kernel Blitz '99 in conjunction with the enhanced littoral battlefield (ELB) ACTD (April 1999), in the Pacific Warrior Exercise CPX (November 1999), in Cobra Gold 2000 (May 2000), Cobra Gold 2001 (May 2001), and Cobra Gold 2002 (May 2002).

### **Multi-Host Automation Remote Control & Instrumentation (MARCI)**

SPONSOR: USJFCOM J9

MARCI is a highly automated system that uses a graphical user interface tool to manage distributed simulation systems and resources, and enhance technical support capabilities. The application allows non-technical operators to run and execute distributed simulations systems with minimal technical support. MARCI starts and stops multiple applications automatically, queries federates, and collects and records event data.

Key features of MARCI include the ability to start multiple applications on multiple computers at multiple sites across the country from a single location, and to monitor the status of each of those applications and computers. MARCI communicates with each machine across a LAN or WAN, and is able to monitor network connectivity. Starting the software from a centralized location guarantees the correct software and parameters are being used. MARCI provides the ability to pause, save, resume, and restore the entire federation.

### **Run Time Infrastructure (RTI)**

SPONSOR: Defense Modeling and Simulation Office (DMSO)

RTI 1.3NG is a full implementation of RTI services based on competitive industry designs and development. The Phase I RTI 1.3NG software design contract began immediately following the HLA Baseline Definition in August 1996, and culminated in the award of a Phase II RTI 1.3NG software development contract to SAIC in September 1997. STRICOM has been the procurement agent for the design and development effort, and a technical advisory team, which includes representatives from various DoD user organizations, is supporting this activity. RTI 1.3NG supports HLA Specification 1.3.



**Validation and Verification (V&V)**

The Johns Hopkins University Applied Physics Laboratory conducted V&V of the MC02 Joint Experimentation Federation in strict compliance with Department of Defense Instruction 5000.61 (final draft). The final V&V report was completed 19 July 2002 and is available at the following website via this hyperlink. (Hyperlink to V&V report). The Director for Joint Experimentation, United States Joint Forces Command accredited the Joint Experimentation Federation for use in MC02 on 24 July 2002. (Hyperlink to Accreditation letter).

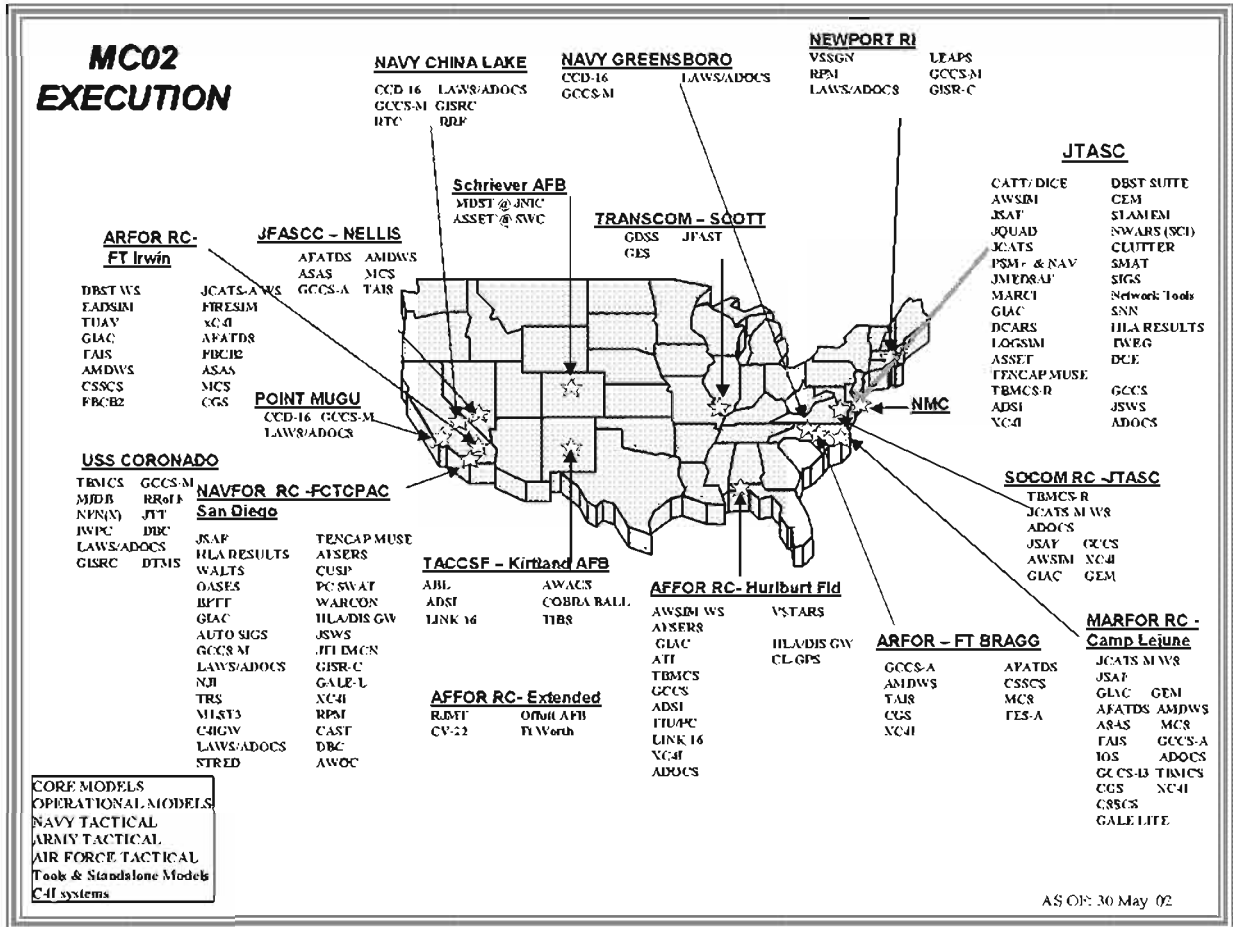


Figure 279: MC02 Simulation Sites

(This Page Blank)

## Annex I — Sponsored Joint Initiatives

### INTRODUCTION

The MC02 joint initiatives process was established to provide a systematic, objective review and evaluation of proposed joint initiatives submitted by various governmental and Service sponsors. The process provided a multi-level review supplemented by interagency and Service representation. The initiative approval process objectively compared each proposed initiative to the overall experiment objectives and then measured its degree of applicability to the joint environment. Initiatives that scored well on both counts were incorporated into MC02. The joint initiatives process provided a two-way communication path between the individual initiative sponsors and the MC02 experiment planning and integration teams.

An initiative proposed for incorporation in the experiment weathered three progressively more difficult examinations. In addition, at each level the endorsing signature came from higher in the experiment command chain. Phase I was the initial review conducted by subject matter experts from the functional and experimentation communities. They screened submissions against Rapid Decisive Operations (RDO) objectives and MC02 joint environment objectives. As part of Phase II, a “Council of Colonels” was formed to review the recommendation of the operational and technical panels from Phase I. The colonels forwarded their findings and recommendations to the third stage review (Phase III) – a general officer/flag officer panel.

Many Service proposed initiatives were not approved for joint integration due to their singular, Service-oriented nature.

Joint Experimentation Initiatives Statistics:

- 144 total initiatives proposed by 24 separate organizations (combatant commanders/Services/agencies) were reviewed
- 25 separate initiatives were recommended for integration into MC02, 20 of which were incorporated as joint experimentation initiatives and 5 of which remained at the Service level
- 79 initiatives were not approved or were withdrawn after initial approval due to failure to meet basic eligibility requirements (did not match objectives, funding, or initiative readiness for experimentation)

---

The 20 joint experimentation initiatives included in MC02:

- ♣ Command and Control for Space, Information Operations Forces (C2 Space, IO Forces)
- ♣ Global C2 System - Integrated Intelligence and Imagery (GCCS-I3)
- ♣ Global Strike Task Force (GSTF)
- ♣ Collaboration Tool Suite (InfoWorkSpace 2.5 (IWS 2.5))
- ♣ Joint Automated Single Guard Solution (JASGS)
- ♣ Joint Automated Target Folders (JATF)
- ♣ Joint Enroute Mission Planning and Rehearsal System-Near Term (JEMPRS-NT)
- ♣ Joint Fires Initiative (JFI) Automated Deep Operations Coordination System (ADOCS)
- ♣ Joint ISR Management Tools (JISR Tools)
- ♣ Joint Public Affairs Ops Group (JPAOG)
- ♣ JSOTF Reach-back/Special Operations Mission Planning Environment (SOMPE)
- ♣ Logistics Tools Suite (LTS)

- ♣ Maneuver Control System-Tactical Combat Operations (MCS-TCO)
  - ♣ National Imagery and Mapping Agency (NIMA) Initiative
  - ♣ Network Security Management Correlation & Display (NSM C&D)
  - ♣ Theater Medical Integration Planning-Joint (TMIP-J)
  - ♣ Unmanned Sensor Support to Special Reconnaissance (US support to SR)
  - ♣ ONA Tool Suite
  - ♣ Automatic Network Information Flow (ANIF)
  - ♣ Joint Special Technology Operations (STO)
- 

## **C2 of Space, IO Forces**

### Description

In January 2001, US Space Command (USSPACECOM) and JFCOM co-sponsored a seminar on how to transform Space/IO C2 into RDO. Space/IO C2 involves experimenting with a space cell embedded in the Joint Force Headquarters with reach-back to USSPACECOM for planning, coordinating, and executing space control and space force enhancement. Additionally, USSPACECOM will demonstrate its C2 for Computer Network Operations (CNO), defined as Computer Network Defense and Computer Network Attack. Unified Command Plan 99 assigned these two missions to USSPACECOM on 1 Oct 99 and 1 Oct 00, respectively, and the Command has just completed development of a C2 structure to be used among the regional combatant commanders, Services and agencies.

The USSPACECOM MC02 experimental hypothesis can be stated as follows:

If a space/IO C2 element is embedded in the JTF command structure with reach-back capabilities to USSPACECOM for planning, coordinating and executing, then the JTF commander will experience unity of effects, battlespace awareness, lethal and non-lethal overmatch, knowledge superiority and force protection across the joint force through coordinated, synchronized space/IO effort.

The value added for the joint force includes, but is not limited to:

- Increases accountability to joint force commander
- Increases representation of space/IO effects at JCB
- Injects space/IO weapons and enablers into EBO
- Synchronizes space/IO relationships across the joint force
- Refines resident space/IO relationships across the joint force
- Integrates theater campaign plan with global space/IO campaign plan

### Overall Assessment Results

The MC02 experiment demonstrated the value added by the space and information operations element (SIOE), both on the combatant commander's and on the CJTF staffs based upon feedback from surveys received and senior mentor input. Space planners and operators within the JTF staff were readily assessable, and Space play within the experiment was more visible than it was in Unified Vision 2001. Players within the SIOE said that the SIOE chief, at the combatant commander level, and the IO supervisor, at the JTF level, ensured the integration of all elements of IO, and they integrated component planners into this process. Although players said that this integration took place, the SJFHQ and ISG groups said that all elements of IO did not really integrate despite the fact that an SIOE existed. Because the JTF commander

recognized the importance of IO as a force multiplier, and moved the IO supervisor out of the Information Superiority group into a principle staff position, IO improved. Additionally, prior planning by USSPACECOM ensured viable representation on the JCB which provided the opportunity to elevate the consideration of space/CNO/IO effects, mostly due to the experiment, to the same level as kinetic options offered by air, land and sea components.

### Methodology

Users evaluated C2 of space/IO during MC02. Users were questioned regarding the integration of space and information operations (USSPACECOM inserted an 18-person SIOE into the JTF). In addition, USSPACECOM inputs were considered to better evaluate the utility of C2 for space/IO. The combined analysis indicates the potential exists for providing significant key enabler support to the SJFHQ.

Key experimentation issues were as listed:

- Space/IO relationships within JTF HQ
- Space/IO relationships with component commanders
- Space/IO representation at Joint Coordination Board (replaces JTCCB)
- Synchronization of space/IO with other fires
- Space/IO representation comparable to air/sea/land
- Reach-back required for space/IO issues

USSPACECOM objectives for this experiment were to validate the SIOE concept in support of RDO and EBO in a collaborative environment, refine a way ahead for Pinnacle Pathway, expand USSPACECOM visibility within the joint experimentation process, provide the supported commander a focal point for space/IO, and centralize C2 for disparate USSPACECOM elements. Additionally, it was important that USSPACECOM interests were represented at the JCB and that space, and IO were synchronized with traditional fires. USSPACECOM wanted commanders to be presented space/IO effects equivalent to that of air, land, and sea. MC02 explored a variation of the SIOE concept. Specialized expertise was provided for synchronization at the JTF and JFACC. Space/IO was focused on EBO to accomplish RDO and JCB input was provided to synchronize effects.

### Observations

The actual experiment demonstrated the value added by the SIOE, both on the combatant commander's staff and on the CJTF staff. Space planners and operators within the JTF staff were readily assessable, and Space play within the experiment was more visible than it was in Unified Vision 2001. The SIOE chief, at the combatant commander level, and the IO supervisor, at the JTF level, ensured the integration of STO, and IO, (PSYOPS, electronic warfare, physical destruction, information assurance, and public affairs were the key IO focus points during the experiment), and they integrated component planners into this process as well (See Figure 280).

The JTF commander used IO as one his main tools for EBO, and improved IO as a result. Additionally, prior planning by USSPACECOM ensured viable representation on the Joint Coordination Board which provided the opportunity to elevate the consideration of space/IO effects to the same level as kinetic options offered by air, land and sea components; this issue fell short of the mark. MC02 provided a good step-off point for USSPACECOM forces, planning for participation in future experiments.

The way ahead suggests a restructuring of SIOE support to the JTF based upon lessons learned during MC02. Senior mentors and senior experiment officials agreed that IO was a combat multiplier that warrants exploration to Joint Information Operations Task Force (JIOTF) status. Future planning for experiments must include more robust IO play at all levels, up to and including interagency. Although, despite the fact that experiment planners prior to MC02 did not consider IO a focal point, IO became important early due to CJTF emphasis.

Combatant commander level IO play was not developed. Early on in MC02 planning, JFCOM made the decision to limit IO play. Planners made this a funding decision, but the experiment demonstrated that IO is an integral and growing facet of current warfighting capability. This resulted in a lack of fidelity in the IO play at the combatant commander level. The background to answer the JTF's IO RFI just wasn't available and this resulted in ad hoc or inadequate answers. The SJFHQ and ISG groups noted that IO was broken in MC02.

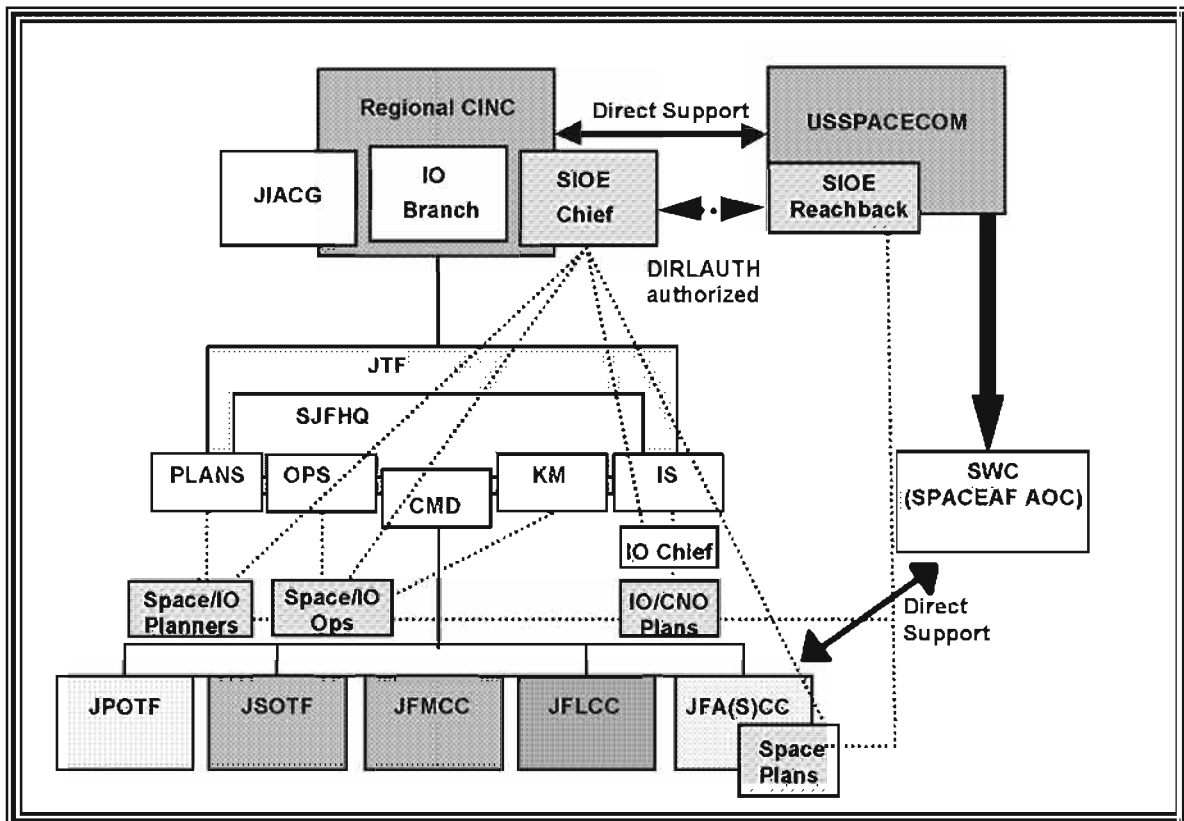


Figure 280: Integration of Component planners

Despite this lack of IO emphasis, Figure 281 shows that 60 percent of respondents realized the synchronization of IO effects that the SIOE provided. Future experimentation must refine how IO expertise and support is presented at the JTF and combatant commander levels.

Improving interfaces among the JTF, SIOE, and space/IO reach-back element to make it more useful to the JTF

Comments provided pointed towards enhanced synchronization between ISR, IW, and space-based systems within the SCIF and with combat operations. The embedded USSPACECOM personnel brought relevant and needed expertise to the JTF staff, which allowed

increased consideration of space/IO effects. However, lack of experimental emphasis on space/IO decreased the ability to achieve increased synchronization. For example, all space play (limited) was performed at the JFACC level. This limited visibility among the other components of the JTF and the JTF staff. This begs the question of the role of space planners at the JTF level. If the JFACC has responsibility for space operations as well as air operations, then it is not obvious that space planners embedded at the JTF level are necessary.

One result of the JFACC's assumption of all space activities (JFASCC) was decreased visibility of space at the JTF level. Despite continuous efforts, there was no space status presentation within the JTF commander's update or the JCB. On the other hand, situational

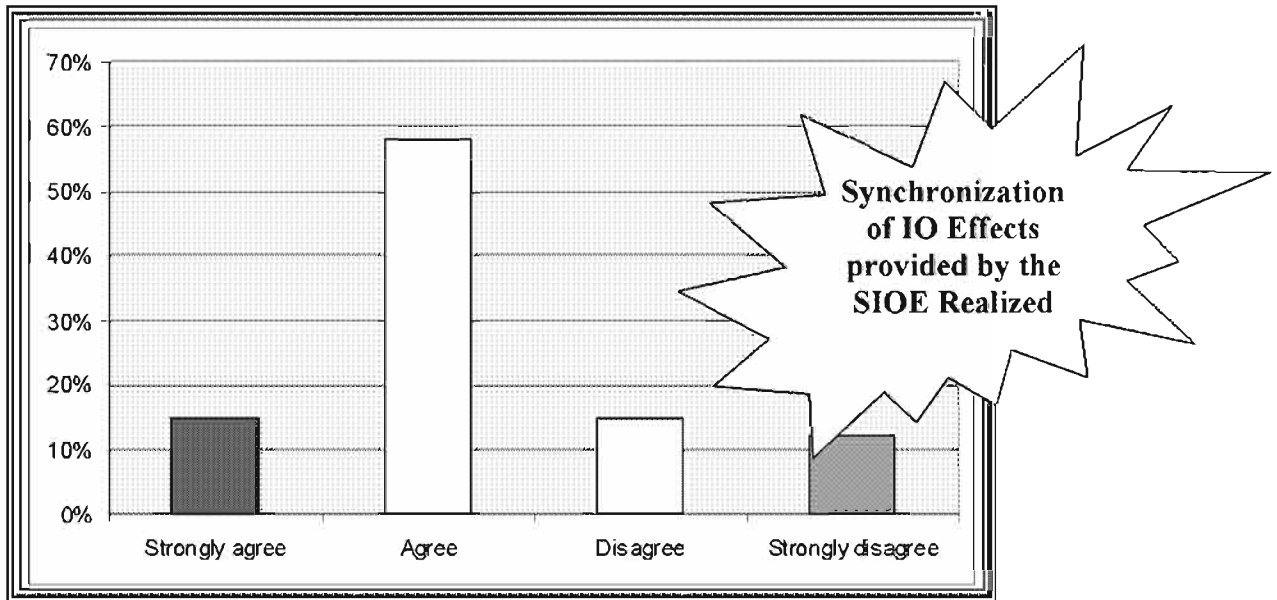


Figure 281: Space & IO Personnel Increased the Consideration of Space Assets at the JTF Level & Below

awareness for the CJTF on STO initiatives was excellent. The CJTF was briefed on a near daily basis.

For IO, significant synchronization was achieved collaboratively because the IO cell held daily online sessions with all elements of IO at the combatant commander, JTF and component levels. This collaboration greatly increased awareness of plans and capabilities, but there was no accepted means of command and control of these capabilities. While the IO supervisor evolved *de facto* to become a principal member of the JTF staff, and the CJTF gave a number of missions to the IO supervisor, he had no authority for command and control of the forces to accomplish these missions. For example, PSYOPS – a component of IO, was organized separately as a component commander, and reported JPOTF actions to the CJTF and staff, somewhat independently of the IO supervisor (synchronization between JPOTF and IO supervisor increased as experiment progressed).

MC02 highlighted the need for an effective organizational construct for IO. Leveraging full spectrum IO to benefit the JTF may require a component commander (JIOTF) who has responsibility for IO. In MC02, the IO Supervisor had no authority or resources to accomplish his mission. The concept of a JIOTF should be tested in both limited objective experiments (LOEs), and large-scale joint experiments.

CNO was not actively played in the game. CNO planners embedded in the JTF staff were able to propose and begin planning potential CNO actions, but there was no ability to follow through on the planning. There was no ability in the experiment to simulate the effects of a CNO action, nor was there an ability to effectively simulate the coordination and approval process for CNA.

When developing Effects-Based Operations within the JTF was the JTF commander and his staff presented with valid space and planning factors for increased unity of effects and battle space awareness?

The consensus here was “yes,” space planners were readily accessible and well informed. Most of the staff did not understand what Space brought to the fight. From an IO standpoint, the answer was a resounding “yes.” The JTF IO supervisor provided leadership and direction in the integration of all aspects of IO.

The SIOE-provided IO supervisor gave the JTF commander a focal point for IO. However, the organizational construct of having IO embedded under the IS Group suppressed this representation until the CJTF effectively lifted the IO supervisor up to the JTF staff level. In addition, the construct used a JPOTF component commander, which further diminished synchronization. As space was much embedded under the JFACC, the JFACC provided the focus for space, rather than the SIOE.

The SIOE director, located at the combatant commander level, provided a focal point for both the combatant commander and the JTF commander for all STO activities.

Effectiveness of the space and IO personnel embedded within the JTF HQ staff in increasing the planning and execution of RDO

A majority of the comments provided indicated the space and information operations personnel were very effective. Each cell lead stated that SIOE personnel were invaluable in providing needed planning and execution input. They were accordant with the JFACC.

Embedding the expertise of the SIOE personnel into the JTF was essential in the conduct of RDO/EBO in the IO arena (including STO actions). The expertise provided by SIOE personnel to the JTF staff was essential. Whether deployment of this element is the correct long term solution or not, in the near term it is the only way to get the subject matter expertise embedded in the JTF staff. The necessity for up front planning for effective IO application leads one to the conclusion that significant IO planning capability must be embedded in the SJFHQ staff, either by deploying the support, or by assigning the people directly.

Placement of the JTF information operations supervisor and information operations personnel under the IS group

Membership on the JCB provided an excellent opportunity to synchronize space/CNO/IO with maneuver and fires. The JTF IO supervisor was effective in representing IO effects at the JCB. However, as the staff worked to minimize time spent in JCB sessions, the level of IO visibility was again reduced. In addition, as the campaign progressed, the IO supervisor was increasingly co-opted to be the principal public affairs spokesperson.



The SIOE director, as the combatant commander's principal space/IO coordinator, supported the CJTF in the STO level equivalent to the JCB. Limitations of STO did not allow effective collaboration of STO with the JCB; in an integrated operation, where only those cleared for STO activities have the full picture and STO billets were limited, integration of STO and non-STO activities was difficult.

It is not clear that IO effects were integrated in the targeting process; the need for horizontal integration between IO/CNO and other fires is critical. (It appears that this integration took place to some extent within the JFACC, but not necessarily with the other components).

Finally, the commander-centric nature of this JTF diminished the role of staff, and their voice in the JCB. This organizational construct provides further rationale for having IO represented by a component or task force commander. JPOTF as a component command, although representing only a small part of the IO spectrum, received significant attention at both the JCB and the daily commander's update, as well as the closed commander's huddle sessions (to which staff were not invited). If IO is a combat multiplier, it must be represented at the combat commanders' table in a commander centric operation. In addition, membership on the JCB provided an excellent opportunity to synchronize space/IO with maneuvers and fires.

#### Recommendations

The way ahead suggests a restructuring of SIOE support to the JTF. Senior mentors and senior experiment officials agreed that IO is a combat multiplier that warrants exploration to JIOTF status. Future experiment planning must consider more robust information operations play at all levels. Internally, USSPACECOM / USSTRATCOM should begin preparation at the HQ's level and the component level for the next series of experiments.

### **Global C2 System Integrated Imagery and Intelligence (GCCS-I3)**

#### Description

GCCS-I3, sponsored by the joint experimentation/C<sup>4</sup>I team, is a tightly integrated set of intelligence applications and tools intended to provide integrated intelligence support to the GCCS COP. It provides surveillance and reconnaissance information and access to global intelligence sources as well as data on the precise location of dispersed friendly forces. The GCCS-I3 applications build the intelligence portion of the COP by integrating imagery with intelligence reference data (modernized integrated database (MIDB), characteristics and performance (C&P)) and with the tactical track picture. GCCS-I3 provides C2 users the capability to receive process, display, and maintain current geo-locational information on threat and neutral land, sea, and air forces integrated with intelligence, imagery, and environmental data in multi-media formats.

GCCS-I3 gives users direct access to MIDB data, weapon systems' characteristic and performance (C&P) information, and national and tactical imagery. GCCS-I3 also allows users to integrate locally collected tactical imagery and other intelligence with national and theater-produced intelligence. Intelligence information can be plotted directly on operational/tactical displays in conjunction with continuously updating operational and operational-intelligence information, thereby providing operators, planners, and intelligence analysts vastly improved knowledge of the battlespace. Figure 282 depicts how GCCS-I3, as part of the MIDB replication architecture, supports the component commands in disseminating relevant M&S intel information.

Overall Assessment Results

Initial surveys and interviews conducted during MC02 indicated a lack of knowledge or use of this initiative during MC02 exercise. Personnel with more significant knowledge or experience indicated this warfighter tool was useful. Based upon the MC02 network setup and user feedback, GCCS-I3 was integral to joint warfighter operations and targeting functions because it was the backbone to the joint automated target folders database and joint fires initiative element. However, feedback from personal interviews during MC02 revealed a lack of

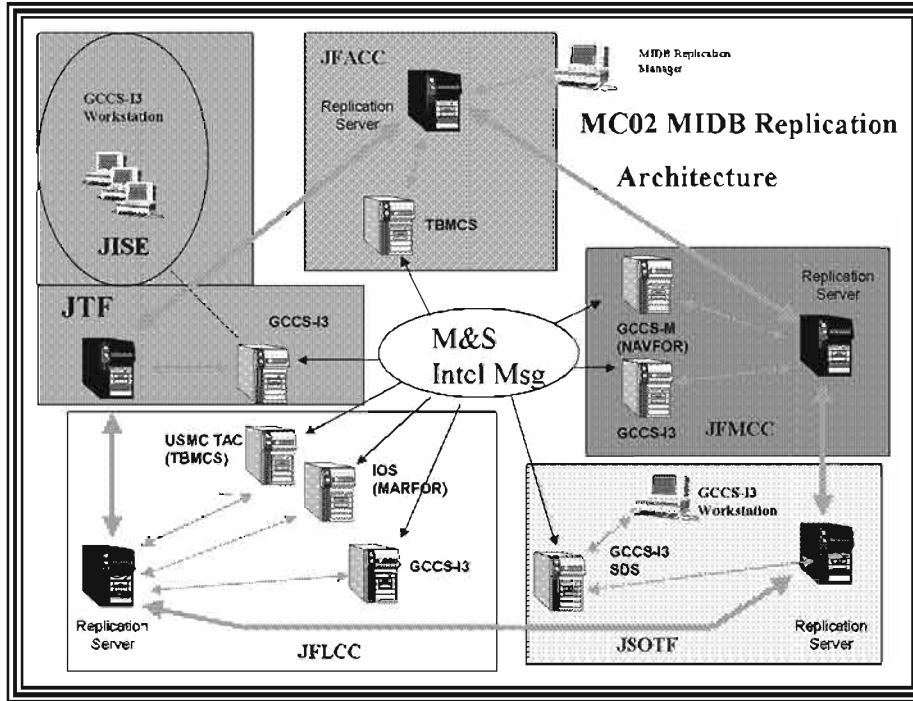


Figure 282: MC02 MIDB Replication Architecture

adequate training and/or focus of user applications of GCCS-I3, particularly with regards to mission needs.

Observation and Methodology

Forty operators and targeting personnel evaluated GCCS-I3. Initial surveys indicated either a lack of knowledge or a lack of usage of GCCS-I3. Later, a revised survey sent to a selected list of participants confirmed this finding. Personal interviews also indicated a lack of

adequate initiative training and a lack of understanding of the user applications. This was emphasized particularly with GCCS-I3 trainer user needs. One experienced user said GCCS-I3 was very critical to joint warfighter operations and targeting because it provided the backbone to the joint automated target folders database and joint fires initiative.

Those individuals with more significant knowledge or experience with GCCS-I3 indicated it was useful and would benefit the warfighter effort as a whole. These same users still experienced some problems with connectivity and information coordination among the different warfighter components. The most crucial functional problems affecting the warfighter occurred when imagery intelligence information could not be relayed to or properly coordinated between different warfighter components in real-time. The sponsor technical lead pointed out that the lack of adequate warfighter user training contributed to the majority of the respondents' "lack of knowledge and understanding of the functionality of the initiative" and low confidence with GCCS-I3 in supporting the MC02 warfighter objectives.

GCCS-I3 was evaluated against the key enablers of the SJFHQ. GCCS-I3 provided the means for the potential knowledge and IS aspect of SJFHQ by providing the tools to access current military intelligence embodied in the local MIDB and updated by the functional components.

GCCS-I3's functional capabilities directly supports the components in rapidly setting conditions for decisive Operations, assuring access into and through the battle space, and conducting decisive Effects-Based Operations by being employed at the component commander, JTF and component level to synchronize and update the process in developing/establishing target sets.

With imagery technology available, GCCS-I3 provided a number of fused assessment and battlespace visualization capabilities to the joint warfighter via the COP/CROP. The initiative was intended to provide to warfighters the enhanced intelligence operations infrastructure in support of the ONA and EBO. GCCS-I3 enhances the operational commander's situational awareness and aids track management duties with a standard set of integrated, linked tools, and services that maximize commonality and interoperability across the tactical, theater, and national communities. The initiative supports and improves the decision process in target nomination and the COP/CROP picture.

Table 46: GCCSI3 impacts measured

|                                                | Supports | Potentially Supports | Did not provide significant support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish Information/Knowledge Superiority    |          | X                    |                                     |
| Rapidly Set Conditions for Decisive Operations | X        |                      |                                     |
| Assure Access Into and Through the Battlespace | X        |                      |                                     |
| Conduct Decisive Effects-based Operations      | X        |                      |                                     |
| Sustain the Force                              |          |                      | X                                   |

Furthermore, this initiative provides improved intelligence information flow, which is essential to allow the commander to set the conditions necessary to achieve dominant maneuver and precision engagement for RDO. All of the above observations were based primarily upon subject matter expert insights and interviews.

Relationship to Other Objectives

The analysis and findings for the GCCS-I3 initiative have impacts on the JFCOM ONA assessment area as well as the JISR tools, joint automated target folders (JATF), and the joint fires initiative – Automated Deep Operations Coordination System (JFI ADOCS) joint initiatives. These impacts primarily relate to the performance of the tools employed in the initiative. Performance regarding these tools may impact the findings of the other assessment areas or joint initiatives.

Recommendations

Based on the inputs from the user surveys and personal interviews, there was not enough conclusive data collected to accurately assess the impact GCCS-I3 had on the MC02 goals. No correlation could be made in regards to technological deficiencies and the lack of both adequate user training and/or understanding of implications of the GCCS-I3 system.

It is recommended that all GCCS-I3 users be given more extensive training emphasizing a greater understanding of user applications associated with the mission needs.

**Global Strike Task Force (GSTF)**

Description

GSTF CONOPS demonstration was an Air Force-sponsored joint initiative for MC02. This demonstration was also part of the Air Force's Joint Expeditionary Force Experiment (JEFX 02). GSTF was the only concept initiative for the MC02 experiment, and was the first time that this concept was demonstrated in a large-scale environment. The hypothesis was that GSTF CONOPS would help achieve all five of the MC02 objectives (Establish Information Superiority, Set Conditions for Decisive Operations, Assure Access, Conduct EBO, and Sustain the Force). Both live and constructive elements demonstrated GSTF capabilities to confront a determined adversary in the 2007 timeframe. For MC02, the goal was to examine the Air Force's concept in a joint experimental environment to further refine the concept, demonstrate how the concept can contribute to future joint operations, and to stimulate joint development efforts. Information that is more specific can be found in the MC02 CONOPS for GSTF.

As one in a series of seven Air Force transformational task force CONOPS, GSTF CONOPS employed joint power-projection capabilities to counter adversary anti-access systems and create the conditions required to gain and maintain access to the battlespace for joint air and space, land, and maritime forces, conducting RDO. GSTF CONOPS "first-wave" attack capability affords US and coalition follow-on forces freedom from attack, as well as freedom to attack. GSTF CONOPS leverages America's asymmetric technological advantages by balancing the capabilities of stealth, standoff, precision, information, and space. Prior to the conflict, GSTF CONOPS employed persistent, all-weather ISR elements, focused by the process of predictive battlespace awareness (PBA). PBA monitors adversary actions, identify, locate and track targets and threats, and develops and updates plans for countering anti-access strategies and capabilities. At the start of operations, the GSTF CONOPS employed a relatively small number of low observable, standoff systems, supported by focused electronic, and information attack. The GSTF CONOPS capabilities were designed to "kick down the door" by rapidly neutralizing adversary anti-access capabilities, and at the same time, holding high value targets (HVT) at risk. By neutralizing adversary anti-access capabilities and attacking HVTs, GSTF CONOPS allows the CJTF to employ persistent follow-on forces and create war-winning effects. There were two elements to the GSTF initiative: constructive and live fly. These included a live fly rehearsal on July 26, constructive play July 28 – Aug 1, and live fly execution on July 29.

Overall Assessment Results

The Global Strike Task Force joint concept initiative successfully demonstrated the capabilities required to overcome an anti-access strategy. As one framework for coordinating joint forces, GSTF demonstrated the synergy that can be achieved when a Joint Task Force addresses assured access in a coherent way. In addition, the results from this experiment indicate

that further development—in terms of CONOPS and TTP, education and training, procurement, and leadership development—is warranted.

### *M&S Constructive Modeling*

The constructive entities that participated included two Airborne Laser (ABL) aircraft, two squadrons of F-22s, as well as a full complement of USAF, US Navy, and Special Operations Forces that are already fielded. Information that is more detailed can be found in the constructive force list for GSTF. The original plan was for constructive GSTF to occur only two days (28-29 July); however, as the scenario actually played out, anti-access activities occurred beyond those two days. The reason for this was that pockets of anti-access activities continued to be prosecuted through 1 August when JOA air access dominance was achieved. In practice, GSTF operations would continue until the JTF commander said the air access dominance objective had been met.

The same constraints that M&S placed on assessment of all other areas applied to assessment of the GSTF CONOPS demonstration as well. Deciding which weapon systems would be in place in 2007, and the specific capabilities of those systems, was difficult.

### *Live Fly*

The live GSTF demonstration employed 30 platforms operating on or above the Nevada Test and Training Ranges (NTTR) during a two-hour period (2000-2200Z) on July 29. All sorties were flown from home station. In preparation for the GSTF live fly event, a live fly rehearsal was conducted on July 26. Each flying period consisted of ATO sorties designated for dynamic targeting as well as pre-planned fixed targets.

### *Analysis Methodology*

There were three categories of data collected: player questionnaires, results extracted from M&S and C<sup>4</sup>I systems, and subject matter expert and senior leader inputs.

The first category—player questionnaires—was the primary source of data used to establish findings and draw conclusions. During the course of main execution, four web-based questionnaires were administered, to four different groups of players. The first questionnaire was directed at planners across the JTF, asking about planning considerations prior to the assured access phase. The next set of questionnaires was administered to planners, operators, and intelligence specialists after access had been achieved. The result of these questionnaires was used to gain perspective on the contribution of the GSTF CONOPS to the RDO warfighting challenges.

The second category of data was used to provide an objective basis for validating the subjective inputs collected via questionnaires. The specific information to be collected was framed in terms of three analytic questions, and a series of supporting tasks and sub-tasks. Limitations of the federation of models and simulations and the experimental construct, and the resulting problems with discovering “ground truth,” hindered the ability to draw accurate conclusions based on this source of data.

The final category provided a “sanity check” for the use of the other results. Based on general observations, interviews, meeting minutes, and informal analyst discussions, senior leader perspective was captured. These “senior leaders” primarily included the JTF and component commanders and their principal staffs, and the experiment senior mentors (retired

general and flag officers.) In addition, specific subject matter experts were consulted and their inputs were captured via web-based observations and analyst notes.

In addition to the three analytic questions for the GSTF assessment, preliminary analytic work was completed identifying which of the warfighter challenges to Rapid Decisive Operations GSTF CONOPS addresses.

*Live Fly Results*

In general, the results were very successful, as indicated in these highlights:

- Both GSTF pushes executed as planned except for a five-minute Rolex on the first push
- Four Red air were killed on each push without Blue losses
- Five High-Speed Anti Radiation Missile (HARM) shots taken on first push; six taken on second push
- All preplanned targets hit
- Three TSTs successfully prosecuted on second push

*Analysis Questions*

Three analysis questions addressed critical assessment areas for the GSTF CONOPS. Each of these questions is addressed in this section.

What assured access effects did the GSTF CONOPS demonstrate?

Created initial access. Only one type of aircraft was employed within enemy anti-access threat areas during first 16 hours of the campaign. The aircrafts' mission was to perform sweeps and to attack anti-access targets. According to the JFASCC, "We could not have done the operation without it."

Created air dominance ("kicked down the door"). GSTF CONOPS enabled operations such as the Stryker Brigade Combat Team insertion and Ship to Objective Maneuver (STOM) to attack WME facilities and achieved air access dominance for the entire JOA by D+5.

Created war-winning effects, targeting HVTs. The successful targeting of such HVTs as SA-20s, air defense HQs, CRCs, and airfields allowed follow-on operations to be employed and helped cutoff the adversary's C2. Besides these high value air access targets, other HVTs were prosecuted to achieve maritime access. Maritime access HVTs included CDCMs, small boat storage and hovercraft facilities and mine ordnance depots. These maritime access HVTs threatened military as well as commercial ships, producing severe political ramifications as Freedom of Navigation (FON) suffered and natural resource prices increased. The successful neutralization of these maritime access HVTs helped create maritime access.

What current and projected capabilities were required by the GSTF CONOPS to achieve those effects?

The current version of the GSTF CONOPS specifies the current and projected capabilities that are required to achieve the effects demonstrated by GSTF CONOPS during MC02.

What other war-winning effects did the GSTF CONOPS demonstrate?

Due to limitations of the experimental construct, not all areas of the anti-access scenario were examined. For example, there was no consideration for possible threats to friendly forces during the deployment phase. GSTF CONOPS may be helpful in countering this threat. This is an area for further examination during future experiments, exercises, and wargames.

Support to Standing Joint Force Headquarters

GSTF CONOPS demonstrated the capability to support future JTFs in achieving four of the five-warfighting objectives. The fifth objective — Sustain the Force — is an area for future experimentation and wargaming relative to the GSTF CONOPS.

Table 47: GSTF provided support to the SJFHQ

|                                                | Supports | Potentially supports | Did not provide significant support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish Information / Knowledge Superiority  | X        |                      |                                     |
| Rapidly Set Conditions for Decisive Operations | X        |                      |                                     |
| Assure Access into and through the Battlespace | X        |                      |                                     |
| Conduct Decisive Effects-Based Operations      | X        |                      |                                     |
| Sustain the Force                              |          | X                    |                                     |

Establish Information / Knowledge Superiority

GSTF CONOPS forces must coordinate IW operations with appropriate national and theater authorities to deny information to the enemy and achieve other offensive battlespace effects. In the conduct of ISR missions, data and information from space-based, land-based, and sea-based ISR forces and assets are integrated to achieve Information Superiority. Defensive IW operations must be employed in the pre-conflict stages to protect and defend friendly information and information systems. Offensive IW operations must also be employed to influence adversary situational awareness and decision-making processes. If the enemy can be dissuaded, conflict may be deterred. If conflict is not avoided, then IW operations can be used to shape the battlespace for other joint operations.

Rapidly Set Conditions for Decisive Operations

The ability to rapidly deploy and employ airpower globally to create war-winning effects for the JFC is at the heart of the Air Force’s core competencies. These inherent capabilities along with airpower’s flexibility helps enable the JFC to rapidly set conditions for decisive operations.

Assure Access into and through the Battlespace

The GSTF CONOPS will allow the JFC to employ joint power-projection forces to counter adversary anti-access systems and create the conditions required to gain and maintain access for follow-on joint forces. The GSTF CONOPS will also seek to exploit, neutralize, disrupt, and/or destroy critical opposing capabilities in the initial stages of crisis or conflict to more rapidly create war-winning effects and enable JFC objectives to be achieved.

Conduct Decisive Effects-Based Operations

The primary effect achieved by the GSTF operations was access. Without access, follow-on operations would not have been possible, and national security objectives would have been unattainable. With access, the GSTF forces continued to produce a variety of war-winning effects such as air superiority, degraded adversary C2, and reduced threats from WMD. Planning for the effects achieved by GSTF forces were the very first step in a well-executed Effects-Based Operation.

*Sustain the Force*

The same capabilities that allow GSTF CONOPS to create access to the battlespace for deployment and employment also enable maintaining access for joint activities required to sustain the joint force.

*DOTMLPF Findings:*

*Doctrine*

The Services are independently pursuing concepts for confronting the "anti-access" scenario. GSTF is the AF concept; the Navy and other Services have similar ideas. There is not a single, integrated Joint Assured Access CONOPS to leverage those access capabilities, which each Service brings to the fight. Establishing common terminology is key to developing cohesive documentation and language references for staffing and operational clarity in execution.

*Training*

As evidenced by GSTF warfighter survey results (graphs), GSTF warfighter survey results (comments) and the perception by some personnel is that GSTF is its own force rather than a set of capabilities presented thru the AEF as part of the ASETF. A small minority of personnel thought of GSTF in terms of F-22s and B-2s only rather than a set of capabilities required gaining and maintaining access to the battlespace. Overall, the Air Force and other Services require more training on the GSTF concept.

*Materiel*

There is potential for near-term development efforts for technologies associated with GSTF CONOPS. The requirement for the F-22, small diameter bomb (SDB), increased sensor fusion (including non-traditional sensors), and multi-sensor command and control aircraft (MC2A) must be further examined. Specifically, as noted by the JFACC, the F-22 was instrumental in achieving initial access. In addition, non-traditional sensors also played a key role.

*Leadership*

During MC02, senior leadership was aware of the contribution of the JFACC to achieving access for the joint force. Future leaders—both within the Air Force as well as other Services—must continue to develop an appreciation of the challenges associated with achieving and maintaining access, as well as the contributions that each Service can make to this effort.

*Way Ahead*

ACC hosted a capabilities conference, August 21-23, that focused on the challenges for operationalizing the GSTF CONOPS. The minutes of this conference point to the way ahead for bridging the gap between capabilities and programming. AFEO, in coordination with ACC/XPS,



will develop and submit a GSTF Information Paper based on the results of this experiment and other activities related to GSTF CONOPS. The next version of the GSTF CONOPS is being developed and will be published on the Air Force CONOPS web page when complete. ACC/DRYF continues to conduct modeling and simulation that will further refine the capabilities and force structure required for the GSTF CONOPS.

#### Successes

GSTF was successfully introduced to the joint community during this experiment. This was the first time a Service concept was examined in this forum. Although more training is required, the awareness of GSTF and the challenges associated with the anti-access scenario was increased across the functional and joint communities. In addition, the GSTF TF CONOPS was further refined.

#### Recommendations

##### Doctrine

The joint community must continue defining a *joint context* for assured access. Specifically, USJFCOM should develop an Assured Access CONOPS that clarifies the contributions that each component makes. Moreover, Tactics, Techniques, and Procedures must be developed that specify the means of coordinating each component's assured access activities in a way that supports this critical warfighting challenge.

##### Training

The Air Force must continue educating both its own personnel, as well as those in the joint community, on the issue of access, and the specific contributions of the GSTF CONOPS.

Specifically, the AFC2TIG should incorporate the GSTF CONOPS into the curriculum of training courses for AOC personnel.

#### Collaboration Tool (InfoWorkSpace (IWS) 2.5)

##### Description

Collaborative tools development supports the Assistant Secretary of Defense (ASD) response to congress and OSD/JS issues on collaboration interoperability between combatant commanders, Services, agencies, and coalition forces. This collaborative tool is a pilot project, endorsed by OSD and the Joint Staff, that provides digital communications across echelons, joint

mission areas and national boundaries for joint crisis action planning, deployment and targeting.

During MC02, the IWS collaborative tool suite was sponsored by USJFCOM and was used to collaborate at all echelons of the experiment. The IWS tool suite proved itself a flexible suite for war planners and warfighters.

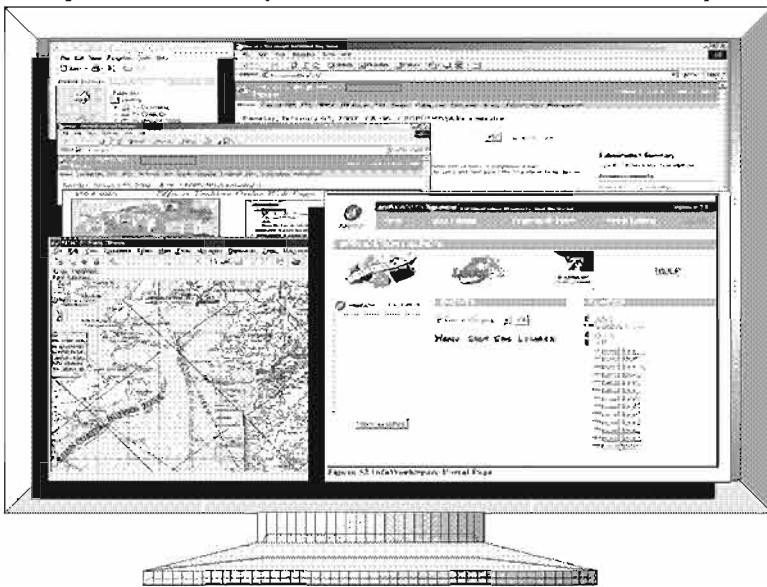


Figure 283: IWS Screen Capture

Collaborative tools are engineered for distributed commands deployed to multiple locations. The tools are intended to revolutionize the way command groups and individuals perform day-to-day operations and ad hoc mission planning. A collaborative suite of technologies allows an organization to reconstruct their dispersed environment into a virtual model and operate in that model regardless of geographical dispersion. As displayed in figure 283, users have access to presentations, files, screens, whiteboards, and chat rooms simply by joining a virtual conference center. Using the internal instant messaging or the COTS Microsoft Instant Messenger, conferees can construct sidebar-meeting rooms to take a discussion off the main session.

Overall Assessment Results

In the network centric environment, the planners can expect to receive a significant amount of data. Users gave the net a strong vote of confidence as 96 percent of the respondents spoke favorably of the nets quality. Collaboration tools allowed data from a diverse group be synthesized into information that could be used to support execution of current and future missions.

Users demonstrated, through extensive use of and participation in collaboration, that the SJFHQ would benefit from effectiveness of these tools. Additionally, collaborative tools would contribute to the IS that combatant commanders, Services, agencies, and coalition forces require during planning and execution phases of RDO.

Methodology

IWS was evaluated by 487 users during MC02, spanning the entire spectrum of participants. Additionally, interviews and subject matter expert insights were used in this evaluation. Users were questioned regarding their use of IWS throughout the exercise. From the positive responses provided by exercise participants, it is clear that future warfighters and planners will benefit from a common collaborative tool suite. IWS has been evaluated to provide significant support of the key enablers of the SJFHQ.

Observations

IWS 2.5 was evaluated against the following key enablers of the SJFHQ. IWS was deemed to provide support in all of the key enablers of the SJFHQ. Based on the resources available and user feedback, IWS supported the previously identified requirement for

Table 48: IWS evaluation

|                                                | Supports | Potentially Supports | Did not provide significant support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish information/ Knowledge Superiority   | X        |                      |                                     |
| Rapidly Set Conditions for Decisive Operations | X        |                      |                                     |
| Assure Access Into and Through the Battlespace | X        |                      |                                     |
| Conduct Decisive Effects-Based Operations      | X        |                      |                                     |
| Sustain the Force                              | X        |                      |                                     |

collaborative tools in the SJFHQ. The tool was thoroughly tested during MC02. Two separate categories of reviewers evaluated collaborative functions during MC02, senior leaders, and operators.

Senior leaders (mentors, commanders and senior planners), envisioning the potential of collaborative planning, indicated collaborative tools were “combat multipliers” for operational planners. The audio conference rooms with synchronized graphics and documentation allowed them to envision critical coordination. In contrast to face-to-face meetings that took time to arrange, collaborative tools, with file sharing, audio and desktop video reduced the risk of having key leaders traveling to mission briefs and reduced the time latency associated with the delay of having to get from the meeting site back to subordinate headquarters. There were three comments that received agreement by the senior leader panel. The leaders concurred that Service-centric tool development was unacceptable, that commanders shouldn’t become tied to their computer screens, and that a breakdown in the chain of command is a possible result of collaboration among a wide audience.

If we have no standards, then we have no collaboration. It was understood that as joint forces begin to use collaborative tools, we couldn’t afford for organizations (Services and agencies) to use their own brand of collaborative tool—all must have been using the same jointly certified and developed tool. The panel understood that in MC02 the same tool was used everywhere and that contributed to the “universal” use of the product and its success.

Commanders cannot become tied to the tool—“HMMV hood meetings are important to leaders.” There was a concern voiced that a collaborator deep in the rear or outside the area of operation could be caught up in the fight and influence decisions made by the mission commander. Additionally, leaders need to understand that the tool should not replace face-to-face meeting opportunities, but rather compliment them. Finally, the tool needs to be robust enough to travel with the key leaders so that continual collaborative processes can occur.

In a collaboration-centric environment, the commander risks losing control. The large audiences that are capable

with electronic collaboration tools means more people hear the “word” first hand. It also means the time lag between order issuance and order receipt by operating forces is greatly reduced in the fewer tellings. That rapid dissemination feature of collaborative tools, however, puts a burden on the commander. Wrong information or incorrect decisions are much harder to counter as they rapidly move from promulgation to execution in the electronic environment.

Comments suggest collaboration is indeed a significant tool to keep the team focused. Commanders need to balance collaborative sessions with the staffs and coordination with the “team.” During MC02, users were questioned on the amount of time spent in informational

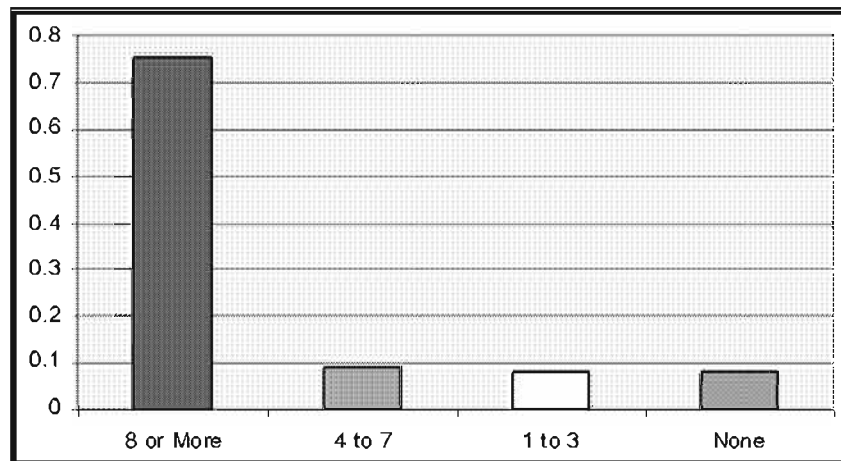


Figure 284: Collaborative Sessions Opened

versus collaborative sessions. Users indicated that they spent 48 percent of their time in collaborative sessions and 43 percent of their time in informational briefings. Leaders indicated that they balanced their time between collaborative sessions and information briefs. Informational sessions on a collaborative infrastructure might be just as important as collaborating on a plan. The central question is “will the quest for intelligence and information find warfighters listening in on every broadcast conference instead of using the tool to collaborate with other team members to execute the mission.” For some, the desire to attend every conference was significant. Follow up experiments should attempt to determine how user-time spent getting information through meeting detracts from the mission focus and preparation.

The second category of reviewer was the operator. Operators vigorously used collaboration during MC02. Four hundred eighty-seven participants were surveyed and their responses showed significant use of collaborative tools during MC02.

In addition to the heavy use of collaboration during this experiment, it was also important to determine how the user community internalized data. In the network-centric environment, planners can expect to receive a significant amount of data as web-enabled tools put data at the warfighters’ fingertips. Users were asked specifically about the quality of both oral and visual information. The

experimental tools received a 96 percent approval rating with respect to quality (See Figure 285). Collaboration clearly let data from a diverse group to be synergized into information that could be used to support execution of current and future missions.

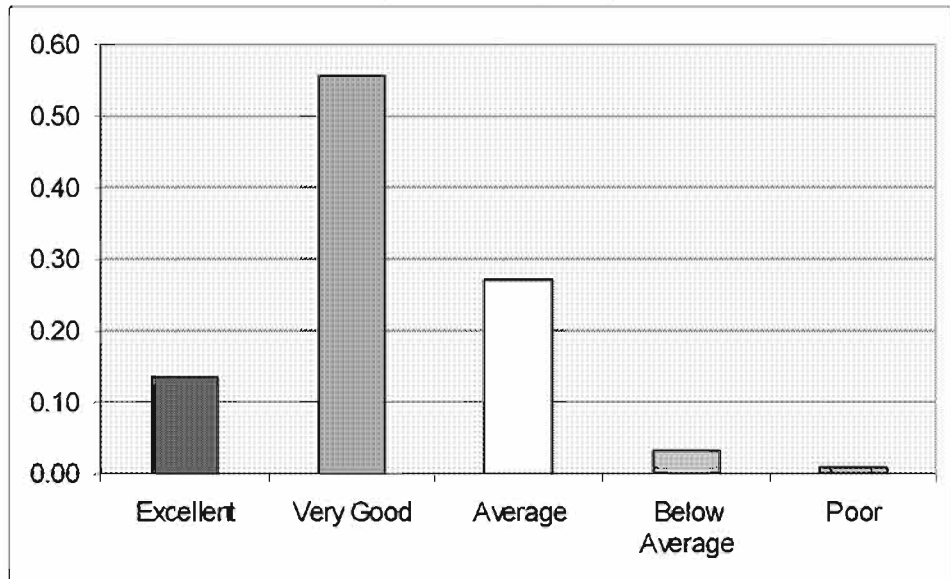


Figure 285: Rating of the Quality of Visual and Oral Information Users confident in quality of information presented. Quick learning curve resulted in extensive use.

The intense use of collaboration tools and the

synergizing of data into information lead to the question of value added to the SJFHQ and the accomplishment of mission. MC02 users sent a strong and clear message with respect to a collaborative tool suite. The message from 90 to 95 percent of the users is that collaborative tools are effective. More important, this effectiveness supports the horizontal and vertical coordination efforts necessary to synchronize the visualization of the battlefield via the CROP/COP.

Many responders in this category were caught up in the “button-ology” of IWS. Their focus was how the tool functioned “today” and this focus blurred how they envisioned it would work in the future. Strong configuration management and future developments in a joint collaborative tool suite will mitigate many of their concerns. Planners and developers should be aware of the single thread that the minority voiced as a concern – training. Users continually commented on how their level of training influenced their ongoing activities. Users who attended

Spiral 3, and received training, indicated IWS was easier to use during this exercise. Users with prior experience with IWS at their home command were trumpeting the benefits of collaboration. Some users reported that once they became familiar with IWS, then they experienced significantly fewer problems. As joint collaborative tool suites are fielded to the Services, their common “look and feel” should significantly reduce the learning curve experienced with this tool. In addition to training, server stability and network control were voiced by users as areas needing improvement.

If COE standards are enforced, a common look and feel will emerge.

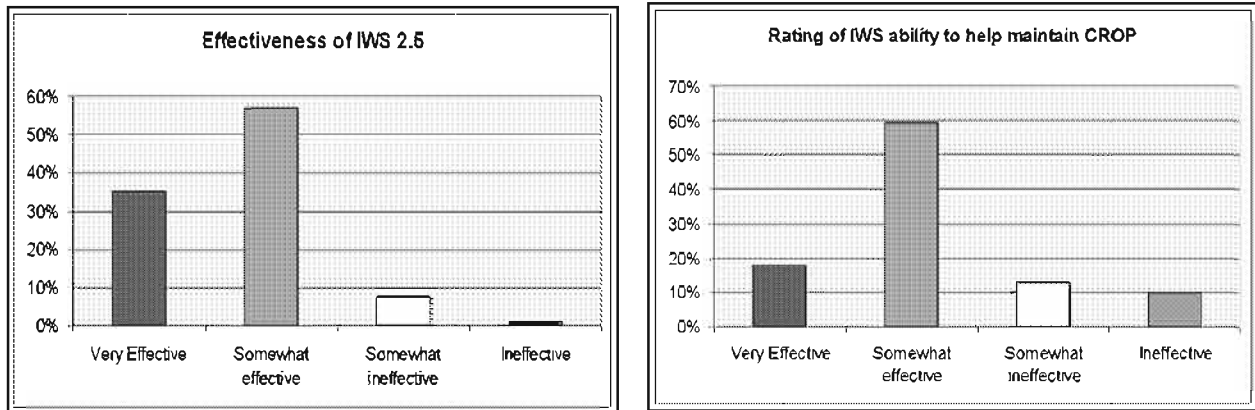


Figure 286 A & B: Effectiveness of IWS and its ability to help maintain CROP

The combined use of collaborative tools such as IWS, MSN messenger, and the SPSS significantly enhanced the positive outcome of Millennium Challenge 2002, according to many participants. Key leadership and users alike touted the benefits of rapidly collaborating with key personnel to focus on the mission. All leaders and mentors reinforced the need for a joint collaborative tool suite. Users demonstrated through extensive use of and participation in collaboration that the SJFHQ would benefit from these tools. Collaborative tools strongly support the functionality required by the SJFHQ.

Relationship to Other Objectives

As the primary collaborative tool for MC02, IWS can be linked to every other area evaluated within this experiment.

DOTMLPF Linkage

IWS results support the DOTMLPF package by confirming that users found the CIE was a transformational capability in comparison to current operations.

Recommendations

Many users were caught up in the “button-ology” of IWS. Their focus was how the tool functioned “today” and this focus blurred how they envisioned it would work in the future. Strong configuration management and future developments in a joint collaborative tool suite will mitigate many of the “button-ology” concerns. Planners and developers should also be aware of the single thread that the minority voiced as a concern—training. Users continually commented on how their level of training influenced their ongoing activities. In addition to training, server stability and network control are also areas that need improvement.

Users reported the IWS was very effective to somewhat effective as a collaborative tool in support of RDO and the CROP. The collaborative tool must include the following capabilities found in IWS during MC02:

**Online Detection & Instant Messaging** – instant messenger capability enables users to locate people connected to the system, chat with them, and/or invite them to join a virtual conference.

**Virtual Work Space** – complete virtual meeting facility where users can meet and collaborate, store projects and review archives. The majority of users indicate that they used eight or more collaborative sessions.

**Collaboration Tools** – includes a full range of collaboration tools such as multi-party message chat, multi-party audio conferencing, video web casting, advanced white boarding capability, application casting and shared viewing, persistent storage of meeting minutes, online voting and polling, and much more. Users reported IWS quality of visual and oral information being between excellent and very good.

**Video Conferencing** – provides support of standards-based video conferencing (IP H.323 and ISDN H.320) and offering “one-click” access to video meetings in addition to the full suite of collaboration features.

### Joint Automated Single Guard Solution (JASGS)

#### *Description*

JASGS, sponsored by the Joint C<sup>+</sup>ISR Battle Center, is a composite multi-level security (MLS) solution that offers the unified commander and Joint Task Force staff a single, common interface to share

information among security domains in accordance with existing policy, procedures, and standards. It offers a shared view of multi-level security data including unformatted data and general military intelligence (GMI). When operational, the SJFHQ can expect to use JASGS to exchange properly marked information among US SCI (JWICS), US Secret (SIPRNET) and multi-national Secret environments through a single, common web-

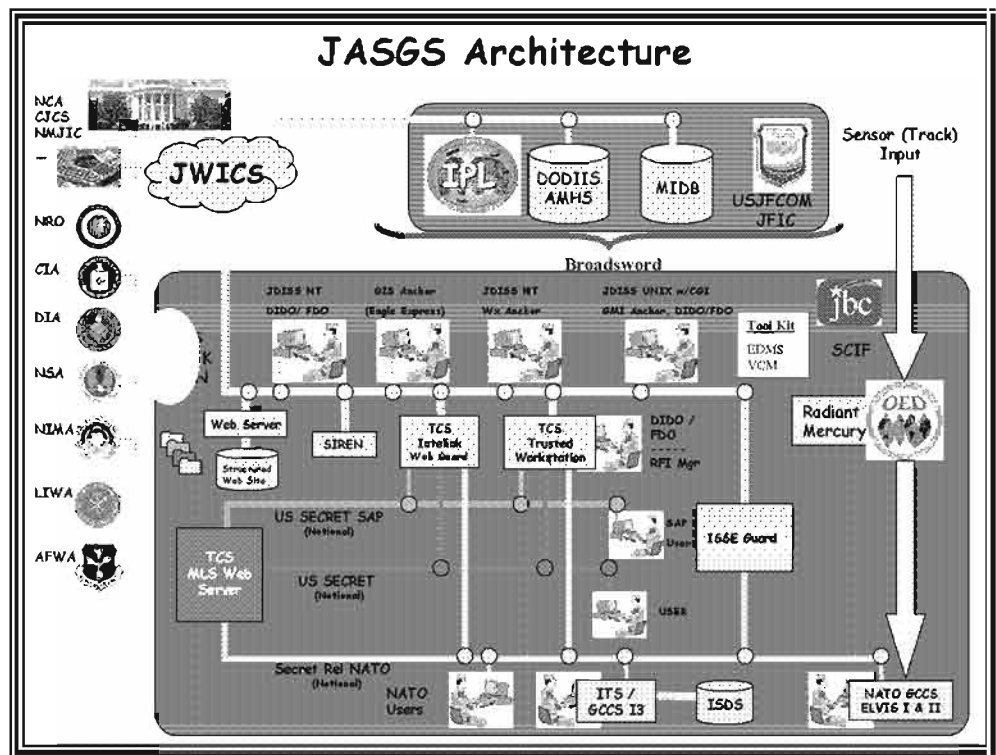


Figure 287: JASGS Architecture

information among US SCI (JWICS), US Secret (SIPRNET) and multi-national Secret environments through a single, common web-

enabled interface (See Figure 287). As the DoD emphasis on web-centric operations grows, JASGS will be positioned to enhance our security posture.

JASGS has two primary information exchange capabilities between multiple security domains. The first capability is the movement of releasable information prepared by users on the JWICS network and passed through the trusted web guard to the MLS web server located on a closed U.S. Secret network. This capability enables information to be posted to the MLS web server and provides users the ability to access and view directory structures based upon their authorized level of access. The second capability (unclassified to Secret) was provided during the exercise by the inter-domain transfer system. It was a separate initiative not included as a component JASGS, but may be included some time in the future. This system was previously assessed by the JBC and was used to support the ONA analysts during MC02.

#### Overall Assessment Results

JASGS was a demonstration project for MC02. This initiative was also previously assessed by the JBC in August 2000. Therefore, no assertions can be made based upon the MC02 survey results on JASGS as the technology and capability was not sufficiently exercised during the experiment. Connecting JWICS and NIPRNET to the operational SIPRNET could have been overcome by simulation of each network throughout the exercise. JASGS may support a previously identified requirement for multi-level security, but that requirement was not thoroughly tested during MC02. In future operations, a SJFHQ can expect to deal with a variety of "plug and play" units like JASGS, thus a simple and intuitive multi-level security platform is needed to meet dynamic data exchange requirements. Indications are that JASGS supports an identified requirement for multi-level security, but the level of support to these requirements was not fully evaluated during MC02.

#### Methodology

JASGS was evaluated by seven users from the JTF. These users were questioned through surveys about their use of JASGS. JBC resources were also surveyed to better evaluate the utility of JASGS. The combined analysis indicates a potential for providing significant key enabler support to the SJFHQ.

#### Observations

The proliferation of data on our three primary networks (NIPRNET, SIPRNET and JWICS) requires seamless data exchange between these networks based upon the need to support ONA. As we attempt to establish information and knowledge superiority, we need a mechanism to move the data between systems to develop the entire COP and CROP picture. As we establish a persistent collaborative environment across echelons of command, interagency participants, and centers of excellence, the use of JASGS should enable formal and informal collaborative sessions based upon capabilities inherent within this system.

JASGS is also poised to support the assured access into and through the battlespace required by the SJFHQ. The initial phases of a "come as you are war" requires the warfighter to have the ability to plug a JASGS configured laptop, personal digital assistant or other mobile device into the global information grid, while ensuring synchronized security and force protection. Findings presented in the final report prepared by the JBC indicate there is little question that JASGS will provide a fast, efficient and effective mechanism to move data between networks. However, the results of MC02 cannot conclusively be used to determine the viability

of JASGS in an operational environment because planners elected not to inject JASGS play throughout the experiment.

Of the seven people surveyed on the existence of requirements to move information from an unclassified network to a Secret network, only two users indicated that they were qualified to answer a requirements based question; therefore, no assertions can be made from the survey. The survey results indicate only 50 percent of the users during MC02 believed there was a requirement within their organization to move information between classified networks. However, within the technical and functional communities with an interest in this type of functionality, there is an intense, real-world interest in a JASGS-type product to support coalition and joint warfighters. A possible explanation for the unfavorable survey results may be that JASGS was not properly presented or used during MC02 (to include lack of sufficient training). Injecting information at specific times of the experiment would have presented the small user community with a reservoir of information that would force them to move data as appropriate.

The concern of connecting JWICS and NIPRNET to the operational SIPRNET could have been overcome by simulation of each network throughout the exercise. A SIPRNET enclave could have been designed and connected to the network. The enclave could have been designed to meet all SIPRNET requirements and the designer could have put "SECRET EXERCISE ONLY DATA" on that local area network. All data coming into and out of the exercise SIPRNET enclave could have been examined for evaluation. This could have been duplicated for an MC02 NIPRNET. Significant information and insight could have been gained regarding how data is perceived and what is passed between networks. In future operations a SJFHQ can expect to deal with a variety of "plug and play" units like JASGS, thus a simple and intuitive multi-level security platform is needed to meet dynamic data exchange requirements. Indications are that JASGS supports an identified requirement for multi-level security, but the level of support to these requirements was not fully evaluated using JASGS during MC02.

### Recommendations

The Joint Requirements Oversight Council approved the JASGS in August 2002 for fielding to selected combatant commanders in FY03 and FY04, based on the results of a functional assessment conducted by the JBC with warfighter participation. Accordingly, no additional experimentation is recommended for the JASGS architecture.

## **Joint Automated Target Folders (JATF)**

### Description

Joint Automated Target Folders, JATF, is an immature tool, which was recently developed for concept demonstration during MC02 and was sponsored by Joint Forces Command. The JATF database is a dynamic repository of targeting information and products that reside in a web-based environment accessible through a service member's commercial off-the-shelf web browser. Using a trusted client relationship with the Services and combatant commanders, the JATF can be dynamically updated in real time to reflect the most current data on a threat target in the JOA. It is maintained centrally, but can be exported to distant and isolated locations/headquarters as appropriate. This capability is a logical evolution in target folder development given technological leaps forward in information technology.

JATF is a component of the joint targeting toolbox (JTT). The goal of the JATF is to provide timely targeting information, situational awareness, demonstrate weapon target pairing, and the value of horizontal coordination among and across components, NATO allies and



coalition forces during the prosecution of time sensitive targets (TSTs). JATF has the capability to execute virtual target development with the targeting support products using the JATF database, and to dynamically update the targeting JATF database, as target updates are required. JATF will also provide the capability to use the JATF to collaborate with NATO allies participating in coalition environments.

JATF database will interface with GCCS supporting the CROP at selected nodes, and

will communicate with the Advanced Field Artillery Tactical Data System (AFATDS), the Theater Battle Management Core System (TBMCS), and the ADOCS/Land Attack Warfare System (LAWS) as normal. Communications with AFATDS and TBMCS will be via simple mail transfer protocol (SMTP). Figure 288 depicts the JATF website.

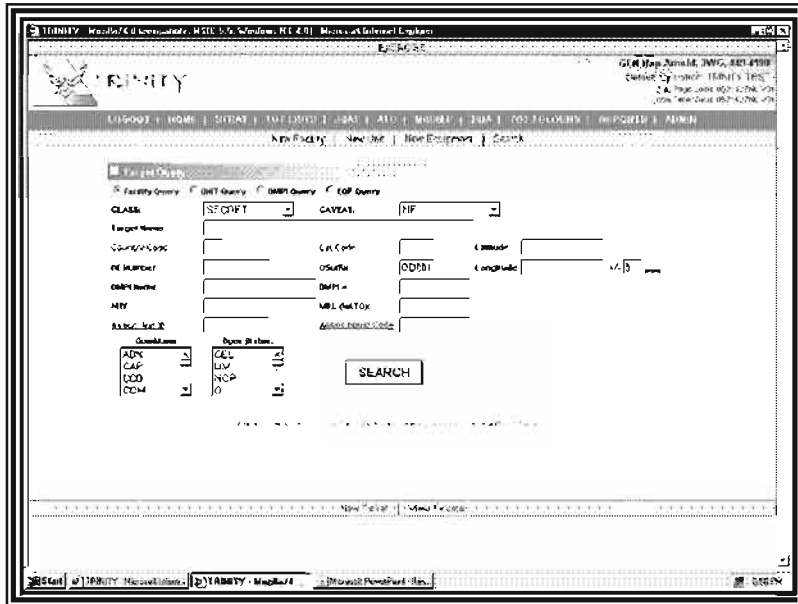


Figure 288: Screen Capture of JATF

### Overall Assessment Results

Findings based on the results from the assessment questionnaires completed by

operators follow:

- JATF helped reduce the targeting cycle time
- JATF had a positive impact on the JTF performing actions on developing COAs, maintaining high-value targets, executing rapid targeting and re-targeting, receiving and providing target information, modifying and adjusting planned missions, conducting dynamic planning, and coordinating fires among Services

The need for a consistent database replication/overlays across the participating units is emphasized. The COP display was not consistent among GCCS, AFATDS, TBMCS, ADOCS, and LAWS.

### Methodology

Users that dealt specifically with targeting evaluated the JATF. A series of survey questions were submitted to the users for evaluation. Users were also interviewed. The JATF was reviewed in light of the fact that it is an immature tool used for concept demonstration only.

### Observations

JATF demonstrated the support of the SJFHQ key enablers as follows:

- Established Information/Knowledge Superiority by:
  - Providing target information to the COP
  - Conducting target planning, execution and assessment in a collaborative environment

- Establishing a collaborative environment for target information
- Rapidly Set Conditions for Decisive Operations by:
  - Providing target information in the conduct of effects-based planning
  - Synchronizing target information for joint actions
- Assured Access into and through the battlespace by:
  - Providing target information to optimize positioning to maximize operational reach
  - Provide target information available for en-route planning C4
  - Provide target information for en-route force protection
- Conduct Decisive Effects-based Operations by providing target information used in the:
  - Development of effects-based tasking orders
  - Reach-back capabilities to enhance the targeting process

Table 49: JATF survey results are measured

|                                                | <b>Supports</b> | <b>Potentially Supports</b> | <b>Did not provide significant support</b> |
|------------------------------------------------|-----------------|-----------------------------|--------------------------------------------|
| Establish Information/Knowledge Superiority    | X               |                             |                                            |
| Rapidly Set Conditions for Decisive Operations | X               |                             |                                            |
| Assure Access Into and Through the Battlespace | X               |                             |                                            |
| Conduct Decisive Effects-based Operations      | X               |                             |                                            |
| Sustain the Force                              |                 |                             |                                            |

Twenty-nine operators responded “yes”; 17 operators responded “no.” This indicates that the JATF developed for the MC02 experiment was better than average at reducing targeting cycle time. Operators rated the functionality of JATF in each area listed.

- Developing Courses of Action (COAs) - based on 33 responses
- Maintaining High Value Targets (HVTs) - based on 31 responses
- Executing rapid targeting and re-targeting - based on 32 responses
- Receiving and providing target information – based on 39 responses
- Modifying and adjusting planned missions – based on 24 responses
- Conducting dynamic planning - based on 26 responses
- Performing Command and Control (C2) of assigned units - based on 23 responses
- Coordinating fires among Services-based on 26 responses

The operators that elaborated on the reasoning of their rating provided some comments. Some of the highlights of those comments on JATF follow:

**Positive feedback**

Respondent comment:

“It helps us with our collection decks, supplementing what we are not always getting from analysts. I think the tool has some use at least.”

“Excellent tool in providing targeting information, however, it needs to use standardized format to be used throughout all firing units and all of the information in the folders be maintained current.”

**Needs for improvements**

Respondent comment:

No apparent way to relay TSTs to JATF and to MIDB information.

No indication that the folder contained the latest of the target information.

There is a need for more JATF training/familiarity for the operator in support of MC02 CONOPS. Due to the lack of training, a number of operators did not use JATF and this resulted in incomplete target folders.

There is a need to standardize required target information to be included in the folder. Lack of standards causes confusion, inconsistent data information from one folder to the other, and in some cases, volumes of information including old data. Because of the dynamic insertion of information, the picture being generated changes with time, and that causes confusion.

There is a need for JATF to have a backup process/system in case the server, which contains all the JATF information, crashes.

Recommendations

A consistent database is needed across the participating units. A method is also needed to

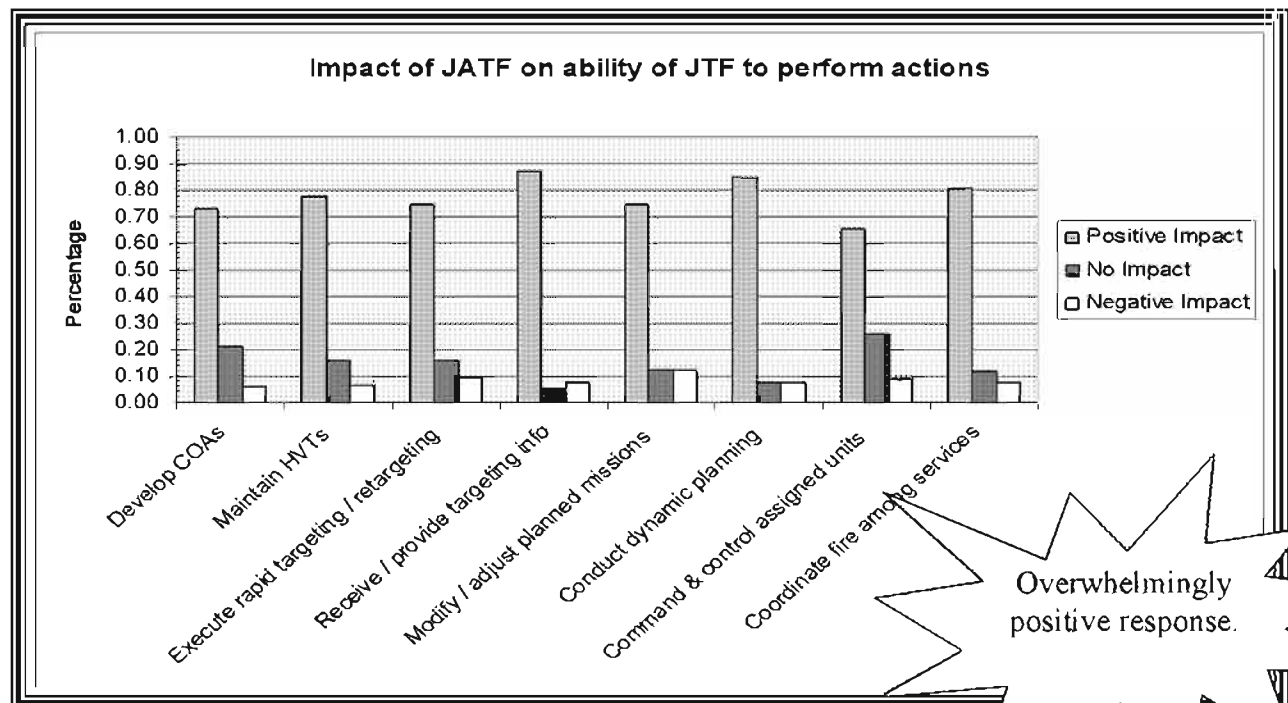


Figure 289: Impact on JTF performance

Overwhelmingly positive response.

relay TSTs to JATF and to MIDB information. Additionally, the JATF also needs some way of indicating that the folder contains the latest information. There is also a need to standardize required target information to be included in the folder. Lack of standards causes confusion, inconsistent data information from one folder to the other, and in some cases, volumes information including old data. Last of all, there is a need for JATF to have a backup process/system in case the server, which contains all the JATF information, crashes.

**Joint Enroute Mission Planning and Rehearsal System – Near Term (JEMPRS-NT)**

Description

Joint Task Force commanders require a robust and secure command, control, communications, computers, and intelligence (C<sup>4</sup>I) information system to support mission planning with component commanders while enroute to and from an area of operations.

The JEMPRS-NT program sponsored by the Joint C<sup>4</sup>ISR Battle Center, identified, integrated, and assessed technologies to support a mobile C<sup>4</sup>I information system. The JBC leveraged lessons learned from JC2S, EMPRS/SECOMP-I, JCF-AWE, and JEFX initiatives and put together commercial off-the-shelf products to provide secure voice, video, application sharing, whiteboard and text chat, digital dashboard, e-mail and file transfer, web service, COP and network access to C2 and intelligence systems.

JEMPRS-NT enables global collaboration using collaborative tools such as Defense

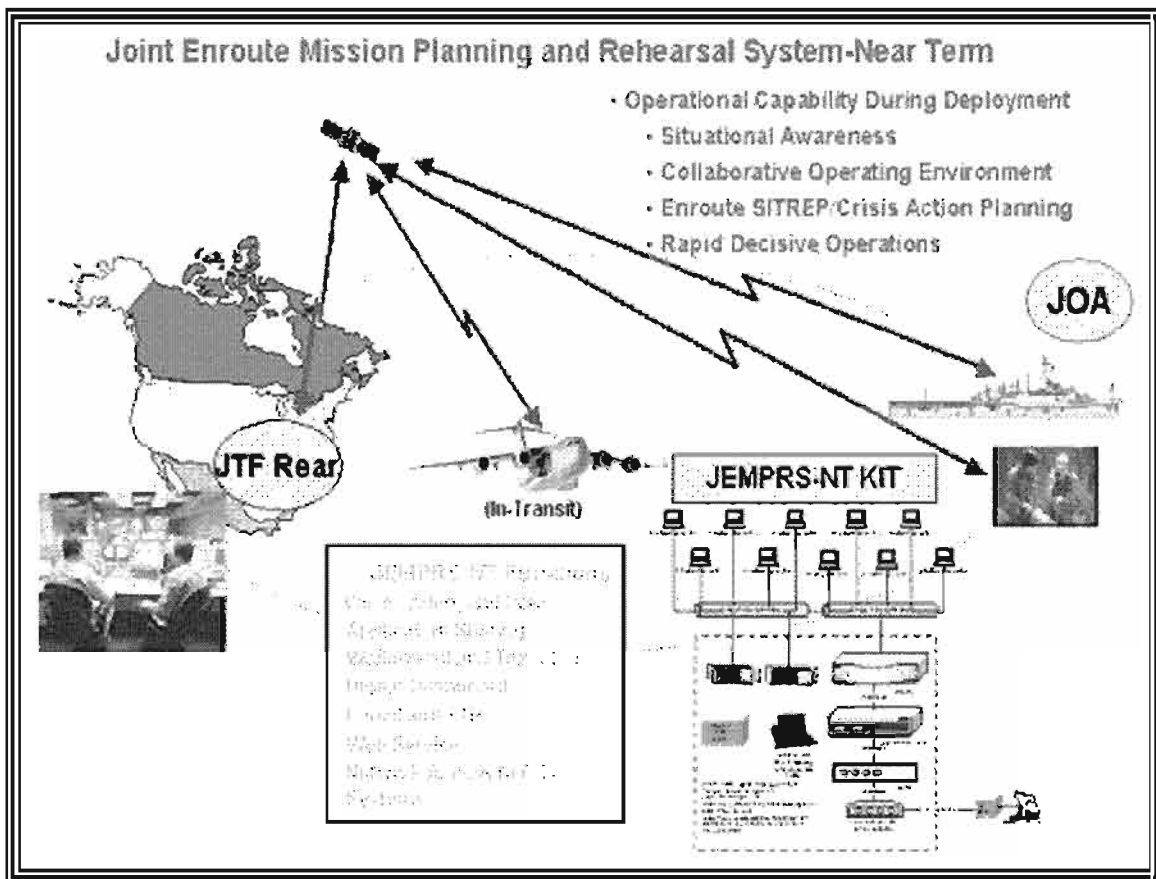


Figure 290: JEMPRS-NT

Collaborative Tool Suite (DCTS) or in the case of MC02, InfoWorkSpace (IWS). It does this by

using specific commercial satellite service technologies that provide data rate acceleration and bandwidth optimization techniques to increase communications.

Overall Assessment Results

JEMPRS-NT enabled the JTF commander to accomplish all necessary C2 tasks while physically separated from his headquarters (See Figure 290). During MC02, the JTF commander and staff used 13 workstations loaded with IWS collaborative tools, ADOCS, and e-mail to maintain the battle rhythm. The commander and staff actively participated in the joint targeting board (JTB), while maintaining good situational awareness transiting to and from the AOR. Each flight aboard the special operations low level (SOLL-II) modified C-17 lasted approximately five hours. Communication link connectivity was lost a minimal number of times going to California and coming back to Virginia due primarily to ISDN anomalies. The communications link was quickly restored each time connectivity was lost. ADOCS and web browsing came back, even easier.

Methodology

Eighteen users evaluated JEMPRS-NT during MC02. These evaluators consisted of operations, plans, intelligence, and knowledge management officers, as well as JEMPRS system administrators. The JTF commander and staff used 13 workstations loaded with IWS collaborative tools, ADOCS, and e-mail to maintain situational awareness, IS, collaborate, and conduct joint interactive planning in support of synchronized and integrated command and control while in transit to a forward command post. This assessment was written using warfighter surveys, comments, interviews, and personal observations. This assessment methodology, although not scientific, showed that JEMPRS-NT supported all the key enablers of the SJFHQ.

The SOLL-II C-17 was chosen because it has a specific commercial satellite antenna that could be used to connect with the ground station at Suffolk, VA.

Observations

Over 60 percent of those surveyed said the capability to access the JTF collaboration system using JEMPRS-NT, while enroute to an AOR was good or excellent. Less than 25 percent said this capability was adequate or less than adequate. One person mentioned they were unable to access the JOC, but that was due to server problems and was not related to JEMPRS-NT. Another commented that more workstations were needed and some staff members were only able to listen in. It was explained that the number of workstations was limited in order to manage bandwidth. If there were more workstations, there would have been reduced capabilities on each; they would only have e-mail and web access and not collaborative tools.

Over two-thirds of the warfighters surveyed strongly agreed that enroute collaboration, and transferring, sending, and receiving files between deploying personnel and the JTF rear via a reach-back link was an important capability. The survey response to the current capability to transfer/send/receive files was mixed due to the slow load time for graphic files/maps. This problem can be solved by increasing bandwidth or to transfer smaller files.

Information access through hypertext transfer protocol (HTTP) was a problem for some users aboard the C-17. This could have been due in part to graphics posted on some pages causing long download times. This may be an issue for the KM/KMO ROE. Some web pages

had graphics, which did not provide value-added information. Ninety-nine percent of the users agreed (61 percent strongly agreed) that information through HTTP access was important.

Eighty-three percent of JEMPRS-NT users agreed (61 percent strongly agreed) that access to COP, while the JTF is on the move, is important.

Most users agreed or strongly agreed that JEMPRS-NT should be fielded. It was commented that this capability does not have to be installed on a C-17. Most any specific commercial satellite equipped platform will do. One drawback, according to users, is communication data rates. Thirty-seven percent rated the data rate partially adequate, 17 percent said they were adequate, 28 percent rated the data rate as good, and only five percent said they were excellent.

Most of the warfighters surveyed approved of the ability of JEMPRS-NT to perform the required tasks—it was rated excellent by 17 percent, good by 44 percent, and adequate by 22 percent. In addition, most users agreed that the JEMPRS-NT flyaway kit supported situation awareness, while the JTF battle staff was enroute 61 percent said it was good, 17 percent said it was excellent and only 11 percent said it was adequate.

JEMPRS-NT enabled the JTF to accomplish all necessary tasks during flight, which supported all key enablers for the SJFHQ. JEMPRS-NT supports all the SJFHQ key enablers by allowing the JTF commander and his battle staff to collaborate using voice, video, application sharing, text chat, file transfer, and digital dashboard. This is accomplished over two encrypted satellite links which gives the JTF commander freedom to plan missions with the regional commander and component commanders from anywhere in the world. When the system was up it approached excellent, but data speed is still an issue. During MC02, limited bandwidth restricted use of all applications by all users aboard the C-17, although no other system can provide this level of service in an airborne experiment at this time.

A final key observation that must be noted is that to collaborate, the JTF rear location must have the same collaborative tools as the JEMPRS-NT flyaway kit. The JEMPRS-NT flyaway kit must access DISN services through a gateway/ground station.

Table 50: JEMPRS-NT support for MC02 objectives measured

|                                                | Supports | Potentially Supports | Did not provide significant support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish Information/Knowledge Superiority    | X        |                      |                                     |
| Rapidly Set Conditions for Decisive Operations | X        |                      |                                     |
| Assure Access Into and Through the Battlespace | X        |                      |                                     |
| Conduct Decisive Effects-based Operations      | X        |                      |                                     |
| Sustain the Force                              |          |                      | X                                   |

DOTMLPF Linkage

USJFCOM, working with other component commanders and Services as required, is developing a DOTMLPF synchronization plan and the interface should be fielded after JITC certification tests.

Recommendations

JEMPRS-NT leverages commercial off-the-shelf technology and is technically mature enough to transition to a program management office (PMO). The Joint Task Force (JTF) headquarters requires a collaborative mission planning capability between aircraft, ship, and mobile ground forces while deploying to an AOR. JEMPRS-NT enables this using collaborative tools, Command and Control, and intelligence systems across enhanced global reach-back links.

**Joint Fires Initiative – Automated Deep Operations Coordination System (JFI-ADOCS)**

Description

Sponsored by the Naval Warfare Development Center and the Joint Precision Strike Demonstration Office

The JFI ADOCS identified technologies that demonstrate near term potential for management of time sensitive targeting within the JTF. JFI provides a common tool set, architecture and automated processes for the joint force commander,

**JFI enables time sensitive target coordination across components and the Joint Task Force headquarters.**

component commanders, and supporting tactical commanders to conduct operational and tactical “fires” across the engagement spectrum from planning to execution for time-sensitive targeting. The tool set used was the ADOCS for the Army, Air Force, and SOF. The Navy and the Marine Corps used the LAWS. ADOCS/LAWS integrates a broad range of command, control, communications, computers, intelligence, surveillance, and reconnaissance (C<sup>4</sup>ISR) systems, enabling horizontal and vertical integration of information and command and control actions.

ADOCS provides an integrated set of tools for data management and analysis, and mission planning, coordination, and execution. It was originally developed for deployment at the Army corps level, but has since migrated to both higher and lower echelons. ADOCS is a distributed system supporting a wide number range of workstations that are typically located at multiple echelons. This enables ADOCS to provide horizontal coordination within each echelon, as well as vertical coordination among echelons.

The use of this system’s functionalities allowed the MC02 team to engineer bridges to Service systems such as TBMCS, AFATDS, GCCS I3, and MIDB, which helped automate the TST process. The focus of effort was on TST management functionality. A code bridge was established, that automatically connects the TBMCS dynamic target list (DTL) to the JDTL in ADOCS. Another code bridge automatically connected AFATDS mission manager to the ADOCS mission manager. Fires mission information was passed from ADOCS to AFATOS. Status of fire missions was then exchanged back to ADOCS from AFATOS. A JDTL also established a common targeting knowledge base for engaging TSTs.

ADOCS and LAWS are synonymous terms because they are essentially the same system. The ADOCS/LAWS provides the joint warfighter a common set of situational awareness tools and capabilities in the fires, targeting, weapons, operations, and intelligence disciplines.

The presentation tool of ADOCS demonstrated near-term potential to support the combatant commander’s requirement for an effective way to manage information and assess emerging situations rapidly with a focus on optimizing decision-making through enhanced situation awareness. The technology provided a common display toolset across the MC02 infrastructure to gain situation awareness across the combatant command, Joint Task Force

headquarters and component staffs. The assessment determined a successful architecture that could be institutionalized as a common joint fires integration management tool or as a presentation and situational awareness tool to support TST decisions.

The JFI mission is enhanced by the CROP toolsets, which provide the users with the same information and the same results, ensuring consistent horizontal integration of information across components.

### Overall Assessment Results

During the MC02 scenarios, the operators were successful in their ability to maintain and distribute timely, accurate, and relevant integrated pictures of JTF units, locations, and status for the JFI missions. The operators succeeded in creating and maintaining a shared awareness and collaboration to synchronize our forces. This supports the operational tempo and enables the force to mitigate surprises by the adversary. Therefore, the JFI, as a concept, was proven to enable the creation of a common picture, based upon the toolset (ADOCS and the InfoWorkSpace collaborative tool in this instance), using common information formats (ADOCS displayed U.S. Message Text Format and TACFIRE formats), codified by a common set of JFI tactics, techniques, and procedures. This is vital to our telling of the story and moving the “concept” of JFI forward in future events and out to the warfighting commanders.

### Methodology

Fifty-five users and SMEs evaluated JFI during MC02. The survey respondents included targeting personnel from each of the components and the JTF targeting staff. A series of different questions were periodically submitted to the users for evaluation to obtain responses that measured the maturing perspectives of the users as familiarity and functionality increased during the operational tempo. This methodology also supports the design of future training for the operators based upon the feedback received on surveys. The users were asked questions related to key JFI functions and capabilities. Specifically, the users were asked about collaboration/coordination capabilities, target handoff capabilities, situational awareness, ATO/ACO requirements and the effectiveness of CONOPS/TTPs for successful mission execution. The findings presented below are based upon actual user feedback.

### Observations

Figure 291 provides a snapshot of the functional elements that are consolidated onto one operational screen. It emphasizes the importance of generating a dynamic common picture for TST collaboration and coordination.

The following paragraphs summarize the major findings obtained from user feedback.

- Future JFI tools should include the following functions:
- Alerts of duplicate targeting
- Rapid access and exchange of target info
- Easy to use displays and functions
- Accurate and timely identification of available strike assets

Future JFI tools should support situational awareness with the following functions:

- Display of Red and Blue forces
- Create, share and display overlays
- Display maps for coordination



- Visualization of terrain (2D, 3D)
- Display imagery for TST
- Display fire-coordination measures

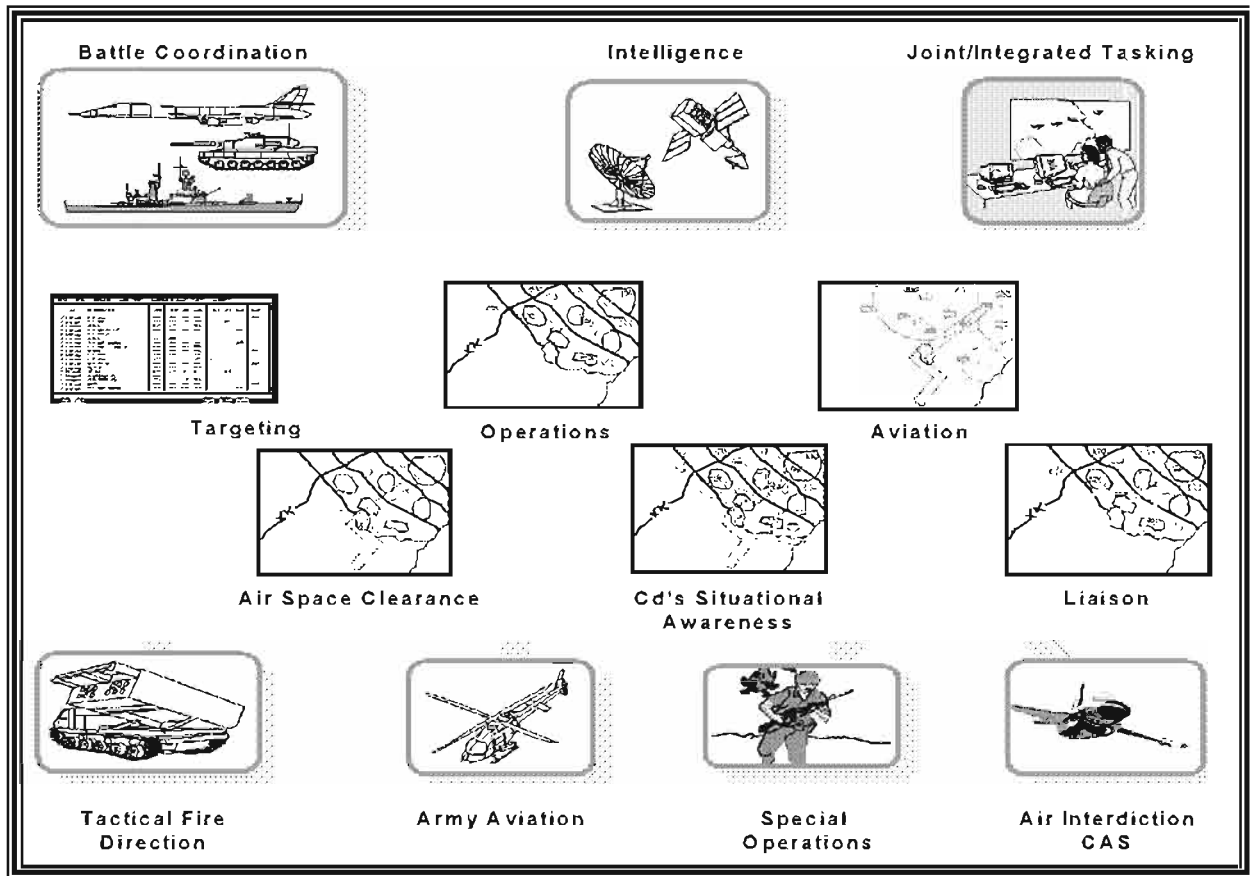


Figure 291: The JFI communications grid ensures critical information is shared with the people who need to know, when they need to know it.

Operators recognized the need to include all the functionalities in the situational awareness set of capabilities to support TST coordination. The neutral responders either did not use the tool or were not sure of the benefits. When assessing terrain visualization, some operators doubted the significance of the 2D or 3D utility in the successful coordination and execution of TST operations.

JFI concepts of operation and tactics, techniques, and procedures. More than 60 percent of the operators agreed that the JFI concept of operations and TTPs were adequate to support real-world joint operations.

The operators who disagreed did so based upon lack of knowledge or training regarding the CONOPS/TTPs or a concern that the TTPs were not sufficiently mature for real-world operations.

Eighty percent of the responders did not believe that TST cross-component coordination and decision-making complicated the mission (See Figure 292). However, 20 percent believed there is a need to improve the concept of operations and TTPs. Specifically, the TTPs need to delineate clearly between critical targets and time-sensitive targets and how they are prosecuted.

Operators indicated that there should be an acceptance of a joint standard for CONOPS/TTPs. They also indicated that the CONOPS/ TTPs contributed to mission success.

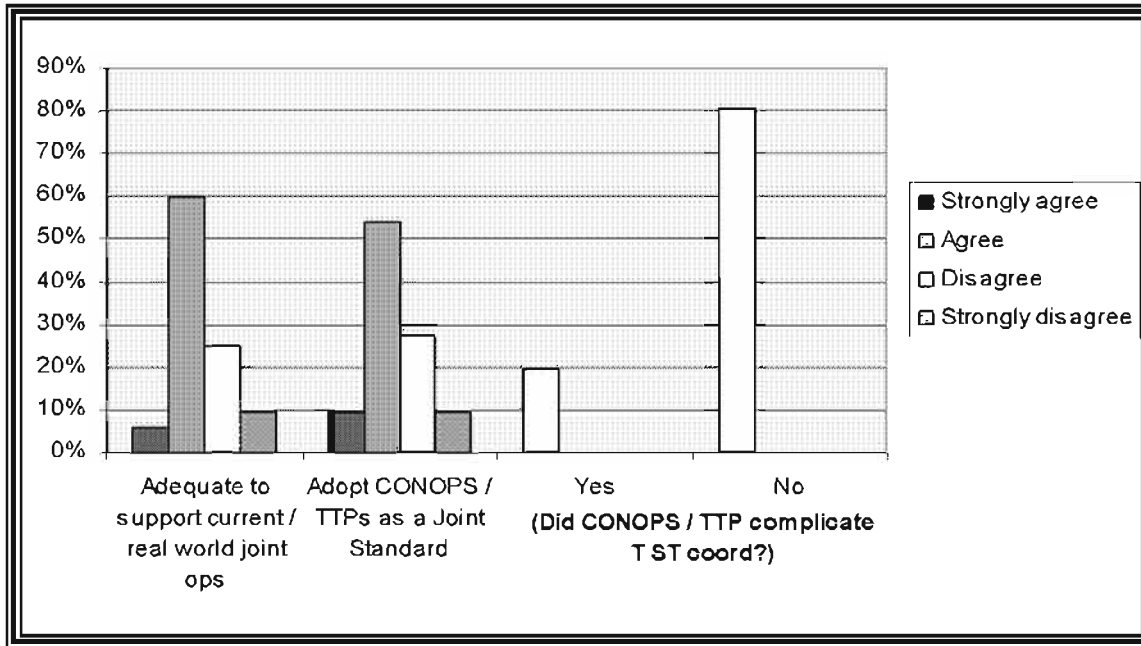


Figure 292: Effectiveness of JFI Concept of Operations and TTPs

JFI demonstrated that it could support the key enablers of the SJFHQ in the following areas based upon warfighter observations. Within each area, users identified the JFI elements as significant in their contribution to Rapid Decisive Operations.

Table 51: JFI support for MC02 objectives measured

| Enabler                                        | Supports | Potentially Supports | Did not Provide Significant Support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish Information Knowledge Superiority    | X        |                      |                                     |
| Rapidly Set Conditions for Decisive Operations | X        |                      |                                     |
| Assure Access Into and Through the Battlespace | X        |                      |                                     |
| Conduct Decisive Effects-Based Operations      | X        |                      |                                     |
| Sustain the Force                              |          |                      | X                                   |

Establish information and knowledge superiority:

- Displays the GCCS database portion of the Common Operational Picture
- Develop the “Relevant “ information portion of the CROP regarding TST
- Conduct Planning, execution, and Assessment in a Collaborative Environment
- Establish a persistent collaborative environment across echelons of commands, interagency participants, and centers of excellence enabling formal and informal collaborative sessions

Rapidly set conditions for decisive operations:

- Show position of combat-configured joint forces for decisive operations
- Manage cross-domain processes
- Protect the joint force (including support systems and capabilities)
- Synchronize application of joint actions

Conduct decisive effects-based operations:

- Assess the contribution of actions to the desired end-state based on the measures of performance
- Conduct joint tactical actions
- Support EBO with precision-strike capabilities
- Use reach-back capabilities to enhance the targeting process
- Conduct precision engagement collaborative planning
- Integrate kinetic, non-kinetic, lethal and non-lethal weapons to shape the battlespace
- Conduct precision engagements against time-sensitive targets
- Achieve coordinated DoD and non-DoD actions

In addition to MC02, findings from other experiments and venues support ADOCS or ADOCS-like capabilities in support of RDO.

The Information Superiority – Command and Control Workshop II final report states: “The time sensitive targeting problem is one of the most difficult challenges we face today. To be successful the TST process must merge planning and execution. The commander must carefully monitor the battlespace to constantly coordinate among possibly conflicting priorities that could impact the planned and desired effects.”

Fleet Battle Experiment-D found: “The LAWS-ADOCS network improved cross-Service coordination and situational awareness resulting in improved CSOF execution.”

A finding from Fleet Battle Experiment-H observed: “Synchronization must be accounted for within the planning process and facilitated by a planning tool that rapidly aggregates, modifies and integrates the individual warfare commander’s plans to digitally identify and assist in rectifying conflicts, while synchronizing multi-mission platforms and [melding] multiple plans [into] a single plan.” It further stated: “Engagements and the dynamic target list needed to be coordinated or integrated. A list of deliberate targets not engaged due to TST tasking was required to simplify re-strike planning. This process should be automated within the web-based tool and/or JFMCC planning tool to ensure visibility of those targets not engaged due to plan modifications, coming as a result of time critical targeting operations.”

The Coherent Joint Fires Report observed: “The coordination and engagement process for immediate targets is fragmented across the joint force. Streamlining an operational architecture oriented toward immediate targets will facilitate the efficient integration of targeting—including relevant aspects of joint intelligence preparation of the battlespace (JIPB)—and engagement of this type of target.”

The Center for Army Lessons Learned identified a lesson learned from Afghanistan: “Strategic, operational, and tactical targeting responsibilities and concerns may overlap and must be coordinated.” The ADOCS answers the need for coordination.

A joint TST coordination tool must have the ability to access and visualize the air tasking orders (ATO) and airspace control orders (ACO). The operators who expressed strong agreement highlighted the importance of the ability to sort and display the ATO.

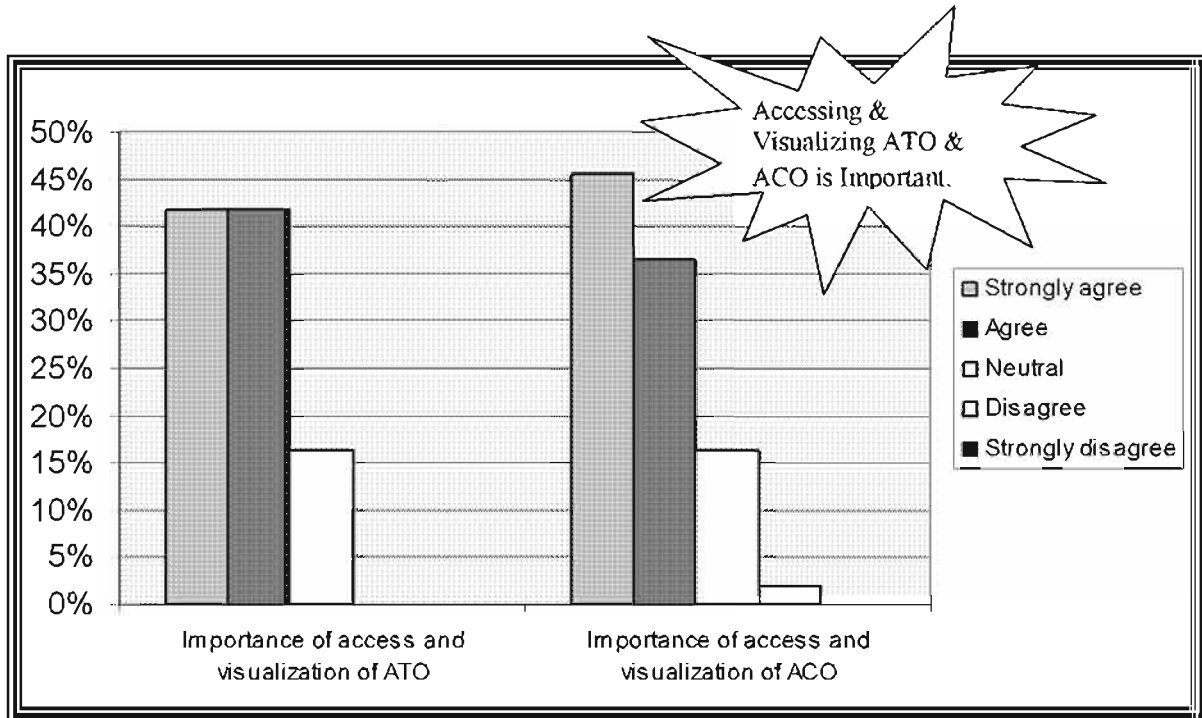


Figure 293: Importance of Acceptance and Visualization

Relationship to Other Objectives

The analysis and findings for the JFI initiative have impacts on the assessment of IWS 2.5, GCCS-I3, JISR tools, and JATF joint initiatives. These impacts primarily relate to the performance of the tools employed in the initiative. Performance regarding these tools may impact the findings of the other assessment areas or joint initiatives.

DOTMLPF Linkage

The analysis conducted on JFI supports the DOTMLPF package by providing direct input regarding the importance of training and materiel in the success of performing Rapid Decisive Operations.

Recommendations

Based upon the major findings obtained from the user feedback, the following recommendations are given:

Future JFI tools should include the following functions:

- Alerts of duplicate targeting
- Rapid access and exchange of target info
- Easy to use displays/functions
- Accurate/timely identification of available strike assets
- Future JFI tools should include effective target-handoff
- Support rapid execution of TST

- Support automated handoff to Service systems

Future JFI tools should support situational awareness with the following functions:

- Display of Red and Blue forces
- Create, share and display overlays
- Display maps for coordination
- Visualization of terrain (2D, 3D)
- Display imagery for TST
- Display fire-coordination measures

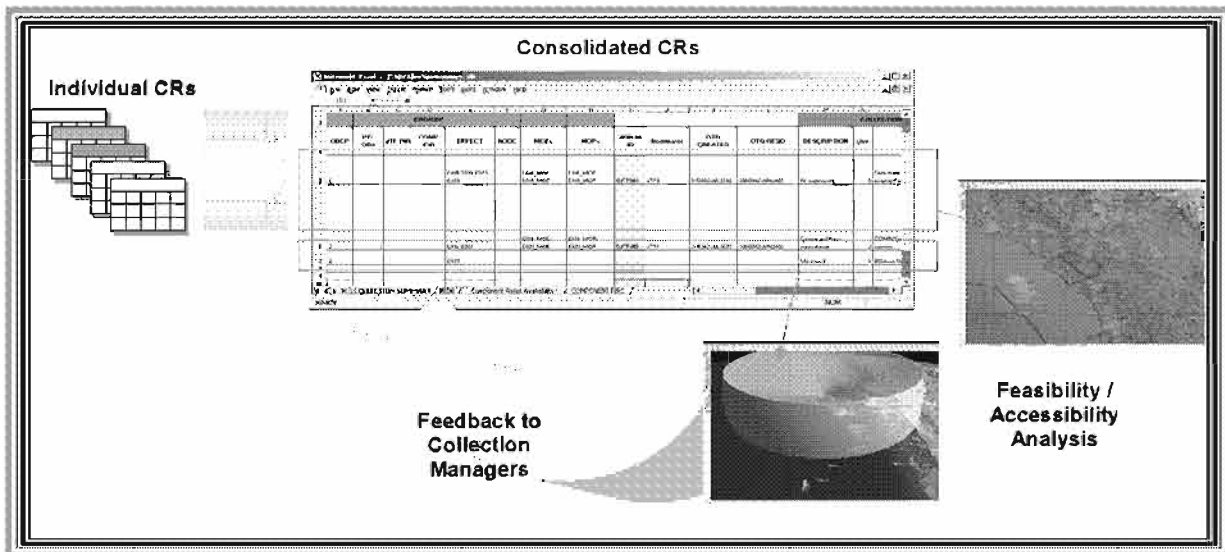


Figure 294: JISR Tool

## Joint Intelligence, Surveillance and Reconnaissance/ Collection Management

### Description

The JISR module, sponsored by the joint experimentation/C<sup>4</sup>I team, is a network-centric approach to the management of available ISR platforms and sensors to better support the quick-paced demands of effects-based operations. JISR module supports ISR planning through collaboratively developing an “effects-based” ISR collection plan and ISR synchronization matrix. JISR module supports ISR execution through collaboratively executing the ISR plan and adjust resources (dynamic re-tasking) as necessary (See Figure 294).

### Overall Assessment Results

JISR module, still an immature tool, was developed to enable the JISR concept. JISR tools are “somewhat effective” in displaying ICSAS visualization information, in operating in ADOCS, SPPS, and IWS environment, as well as in the use of MIDB/ADOCS data. JISR tools enhanced JISR planning.

### Methodology

Surveys were distributed to 149 personnel on the JISR module. All people surveyed were directly involved with the joint intelligence support element (JISE). This assessment was written using warfighter surveys, comments, interviews, and personal observations. This assessment

methodology, although not scientific, showed that JISR module supported key enablers of the SJFHQ.

Observations

Most operators assessed JISR tools to be “somewhat effective” in displaying ICSAS visualization information, in operating in ADOCS, SPPS, and IWS environment, as well as in the use of MIDB/ADOCS data and most operators rated JISR tools as enhancing JISR planning.

Table 52: JISR module relationships to MC02 objectives and SJFHQ

|                                                | Supports | Potentially Supports | Did not provide significant support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish Information/Knowledge Superiority    | X        |                      |                                     |
| Rapidly Set Conditions for Decisive Operations | X        |                      |                                     |
| Assure Access Into and Through the Battlespace | X        |                      |                                     |
| Conduct Decisive Effects-based Operations      |          |                      | X                                   |
| Sustain the Force                              |          |                      | X                                   |

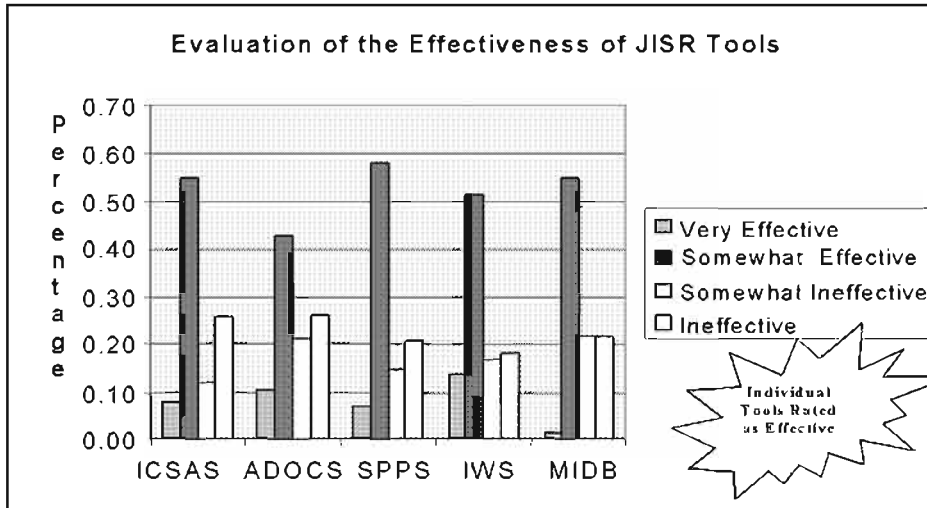
The following are JISR module’s relationship to MC02 objectives and key enablers of the SJFHQ:

- Established Information/Knowledge Superiority by:
  - Providing ISR assets situational awareness
  - Managing collection of ISR information
  - In conducting ISR requirements definition and ISR asset allocation in a collaborative environment
  
- Rapidly Set Conditions for Decisive Operations by:
  - Deploying and integrating JISR system
  - Managing cross-domain ISR collection processes
  
- Assured Access Into and Through the Battle space by:
  - Integrating ISR capabilities

ICSAS indicates that JISR tool was somewhat effective in displaying Integrated Collection Situational Awareness System (ICSAS) visualization information for collection management (51 operators responded) (See Figure 295). The capability to visualization of ISR missions and sensors coverage is shown in figure 296 as a screen capture.

ADOCS indicates that JISR was somewhat effective in operating in ADOCS environment by providing a centralized location for registering ISR collection requirements (66 operators responded).

SPPS indicates that JISR was somewhat effective in the MC02 SharePoint Portal Server environment, including share documents, manage documents, exchange files, collaborate, and search; 69 operators responded. The MC02 SPPS provides the gateway to the supporting information environment. The portal is the vehicle by which the user accesses and stores information products and applications supporting the JTF. Critical databases and tools required



by JISR participants include the RFI tool, the Blue ISR database, ONA IS, and joint automated target folders (JATFs). It is also, where critical plans, orders, reports, and briefings are posted. An ISR page has been created within the ISG to provide ready access to the Blue ISR database, the EBSP, the ISR synchronization

Figure 295: Effectiveness of JISR tools

matrix, and reference materials.

IWS indicates that JISR was somewhat effective in operating in the IWS environment (66 operators responded). IWS provides the primary secure (SECRET NOFORN-level) virtual workspace for JTF collaborative planning and execution. Instant messaging, white boarding, screen sharing, and text chat are among the array of collaboration tools included in IWS. JISR activity took place in two primary locations on IWS: the JCMC and the JOC.

IWS indicates that JISR was somewhat effective in the use of modernized integrated database (MIDB)/ADOCS data (60 operators responded). JISR allows users to identify new or

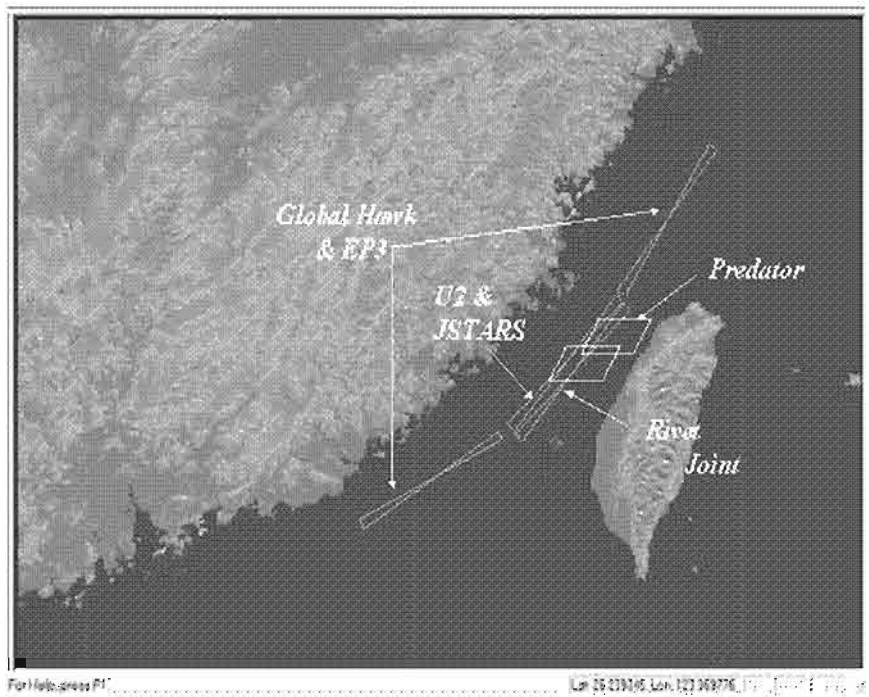


Figure 296: Visualization of ISR Missions and Sensors

modify existing requirements, where users can select fixed sites from the MIDB.

There were 66 operator responses to the request to rate how much JISR tools enhanced JISR planning; 43 responded, “enhanced”; 23 responded “degraded.”

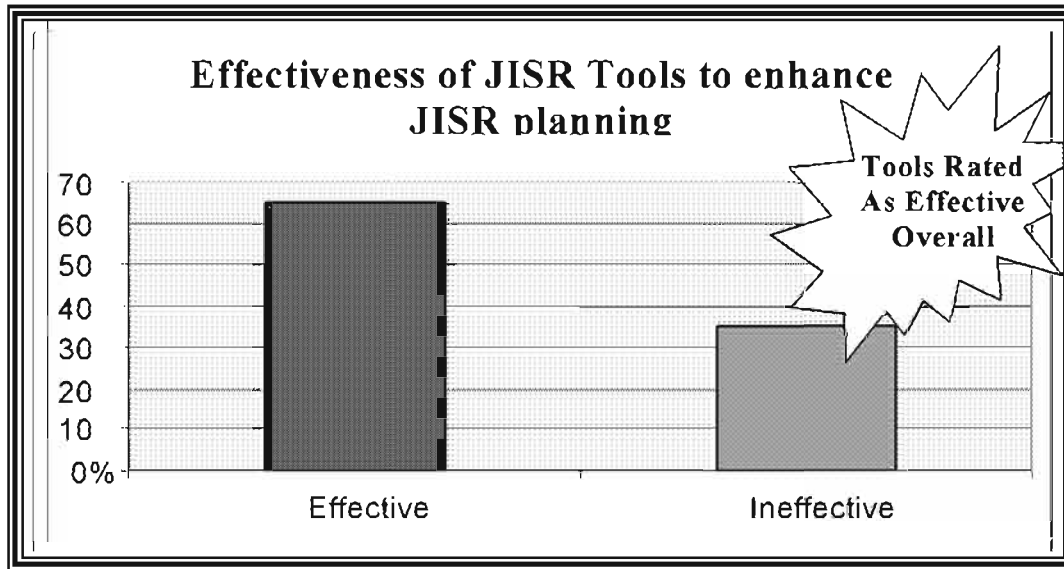


Figure 297: Enhancement of JISR Planning

Operators that elaborated on the reasoning of their rating provided some comments on the JISR module such as:

- JISR has good potential to provide for effective ISR assets situational awareness
- JISR provided a good tool for joint collaboration for ISR assets requirements coordination
- JISR provided a good tool for joint collaboration for ISR assets allocation coordination
- JISR allows for submittal of ISR requirements “ad hoc” to the assets managers using the spreadsheet export function
- This capability used to be a cumbersome procedure using excel spreadsheet and e-mail
- Lack of effective training, due mostly to a lack of time to gain required skills/knowledge of capabilities, and to receive relevant training in support of MC02 operational concepts
- JISR should provide for filtering or sorting of ISR requests based on “effects” and tasking of ISR assets that directly relates to the PEL
- JISR could be improved by having the capability to perform predictive modeling
  - Indicates total ISR coverage over period of time
  - Shows all airborne sensor positions, sensor coverage
  - Indicates what has already been imaged
  - Indicates what images would be lost if ISR assets are moved
  - Provides for dynamic re-task of sensors for any platforms

Relationship to Other Objectives

The analysis and findings for the JISRM initiative have impacts on the JFCOM ONA assessment area as well as the IWS 2.5, GCCS-I3, and JFI (ADOCS) joint initiatives. These impacts primarily relate to the performance of the tools employed in the initiative. Performance regarding these tools may impact the findings of the other assessment areas or joint initiatives.



DOTMLPF Linkage

The analysis conducted on JISR supports the DOTMLPF package by providing direct input regarding the importance of training and materiel in the success of performing Rapid Decisive Operations.

Recommendations

Based upon the major findings obtained from the user feedback, the following recommendations are that JISR tools must include the following functions:

Operate within the following environment:

- ADOCS
- SPPS
- IWS
- Web Portal
- Common Operational Picture
- Distributed Planning and Situational Awareness
- Display ICSAS visualization information
- Interface seamlessly with MIDB data
- Provide effective ISR assets situation awareness
- Provide collaboration for ISR assets allocation coordination
- Provide “ad hoc” ISR requirement submittal
- Provide sorting of ISR requests based on “effects” and tasking of ISR assets that relates directly to the PEL
- JISR tools must develop the capability to perform predictive modeling that:
  - Indicates total ISR coverage over period of time
  - Shows all airborne sensor positions, sensor coverage
  - Indicates what has already been imaged
  - Indicates what images would be lost if ISR assets are moved
  - Provides for dynamic re-task of sensors for any platforms

**Joint Public Affairs Operations Group (JPAOG)**

Description

The JPAOG is an experimental concept designed to be a standing rapid deployment joint public affairs team. Its mission is to plan, coordinate and employ a series of small, mobile teams of public affairs specialists. These teams will provide both forward deployed public affairs resources as well as a reach-back support in response to theater or unified combatant commander tasking. This joint force team will also provide command and control of public affairs units and elements from pre-deployment through entry phases of joint operations prior to the establishment of a formal joint information bureau or inter-agency information service.

Communication is global and nearly instantaneous. Tools and tactics for working with media professionals are global and nearly instantaneous as well. The satellite video and data communication system central to the JPAOG experiment is an example of an off-the-shelf technology that can provide immediate information to international media and the global public. MC02 provides the far-reaching environment for the JPAOG experiment. The group deploys a rapid, flexible, and transformational communication tool suite to the warfighting commander. It provides three critical assets for operational success:

- Public affairs expertise
- Communication situational awareness
- Ability to design and transmit communication products

The JPAOG provides a self-contained public affairs unit, ready to deploy with the first wave of combatants rather than waiting until the traditional follow-on-forces style of the past. The 31-person team connects news knowledge to the battle space. The Joint Public Affairs Collection Team, deploying with satellite communication tools, provides real-time reach-back from remote locations. They provide an environment for reporters to interview commanders and their spokesmen in the combat zone, as well as providing near real-time information presence in an operational environment to counter propaganda and disinformation tactics of the adversary.

Military public affairs tasks for 2007 are just what current doctrine predicts: trusted counsel to leaders, global influence, and deterrence as well as improved morale and readiness for our own and coalition troops. Commanders will gain immediate public affairs strategies for the information battle space through JPAOG. JPAOG can counter enemy propaganda and disinformation by credibly communicating with combatants in real-time. JPAOG can interact with troops so they feel supported and proud of their achievements. JPAOG connects the information battle space with the combatant commander for rapid, credible service to international media and the global public.

The JPAOG experiment tested the operational design and mission effectiveness during a simulated conflict simulation. The value of conducting its operation during MC02 was to seek validation and information regarding the enhancement of communication opportunities during transformation experiments conducted by each Service. By creating both a forward deployed team as well as a Joint Task Force element, the JPAOG sought to prove the value of augmentation to the joint force commander (JFC). Support included public affairs staff augmentation to the commander's personal staff, JIB manning, improved combat camera coordination, and remote operations using newly developed, portable video teleconferencing and data transmission technology (See Figure 298).

The JPAOG team is designed to remain engaged until redeployed – 60 to 90 days after initial deployment. It adds value, providing early entry public affairs capability in an operational environment and complements a SJFHQ element sent to augment a designated joint force commander. Early insertion provides timely, proactive information flow to counter adversary propaganda and other information warfare tactics. By having real-time access to public affairs staff, media representatives and opinion leaders have access to the battlespace and its leadership.

When not deployed, JPAOG members will be assigned to the Joint Training, Analysis and Simulation Center (JTASC), USJFCOM, to conduct joint public affairs training in live exercises and simulated environments. An alternate plan would be to establish a JPAOG at the headquarters of each combatant commander for deployment within the AOR –in conjunction with the deployment of a JFC because of hostilities.

As currently envisioned, the core JPAOG organization, with 31 projected billets, will include a director (O-6), training officer deputy (O-5), and an administrative assistant (E-7). Four liaison functions will support them—media analysis, plans, information operations, and public information. Additionally, a four-person contractor team would support logistics, communications, computers and media channel integration. A four-person joint task force augmentation team would include a JTF director (O-4/5) two media officers (O-3) and an administrative assistant (E-7). Complementing this leadership team would be a JIB establishment

team of ten people. It would be led by a JIB team chief (O-3/4) with a plans officer (O-3), two media officers (O-3), an administrative assistant (E-7), four public affairs specialists [two print, two visual] (E-7), a technical support specialist (E-6) and two deployable active duty teams of seven people per team. The deployable teams would consist of a team chief (O-4/5), NCOIC (E-7), technical support specialist (O-3), media officer (O-3/4), plans officer (O-3), and two PA specialists (E-5/6). Two additional teams may be staffed from within the USJFCOM Joint Reserve Unit.

The core JPAOG organization would be supplemented by a combat camera cell (consisting of three people – one digital photographer and a two-person video crew). The total JPAOG unit staffing is estimated to be 31 active duty military personnel, plus combat camera personnel. The unit will be scalable and flexible which could result in the deployment of smaller units or individuals.

Overall Assessment Results

**BATTLE TASK 1:** Provide Senior Leader media availability via remote VTC into OSD press event

Contemplated Scenario: A combat leader from a remote location is interviewed via the remote VTC/data system with no hardstand infrastructure. This task would optimally be accomplished by connecting into the Pentagon press briefing room. Constraints: Uses remote VTC/data system, dual INMARSAT and vehicle power from “In the box”; VTC is “2-way” allowing the leader to receive and answer questions in real time; “B-roll” is provided for the use of the audience to be played on demand. B-roll transferred via Remote VTC/data system.

Implementation: After six months coordination with the OASD/PA media operations staff at the Pentagon, an access line was dropped into the DoD media briefing room. Suffolk technical support staff also coordinated a backup VTC facility in case the desired location was unable to be configured during the experiment period.

The remote team coordinated with Marine public affairs staff at the SCLA and provided a spokesperson to the Washington press corps for a live, real time interview.

The remote team provided prepared video clips during the VTC to augment the presentation; they were made available to the media representatives via a spare remote system

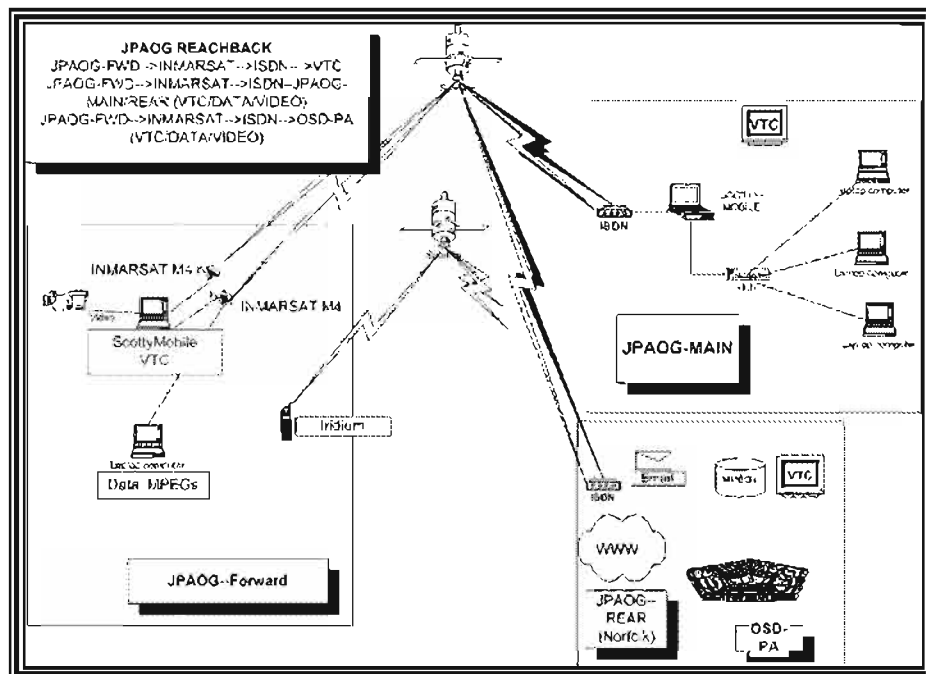


Figure 298: JPAOG Reach-back Capabilities

that had been transported and managed by a member of the support staff.

Implications: While the Pentagon conducts VTCs on a daily basis as well as interviews with senior leadership from command locations (such as Gen Franks from CENTCOM headquarters during Operation Enduring Freedom), we believe this is the first time that tactical communications from a simulated battle space has been accomplished. The opportunity to break into the news cycle with real-time event-driven information will now give military leaders the ability to provide first impressions on events as well as the first explanation of a military operation rather than the first reaction.

BATTLE TASK 2: Conduct coordination and planning of public affairs assets for media operations

Contemplated Scenario: Remote team or teams conduct a secure VTC to coordinate media operations in support of the exercise. *Constraints:* A minimum of two locations is needed. One site via INMARSAT; third location is desirable. Use Microsoft Net Meeting as a collaborative tool. Net Meeting is included with the Remote VTC/data system Units.

Implementation: Due to access of secure Iridium satellite telephones, the choice was made to use this tool rather than the more text intensive Net Meeting. In addition, due to the cost of INMARSAT time and limited resources to pay for such time, the decision was made to save airtime for live video teleconferencing experiences rather than using the time for text-based chat.

Implications: If the remote forward teams were deployed in a foreign environment, or access to an outdoor phone was not possible or practical, the Net Meeting tool would be ideal for coordination and continued interaction. However, access to the Internet and e-mail and/or Instant Messenger might prove just as useful in point-to-point coordination. Multiple coordination among JTF, unified command and specified command, would make a collaborative tool like Net Meeting the ideal choice.

BATTLE TASK 3: Conduct service member availability via satellite link from a remote location to a local media outlet

Contemplated Scenario: Remote team identifies a service member and arranges with member's local TV affiliate or affiliates for live stand up for a feel good, love from the field type of interview. Optimally, JPAOG would like to hold a similar event back in Tidewater area. *Constraints:* Minimum of one service member could be multiple, held in a field environment with questions and answers.

Implementation: During the overall experiment, two units (one out of Ft. Lewis, WA, and the other from Ft. Bragg, NC) wanted to clarify stories that had run about their units to their hometown newspapers. The VTC was arranged with the Ft. Lewis station though the media representative chose not to attend. The Ft. Bragg media did not decide to use the opportunity either.

Implications: The ability to redirect a story after an accident or incident is a premiere rationale for the immediacy of VTC capability organic to the remote team. Additionally, the ability to counter propaganda and disinformation is also significant. The fact that the team was able to send night-vision footage of the 82<sup>nd</sup> Airborne Div airdrop clearly showed the difficulty soldiers were having in sensing the ground. Having that available to answer questions by media provides credible back up to the reassurances offered verbally.

BATTLE TASK 4: Participate in an experiment VTC from the battlefield (secure transmission)

Contemplated Scenario: An event triggers the need for direct coordination with OSD, the JTF, and other participants as available. The JPAOG PACT Team will provide on-the-spot coverage in order to cut through the “fog of war” and provide higher clarity. *Constraints:* Can be MSEL driven; must be secure; involves OSD or OSD representatives from a location other than Suffolk

Implementation: Ability to conduct live interviews to the exercise location became very powerful for promoting its use to distinguished guests and military leaders who visited. With the generous support of the USJFCOM Chief of Staff, the team at Suffolk was able to project images from the remote VTC equipment onto a large flat panel display. This allowed for guests to talk with the team and learn more about the operational value of the system. Due to a defective handset on one of the INMARSAT devices, the team was unable to connect during the visit of the SECDEF and the ASD/PA.

Implications: One comment by a visiting general was that such equipment would then lead to micromanagement by senior leadership at the Pentagon or second-guessing by media and other opinion leaders with access to the connections. The counter, provided by another general officer visiting, was that “they already do; this just gives us a chance to do it faster, better and with more intent.”

BATTLE TASK 5: Provide video report back to JTF of an experiment event involving media

Contemplated Scenario: An event, involving the media, occurs, that the PACT reports in real-time or near-real-time coverage. *Constraints:* Could be MSEL driven—Examples:

- Member of the media releases a factually inaccurate story. PACT provides live video to discount the story
- Media member is injured in an incident with an encounter with opposition forces,
- A VTC is conducted involving the media representative and the JTF PA to ensure what should be publicly released and to ensure media representative of JTF concern and caring for the media
- Media is granted coverage of military operations in a remote area, in order to ensure the story is pushed out
- The JPAOG PACT is tasked with supporting the media (on a reimbursable basis)
- Story can be fed into WNN as a live or recent feed
- Use remote VTC and “b-roll”
- Live voice-using video shot earlier
- Similar to combat camera live footage from other areas but with live voice over
- JPAOG could cover events, and provide for the use of WNN

Implementation: The constraint was not taken because the decision to make the JPAOG experiment parallel rather than integrated into the overall exercise made it impossible to respond to MSELs. The JTF Public Affairs Team, however, did interact with the JPAOG and responded to exercise events in ways that could have used the equipment and capability of the system. The remote team, in cooperation with JCCC, participated in nearly every physical training range. They provided video footage of the rapid air delivery of the Army’s Stryker vehicles. The team adapted the NTC Vulture team’s coverage of a mass airdrop at NTC. They participated with the

Navy SEALs and the experimental HSV off the coast of California. The Marine's urban warfare event was covered, participated in along with media to get their feedback of the remote VTC system's capabilities as well as providing a live interview with their commander to the Pentagon press corps.

Implications: The participation of the remote team would have provided a great deal more "realism" to the simulations as well as providing more understanding of the interaction between "physically" present events and "virtually" present ones. The system provides a unique way to create proximity to distant events so that more can participate as if they were more physically involved in the overall event.

BATTLE TASK 6: Provide live battlefield coverage of a recent event

Contemplated Scenario: Provide a story from the sight of a recent action for use in WNN or other media outlet depending on the event. *Constraints:* Could be MSEL-driven; could include an interview with a local unit member or commander who participated in the action, provided from the actual battlefield.

Implementation: The constraint was not used for the reason mentioned above. However, live coverage of events involving all Services provided members at the JTASC an opportunity to see and talk with those so linked. Since a live feed was connected to the JTASC unclassified exhibit area, many visiting leaders, as well as military leadership, had the opportunity to witness the value of such a tool.

Implications: Since it was not connected to the overall video and/or media system for the experiment, the value of the footage was more archival and "proof of concept" rather than providing a sense of immediacy and presence to the "virtually" distant participants.

There was also no "reverse coverage" with the simulators.

BATTLE TASK 7: Update story or report to website via satellite link

Contemplated Scenario: From a remote location demonstrate reach-back by updating a web page with info; should be kept small to minimize bandwidth use. *Constraint:* Could be classified on an unclassified site.

Implementation: Inability to gain access to the military website through the gateway due to constraints on the firewall from DISA. While it was technically feasible to do, the permissions to access through this secure gateway were too difficult to do in the time allowed.

Implication: Peacetime security environment will not be appropriate in a combat one.

BATTLE TASK 8: Provide coverage of a DV event

Contemplated Scenario: Provide video report of a DV event or arrival; could be used for any media outlet. Could be real world, EXERCISE, or both. *Constraint:* May be MSEL-driven

Implementation: The constraint was not taken because the decision to make the JPAOG experiment parallel rather than integrated into the overall exercise made it impossible to respond to MSELs. Video reports were created in QuickTime for DV events and arrivals that were later replayed for other guests, as well as provided to the in-house WNN producer. The remote team participated in nearly every physical training range. They provided video footage of the rapid air delivery of the Army's Stryker vehicles. The team adapted coverage of the NTC Vulture team's coverage of a mass airdrop at NTC. They participated with the Navy SEALs and the experimental HSV off the coast of California. The Marine's urban warfare event was covered by

media, who participated by giving their feedback on the remote VTC system's capabilities as well as providing a live interview with their commander to the Pentagon press corps.

Implications: The power of immediate information about a particular operations or action will provide critical authority to senior leadership during news media interaction. This will be compounded by the insertion of propaganda and/or disinformation about the activities by the adversary in order to weaken or misrepresent our actions. The ability to be able to interact with trusted public affairs staff in the field as well as having that counsel for on-camera spokespersons provides commanders with the ability to exercise the information arm of national power in an unprecedented way—far beyond just having a camera present such as those provided by JCCC.

BATTLE TASK 9: Use JPAOG communications capability to push ComCam or other video back to JTF or JPAOG

Contemplated Scenario: Use another organization's equipment and material and transfer via the remote VTC/data system and INMARSAT back to JTF for editing or distribution.

Constraints. Test interoperability of equipment and personnel. Transfer video or other product to a target location at the JTF (Team 2) via INMARSAT.

Implementation: During the load out of equipment for the forward deployment of the JTF, a camera crew from JCCC filmed inside a C-17. The footage was then edited, transferred into a file, and sent via INMARSAT to another location within 90 minutes of start of filming. The team was also able to test the ability to transfer video footage and digital still imagery.

Hypothesis was that different formats would transfer at different speeds, however, results found all formats transferred at same speed of INMARSAT connection rather than due to file format. The rate was averaged at 1MB per minute of content. The speed was then due to the size of the files and the compression of the particular file format. Thus, MPEG transferred faster than JPEG and QuickTime transferred faster than Media Player.

We also discovered that different headquarters have made particular choices on multimedia formats that affected our ability to send files for their review. In MC02, our test of sending packaged compressed video to ASD/PA were limited not only by the size of e-mail attachments and the security filters of such file formats through its firewall but all by the fact that they had chosen to use the less compressed file formats of JPEG and Media Player rather than MPEG and QuickTime.

Implications: The ability to be able to capture events that might contain classified or sensitive features could still be accomplished by JCCC in their operational, archival function. But having a remote public affairs team in place, provides for release at the source, editing closer to the experience being covered so that operational features and/or force protection issues are clearly known prior to being sent in a protected manner to the headquarters for the commander's use in conducting the information arm of military power. The choice of multimedia file formats made unilaterally by a computer systems engineer needs to be integrated across the Services in order to facilitate uniform transfer of multimedia assets in a timely and useful manner.

Collaboration: While the visual information plan (VIP) provided from the JCC ran to nine pages and covered the efforts of over 60 lenses at allocations, the remote VTC team did not work from a similar video and interactive framework. The ability to better balance the value of the JCCC for media consumption as well as command and internal information might have been better accomplished through closer collaboration and integration. As the JCCC crews better understood the remote team, their imagery was used more often instead of creating similar products by the remote team. This allowed the PA staff to provide editing, positioning and

“pitching” of the material for use within the experiment as well as to media interested in visuals about the overall exercise.

BATTLE TASK 10: Provide a task order or tasking from the JTF PA to the JPAOG PACT using satellite phone to transfer satellite link data or taskings

Contemplated Scenario: Plan and coordinate the providing of a tasking from TF PA or designee to the PACT. Could be a transfer of an order, memo, or a VTC using shared data. *Constraints:* Tests coordination abilities from higher to lower—does the PACT team set up its INMARSAT and Remote VTC/data system at regular intervals, and on demand? Tests ability to share, collaborate, and transfer data from a ground site to a remote location via INMARSAT.

Implementation: The remote JPAOG team found that radio and print journalists were not as concerned with being able to “see” their interviewees as much as television media. When an accident occurred during MC02 because of the night drop of paratroopers, the Ft. Bragg print media conducted the interview with the company representative over the satellite phone. This met their needs, saved valuable satellite connection time, and provided a timely, accurate, relevant, and useful support of media representatives.

Implications: The ability to interact with MSEL injects could have been enhanced through this technology. However, planners need to determine, in advance, any MSEL-driven activity by the JPAOG to ensure complete separation from real-world news media and information documentation of live-exercises activities. A complete communication plan will also benefit from this technology as it seeks to balance coverage of an event with a continuous and varied stream of information, images, and interaction for use by media representatives and opinion leaders.

BATTLE TASK 11: Provide an interview opportunity for shipboard interviews to be conducted by Navy staff and/or Army/Marine components being carried

Contemplated Scenario: Plan and coordinate a VTC with members of the Army Stryker unit as they participated with the Navy HSV or with staff aboard the MC02 flagship, USS *Coronado*. *Constraints:* Test the ability of the remote team INMARSAT equipment in proximity to ship systems; test the ability to use shipboard INMARSAT equipment as a substitute for the remote system’s set; test the ability to use the remote VTC system while underway.

Implementation: The remote JPAOG team provided several opportunities to fulfill this battle task. They covered the aerial and marine insertion of a SEAL team aboard the Joint Venture high-speed vessel as well as provided an interview opportunity aboard the USS *Coronado*—the experiment’s command ship. The Joint Venture piece was recorded and produced aboard for later transmission while the *Coronado* sought to broadcast the interview.

Implications: The ability to use INMARSAT antennas with the shipboard systems will assist the integration of technologies as well as not interfering with resident systems. Further research is required in order to be certain of the particular vessel’s communication setup, the technical requirements needed to connect to them, as well as the value of having more mobile INMARSAT antenna choices.

#### Methodology

Users evaluated the JPAOG experiment during MC02. A series of three questions were periodically submitted to the users for their evaluation of the experiment. In addition to the status report questionnaire, other sources were used to better evaluate the utility of the JPAOG in



supporting the needs of the combatant commander’s information needs. Using this methodology, the JPAOG has been evaluated to provide significant support for the key leadership of the MC02 staff.

Observations

The key findings include the ability to provide:

- Real-time access to combatant and operational leadership
- High-quality video, audio and still imagery in near real time to potential media outlets and combatant commanders
- Redirection or further clarification on an operational event for interested publics after an adverse incident
- Access to the information battlespace for leadership at all levels of command from the field to the Pentagon briefing room
- Dramatic operational interest in the equipment by other military professionals who value time-sensitive two-way communication processes

Opportunity to further test the concept and processes in real-world training and exercise environment is underway. Improvement opportunities:

- The name of the experiment is easily misunderstood as a component of the psychological operations mission area, as in JPOTF and 4<sup>th</sup> POG
- The need to market the group as a building block tool set is key; creating a workable team name as well as an operational framework that could work easily in Service contexts would help to create early adoption and integration
- Need to create an integrated communication plan that would have outlined the images, information and interaction that would promote the themes and messages of the experiment’s information goals and objectives. Instead, the event continued to be run in a traditional way with media interest creating the images, events and stories rather than having an intentional outcome for these products that could be easily adapted and customized for media use

Table 53: JPAOG Battle Tasks for MC02

| JPAOG Battle Tasks for MC02                                                                           | Supports | Potentially Supports | Did not provide significant support |
|-------------------------------------------------------------------------------------------------------|----------|----------------------|-------------------------------------|
| Provide Senior Leader media availability via remote VTC into OSD press event                          |          | X                    |                                     |
| Conduct coordination and planning of Public Affairs assets for media operations                       | X        |                      |                                     |
| Conduct service member availability via satellite link from a remote location to a local media outlet | X        |                      |                                     |
| Participate in an experiment VTC from the battlefield (secure transmission)                           | X        |                      |                                     |
| Provide video report back to JTF of an experiment event involving media                               | X        |                      |                                     |
| Provide live battlefield coverage of a recent event                                                   | X        |                      |                                     |
| Update story or report to website via satellite link                                                  |          |                      | X                                   |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

| JPAOG Battle Tasks for MC02                                                                                                          | Supports | Potentially Supports | Did not provide significant support |
|--------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------|-------------------------------------|
| Provide coverage of a DV event                                                                                                       | X        |                      |                                     |
| Use JPAOG communications capability to push Combat Camera or other video back to JTF or JPAOG                                        | X        |                      |                                     |
| Provide a task order or tasking from the JTF PA to the JPAOG PACT using satellite phone to transfer satellite link data or taskings. | X        |                      |                                     |

Relationship to Other Objectives

The Standing Joint Force Headquarters initiative most closely integrates with the JPAOG experiment. The JPAOG validates the SJFHQ concept by providing a mobile, scalable team of technical and leadership experts as a resource to the supported combatant commander. However, the need to have integration with such a force is critical to both organizations' success. The commander of the JPAOG should be a resource to the SJFHQ organization in order to determine appropriate training and equipping needs of both. It will also provide the leadership using the SJFHQ with the additional resources of the JPAOG especially in the early hours of an operation by having the information, images, and interaction for the field that its remote forward team provides.

The JEMPRS-NT experiment is a technical integration tool that could extend its command and control capability with linkage to the JPAOG. Not only is it already using similar technology and communication systems, but it also provides better situational awareness for the commander using such systems to have public affairs information available at the same time as those generated for intelligence, command, and control.

DOTMLPF Linkage

The value of experiments such as those of Millennium Challenge require further testing, validation and extension as a result of the lessons learned. The ability to field a mobile, interactive public affairs team provided vivid evidence of its value to commanders and civilian leaders who participated with its use. However, the battle tasks conducted yielded valuable lessons not anticipated during preparations or the preceding Spiral exercises. Further equipment testing is required, better integration with command and control systems will better extend the value of all such teams. Transforming current public affairs, civil military operations, and information operations as well as determining the implications to military broadcasting, psychological operations, and diplomatic operations is essential. The DOTMLPF process provides a mechanism to accomplish these and others as they seek to better deploy forces for military success.

Recommendations

The need to market the group as a building block tool set is key; creating a workable team name as well as an operational framework that could work easily in Service contexts would help to create early adoption and integration.

Need to create an integrated communication plan that would have outlined the images, information and interaction that would promote the themes and messages of the experiment's

information goals and objectives. Instead, the event continued to be run in a traditional way with media interest creating the images, events and stories rather than having an intentional outcome for these products that could be easily adapted and customized for media use.

### **JSOTF Reach-back Special Operations Mission Planning Environment (SOMPE)**

This joint initiative has been expanded in scope since its original submission to USJFCOM. Therefore, the initiative name has been changed from JSOTF/JCPT to that reflected above.

#### Description

In a contingency operation, the JSOTF and/or Theater Special Operations Center (TSOC) will require expertise, data, or tools from rear locations to accomplish its mission under RDO tenets. The JSOTF reach-back/SOMPE initiative considers the JSOTF's use of reach-back to support the targeting process, develop effects-based tasking orders, and use distributed planning tools. It also focuses on the use of reach-back to support collaboration with out-of-area organizations and centers of excellence.

A reach-back capability (See Figure 299) will allow the JSOTF commander to reduce his forward footprint by the use of a support facility located outside the crisis area. The reach-back facility will consist of subject matter experts, staff members, and interagency representatives with access to circuits and networks connected to regional, national, and local sources of operational and intelligence data. The intent is for the reach-back facility to provide battlespace awareness to the warfighter with requisite accuracy and timeliness, collecting data and information from multiple sources, and processing, fusing, transmitting, placing in context, and presenting it in ways that facilitate rapid and accurate decision-making, collaborative planning, and target engagement. The United States Special Operations Command (USSOCOM) sponsors this initiative.

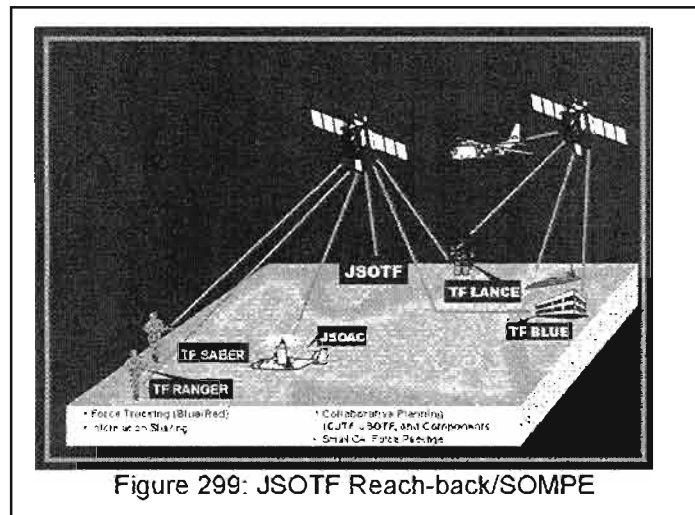


Figure 299: JSOTF Reach-back/SOMPE

#### Overall Assessment Results

The MC02 experiment demonstrated the JSOTF reach-back/SOMPE concept by providing capabilities in two specific areas. The JSOTF used reach-back capabilities to enhance the targeting process. Additionally, the JSOTF was able to develop effects-based tasking orders using reach-back and collaboration. The collaborative tools employed during MC02 significantly enhanced the overall effectiveness of the JSOTF staff, both vertically and horizontally. It allowed for the virtual real time interaction between all components and activities supporting the experiment.

Some distributed planning tools were effectively used via reach-back. The reach-back capability in MC02 was only partially effective in representing the full range of access to information, expertise, and tools. The notional nature of the exercise scenario negated contributions by outside agencies and organizations. Likewise, the full range of tools available to

a SOF Mission Support Center (MSC), were not available in MC02. These factors also prevented an accurate assessment of potential reductions in a SOF forward footprint.

### Methodology

The MC02 assessment methodology for this initiative employed the use of questionnaires and observations by dedicated Subject Matter Experts (SMEs). The questionnaires consisted of a series of 57 questions that were submitted to over 1000 SOF participants in the JSOTF and sub-components such as the ARSOTF, JFACC/SOLE, and the NSWTG. Questionnaires considered measures relating to information and tool availability through reach-back; the performance of targeting systems and planning tools accessed via reach-back; the performance of the mission planning process via reach-back; and the reliability and adequacy of reach-back communications. They also provided areas for participant comments. The questionnaires were submitted three times during the experiment.

Questionnaire responses were supplemented by SME observations. These observations were conducted both actively and passively. In an active mode, the SME's conducted small group interviews with participants addressing questionnaire issues. These interviews produced valuable, candid assessments from a users' perspective. In addition to the interviews, passive observations of activities were made throughout the experiment period.

Using this methodology, the JSOTF reach-back/SOMPE initiative has been evaluated as supportive of Rapid Decisive Operations.

### Observations

Overall, participant responses to the JSOTF reach-back/SOMPE questionnaires reflected a high confidence in the JSOTF/Theater SOC "reach-back" capability. A significant number of participants adopted a neutral position on this objective. However, the majority of participants evaluated SOF reach-back as 'Somewhat' or 'Very Effective.'

Warfighter Challenge One evaluated the reach-back capabilities to enhance the targeting process addressing capabilities primarily relating to targeting information and tools. Although a significant number of participants were neutral on this subject, 60 percent of the remaining warfighters rated reach-back targeting support as 'Somewhat' or 'Very Effective.' As improvements, participants suggested reduction of the number of web pages, and providing situational awareness and collaborative tools to the forward operating base (FOB) level.

The SMEs noted that the JSOTF used ADOCS to support TST. Accordingly, target nomination, validation, authentication, and approval were supported virtually. The MC02 CROP CONOPS was drafted as the guidance for MC02. These procedures included TTPs for the COP. The JSOTF adopted some of the standard TTPs and established other TTPs to manage Blue and red force track data associated with SOF operations. In some cases, the TTPs met specific local requirements, and in some cases, the TTPs used were ineffective in managing or distributing information/knowledge to applicable organizations. Some of the ineffectiveness could be attributed to system architecture and technical, interoperability issues. The reliability of the CROP/COP increased daily. Because of technical and procedural issues, the JSOTF often had to confirm that units were correctly located. This was attributed to multiple reporting sources. The resolve to these issues are a clearly defined CONOPS and associated TTPs.

The second warfighter challenge concentrated on the JSOTF staff's ability to develop effects-based tasking orders using reach-back and collaboration. Performance measures associated with this challenge pertained to mission analysis and COA development,

joint/multinational and interagency coordination, and distribution of battlespace views. An additional measure of performance addressed the possibility of reducing the forward footprint (personnel adequacy) in light of reach-back capabilities. Participant rating of this challenge was split between confident and not confident. After eliminating the “Neutral” position, 51 percent opted for a less than confident position regarding the use of reach-back for mission analysis, coordination, and distribution. Comments associated with this challenge indicated a belief that the forward “footprint” should not be reduced.

SME observations noted that collaboration via IWS and Netmeeting™ provided real time coordination, planning, rehearsal, and execution. Accordingly, modifications and changes to existing plans and orders were facilitated as part of the mission analysis phase of the process. Although a primary focus of the experiment was to evaluate the use of collaborative and distributed planning systems, the operational impact of losing these systems (i.e. through computer network attack) during a campaign was not considered.

Warfighter Challenge Three specifically evaluated the effectiveness of distributed planning tools used for reach-back. Several detailed measures of performance addressing planning tools in terms of their quality, adequacy, timeliness, and general contributions to the planning process were addressed. Nearly 70 percent of the non-neutral responses gave a high confidence rating to the distributed planning tools employed in reach-back. The remaining low confidence ratings were attributed to a need to consolidate tools, the new ETO process, and problems with the new tools introduced from the JFHQ.

SMEs noted that IWS was primarily used between the JSOTF and the JTF to effect coordination, mission rehearsals, and daily meetings supporting functional processes. Netmeeting™ was used throughout between the JSOTF and component forces in support of a continuing dialogue sharing critical information, updates, ad hoc situation reports, and in support of execution checklist items. Chats were facilitated via Netmeeting™, private sessions on the IWS and the MIRC. The JSOTF Web Information Center (WIC) was employed to provide situational awareness to JSOTF components. The WIC allows the JSOTF and assigned forces to post and retrieve (“push and pull”) operational and administrative data supporting the mission. Components also built their own WIC supporting internal awareness at each echelon. The WIC provided an effective tool for request for information (RFI) management and tracking. The RFI manager indicated that because of the participation at the DoD, National and Agency level, all RFIs were satisfied within the available collaborative network infrastructure. This, coupled with the availability of the ONA demonstrated an advantage of real time coordination and availability via collaboration and distributed planning tools.

In addition to questionnaires, a SOF SME, specifically assigned to this initiative provided the following observations:

The original intent during planning for MC02 execution was for the JSOTF to use an established Mission Support Center (MSC), at a distant location. Since this plan could not be executed, an alternative MSC was established at SOCJFCOM in Norfolk, VA. Approximately 70 percent of the MSC capability was replicated. While the network and system configuration the JSOTF was able to achieve, was consistent with the architecture being employed at the JTF level, several SOF specific planning tools were not included. In addition, since the JSOTF and MSC were in the same location and had access to the same tools and data, the reach-back facility was not serving to support a forward JSOTF headquarters.

Since MC02 was conducted at the collateral Secret classification level, assessment and evaluation of the gathering, fusion, sanitization and dissemination of SCI material to collateral networks was not observed.

One of the objectives of the reach-back assessment was to ascertain if it would/could reduce a forward tactical footprint. Based on the reduced reach-back capability observed in MC02, it was difficult to quantify how much of an actual tactical footprint could be reduced. However, a previous MSC risk assessment estimated a 67 percent reduction in the deployed force's forward footprint could be achieved using the MSC and reach-back. Until adequate doctrinal changes are considered and TTPs are developed, reduction of a deployed force using the JSOTF reach-back concept may not be as significant as that demonstrated during the MSC assessment.

Table 54: The JSOTF reach-back/SOMPE evaluation in relation to the RDO key enablers

|                                                | Supports | Potentially Supports | Did not provide significant support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish Information/Knowledge Superiority    | X        |                      |                                     |
| Rapidly Set Conditions for Decisive Operations | X        |                      |                                     |
| Assure Access into and Through the Battlespace | X        |                      |                                     |
| Conduct Decisive Effects-based Operations      | X        |                      |                                     |
| Sustain the Force                              |          | X                    |                                     |

Relationship to Other Objectives

The analysis and findings for the JSOTF reach-back/SOMPE initiative have impacts on the JFCOM ONA assessment area as well as the IWS 2.5, GCCS-I3 and JFI (ADOCS) joint initiatives. These impacts primarily relate to the performance of tools employed in the initiative. Performance information regarding these tools may impact the findings of the other assessment areas or joint initiatives.

DOTMLPF Linkage

This assessment does not support any pending DOTMLPF change recommendation packages. However, with the validation of the JSOTF reach-back/SOMPE concept, to include Collaborative Environment and Collaborative Tools, some significant changes to doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) will likely evolve.

Recommendations

The following recommendations were derived from SOF participant comments and SME observations.

Doctrine: Develop doctrine to address the collaborative process.

Organization: Organizational impact should be none.

Training: Establish policy and plans for joint training.

Materiel: Expedite the materiel technology insertions and POM initiatives.

**Leadership:** Cultural changes associated with the collaborative environment require senior leaders to possess familiarity and functionality with the collaborative processes that enhance warfighter capability.

**Personnel:** Skill sets and duties must be realigned and integrated into personnel development systems in time to provide long-term sustainability. **Facilities:** The reach-back concept may require additional facilities.

JSOTF reach-back facilities should be established at the regional TSOC locations. A JSOTF reach-back provides the capability to collect process and disseminate an uninterrupted flow of specific information to forward deployed SOF forces. In concert with ongoing efforts to provide each regional combatant commander with a Standing Joint Force Headquarters (SJFHQ), placement of a JSOTF reach-back at regional locations, is appropriate. The regional concept will allow for planners and technical specialists who are subject matter experts in Special Operations and their regional area of expertise, the ability to collect, process, distill and disseminate timely and useful information and participate in planning and collaboration activities.

Doctrinal and TTP issues need to be addressed by HQ USSOCOM with regard to implementation and utilization of reach-back facilities. Final communications architecture requirements to support each facility need to be identified, ensuring interoperability and integration with ongoing DoD initiatives in support of JTF level collaboration and mission planning requirements. The reach-back initiative should be incorporated under the HQ Mission Planning Environment effort. The JSOTF reach-back/SOMPE concept and infrastructure proposal must be included in the Mission Planning Environment ORD, and approved by the Special Operations Command Requirement Evaluation Board (SOCREB). This will ensure that material solutions and acquisitions are consistent with DoD programs in which we are currently leveraging, in addition to deployed configuration management considerations and requirements.

USSOCOM needs to continue to stay engaged with ongoing DoD efforts with regard to collaborative tool enhancements. Additional efforts and initiatives need to be pursued to integrate unique Mission Planning tools and applications within the collaborative environment. This effort will allow growth of the collaborative environment beyond that of situational awareness and facilitate actual real time route planning, course of action development, and real time effects-based operational planning.

## **Logistics Tool Suite (LTS)**

### Description

The LTS, sponsored by Joint Experimentation/Command, Control, Communications, Computers, and Intelligence (C<sup>4</sup>I) Team, is a compilation of existing and experimental tools that enables planners to collaborate, using common and shared information, on logistical issues in support of rapid deployment and sustainment objectives. Joint logistics tools also provide decision support assistance in log planning and execution. The tools suite provides a near-real-time collaborative operations and logistics capability, that supports planning and rapid re-planning within a web-based environment using interactive map graphics, tables, charts, schedules, text documents and video applications. It gives the ability to develop, assess, monitor, and visually display logistics support.

### Overall Assessment Results

The Joint logistics tools were useful. The tools support “sustaining the force.”

Methodology

Fifty-three logistics personnel evaluated LTS during MC02. Users were surveyed regarding their use of the logistics tools. In addition to the surveys, interviews and subject matter expert opinions were also considered to better evaluate the utility of the LTS. The analysis indicates logistics tools have potential for providing significant key enabler support to the SJFHQ. This assessment primarily focused on whether or not the individual tools were useful to the warfighter.

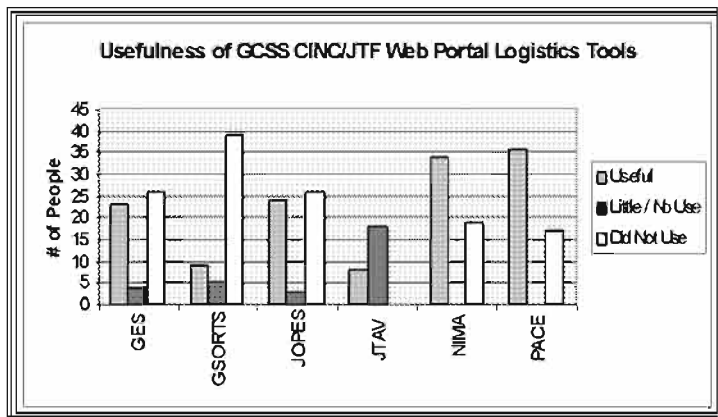


Figure 300: Tools were useful to the warfighter

Displaying both the manifests and the schedules was very useful, particularly in populating the POD portions of the watchboard and researching the contents of downed aircraft and delayed ships. Global status of resources and training was useful in determining the characteristics of units.

The Log CROP and the joint total asset visibility (JTAV) feature provided sufficient

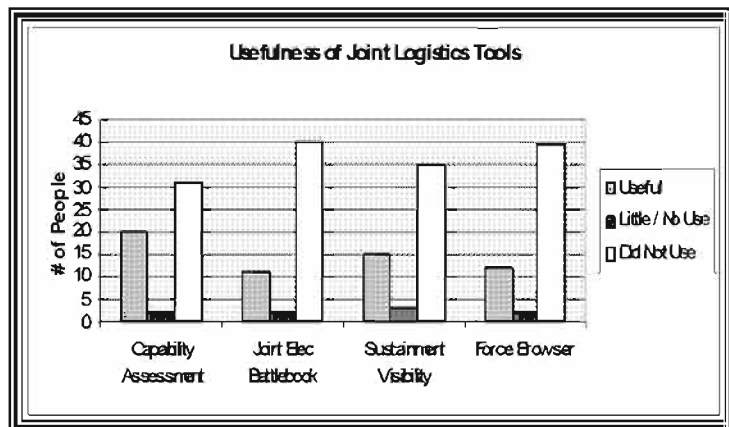


Figure 301: Logistics Tools were Useful

visibility of assets to enable JFC to divert PREPO and inbound supplies to satisfy needs elsewhere in the JOA.

Observations

Operators were queried on the importance of each of the joint logistics tools. The responses received are reflected in figures 300-302.

Web portal logistics tool positive feedback

Overall, the global transportation network exercise system (GES) was a very valuable tool.

The use of NIMA was very beneficial when researching the capabilities of low use island airfields. The topographic chief worked closely with NIMA to collectively provide critical data packages for component forces and analysis packages for JTF decision-making.

The port and airfield collaborative environment (PACE) provided very good imagery and metadata on ports and airfields and was very useful in getting information on Airports of Departure (APODs) and Seaports of Departure (SPODs).

The port and airfield collaborative environment (PACE) provided very good imagery and metadata on ports and airfields and was very useful in getting information on Airports of Departure (APODs) and Seaports of Departure (SPODs).

Web portal logistics tool need for improvement

In regards to the use of joint force deployment planning procedures, it was noted that JOPES is an antiquated system. To facilitate scheduling and force deployment, a flexible tool/system is required to allow rapid force selection with CS/CSS elements linked with easy



data manipulation to allow for force packaging and includes a sustainment generator to create the combat force packages.

JTAV needs the capability to reflect the asset status of user defined grouping of units. Of the people that used the joint logistics tools, a majority reported that the tools were useful. This covered the areas of capability assessment, the joint electronic battlebook, sustainment visibility, and the force browser. The joint logistics decision support tools (JLDSTs) were very beneficial and appreciated by JTF log planners and operators. They provided necessary data to refine the JTF concept of support. A JTF logistics planner made a comment that “logisticians would be lost without JLDSTs.” A significant observation emphasized that training on and familiarity of systems is and will be, key to operational sufficiency in joint logistics tools. Other observations included:

- Capability assessment is a superb tool, which is very user friendly and flexible; incorporate into GCSS
- Joint electronic battlebook (JEB) should be expanded to include all military units, not just logistics units
- Sustainment visibility was used as a backup to JTAV and GCSS access to JTAV
- Force Browser was the most used tool in MC02 and was superb in analyzing the contents of the TPFDD as it developed

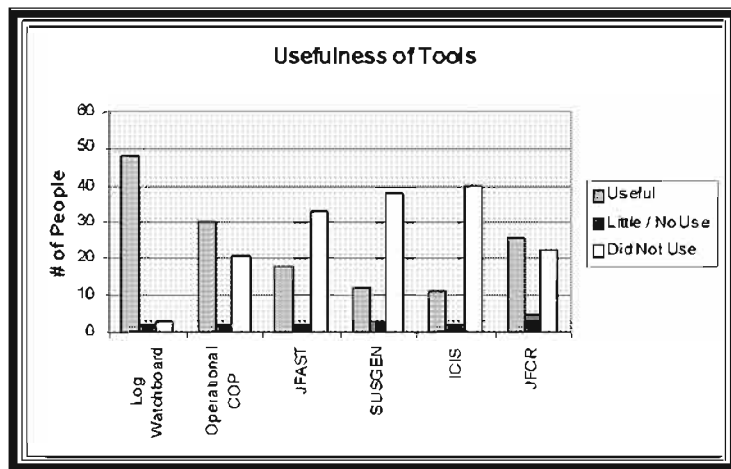


Figure 302: Tools were useful to the warfighter

consumable item support (ICIS) was rated as a superb tool that gave great visibility over projected Service usage of POL products tailored to the TPFDD.

Tool usefulness positive feedback

The log watchboard provided good situational awareness to the JTF although there has been initial difficulty with components updating some of the required fields. There were numerous concerns on the data posted on whether it was current. More fidelity is required on engineer information. The joint flow and analysis system for transportation (JFAST) was a good planning tool for TPFDD validation. Integrated

Tool usefulness needs improvement

Build a link between JFAST and ELIST so that JRSOI can also be assessed during the feasibility analysis.

As with all the tools, the training was minimal.

The extended deployment planning beyond Spiral 3 precluded the intended use of the sustainment generator (SUSGEN). However, the concept was a good one and could have enabled logisticians to better evaluate the sustainment burden for lift that the JTF and COCOM had to plan. Logisticians could have also avoided a lot of the TPFDD analysis and modification to support the sustainment function later in the game had SUSGEN been run to set aside X amount

of lift requirements in short tons/measurement; tons for sustainment replenishment by each Service by supply class.

ICIS should be improved by adding the capability to manually adjust the operations tempo and logistics factors used to determine requirements.

Joint force capability register needs further refinement in the search capability. Possibly, add a ULN listing for referencing like items.

*Relationship to Other Objectives*

All of the tools addressed in this section are discussed in some form in other areas of this report.

*Recommendations*

A flexible tool/system is required, beyond the JOPES system, that will permit quick force selection with CS/CSS elements linked with easy data manipulation to allow for force packaging, and including a sustainment generator to create the combat force packages.

JTAV needs the capability to reflect the asset status of user defined grouping of units.

A link needs to be built between JFAST and ELIST so that JRSOI can also be assessed during the feasibility analysis.

The extended deployment planning beyond Spiral 3 precluded the intended use of the sustainment generator (SUSGEN). However, the concept was a good one and could have enabled logisticians to better evaluate the sustainment burden for lift that the JTF and COCOM had to plan.

In future experiments, the sustainment generator (SUSGEN) needs to set aside X amount of lift for each of the components by supply class in order to avoid a lot of the TPFDD analysis and modification to support the sustainment function.

ICIS needs to be improved to add the ability to manually adjust the operations tempo and logistics factors used to determine requirements.

Joint force capability register needs further refinement in the search capability. Possibly, add a ULN listing for referencing like items.

**Maneuver Control System – Tactical Combat Operations (MCS-TCO) Interface**

*Description*

Army battalion through corps and Marine Corps regiment commanders need interoperable command and control systems to share situational awareness information when fighting in close proximity to one another. Currently, situational awareness information is routed through higher headquarters and back down to the respective Services' systems. The ability to transfer situational awareness data horizontally between these forces would greatly reduce time delays. In addition, real-time C2 information sharing between Army and Marine Corps units is critical to prevent fratricide and to enable RDO from the battalion and two echelons above. The MCS-TCO interface allows the two C2 systems to interoperate, enabling horizontal sharing of situational awareness information.

The maneuver control system is the central C2 system of record for Army maneuver elements at battalion through corps echelons. It consists of a network of computer workstations that integrate information from subordinate maneuver units with those from other army battle command system (ABCS) battlefield functional areas to create a joint common database referred to as the common tactical picture (CTP). Tactical information products such as situation maps

and reports allow the display and manipulation of this information. MCS also provides a means to create, coordinate, and disseminate operational plans and orders. Its role in communicating battle plans, orders, and enemy and friendly situations reports makes it a key component of the Army's ongoing effort to digitize the battlefield. MCS can be deployed in two standard configurations; MCS workstation (WS) (UNIX-based) and MCS light (Windows-based). MCS WS is the backbone of the MCS system and is used to display and pass near real-time situational awareness and houses the system database. MCS Light (laptop) is primarily used as a planning tool at the battalion level and above for overlays and targeting. MCS Light can be employed in a stand-alone configuration or integrated into the MCS network.

The Marine Corps C2 system of record is the TCO system. TCO performs C2 functions by building situational awareness through the compilation of data inputs from other MAGTF C<sup>4</sup>I systems. TCO provides operational commanders with the capability to receive and display select information. The functional application involved in the Marine Corps TCO architecture is the command and control personal computer (C2PC) (Windows-based) module on the intelligence/operations workstation (IOW). C2PC is a client application that displays tactical track data in the TCO system. This application is the battle staff's primary planning and execution application for display and management for the COP. C2PC supports collaboration, course of action development, and near-real time display of friendly and threat forces on the battlefield.

To enable interoperability, ASD (C31) tasked the Services to plan, develop, and build an interface between the C2 systems. The two Services have developed an interface that shares eight Variable Message Formats (VMF) (free text, basic weather, SPOT/SALUTE report, position report, threat warning, field orders, overlay message, and NBC report) in an effort to provide ground situational awareness to the maneuvering commander. The underlying technology of the MCS-TCO interface is the common message processor (CMP). The CMP is designed to support and enhance the interoperability of DoD and associated civilian messaging systems operating in limited bandwidth environments. To date, both Services have established three configurations for employing the systems/interface: a LAN environment, an enhanced position location reporting system (EPLRS) network, and an EPLRS gateway configuration.

#### Overall Assessment Results

The C2PC and MCS light successfully exchanged the eight VMF messages based upon the Joint Battle Center assessment. Both systems successfully transmitted and received all message types, to include rendering symbology on a map background as derived from the K5.17 (overlay) and K5.01 (position report) messages. Several operational issues and minor technical deficiencies were identified and documented. Most of these issues will require doctrinal solutions or development of technical/procedural work-arounds. All of the stated initiatives intended functionalities passed and worked as advertised. Both systems are currently used by the respective Services.

#### Methodology

This assessment was written using data collected from surveys, comments, and interviews from warfighters and SMEs. Nine system users were surveyed to evaluate the MCS-TCO interface for warfighter utility. Although it was not scientific, this methodology showed that the MCS-TCO interface enabled the SJFHQ to conduct decisive EBO.

*Observations*

The USJFCOM has helped to define the joint requirements for the MCS-TCO interface, which are specified in a memorandum of agreement between the US Army Training and Doctrine Command (TRADOC) and the Marine Corps Combat Development Command (MCCDC). The Army battalion through corps and Marine Corps regiment commanders needed to improve their situational awareness when in close proximity to one another. This assessment focused on the utility of exchanging situational awareness data, unit symbology, text messages, threat warnings, and force orders between Army and Marine Corps C2 systems.

The interoperability of the two systems enabled the leaders of the Army Stryker platoon and the Marine Corps infantry battalion to make tactical decisions using additional situational

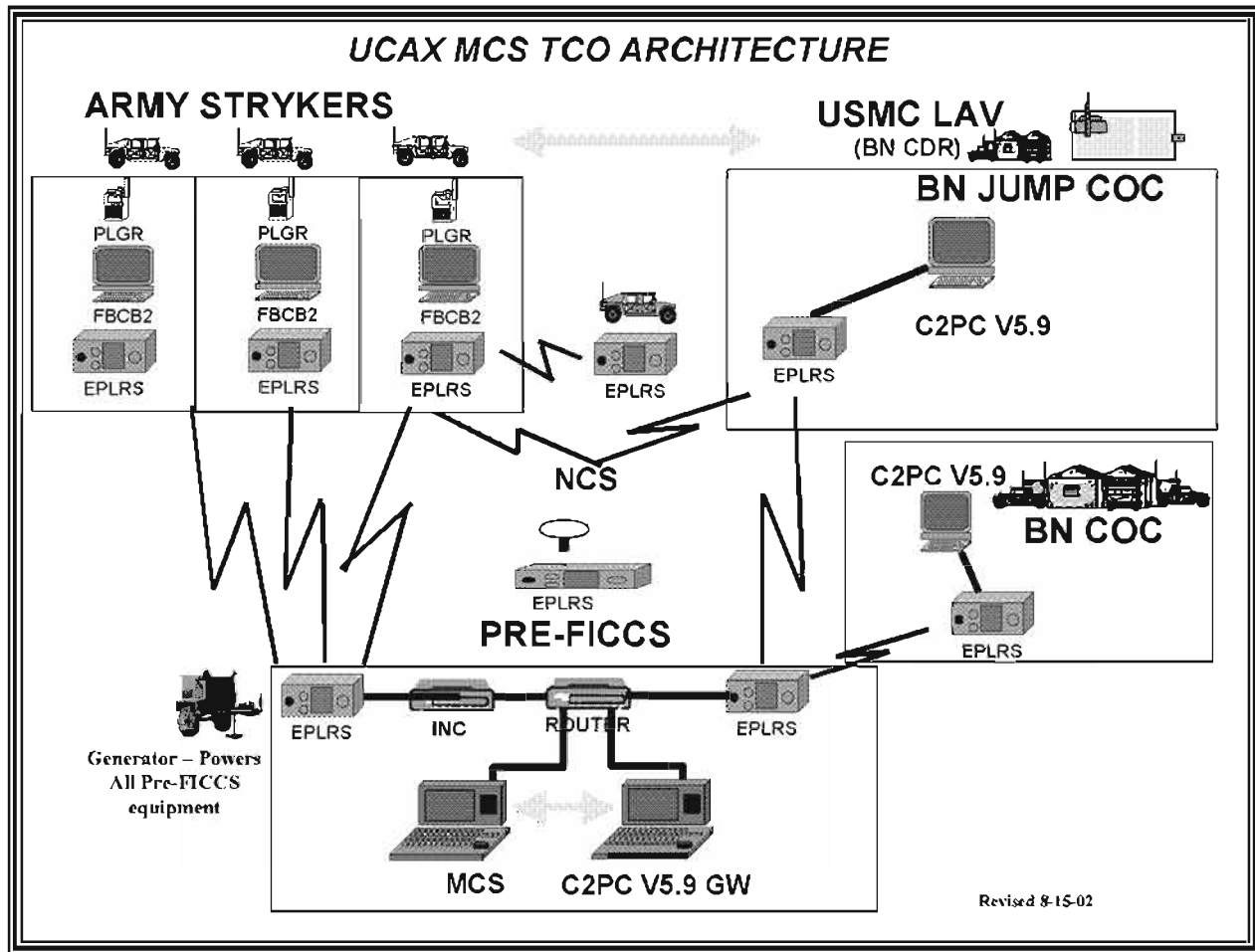


Figure 303: UCAX MCS TCO Architecture

awareness information. This additional information can be used to conduct precision engagement against a time sensitive target.

Both the MCS and TCO are systems of record. The MCS-TCO interface is technically mature enough to exchange critical situational awareness data in near-real time. JI&I are assessing the interface for further development to achieve minimum implementation of VMF standards between the Services' C2 systems and to automate data transfer. This includes exchange of all 133 VMF message types.

MCS-TCO interface testing for MC02 was conducted during the Marine Corps Urban Combined Arms Exercise 2002 (UCAX02). The MCS WS and C2PC used the EPLRS and a LAN to exchange data (See Figure 303).

During MC02, the MCS-TCO integration team successfully established a link between MCS and FBCB2. EPLRS served as the transmission media for passing the VMF messages between the Army and USMC C2 systems with the USMC functioning as the network control station (NCS). To make the Army EPLRS radios active in the USMC network, RSID's from the Strykers were added to the USMC NCS. The EPLRS network also included two Army-provided relay stations with the added capability of establishing a gateway between Army and USMC independent EPLRS networks if needed.

The Marine Corps Testing Systems Support Activity (MCTSSA) provided an infantry battalion with two C2PC systems with the MCS-TCO software. This ensured C2PC systems in the main Combat Operations Center (COC) and "jump" COC were capable of receiving VMF messages.

The primary systems were installed, operated, and maintained in a LAN configuration inside the USMC preliminary first-in command and control system (PRE FICCS) command center. The PRE FICCS was provided as a central location that would serve information between the operational forces involved in the UCAX. A CTP was successfully shared between the Army Stryker platoon and the Marine Corps infantry battalion. Eighty-nine percent of MCS-TCO users rated the ability to establish connectivity between the two systems very good or excellent. No problems were reported with the LAN connection. The ability to accept situational awareness data between MCS and TCO was rated very good or excellent by 89 percent of those surveyed.

- The systems should share a common database which will allow them to display other symbols, i.e. No Fire Areas (NFA), Restricted Fire Areas (RFA), Phase Lines, etc.
- The systems should have fully automated Situational Awareness, a common database to allow complete messaging, and a common implementation of 2525 graphics.
- To maximize use of database replication of exchange data from system to system, minimize message traffic and automate the operation
- VMF message components should be nearly transparent to the user. Full VMF message set should be enabled. Proposed tactical applications should be tested and more thoroughly developed.
- Automatically update both systems when one system receives data from another source. Both systems should use the CMP fully where you have the same capability using the CMP Graphic User Interface (GUI).

Some warfighters suggested further developing the interface to enable updating situational awareness messages automatically. Both systems were able to display MIL-STD 2525B symbology.

Other significant MCS-TCO observations focused on improving future systems and are listed as follows: This is based upon user feedback and subject matter expert opinions.

This interface has no impact on the SJFHQ but does have joint warfighting implications. The warfighter utility of the MCS-TCO interface was assessed against the following key enablers of the SJFHQ. Based upon the significance of the MCS interfacing with the TCO it was deemed that this initiative supports EBO. The system was also rated as potentially supports

establishing information/knowledge superiority, and assuring access into and through the battlespace. It was rated as such because further development of the system to achieve minimum implementation of VMF standards between the Services' C2 systems and to automate data transfer is ongoing. Furthermore, this assessment focused on the utility of exchanging situational awareness data, unit symbology, text messages, threat warnings, and force orders between Army and Marine Corps C2 systems.

DOTMLPF Linkage

USJFCOM is working with program managers to develop a DOTMLPF change recommendation package. The CMP software is planned for incorporation in future versions of both Army and Marine Corps systems.

Recommendations

The additional information obtained from MCS-TCO can be used to conduct precision engagement against a time-sensitive target.

Table 55: UCAX MCS-TCO interface measured as an enabler of MC02 objectives

| ENABLER                                        | Supports | Potentially Supports | Did not provide significant support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish Information/Knowledge Superiority    |          | X                    |                                     |
| Rapidly Set Conditions for Decisive Operations |          |                      | X                                   |
| Assure Access Into and Through the Battlespace |          | X                    |                                     |
| Conduct Decisive Effects-based Operations      | X        |                      |                                     |
| Sustain the Force                              |          |                      | X                                   |

**National Imagery and Mapping Agency (NIMA) Initiative**

This initiative (formerly referred to as National Imagery and Mapping Agency (NIMA) Crisis Action Response Team (CART)) has been expanded since its original submission to USJFCOM. Consequently, the initiative name has been changed to that reflected above.

Description

The NIMA initiative, sponsored by the National Imagery and Mapping Agency, consists of a web site supported by a server holding a variety of geospatial intelligence databases that are accessible via query by the warfighter searching for specific data/products. Multiple workstations connected within the lab provide the geospatial analysts the ability to create or modify products to meet custom requests for support. The site is connected via NIMA's internal networks to other NIMA production centers with additional resources to produce and forward products for further dissemination to the warfighter. A battle captain is responsible for managing the operation and allocation of production resources to meet request for information (RFI) requests. The following

illustration depicts NIMA's interface capability within the support and warfighter level components via the imagery/geospatial portal servers.

NIMA provides much of the geospatial intelligence that enables the CROP concept reality to support RDO in a collaborative environment. Within the framework of joint operational warfighting, the dynamics of RDO and EBO will demand constant updating of the CROP. The capabilities of NIMA enhance the validity of the CROP's depiction of the battle space picture. CART affords the Joint Task Force commander web-enabled access to data, products, tools, and NIMA SMEs. NIMA enhances the joint force's battlespace visualization and situational awareness in conducting EBO and allows real-time interaction between the JTF staff and NIMA in planning and conducting RDO. The ONA requires constant updating with the most current geospatial intelligence. While much of this updating will be automated and obtained from various systems such as GCCS, reach-back to NIMA provides the capability for analyst-to-analyst collaboration in the generation of products such as support to the ONA.

Overall Assessment Results

Initial responses to surveys issued within MC02 execution indicated a lack of knowledge or understanding of the initiative, a lack of awareness that NIMA provided the support data during planning and execution. The use of artificial or 'hybrid' geographic imagery terrain and the M&S systems used to run the MC02 experiment models contributed to limitations of the use of NIMA expertise and capabilities throughout MC02. The NIMA mapping product tools proved crucial in the operations of all M&S systems, as well as providing direct links to the ONA, joint automated target folders, and ATOs. No graphs are provided because a majority of the targeted audience responded, "don't know" in every functional area questioned. This caused the results to be based primarily upon interviews and subject matter expert inputs.

Table 56: NIMA Initiative measured against MC02 objectives

|                                                | Supports | Potentially Supports | Did not provide significant support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish Information/Knowledge Superiority    | X        |                      |                                     |
| Rapidly Set Conditions for Decisive Operations | X        |                      |                                     |
| Assure Access Into and Through the Battlespace | X        |                      |                                     |
| Conduct Decisive Effects-based Operations      | X        |                      |                                     |
| Sustain the Force                              |          |                      | X                                   |

Methodology

One hundred thirty-nine people were surveyed. In addition to the surveys, interviews and subject matter expert opinions were also considered. Using this methodology, the NIMA initiative has been evaluated to provide significant support of the key enablers of the SJFHQ.

Observations

NIMA support was evaluated against the following key enablers of the SJFHQ. As the main imagery/geospatial link from its production centers to the joint warfighters at the combatant

commander, JTF and component levels, NIMA provides them the critical information, directly establishing IS to the warfighter. By demonstrating this key functional capability as the crucial geospatial imagery link, it was determined that NIMA functional capabilities directly support the SJFHQ areas of RDO, required visual battlespace access, decisive EBO for all component command centers.

Normal NIMA interaction is limited within the JTF. During MC02, the geospatial expertise was located in the plans group and consisted of two people, including the JTF engineer. Both individuals provided positive comments regarding the support provided by NIMA.

Though the two-person staff was the primary developer and briefer of geospatial products used by all event participants, there was a definite non-awareness that NIMA provided the support data during planning and execution. This was evidenced by the overwhelming user survey responses of “don’t know” to any of the NIMA functionality questions. Two MC02 event limitations impacted NIMA support to the exercise. The first was the artificial or ‘hybrid’ terrain, which limits the amount of support that NIMA can provide to a JTF. NIMA has extensive geospatial intelligence databases; however, they are based on ‘real’ terrain and over the course of MC02, complete hybrid geography usage limited the level of NIMA support. The M&S systems used to run the MC02 experiment models were the second limitation. These systems were used to maintain, ground truth in the event, and replicate live collections. Since there were few “live” collection requirements, expertise was limited in support of responses to JTF collection requirements or in support of targeting and BDA.

The sponsor initiative technical lead pointed out that even if NIMA had insight into these function requirements, NIMA would not have been able to provide adequate geospatial I&W support to the JTF because the OPFOR was allowed to conduct their activity in an ‘intelligence vacuum’. The ‘surprise’ element to the event participants gave a false impression of the type of geospatial intelligence support that NIMA can provide to a JTF.

NIMA provided a special mapping product that was used as the ‘underpinning’ tool for all M&S systems, as well as the CROP before the start of MC02 execution. Without this special product, visualization of the battle space would have been extremely difficult for the event participants. During the execution of MC02 NIMA posted many actual imagery products within the home page in response to requests made by JTF and component participants. NIMA also provided adequate provisions for ONA, joint automated target folders, ATOs, and geospatial intelligence expertise direct links throughout the MC02 experiment.

#### *Relationship to Other Objectives*

Performance regarding the NIMA initiative may impact the findings of the other assessment areas or joint initiatives.

#### *Recommendations*

Although the NIMA initiative reflected positive feedback provided by the few participants who actually used the site, full NIMA functional capabilities were not completely put to the test due to the limitations of the MC02 experiment. As an unproven technological initiative in MC02, NIMA was able to expose the participants to a number of geospatial visualization tools that should be useful to support current and future warfighter operations. Feedback provided on these tools should enable NIMA sponsors to better identify and support future geospatial requirements. Future military efforts involving NIMA need to expose the functional capabilities of geospatial intelligence to the different levels of joint warfighters.



## Network Security Management Correlation and Display Systems (NSM C&D)

### Description

Computer network defense (CND) is one of the critical enablers for implementing RDO in the 2007 timeframe. MC02 provided the CIE for evaluating the effectiveness of the CND CONOPS envisioned during the network security management correlation and display (NSM C&D) demonstration by the Joint C<sup>4</sup>ISR Battle Center (JBC).

The NSM C&D system had previously been assessed by JBC and is recommended for deployment. See JBC's Network Security Management Correlation and Display Assessment Report # 32-05 dated Feb 2002 on JBC's SIPRNET web site.

The NSM C&D system provides the Commander, Joint Task Force (CJTF) with an enterprise network security management system implemented at the SJFHQ. The system monitors the Service components' and JTF's intrusion detection, firewall and other

information assurance (IA) sensors. It provides near-real-time "attack sensing and warning" and recommended responses to computer network intrusions and attacks. NSM C&D incorporates a near-future commercial enterprise security management product called Cyber Wolf. The software used during MC02 was a beta copy of Cyber Wolf version 2.0 to be released by Symantec in November 2002. Cyber Wolf creates a standard, secure, and interoperable interface for Service and JTF information assurance sensors. Cyber Wolf increases the effectiveness of analysts by correlating, prioritizing, organizing, and displaying results from many thousands of alerts. Cyber Wolf's web-based graphical user interface enabled analytic collaboration and response coordination with supporting, remotely located CND Service Provider organizations such as a DISA Regional Computer Emergency Response Teams (RCERT). Additionally, it facilitated network security event reporting through its interface to the Remedy Action Request System trouble ticketing system, which is the principal fault management and reporting application used in the Joint Defense Information Infrastructure Control System – Deployed (JDIICS-D), in the Defense Information Systems Agency's (DISA) Integrated Network Management System (INMS), and in the forthcoming Joint Network Management System (JNMS).

During MC02, Cyber Wolf was implemented at the Joint Command Control Center (JCCC) to monitor intrusion detection, firewall and other IA sensors throughout the enterprise to provide the IA and CND aspects of the CIE to the CJTF (See Figure 304). As part of the MSEL, a "Purple team" infiltrated the joint force networks and attacked designated target machines. The term "Purple team" was coined to differentiate the team's directed and scripted attacks against specific targets from the non-predictable attacks of a standard Red team against any weaknesses a Red team would have detected. The CONOPS for CND was evaluated for its ability to detect and counter the Purple team intrusions and exploits. The Purple team activities were intentionally designed not to degrade the RDO experimentation.

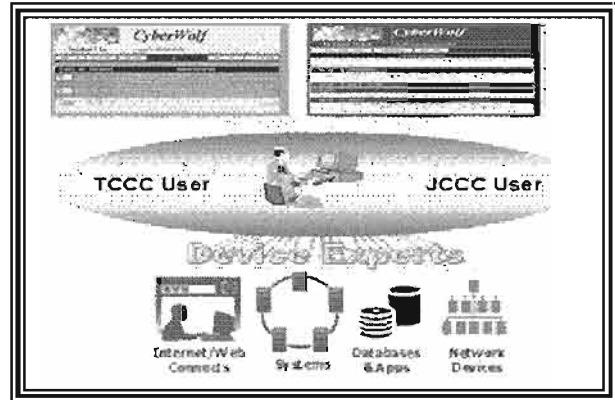


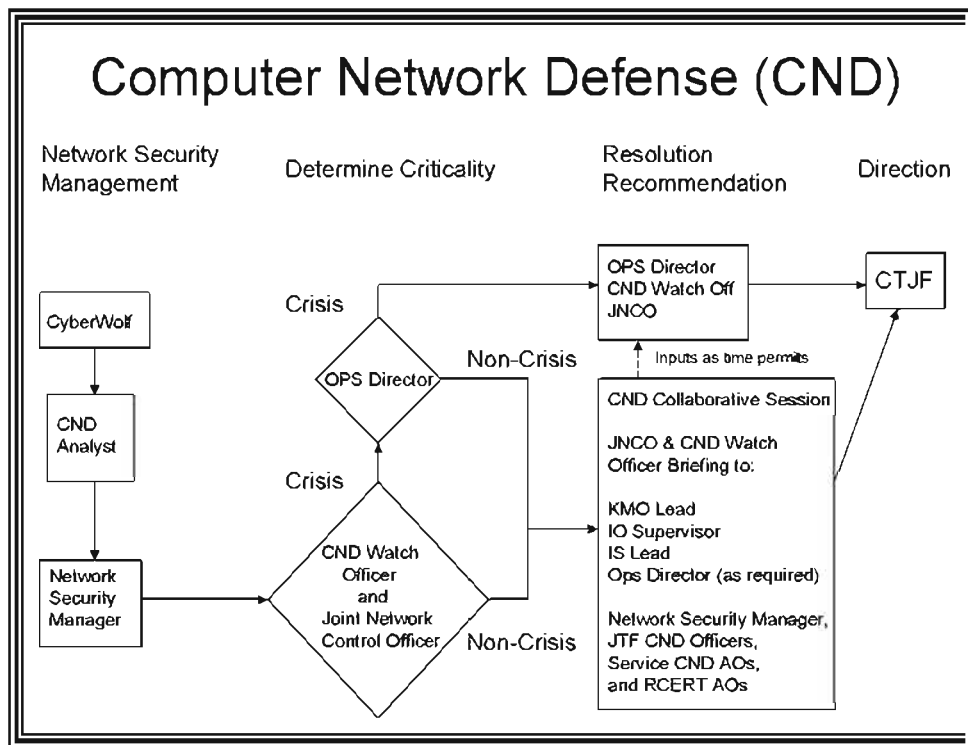
Figure 304: Screen Capture of NSM C&D

Overall Assessment Results

The JBC resources were considered to better evaluate the utility of MSM C&D. Planners elected not to inject NSM C&D throughout all aspects of the experiment because of the interference it would have caused. Initiative administrators conducted some testing during the setup and initial days of MC02 showing that CND CONOPS were a success.

Methodology

A Cyber Wolf device expert that reported alert data to the Cyber Wolf manager monitored each IA sensor deployed in support of the NSM C&D demonstration. The Cyber Wolf manager in turn correlated the alerts and identified potential security incidents. The CND



analysts reviewed the incidents and related data, and recommended responses to the JCCC network security manager. The CND analyst created incident reports through JCIICS-D's Remedy interface.

Upon release of incident data into JDIICS-D, the JCCC network security manager conferred with the CND analyst concerning the possible implications and to discuss

Figure 305: Logical flow for the CONOPS decision making for CND

response recommendations. The network security manager then released an instant message to the JCCC joint network control officer (JNCO), knowledge management officer (KMO), and information operations (IO) watch officer to support collaboration within the JCCC. The network security manager accessed Cyber Wolf through his workstation to support collaboration within the JCCC. Figure 305 provides the logical flow for the CONOPS decision making for CND.

Following notification by the JCCC network security manager, the JNCO initiated a collaborative session with the other relevant officers (including the network security manager, the JTF IO watch officer, the appropriate KMOs, and JTF-CNO liaison officer) to review the severity of the attack and the recommended response. The JNCO then authorized the CND response and informed the CJTF as appropriate.

Two forms of injects were generated during the demonstration; Purple Team injects and simulator derived injects. The Purple Team conducted attacks through the JTF network against designated target machines. In order to simulate intrusions on the Service components' networks,

the Cyber Wolf simulator was employed to inject alerts as if they had originated from the sensors and devices on the Service components' networks. Four such scenarios were run. The network intrusion detection sensors (IDS), firewall logs, and operating system logs (SYSLOGS) were monitored by Cyber Wolf, which provided near-real-time correlation of the alerts and identified potential attacks according to their level of criticality.

**Table 57: Computer Network Defense measured against MC02 objectives**

|                                                | Supports | Potentially Supports | Did not provide significant support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish Information/Knowledge Superiority    |          | X                    |                                     |
| Rapidly Set Conditions for Decisive Operations |          | X                    |                                     |
| Assure Access Into and Through the Battlespace |          | X                    |                                     |
| Conduct Decisive Effects-Based Operations      |          | X                    |                                     |
| Sustain the Force                              |          |                      | X                                   |

Observations

The CND CONOPS was successfully exercised during MC02.

**Incident Notification:**

During the experiment, the joint network operations officer was inundated with e-mails; could easily overlook the notifications. Thus, procedures were changed during MC02 to provide the incident notification via instant messaging. Instant messaging proved to be timely and effective.

**Collaboration View:**

An IWS chat room was used to host the collaborative sessions initiated to discuss detected network intrusions and recommendations for response. The web-browser view of the Cyber Wolf incident display served as a key source of visual information to support the collaboration. The collaboration sessions proved to be quite useful.

**Reference Information:**

As a proof of concept, Cyber Wolf provided a system-generated response recommendation for each incident ticket it generated. This proved to be very helpful to the analyst. The response recommendation is provided with the first instance of an incident's recognition and is updated as the severity of the incident changes throughout the progress of the attack.

**Trans-Service reporting criteria:**

Two of the computer network attack injects served to highlight the differences in reporting criteria among the Services.

**RCERT reach-back support:**

Cyber Wolf's secure web-enabled access greatly facilitates reach-back CND analytical and advisory support from the DISA Theater RCERT.

**Depth of Sensor Information Available:**

Cyber Wolf creates standardized, truncated, encrypted TCP-IP messages for each of the monitored devices/logs to efficiently and securely communicate the intrusion alert data across the enterprise network. This provided sufficient input to enable near-real-time correlation of computer network attack incidents to effectively identify attacks with minimal impact on the network communications bandwidth. However, in order to conduct in-depth retrospective and follow-up forensic analysis, additional packet payload data captured by the sensors would be required.

**Intrusions invisible to network intrusion detection sensors:**

For insider attacks and for attacks from the outside that did not trigger the attack signatures in the network intrusion detection systems, the log files provided the only indication of the attacks. This served to reinforce the importance of providing a correlation capability to read and alert in near real time based upon log file entries.

**Recommendations**

**Network status display:**

Deploy JDIICS-D in all future exercises as the network management system. It is designated as the interim joint network management system. It contains the prescribed tools to monitor the health and status of network devices and to provide a trouble ticket reporting, tracking, and fault management capability. Implement the Cyber Wolf interface to JDIICS-D's HP Open View Network Node Manager application and Remedy ARS application. Include HP Open View NNM web-enabled displays as a part of the collaborative sessions for discussing the impacts of computer network attacks against the JTF enterprise network.

**Incident Notification:**

Implement instant messaging on JDIICS-D and its replacement system, the joint network management system (JNMS), as the principal means of notifying designated watch/response nodes (i.e., the JNCO, CND watch officer, Service CND action officers, and the DISA RCERT action officers).

**Collaboration View:**

Incorporate collaboration with the relevant participants as a standard tool at the JTF to support CND/network security incident response decision-making.

**Reference Information:**

Implement response recommendations as a standard feature in Cyber Wolf and augment its knowledge table to reflect the user organization's desired responses for the enterprise network being monitored.

**Trans-Service Reporting Criteria:**

JTF-CNO standardize DoD incident reporting criteria across the combatant commands and Services in concert with CJCSM 6510 reporting requirements.

**RCERT reach-back Support:**

Enable secure remote web access to Cyber Wolf with appropriate permission levels to facilitate DISA Theater RCERT analysts' online collaborative analysis and advisory support to deployed JFHQ CND analysts and staff.

**Depth of Sensor Information Available:**

Employ Cyber Wolf on the JTF enterprise network for near-real-time identification of computer network attacks. Develop a capability within Cyber Wolf that could enable the analyst to interrogate the sensor logs to obtain selected drill-down data for those incidents declared by Cyber Wolf and identified by the Cyber Wolf analyst as requiring additional forensic investigation.

**Intrusions invisible to network intrusion detection sensors:**

Use Cyber Wolf to monitor the firewalls, routers, host-based intrusion detections systems, operating systems, and network-based intrusion detection systems implemented throughout the deployed enterprise network to increase the effectiveness of the IA defense-in-depth strategy.

**Theater Medical Information Program — Joint (TMIP-J)**

Description

The Theater Medical Information Program – Joint (TMIP-J), sponsored by U.S. Joint Forces Command, was introduced as a tool to develop and demonstrate the medical portion of the CROP and to experiment with tools to better enable the warfighter to receive the expected level of care throughout the JOA. Expanded distance and limited footprint require the use of technology and enhanced monitoring to provide the best available health service support. The goal of TMIP-J is to move the right medical capabilities to support deployed forces at the right time and right place.

TMIP-J integrates medical information systems to capture the medical record data while linking care from the theater of conflict to a sustaining base for enhanced medical care. It allows medical and health sciences environment surveillance to minimize casualties and help maintain a healthy force. TMIP-J also improves medical intelligence gathering and potential threat mitigation on chemical and biological threats and attacks.

There are three tools used for the automated medical record data capture and medical intelligence gathering. Global expeditionary medical system (GEMS) is a hand-held palm pilot-like, paperless, data linked tool for the front line medic to record and track individual patient assessments and is used by the Air Force. Shipboard non-tactical automated medical system (SAMS) is a paperless, hand-held tool used extensively on ships to record and track individual encounter data and medical readiness status. It is also used to reorder medical supplies for maritime commands and is used by the Navy. Medical communications for combat casualty care (MC4) is a hand-held tool, providing commanders with timely medical situational awareness. The MC4 provides casualty/patient tracking; trend analysis of health care encounters, medical command and control, medical surveillance, medical treatment, and medical logistics data across all levels of care. MC4 is used by the Army.

TMIP-J provides an integrated, automated theater medical information system addressing the functional areas of:

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

- Command and control (including medical capabilities assessment/sustainability analysis, and medical surveillance)
- Medical logistics (including assemblage management and blood product management)
- Health care delivery (including medical threat, surveillance and health care delivery)

Overall Assessment Results

TMIP-J did not play a substantial role in MC02. Medical personnel were asked about the effectiveness of TMIP-J in its functional areas. Actual patients in the experiment did not match the patients in TMIP-J. However, TMIP-J was able to integrate medical information systems to capture the medical record data by using scripted data, which was based upon medical personnel feedback. TMIP-J is a powerful tool and with more substantial testing, has the potential to provide significant key enabler support to a SJFHQ in the future.

Table 58: Theater Medical Information Program - Joint measured against MC02 objectives

|                                                | Supports | Potentially Supports | Did not provide significant support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish Information/Knowledge Superiority    |          | X                    |                                     |
| Rapidly Set Conditions for Decisive Operations |          | X                    |                                     |
| Assure Access Into and Through the Battlespace |          |                      | X                                   |
| Conduct Decisive Effects-based Operations      |          |                      | X                                   |
| Sustain the Force                              |          | X                    |                                     |

Methodology

Eight professional medical personnel evaluated TMIP-J during MC02. These users were surveyed regarding their use of TMIP-J tools. In addition to the surveys, interviews and subject matter expert opinions were also considered to better evaluate the utility of the TMIP-J. The analysis indicates TMIP-J's potential for providing significant key enabler support to the SJFHQ. This assessment primarily focused on the warfighter's rating of the effectiveness of each functional area of TMIP-J.

Observations

TMIP-J was rated as possessing the capability to potentially provide significant key enabler support to the SJFHQ. This was because TMIP-J did not play a substantial role in MC02. If the experiment were expanded to include a medical scenario with actual patients, then the assessment would be able to be expanded. Subject matter experts indicated that TMIP-J has the potential, when it is properly designed, tested, and fielded to provide valuable information for clinicians and statisticians to detect trends, provide visibility to the Service and provide health service support status, which may be used by the JTF Surgeon.

Findings based on the results from the assessment questionnaires obtained from the eight medical personnel are shown in Figure 306. All of the functionalities were rated the same across the board despite the fact that TMIP-J was not successful in tracking patients.

The expectations of the TMIP-J initiative were not all realized during the execution, even though TMIP-J was rated as being effective in each functional area by medical personnel

queried. The JTF surgeon and staff chose not to use TMIP-J because of its immaturity and inability to provide any useful information supporting the medical operations.

The ability to assess whether Service play solidified the TMIP-Service is needed to support TMIP-J was not available since the Service boxes did not have their Service specific patient encounter modules (e.g. CHCS II for Army, GEMS for AF, SAMS for USN and USMC). Additionally, there was not enough data to look at patient data trends. Observations indicated that the information from previous Spirals should have been run in joint medical semi-automated forces (JMedSAF) and transferred to the TMIP-J.

TMIP-J was able to integrate medical information systems to capture the medical record

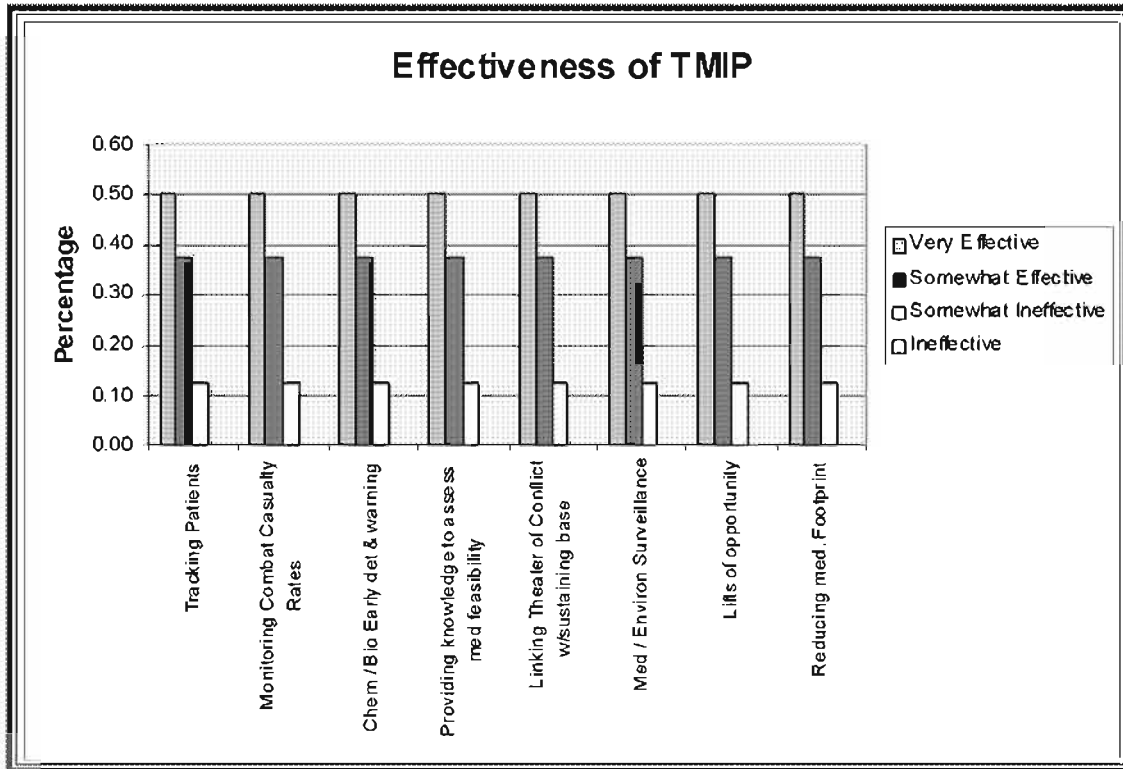


Figure 306: Effectiveness of TMIP

data using scripted data. However, there were discrepancies in the casualty reports. This was primarily due to lack of SOP and early coordination between the exercise controllers at JTASC and the lack of manning roster management. Medical support and execution did not benefit from the application of the SJFHQ concept. Respondents stated that there were no medical planners or medical intelligence representatives on the SJFHQ and someone should have been there. Survey respondents also indicated that the SJFHQ had limited “reach-back” capability to support request for medical intelligence and planning. This issue was magnified because the JTF surgeon’s staff had to start from scratch in their medical planning process.

The lack of early planning and knowledge of what assets were already in theater slowed the delivery of focused medical support services. Survey respondents offered several scenarios in order to demonstrate this slow down. For example, a blood supply unit was not placed on the TPFDD, resulting in the creation of a “make-shift” BSU-like unit in the host nation hospital, which severely limited support. In another example, dedicated assets for medical evacuation (Army Air ambulance company) had an arrival date of C+37, well after the warfighters main

effort was over. The late arrival of the air ambulance company made it necessary for the Services to use organic assets for casualty evacuation (CASEVAC) within the JOA. These lift-of-opportunity assets may be few and hard to obtain during an actual contingency.

Overall, there was a lack of medical information. Pre-hostility patient data was not available to flow into TMIP-J at the beginning of MC02 execution. A work around was created to feed information to the JTF surgeon and staff on the medical portal. This work-around was created because the funding was not available to provide the TMIP-J boxes to all medical personnel within the JTF. As with all of the other logistics tools, additional in-depth training is recommended. The lack of sufficient training could directly be attributed to the observation that information in MEDSITREPS was never consistently sent forward to response cells.

Relationship to Other Objectives

None

Recommendations

The experimentation should be expanded to link actual patients to patients in the TMIP-J. More data is also needed in order to look at patient data trending outcomes. The level 1 medical facilities should be simulated in future experiments in order to generate casualty numbers that are realistic and linked to the manning rosters. This data should then be tied into the combat scenario. Additional information should also be scripted in order to show the evacuation, additional visits/patient encounters. In addition to the above, more data should be made available to assess disease and non-battle injuries and incidents of potential disease outbreaks.

**Unmanned Sensor (US)**

This initiative ((formerly referred to as unattended ground sensor (UGS) support to special reconnaissance (SR) of TBM)) has been expanded since its original submission to JFCOM. The initiative now incorporates both UGS and UAV support to special reconnaissance. Consequently, the initiative name has been changed to that reflected above.

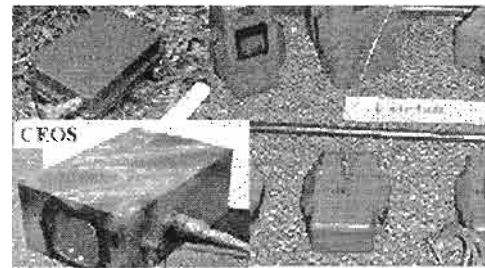


Figure 307: Unattended Ground Sensors

Description

The US initiative incorporates the use of UGS and UAV's to support Special Operations Forces (SOF) performance of SR missions. Both types of unattended sensors were employed and assessed in MC02. The UGS portion of the initiative concentrated on two suites of unattended ground sensors (UGS) and remote sensor and camera controller (RSC2) relays to help locate, classify, and identify TBM targets for immediate strike. Simple sensors (See Figure 308) used to track targets and cue camera systems are emplaced along the roads approaching a key intersection or named area of interest (NAI). These sensors transmit their alert data to a nearby remote sensor and camera controller (RSC2). The RSC2 is collocated with a common electro-optical sensor (CEOS) remotely operated digital camera. The RSC2 serves as a relay and controller, transmitting sensor alert data to a distant station, tracking the transit of targets through the sensor field.

Based on prior programming, when cued, the RSC2 initiates the CEOS image capture. It can be remotely reprogrammed in response to mission changes. The UGS can be employed in



two architectures. In the primary architecture (referred to as free wave (FW), the UGS alerts and imagery are transmitted to a nearby mission support site (MSS) which, in turn passes target identification and location information (via voice) to the JSOTF or JOAC for action. In the second architecture, referred to as Firestarter (FS), the UGS alerts and imagery are transmitted directly to the TST cell in the JFACC. This downlink uses analog phone lines for display on a laptop C2PC portal system.

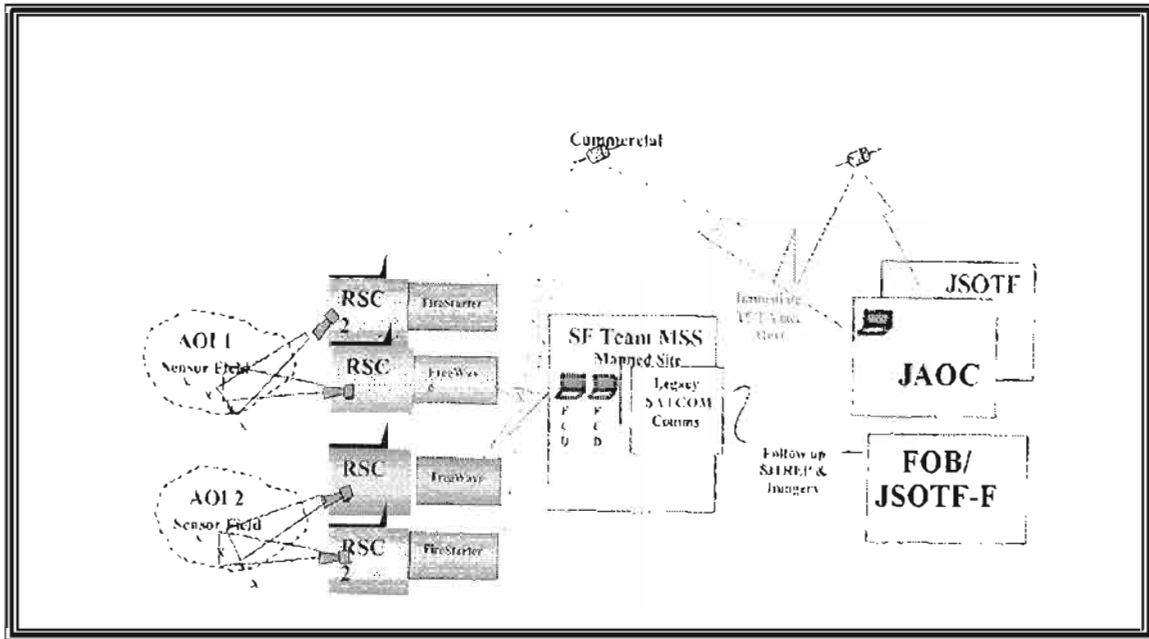


Figure 308: UGS Architecture

The UAVs examined in this experiment were the fixed-wing Pointer, and the larger rotary wing Maverick (See Figure 309). Pointer is a man-portable, hand-launched, electric, low-cost, fixed wing reconnaissance UAV. Its payload consists of either a high-resolution color camera (daylight) or an inferred thermal imager (night) for real-time, high-resolution video imagery. Maverick will be an A160 Hummingbird, which is a developmental rotary wing UAV that is currently undergoing ground testing. A surrogate, the "Maverick," is a Robinson R-22 sport helicopter configured as a UAV to test flight-control systems. Maverick, powered by a commercial piston engine, weighs about 4,000 pounds and has a payload capacity of more than 300 pounds.

Payloads include EO/IR imaging and SAR sensors. The UAV employment architecture is as shown. Pointer was launched and controlled by a SOF SR team near the objective, while Maverick was launched from a Special Forces mission support site (MSS) located away from the objective. Generally, Maverick was launched first to fly an advanced reconnaissance of the area, providing images used in developing the R&S plan. Once deployed, Maverick provided security for the launch and recovery of Pointer. Pointer was launched

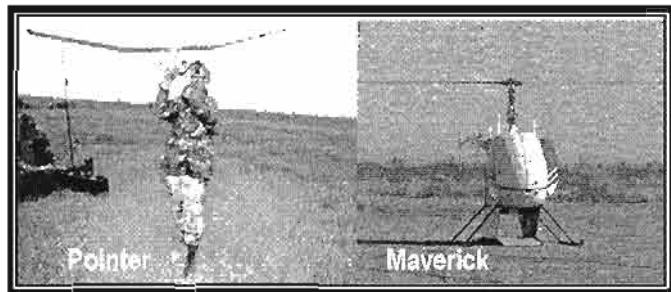


Figure 309: UAV's used in MC02

once the area was secure. Video outputs from Pointer were passed to both the SR team as well as the MSS. Still frames from both UAV's were passed to a naval vessel (with a JSOTF forward) as well as the SOF forward operating base (FOB).

Both elements of the US initiative were used to support SOF SR missions. The UGS sensors were primarily employed to support TBM SR, while the UAV'S supported WME SR. The United States Special Operations Command sponsored the US initiative.

Overall Assessment Results

The US initiative provided a proof of concept for UGS and UAF enhancement of SOF ground team SR mission. Sensor information was passed to JSOTF & JAOC TCT decision makers. The unattended sensors provided "eyes on target" information throughout TST process.

Both UGS dissemination architectures for the RSC2 system worked, allowing tracking and image capture of multiple targets. High value targets transiting the areas of interest (AOIs) were identified and expeditiously reported to higher HQ, in most cases in less than five minutes. This capability demonstrated the utility of UGS to support SR.

MC02 provided an opportunity to identify procedural as well as technical issues in the employment of UGS and the RSC2 architecture. It also allowed for an analysis of the systems tactical utility as viewed from the operational users' perspective.

Using UAV'S SOF teams passed real time information to operational level headquarters as part of SOF SR missions.

MC02 demonstrated the advantages of both UAV platforms operating individually as well as in tandem.

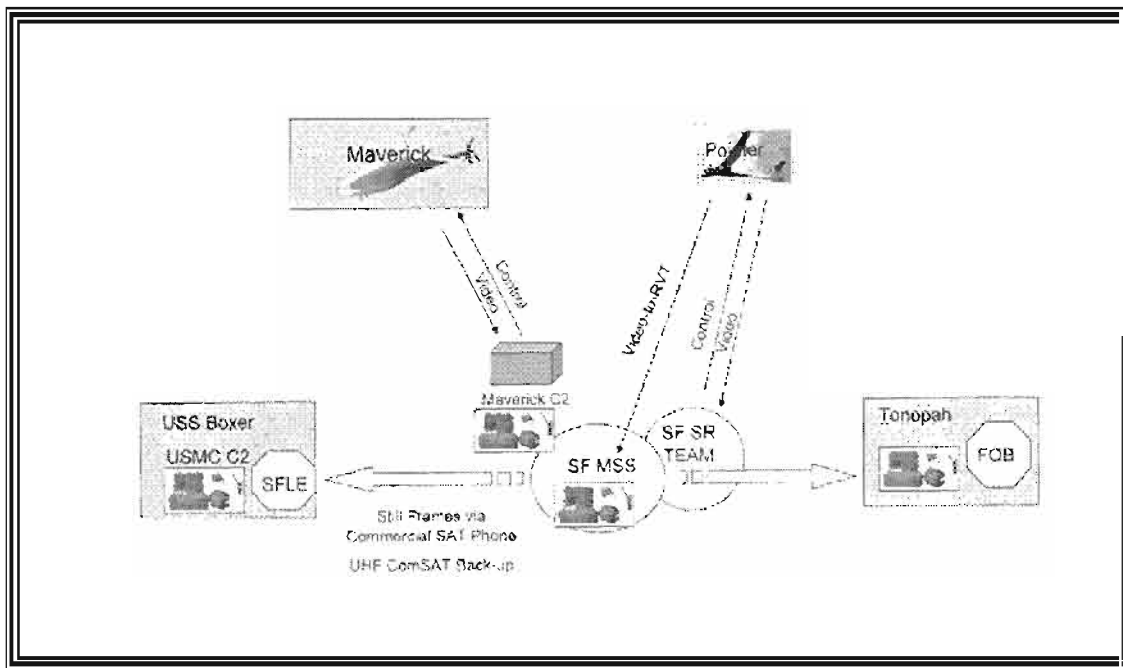


Figure 310: UAV Employment Architecture

Methodology

SMEs deployed from HQ USSOCOM to observe the UGS and UAV activities. They conducted interviews with technical representatives of the systems, Special Forces participants

who employed the systems, and recipients of sensor products. A second USSOCOM SME also spent three days evaluating the intelligence potential of UGS and passed findings to the primary SME. Using this methodology, US have been evaluated as supporting SOF SR.

Observations

US observations are based upon participant interviews supplemented by SME findings.

The UGS portion of the initiative began with the emplacement of EMIDS/MIDS magnetic, seismic, and passive infrared (PIR) sensors along road intersections at two AOI. SOF operating detachments conducted placement of the sensors—alpha personnel under stealth conditions. Both architectures for the RSC2 UGS system worked, allowing tracking and image capture of multiple targets (See Figure 310).

The FW architecture quickly provided images and sensor alerts to the SF team in the field MSS (within one minute of target transit), allowing the team to rapidly transmit voice alerts to the rear. An added bonus provided by the team in the field was the ability in some cases to visually follow targets after they left the sensor field, continuing to report, direct strikes, and provide BDA. The voice reporting chain (through the JSOTF) appeared somewhat cumbersome and slow. The team found itself attempting to report and respond to multiple headquarters (JSOTF, FOB and JAOC) while simultaneously directing aircraft overhead. This proved daunting and in many cases, after an initial report, the team ended up communicating exclusively with inbound aircraft attacking the TBM.

The FS architecture provided images and sensor alerts directly to a workstation in the JAOC SOLE. This architecture was slightly slower than FW, but allowed insertion of the alerts and images, once received, into the MC02 C3 network. The workstation was originally scheduled to be adjacent to the SOF LNOs at the TST/TCT cell on the combat operations floor of the JAOC, rather than in the SOLE. Reporting was limited to sensor system feeds and corresponding pictures, with no follow-on ability to visually track targets once they exited the sensor field.

Most elements of the UGS/RSC2 system, including the EMIDS/MIDS sensors, RSC2, CEOS day cameras, and FS communications link, performed as advertised. The FW link and display software required some troubleshooting and should be further refined to make them more robust and user friendly.

Feedback was generally positive and supportive of the use of the system for SR. Strengths included ease of system emplacement, sensors simple and effective, and programmable software. Weaknesses were noted in the display/communication software being challenging to operate and troubleshoot, FW communications link being “sensitive,” and the inability to automatically transfer sensor data onto SIPRNET.

The risk to the SOF team is reduced since they do not have to remain in the denied area to monitor the sensor field. The team, however, is also not available to follow up on reports, so identification of additional ISR assets to track identified high value targets once they leave the sensor field is desirable.

In the UAV portion of this initiative, Maverick flew an advanced reconnaissance of the area providing images used in developing the R&S plan. Once deployed, Maverick provided security for the launch and recovery of Pointer. Pointer was launched once the area was secure. The SR team performed launch and control of the UAV. Although not necessary, the team practiced hand-off of Pointer control from person to person. Photos from Pointer were captured and sent to a LNO onboard the naval vessel via commercial SAT phone and UHF COMSAT

back up. From the LNO's location, images were sent to the unit planning the mission. As a side benefit, the photos were shared with the MEF onboard the ship. Coordination and mission selection between the two UAV's were demonstrated.

As part of naval special operations participation in MC02, the Pointer UAV was also flown from aboard a second vessel to conduct reconnaissance of an offset target. . The Pathfinder ACTD team successfully launched the Pointer UAV from the ship and landed/recovered it ashore repeatedly over a two-day period, recording videos of these flights from the ground control unit onboard for inclusion in MC02.

MC02 proved useful in refining the TTPs for the employment of Pointer and Maverick and identified areas for further exploration. Because the maneuver area was significantly confined, the potential for compromise of the ODA by enemy forces during a launch of the Pointer UAV was significant. The ODA's security was tremendously increased by employing Maverick early and focusing on key avenues of approach to the ODA's launch and recovery sites. This overwatch capability, combined with communications and the means to engage threats if necessary, could provide a positive impact on future SOF reconnaissance missions. MC02 demonstrated the advantages of both platforms operating individually as well as in tandem. During some missions, Pointer conducted an area reconnaissance followed by the employment of Maverick on targets spotted by Pointer that needed greater clarity. This required, however, direct communications between the ODA employing the Pointer and the C2 node for Maverick. This was accomplished through commercial means for the exercise.

The UAV communications architecture for MC02 was a unique solution for exercise-use-only. While a derivative of this architecture may become the solution for the "hub" that ties Pathfinder systems together, it was intended only as a baseline solution. The indigenous primary, secondary, and contingency means of military radio communication between the ODA, FOB, and the Special Forces liaison element (SFLE) failed during portions of the experiment. The communications node (COMMNODE) provided the only means of steady communication until tactical satellite (TACSAT) communications were established well into the experiment. Although originally designed as a means of passing images, it became the primary means of communicating message traffic between the elements. Tasking received to obtain images of certain target areas was quickly processed and targets were programmed within hours. However, real-time coverage would have been possible if the SFLE had real time direct communications with the FOB and Maverick C2 nodes.

The ODA had a unique task organization for some of its Pointer missions. Rather than co-locating the GCU with the remote video terminal (RVT), the ODA in some cases split these off. This provided for increased security for uploading and downloading images while the GCU continued to provide terminal guidance. In other cases, the launch team was initially co-located with the GCU and RVT elements, and then the latter was split off to a remote site or put in a mounted roving mode. Additionally, the ODA exercised the hand-off capability of Pointer on several occasions, launching it from one site and handing control off to another. They successfully conducted several iterations with distances between sites of up to five KMs under both day and night conditions.

Currently, command and control of the Maverick UAV is separated using two trailers for the flight control system and the mission commander. There is presently additional engineer equipment in the flight trailer to monitor the systems that will not be present upon delivery. This separate arrangement was found to be adequate, but not ideal for command and control of the system. There is adequate space for the mission commander between the pilot and copilot. A

second separate viewing capability would be beneficial for other observers, thus allowing the crew to concentrate on the Maverick flight. However, separating the mission commander from the crew does not allow for proper C2 of the system.

Table 59: Evaluation of US support to special reconnaissance

| Unattended Sensors                             | Supports | Potentially Supports | Did not provide significant support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish Information/Knowledge Superiority    |          | X                    |                                     |
| Rapidly Set Conditions for Decisive Operations | X        |                      |                                     |
| Assure Access Into and Through the Battlespace |          | X                    |                                     |
| Conduct Decisive Effects-based Operations      | X        |                      |                                     |
| Sustain the Force                              |          |                      | X                                   |

While the differences in cost and complexity between Maverick and Pointer UAVs are understood, there are currently no SOF personnel trained to operate the Maverick UAV. A combat controller participated in MC02 as the mission commander for all flights. His leadership, experience, and skill in tower procedures and airspace management significantly enhanced Maverick operations. Training SOF personnel to fly Maverick is the next logical step in this program.

Relationship to Other Objectives

This assessment does not impact other assessed joint initiatives or assessment areas.

DOTMLPF Linkage

The US initiative does not support any pending DOTMLPF change recommendation packages.

Recommendations

Unmanned Sensor recommendations are based on participant comments and SME findings.

MC02 provided an opportunity to demonstrate the potential utility of UGS systems to a SOF element conducting SR and to the JTF with direct sensor data feed into the ISR fusion element. Clearly, these tools can be useful, extending the reach of the SR element over distance and time, while reducing risk to the operator, as well as providing near real-time sensor data for ISR fusion.

In the UGS FW reporting architecture, communications procedures between the deployed team and higher HQ must be fully coordinated. Streamline reporting will avoid layers that create delays unacceptable in a TST/TCT mission. The team cannot simultaneously report and respond to multiple command levels within TST/TCT timelines. In addition to establishing efficient reporting systems, command relationships should be clearly established to support mission accomplishment. Clear mission guidance to the deploying team, based on thorough IPB and pre-designated target strike decisions, is required to maximize mission value.

In the UGS FS reporting architecture, OPCON/TACOM of this asset must be delineated along with procedures to process the data by the controlling authority. Eventually, an effective

processing of the resulting data evolved. Additionally, the lack of an automatic means of inputting the unclassified sensor data onto SIPRNET and into the TCT process delayed the near real-time capability of the system. To alleviate this current limitation, the output of this architecture can be monitored by a series of "Client" displays located at dispersed nodes if desired and planned. For example, the JSOTF HQ monitored the display for two days of the MC02 live fly, however, its integration into the TCT decision process is unknown.

MC02 served to help develop and refine UGS employment TTPs with input from the operators. At the front end, selection of appropriate targets for these limited assets is critical. A thorough IPB must be conducted, factoring in the strengths, limitations, and capabilities of the UGS system. UGS are best used at critical choke points with relatively light traffic. Another critical requirement is detailed coordination of communications to the correct organization/individual, including frequencies, call signs, and cryptography (whether using the FW or FS architecture). Reports must flow directly to the appropriate decision-making HQ to preclude delays. Pre-mission training should be thorough and include detailed rehearsals. Ideally, users should become familiar with the UGS system prior to deployment, through its integration into training and exercise programs. SMEs can be used to further refine expertise on the system during isolation or prior to employment. The monitor site should be established prior to sensor field emplacement, so that system communications links can be tested and confirmed as the sensors and RSC2 are emplaced. Sensor field emplacement team can be split to work the target site, minimizing time on target. Camera aim at night remains a challenging emplacement task, requiring careful planning and rehearsal.

While the current operational UGS prototypes can be further improved, the capability they provide, even now, is significant. As these systems mature, they should have a significant impact on how SOF and the JTF can more effectively conduct SR. Specific operator recommendations are:

- Reduce size/weight, and increase endurance
- Consider alternative power sources
- Integrate night camera and night sighting for day camera
- Add pan/tilt camera control capability
- Provide a guard that allows automatic transfer of unclassified sensor data onto SIPRNET
- Establish a common system configuration for US systems to include a tactical communications link between elements employing UAVs, and UGS
- Develop a training plan and determine prerequisites for selection of military personnel for training on operating UAVs
- Conduct additional experiments to explore TTPs for the employment of UAVs and other reconnaissance assets

### **Operational Network Assessment Tool Suite**

#### Description

The ONA tool suite, sponsored by the joint experimentation/C<sup>4</sup>I team, is a suite of tools providing information collection, storage, processing, sharing, and display functions supporting the OSD, the combatant commander, the CJTF, and warfighters in accomplishing EBO. The following applications: Genoa, Analyst Notebook and ArcView/ArcIMS, and a USJFCOM organically developed ONA database were chosen to make up the suite for the initial MC02 functionality testing.

The ONA views a potential adversary as an interdependent system of systems, all of which contribute to some degree toward his will and capability to pursue a course of action inimical to US interests. The ONA supports the EBO concept, which requires that all levels, strategic to tactical, collaborate to plan and execute synchronized operations to produce a desired effect upon the adversary's capability to conduct operations. The ONA goes far beyond traditional intelligence assessments. ONA is an action-oriented process that provides a continuous stream of knowledge from adversary vulnerabilities to effects to tasks. As such, ONA represents a philosophy that drives a process to produce a product. The process builds situational awareness and understanding. The product supports plans and execution of operations.

A number of tools were evaluated or developed to support ONA implementation. Genoa, Analyst Notebook, and ArcView/ArcIMS were selected for investigation based on their expected functionality. To maintain commonality with the SJFHQ, SharePoint Portal Server was used as a knowledge portal. Finally, the ONA database, developed in-house by JFCOM, was specifically designed to mirror and support the ONA and EBO processes.

Three analytical tools were chosen from a Defense Advanced Research Projects Agency (DARPA) developed Genoa tool suite. The entire suite, consisting of 17 components, was designed to provide enhanced decision support. The three selected tools were:

- SEAS – Structured Evidential Analysis System
- CIM2 – Critical Intent Model
- SIAM – Situational Influence Assessment Module

These tools were primarily used very early, prior to MC02 execution in support of pre-crisis development of the ONA assessment. (Many of the Spiral 3 and execution survey respondents were never exposed to these tools.) According to expert statements, the tools were useful for understanding and building the baseline ONA, but were not extensively used during the execution phase due to complexity, time and manpower requirements.

The ONA database for MC02 evolved focusing on the nation, region, and situation within the combatant commander's AOR for the experiment within an exercise. The ONA database was the most extensively used of the ONA tool suite. This tool provides a structure that mimics the ONA process. This is something that has never been accomplished before MC02. The ONA database was developed and tailored to meet the specific needs and architecture of the ONA process. Two principle modules made up the ONA database: the knowledge base and planning support. Requirements to capture effects, nodes, actions, resources, secondary effects and their link associations and rationale guided the ONA knowledge base module. Support to effects-based planning drove the development of the EBO planning support module. These two modules were used extensively throughout the preparations and execution of the event.

Analyst Notebook (data visualization and analysis) and ArcView/IMS (geospatial/graphic data generation) were used early on and throughout, particularly by the system of systems analysis (SOSA) cell. Both these tools are manpower intensive as well, however, the visualization products were powerful in presenting information to the staff and commander.

SPPS provided a web-like portal that supported the net assessment executive summary and ONA matrix with a drill-down ability to capture greater detail. It provided the links to PMESII summaries, focus of DIME actions, as well as links to regional country assessments. Red views using the same PMESII/DIME construct were also presented. The web approach provided summaries while allowing users to drill down to the level of fidelity desired. An in-depth view of the SPPS can be viewed in the CIE section of this report.

The ONA tools were used to support the process illustrated in figure 311 generating the Effects Tasking Order (ETO):

Overall Assessment Results

The ONA concept, recognized by the experiment participants as a benefit for military operations, demonstrated very strong potential in MC02. By providing a more thorough understanding of the adversary, ONA made a positive contribution to the Blue Force during the experiment and demonstrated that with further concept refinement and development of critical enablers, it could provide the knowledge foundation supporting EBO.

There was not a common understanding of ONA among experiment participants, which in turn led to varying expectations for its intent, scope, content, and utility. Training conducted before the event failed to adequately educate all participants on the ONA concept and as a result, there was an unrealistic expectation of what ONA was to provide for the experiment.

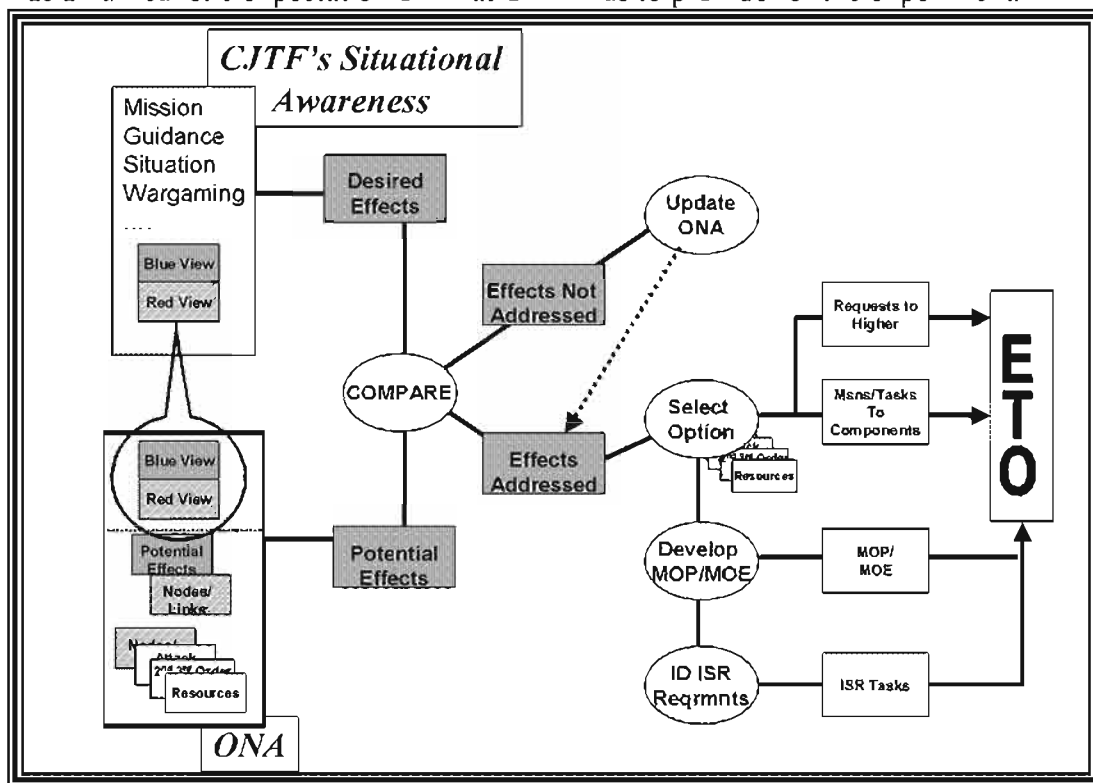


Figure 311: CJTF's Situational Awareness

Based on limited understanding of the concept and limited exposure, the use of complex ONA tools during execution was also problematic. The tools developed to access ONA database and use the planning features were not intuitive and proved difficult for most participants to use. The ONA Tool was especially enhanced through the IWS collaborative capability; enabling as many as 50 simultaneous users on a shared view to collaborate on effects, nodes, actions and resources as well as their link associations in the planning tool. The ONA tools provided valuable shared view and insight into the AO and adversary's infrastructure, but not explicit situation awareness. The tools were not intuitive enough to be learned quickly and required considerable training. Though favorably received and tested in this experiment, many comments were provided for improving these tools. The overarching theme was for enhanced automation,



simplifying the ONA tools into one, and interfacing with other C<sup>4</sup>ISR systems like the ADOCS display, so that the ONA tool suite is more robust with more embedded, updated, information.

Methodology

Seventy users evaluated the ONA suite of tools. Two surveys sought comments on the ease of operation, functionality, and effectiveness as they support ONA's EBO objectives and

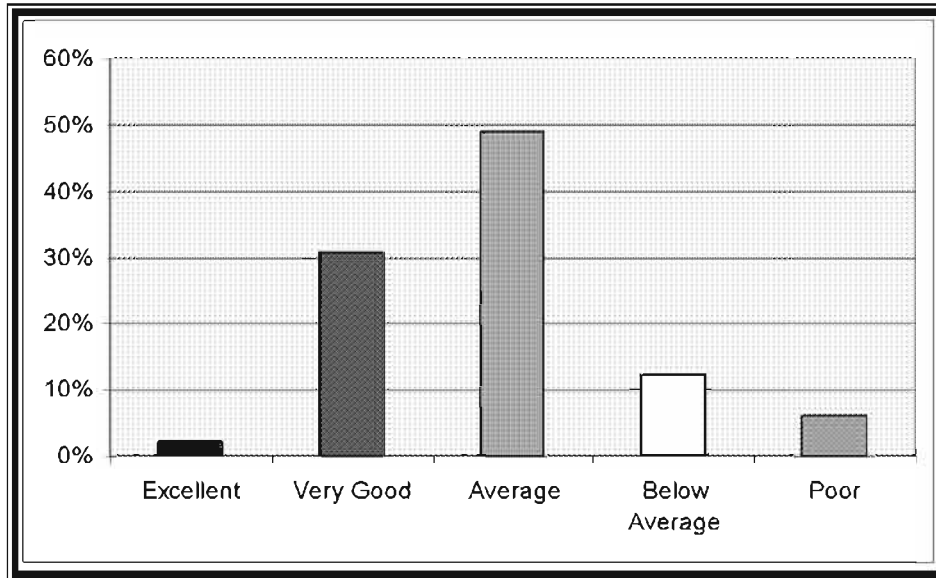


Figure 312: Ease of use and functionality for understanding and situational awareness

feedback in this area. The ONA tool suite developed the pre-crisis view of the adversary's strengths, weaknesses, vulnerabilities, interdependencies, and environment. This would point towards establishing information for rapid planning and conducting EBO. Furthermore, one could argue that developing the pre-crisis view would set the conditions for decisive operations

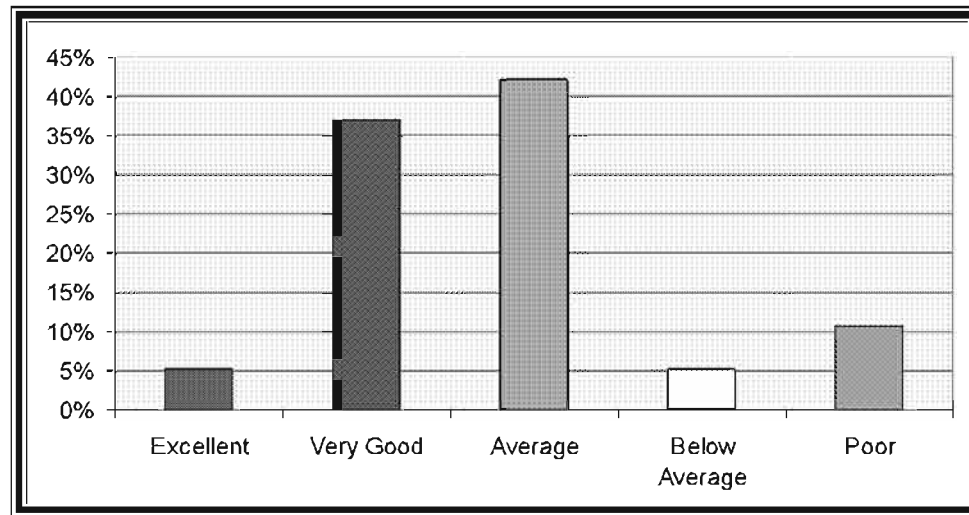


Figure 313: ONA database effectiveness as a collaborative, updated information tool was considered very good to average by participants

the key enablers for RDO. In addition to surveys, interviews and subject matter expert insights were also used.

Observations

An in-depth analysis of how the ONA tool suite (Genoa, Analyst Notebook, and ArcView/IMS) supports the key enablers of the SJFHQ cannot be

given due to the lack of user

and establish Information Superiority.

Figure 312 indicates that the ease of operation and functionality of the ONA Tool Suite for providing understanding and Situational Awareness were favorably received by a majority of the respondents. Approximately 80

percent of the respondents rated the ONA tool suite “average” to “very good” (39 of 49). The below average and poor responses indicated that it was a complex system to manipulate and find data. There were also indications that the system needs a better user interface, search capability, and the means for updating the database.

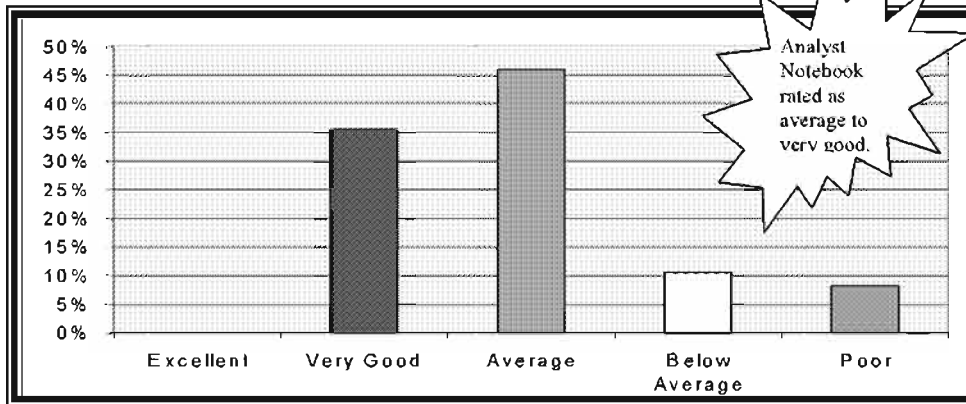


Figure 314: Analyst Notebook effectiveness providing visualization for analysis of the adversary's political infrastructure

Figure 313 shows that 39 of 48 placed a rating of “average” to “very good” on the effectiveness of the ONA Database as a collaborative, updated information tool. The ONA database

offered an extensive reporting function

where all aspects of the ONA database content were available as user selectable fields for generating reports. However, the actual intelligence and the database did not match in some instances based strictly upon comments received by the surveys.

While there were disconnects, it is useful and necessary to clarify what the differences were, why that was the case, and the probable source for them. ONA is about in-depth understanding of the adversary to identify the relationships required for effects-based operations. The number and disposition of tanks, aircraft, or artillery shells is only of cursory interest to ONA, but an integral part of JIPB. ONA is not designed to supplant JIPB; they are complementary. The ONA was necessarily constructed from real world information due to high fidelity requirements.

Figure 314 shows that respondents reported 19 of 23 times that the Analyst Notebook was “average” to “very good” for providing visualization for analysts of the adversary’s political infrastructure.

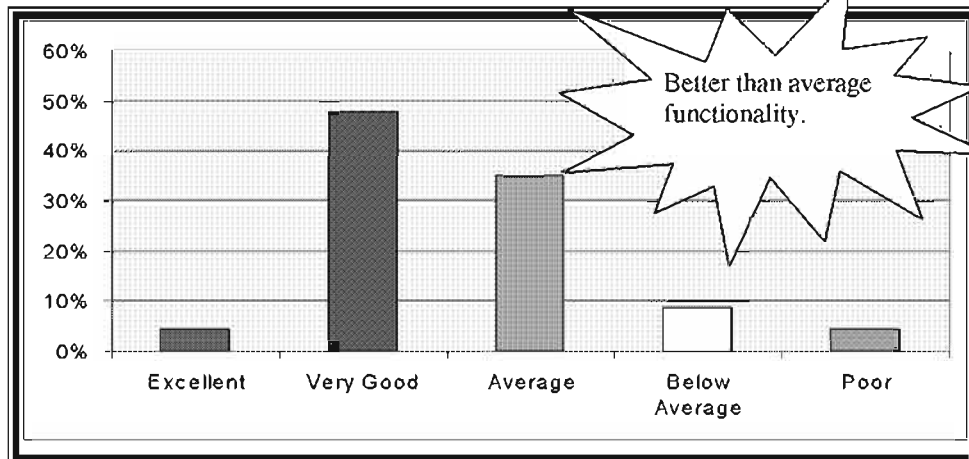


Figure 315: ArcView/IMS functionality in providing geospatial information for planning and situational awareness

However, users need the ability to step out to a URL from Analyst Notebook.

Figure 315 shows that the ArcView response rate was 15 of 19 ‘average’ to ‘very good’ for functionality, providing geospatial information for

planning and situation awareness.

Many of the Spiral 3 and execution survey respondents were not exposed to these tools. According to expert statements, the tools were used to build up ONA, but were not extensively used during the execution phase. The tools are primarily used for initial planning. Comments were summarized based upon the insight gained by users that had exposure to the tools.

Overall, the ONA tool suite provided background understanding for a developing situation. Planners indicated that the tools were used to refine node-action-resource linkages in collaboration sessions. However, the ONA tool suite should be more visually intuitive. More training needs to be provided along with a better search engine.

#### Relationship to Other Objectives

The ONA tool suite assessment may have an impact upon the ONA concept and the CIE sections of this report. These impacts primarily relate to the performance of the tools employed in the initiative. Performance regarding these tools may impact the findings in the other assessment areas or joint initiatives. Other key tools in the ONA arsenal such as SPPS and IWS are covered in other sections of this report.

#### Recommendations

All recommendations are based upon the user and subject matter expert input. Overall, the recommendations support that major enhancements and integration with other C<sup>4</sup>ISR systems are required for the ONA tool suite. This capability would probably come in some other COTS products. Some of the described capabilities and features were 3D graphics, ability to graphically depict locations easily, and greater availability of metadata and file indexing. The data accuracy and metatags also need to be improved. The search and report features need to be more flexible, allowing the user to define the search in free form and select fields to view each record.

The tools could be improved visually by creating the ability to graphically and distinctly depict locations easily. The ONA and “picture” displays need same target names and geolocational data as well. A 3D graphic portrayal for key node relationships between PMESII systems should also be included. The ONA tool suite should also have a multiple link capability for effects/nodes/actions/resources. The tools should be linked to target and other planning, collection, effects, and assessment tools. They should have greater data accuracy, metadata availability, and file indexing. Additionally, users need the capability to link to a URL from within tools like Analyst Notebook.

### **Automated Information Network Flow (ANIF)**

#### Description

The automated network information flow, sponsored by the Joint C<sup>4</sup>ISR Battle Center, is an integration of several emerging advanced technologies that can enable the warfighters to take advantage of the data transfer capabilities of new internetworking technologies while at the same time retaining the information prioritization feature of older legacy technologies. ANIF concentrates on identifying selected technologies that can provide the SJFHQ with the ability to install networks that are capable of providing the users with end-to-end prioritized quality of service (QoS) and give the commander’s information managers the ability to dynamically reappportion bandwidth (See Figure 316). As the DoD emphasis on network operations continues to increase, ANIF will be positioned to enhance our network bandwidth management and QoS reliability. ANIF is a JBC project based on combatant commander survey responses from the

United States Pacific Command (USPACOM) and the United States Strategic Command (USSTRATCOM) representatives. This high priority requirement supports SJFHQ requirements. A conceptual network schema follows:

Overall Assessment Results

ANIF was not an assessed initiative and three of the technologies that comprise ANIF were not used during MC02. Planners elected to integrate only limited ANIF play throughout the exercise. The Joint Battle Center resources were considered to better evaluate the utility of ANIF.

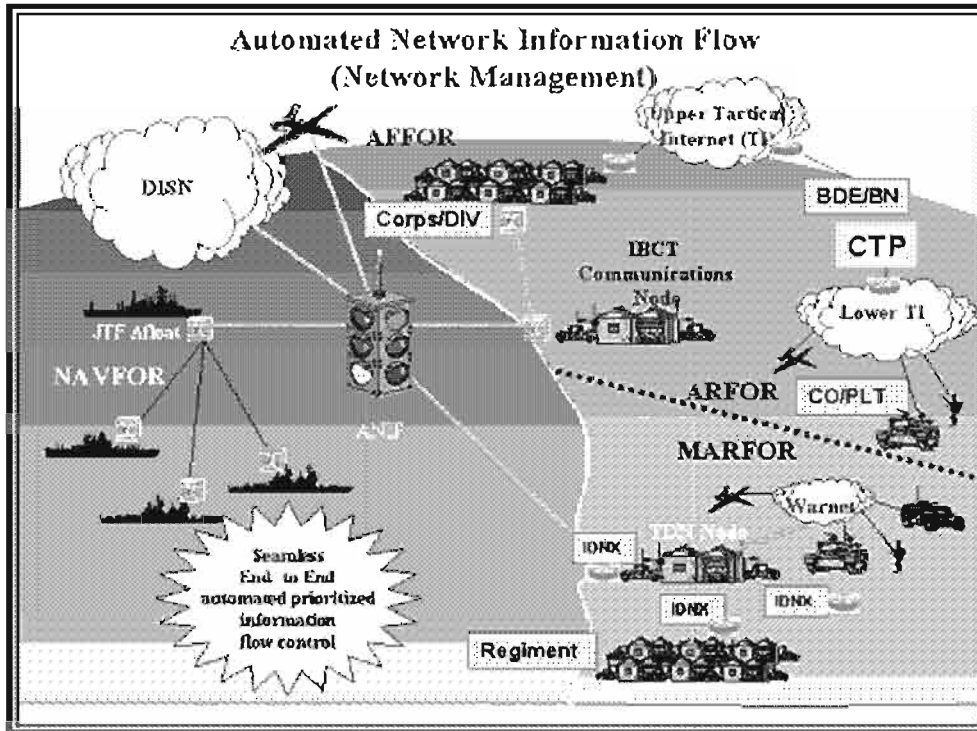


Figure 316: ANIF screen capture

Methodology

Use of information from the JBC ANIF assessment report and a write-up on the one technology actually used during MC02 is presented to better inform the reader on the initiative capability.

Observations

One of the four ANIF technologies was used during the initial MC02 exercise setup in order to cause the least amount of disruption to the experimental construct. Throughout MC02, the Linkway 2000 modem provided reliable service. Using the Linkway 2000, the bandwidth over the satellite path was dynamically apportioned based on QoS assigned to the specific traffic type. The network manager could change the priority of time sensitive traffic and the amount of bandwidth over the network. The Linkway 2000 also provided capabilities that enabled the RF media portion of the network (OSI Layer 1) to support the overall objective of end-to-end QoS. By dynamically managing the bandwidth over the RF path and providing ATM QoS and IP QoS (differentiated service) interfaces, the modem supported the warfighters' need for a robust and

efficient prioritized network. The Linkway 2000 reduced the overall network latency by providing a single satellite hop versus the current dual hop scenario. Employment of dynamic Reed Solomon/Viterbi forward error correction schema improved the overall data throughput of the network. Additional warfighters benefits provided by the ANIF network are listed below:

- Allowed warfighters the ability to share satellite resources dynamically between many sites
- Allows asymmetric links to provide maximum bandwidth efficiency
- Allows user groups to be established within a network to effectively prioritize individual sites as necessary
- Supports multiple protocols within a site in order to efficiently support all types of traffic and applications
- Allows single-hop satellite communications from multiple sites, providing more efficient communications for tactical units using time sensitive applications
- Greatly reduces the expense and equipment necessary for a traditional “hub and spoke” satellite network

By using the bandwidth on demand capability of Linkway, each location could communicate with all of the other Linkway equipped sites with reduced delay, and improved bursting capability using only one carrier. Traditional satellite networks would need to use more modems and extra carriers to provide a comparable connectivity. The ability to control the network and prioritization of bandwidth between the sites was very apparent. The use of multiple carriers and user groups allows for a very versatile network that can support a large number of requirements from many users.

The addition of the packet encryption did not affect application of the Linkway’s dynamic bandwidth reallocation or RF layer QoS capabilities. This also validated the idea that QoS enabled applications can be supported on networks using modern inline network encrypted devices.

Throughout both the JBC assessment and MC02, the ANIF technologies demonstrated the flexibility and capability to control different types of information flow operating in a limited bandwidth network. The assessment validated that a specific type of traffic can be supported on a congested network when QoS features are applied properly. The assessment clearly indicated by carefully applying QoS policies in the network, it not only improved the quality of traffic flow, but also improved the overall performance of the network.

### Recommendations

ANIF has already received approval from the JROC to proceed as a near-term fielding solution for the warfighter. JFCOM is currently working with combatant commanders to develop an ANIF fielding strategy tailored to their requirements.

## **Special Technology Operations (STO) Initiative**

### Description

The introduction of STO activity into MC02 occurred late in Spiral development—following Spiral 1. Based on opportunities provided via the Joint Expeditionary Force Experiment 2002 (JEFX02) and resource availability, the decision was made to proceed with limited objectives to analyze both the ability to conduct STO activities in experimentation and development for future operations. The objectives for this initiative were categorized based on operational focus to manage classified and compartmentalized objectives for oversight and

reporting within security constraints. This effort allowed the Service-level objectives that were already in development within JEFX02 to be bridged with the Joint Staff objectives through the MC02 Joint Task Force (JTF) structure. This bridging allowed an end-to-end assessment to be conducted, as a supplement to results, while providing experimentation observations on STO incorporation into experimentation venues. In particular, an examination of the STO processes, policies, and operations links nontraditional methodologies and programs to traditional operations in the future.

Due to STO classification challenges, limited experimentation objectives were established to ensure oversight of program access and data for the programs was maintained. The end-to-end study accompanying the three levels of effort was to capture the associated issues and potential findings important to adequately evaluate experimentation demands for Services, combatant commanders, DoD, and interagency participation in highly classified operations.

#### MC02 SCOPE OF INTEGRATION

The STO initiative was separated into three focus levels:

-Air Force Level: JEFX02 support through the Air Force Command and Control Training and Innovation Group (AFC2TIG) focused on execution of STO package options to be approved by national authority played at the Joint Chiefs of Staff (JCS) level and processed through the JTF staff in MC02.

-MC02 at JTF staff focused on procedural issues and configuration impacts associated with actions as the SJFHQ transitions into a JTF for operations.

-JCS level focused on examining the decision-making of national authorities for STO operations, particularly the potential need for procedural and policy changes to improve the interoperability of STO programs among the Services and other United States Government (USG) agencies in an RDO environment.

MC02 STO integration occurred during Spiral 2 with injection of activities commencing in Spiral 3. To incorporate STO activities into scenario timelines, script modifications were provided to MC02 JECG and MSEL teams to synchronize activities for Spiral 3.

#### Overall Assessment Results

Assessments were based on two categories of objectives: experimentation framework and operations.

Experimentation Framework Objectives:

- Identify staff positions and security levels required to manage STO oversight for concept and experimentation development
- Requirement for senior mentor roles and missions in STO experimentation
- Permanent staff STO billets by staff positions
- Requirement for surge capability for experimentation manning
- Evaluate the requirement for JFCOM access to multi-service STO programs to support experimentation development and execution (both interim and permanent billet access)
- Policy and procedure modifications required granting interim access for experimentation venues
- Oversight for billet management and granting authority for access

## U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

- Establish list of modifications to facilities to support STO experimentation, including sensitive compartmented information facility (SCIF) requirements, mobile equipment, and communication infrastructure
- Development of assessment formats and protocols for multi-level reporting (collateral to compartmentalized) DOTMLPF packages and information papers.
- Incorporate assessment formats and surveys into JFCOM automated systems and plans.
- Standard archive plan for reports and data to enable cross-reference between different security levels
- Examine timelines for STO integration to experiment venues by Spiral development

### Operations Objectives:

- Identify transition issues associated with end-to-end STO operations in a RDO environment based on establishment of a SJFHQ structure
- Discern STO activities required prior to JTF activation and associated timeline
- Identify handoff and parallel actions required to transition from deliberate planning to crisis action planning
- Need for reconfiguration of Service specific programs to group or tier programs into access levels to facilitate future joint STO operations
- Review decision-making of national authorities for STO execution to identify potential procedural and policy changes to improve interoperability in a collaborative environment in SJFHQ and JTF configurations
- Identify SJFHQ core competency required for STO activities and combatant commander and theater specific competencies and activities required for contingency planning in pre-JTF status.
- Mission qualification training, including levels and understanding of JOPES
- Identification of deliverables by echelon (one up and one down)
- Define STO organization, manning, and equipment requirements to enable full integration of STO activities in theater effects-based planning and operations.
- Development of OPLAN annex and matrix to correlate Service/program with potential effect by objective (matrix Service/program/level of single and combined effects)
- Identify battle rhythm issues associated with synchronization of Program Element (PE) and Program Objective Memorandum (POM) process with contingency planning in a collaborative environment

### Methodology

More than 20 users, consisting of STO, IO, and space subject matter experts evaluated STO. A series of qualitative questions were periodically submitted to the users for evaluation. In addition to the questionnaires, interviews and summary reports on observations and lessons learned were used to better evaluate the utility of STO in supporting the JTF organization. Using this methodology, STO was evaluated to provide significant support to the key enablers of the SJFHQ.

### Findings

STO was evaluated against the following key enablers of the SJFHQ.  
TOPIC: Integrating all Services STO operations into JTF operations

Operational Application: Ensures the JTF commander has full visibility into these programs and allows integration of these operations into the commanders plan.

Operational Utility

Near-term. The majority of experiments, exercises, and war games today do not exercise this process from the component to the combatant commander, or cross component, for integration and interoperability. It was operationalized for the first time in an experiment in the context of MC02. Given the time constraints and the late arrival of the concept, only the Air Force presented STO capabilities for use by the joint force commander for planning and execution during MC02. The success of the concept was based on the solid foundation provided by the Air Force in JEFX02. Other Services were offered the opportunity to participate, but they

Table 60: STO factors measured against SJFHQ objectives

|                                                | Supports | Potentially Supports | Did not provide significant support |
|------------------------------------------------|----------|----------------------|-------------------------------------|
| Establish Information/Knowledge Superiority    |          | X                    |                                     |
| Rapidly Set Conditions for Decisive Operations | X        |                      |                                     |
| Assure Access Into and Through the Battlespace |          | X                    |                                     |
| Conduct Decisive Effects-based Operations      | X        |                      |                                     |
| Sustain the Force                              |          | X                    |                                     |

had not baselined the capability within their Service exercise/experiment. This caused the integration of STO activities to be only vertical vice horizontal across all the Service components. Additional effort was required to further baseline these activities and define the level of interaction required of the SJFHQ for this process to succeed in MC02.

Other Services will need to be encouraged to participate to expand the scope of these operations and provide future JTF and component commanders training and experimentation venues in preparation to achieve full capability for real-world events. Joint concepts of operations for integrating these activities exist, but require consensus among Services and oversight from the Joint Staff to provide STO capabilities to JTF commanders.

JFCOM envisioned the SJFHQ making constant strides to synchronize their efforts with the components' planning process. This lack of maturity in synchronization of collateral efforts between the JTF and components could have further exacerbated the ability to synchronize STO. However, the foresight of the JFACC and JFCOM minimized the STO expectations in MC02, thereby mitigating much of the complexity. Hesitancy is advised at this point to avoid the proclivity of the JTF commander to husband these capabilities. This could both defeat the intended potential while placing them in the high-demand low-density domain. What is preferred is a pre-approved toolbox of these applications, which will require extensive collaboration within the military and other elements of national power. The full application of STO will require even greater rigor in synchronization, which could have a positive impact on integrating other planning and execution efforts. It was only in MC02 that the JTF had a battle rhythm. Battle rhythm synchronization is always difficult due to time zones, and location of commanders and facilities. However, the STO battle rhythm is one of the best tools for allowing the JTF commander to think beyond 96 hours. The ad hoc use of STO operations is not prudent



stewardship; coordination must occur to properly exercise these capabilities. This “chessboard mentality” leads beyond current operations and future plans into planning. The JTF commander and his components are provided the additional benefit of “centralized JTF control” and “decentralized component execution.”

An integrated effort to facilitate awareness, assessment, integration, synchronization, policy, doctrine development, apportionment, planning, and execution of STO is essential. To continue STO participation in joint experiments and exercises, USJFCOM will require permanent facilities and a cadre of trained and experienced STO personnel. This cadre would then serve as the cornerstone for the lengthy, detailed preparation to enter an event with these capabilities. JTF STO validation by JFCOM can only be secured with the requisite cleared and trained personnel in place.

Long Term. The strong STO baseline used by the Air Force in JEFX/MC02 can be used for expansion to other Services. Upon consensus of the Services to participate in the planning and execution of these applications, it becomes apparent that these activities support effects-based operations. STO by its nature is joint, forcing integration. There is agreed upon documentation available once other Service buy-in is achieved. The level of collaboration required to conduct and obtain clearance for these activities will require formatting and extensive ongoing interaction with the potential participants. Language in the Defense Planning Guidance directing the integration of these activities will be required to insure policy matches STO capabilities. Rules of engagement, centered on military activity, will require the full understanding and participation by other elements of national power. Due to the nature of these activities and the crossing of military boundaries, clear relationships within the combatant commander’s purview and the JTF commander’s realm need to be developed. Roles and responsibilities of the combatant commander and the CJTF, functional component commanders, the SJFHQ and their respective staffs are not yet well understood and will need clarification.

Technical Feasibility. Secure space within each of the components participating in the STO operation is a prerequisite. Portable equipment is available to process the planning and execution of these capabilities. Communications security (COMSEC) and operations security (OPSEC) issues can be minimized by the dedicated and deployable secure facility. Commonality of clearance requirements and difficulty getting people cleared will remain an issue. Training between the JTF and components is critical and cannot be overemphasized. Timely and accurate information for this activity is even more important than in collateral activities. The complexity of the assessment of these activities is by its nature effects-based and therefore even more obtrusive to the casual assessment process. To best facilitate these activities, not only is a robust ONA—beyond predictive battlespace awareness—required, but equally important is a dedicated SOSA so that these valuable resources will not be wasted on less important objectives. Although STO operations are about effects-based operations, vice message traffic generation, full Service participation will require greater bandwidth. Because STO is about effects-based operations, it becomes a matter of applications vice platforms, which require constant and secure communication between commanders at all levels.

Affordability is based mainly on having the right billets identified and manned for the use of this application. Training in OPSEC and COMSEC procedures must be sufficient to apply the capabilities with the greatest hope for success and integration.

Other Observations and Findings:

- Need for modifications in access for key personnel supporting experimentation (joint and Service level) on an on-going basis
- Senior mentor access is highly desired to ensure the insight of former senior leaders from multi-service backgrounds
- Reconfiguration of Service specific programs into tier/group programs to improve accessibility for joint collaboration among Service programs with like tier/group designation (similar to AF approach)
- Impact of SJFHQ on overall STO processes for future operations
- Increased, but selective access for SJFHQ personnel to Service specific programs for early engagement in RDO environment, particularly in the pre-conflict phase
- Establishment of adequate SCIF facilities and mobile equipment to support experimentation and field use of STO programs
- Development of a collaborative environment with ability to transfer data between classified and unclassified systems through two-way guard technology applications

Relationship to Other Objectives

STO integration and synchronization with several IO and space efforts is essential for seamless operations. Those areas within MC02 were limited in scope and interaction.

DOTMLPF Linkage

Modifications to JCS 3-13 and IO guidance (DoD 3600.1) should consider assessments from MC02. STO experimentation results are related to SJFHQ, EBO, JFI and TCT, JISR, and ATO development efforts within JFCOM. Similar relationships for IO also exist within JEFX02 efforts with the GSTF and predictive battlespace awareness initiatives. Within the Navy's Fleet Battle Experiment-Juliet (FBE-J), the need for IO synchronization and development has also been annotated.

Recommendations

- Modify program access to STO across Services
- Expand use of IJSTO system for joint access to Service programs
- Establish IO as a key area in ALS and special operations
- Establish a collaborative environment with STO operations, to include application of guard technology transfers for both high to low and low to high data develop measures of effectiveness for incorporation into planning and execution processes, to enable intelligence preparation of the battlefield and BDA assessment.
- Formalize training and leadership development for IO and STO operations for officer and enlisted personnel.

## **Annex J — Participating Organizations**

Agencies/Labs and Organizations involved MC02 and Service Experiments

12TH AIR FORCE

422ND TEST SQUADRON -- PART OF AIR WARFARE CENTER

46TH TEST SQUADRON

605TH TEST SQUADRON -- PART OF AIR WARFARE CENTER

8TH AIR FORCE

AIR FORCE AGENCY FOR MODELING AND SIMULATION (AFAMS)

AIR FORCE COMMAND AND CONTROL INTELLIGENCE, SURVEILLANCE, RECONNAISSANCE CENTER  
(AFC2ISRC/TN/DO/LG/SC/AFEO)

AIR FORCE COMMAND AND CONTROL TRAINING AND INNOVATION GROUP (AFC2TIG)

AIR FORCE COMMUNICATIONS AGENCY (AFCA)

AIR FORCE DOCTRINE CENTER (AFDC)

AIR FORCE OPERATIONAL TEST AND EVALUATION CENTER (AFOTEC)

AIR FORCE/XI (AIR STAFF)

AIR MANEUVER BATTLE LAB, FT. RUCKER, AL

ARMY FORCES COMMAND (FORSCOM)

ARMY SPECIAL OPERATIONS BATTLE LAB, FT BRAGG, NC

ARMY TEST & EVALUATION COMMAND (ATEC)

ARMY TRADOC COMBINED ARMES CENTER (CAC)

ARMY TRAINING AND DOCTRINE COMMAND (TRADOC)

ASSISTANT SECRETARY OF THE NAVY RESEARCH, DEVELOPMENT & ACQUISITION ((ASN (RDA)  
CHENG))

AWFC (AIR WARFARE CENTER)

BATTLE COMMAND - BATTLE LAB, FT. LEAVENWORTH, KS

BATTLE COMMAND BATTLE LAB, FT. GORDON, GA

BATTLE COMMAND BATTLE LAB, FT. HUACHUCA, AZ -- "PROVIDES VERTICAL AND HORIZONTAL  
INTEGRATION FOR INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE SUPPORT TO  
INFORMATION OPERATIONS"

BATTLE LAB INTEGRATION, TECHNOLOGY & CONCEPTS DIRECTORATE, FT. MONROE, VA

CENTRAL TECHNICAL SUPPORT FACILITY (CTSFC), FT HOOD, TX

COMBATANT COMMANDER INTEROPERABILITY PROGRAM OFFICE (CIPO)

COMBAT SERVICE SUPPORT BATTLE LAB, FT. LEE, VA

COMBINED AIR OPERATIONS CENTER EXPERIMENTAL (CAOC-X)

COMMAND AND CONTROL BATTLELAB

COMMANDER, OPERATIONAL TEST AND EVALUATION FORCE (COMOPTEVFOR)

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY (DARPA)

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

DEPTH & SIMULTANEOUS ATTACK BATTLE LAB, FT. SILL, OK  
DISMOUNTED BATTLESPACE BATTLE LAB, FT. BENNING, GA  
FLEET COMBAT TRAINING CENTER PACIFIC (FCTCPAC)  
FLEET INFORMATION WARFARE CENTER (FIWC)  
HEADQUARTERS AIR MOBILITY COMMAND (HQ AMC/DOP)  
HEADQUARTERS ELECTRONIC SYSTEMS CENTER (HQ ESC)  
HQ ACC/DOJ/XPS/INX/INY/SC (HEADQUARTERS AIR COMBAT COMMAND)  
HQ AIR INTELLIGENCE AGENCY (AIA)  
JOINT COMMAND AND CONTROL INTELLIGENCE SURVEILLANCE RECONNAISSANCE JOINT TEST  
AND EVALUATION (JC2ISR JTE)  
JOINT INTEROPERABILITY TEST COMMAND (JITC)  
JOINT VENTURE DIRECTORATE  
MANEUVER SUPPORT BATTLE LAB, FT. LEONARD WOOD, MO  
MARINE CORPS WARFIGHTING LAB (MCWL)  
MOUNTED MANEUVER BATTLESPACE LAB, FT. KNOX, KY  
NATIONAL DEFENSE INDUSTRIAL ASSOCIATION (NDIA)  
NATIONAL IMAGRY AND MAPPING AGENCY (NIMA)  
NATIONAL RECONNAISSANCE OFFICE – OPERATIONAL SUPPORT OFFICE (NRO-OSO)  
NATIONAL SIMULATIONS CENTER (NSC)  
NAVAL AIR SYSTEMS COMMAND (NAVAIR)  
NAVAL AIR WARFARE CENTER (NAWC)  
NAVAL OCEANOGRAPHIC OFFICE  
NAVAL POST GRADUATE SCHOOL  
NAVAL SEA SYSTEMS COMMAND (NAVSEA)  
NAVAL STRIKE AIR WARFARE CENTER (NSAWC)  
NAVAL SURFACE WARFARE/WEAPONS CENTER (NSWC)  
NAVAL UNDERSEA WARFARE CENTER (NUWC)  
NAVAL WAR COLLEGE  
NAVY PACIFIC METOROCEN (NAVPAOMETOCEN)  
NAVY RESEARCH LABORATORY (NRL)  
NAVY WARFARE DEVELOPMENT COMMAND (NWDC)  
OFFICE OF NAVAL RESEARCH (ONR)  
OPERATIONAL TESTING COMMAND (OTC)  
PROGRAM EXECUTIVE OFFICE - COMMAND, CONTROL, AND COMMUNICATIONS - TACTICAL (PEO  
C3T)  
PROJECT DIRECTOR, COMBAT TERRAIN INFORMATION SYSTEMS (CTIS)  
PROJECT MANAGER, FORCE XXI BATTLE COMMAND BRIGADE AND BELOW (FBCB2)  
PROJECT MANAGER, GROUND COMBAT COMMAND AND CONTROL (GCC2)

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

PROJECT MANAGER, INTELLIGENCE FUSION AND EFCCS

PROJECT MANAGER, TACTICAL RADIO COMMUNICATIONS SYSTEMS (TRCS)

PROJECT MANAGER, TOC/AIR & MISSILE DEFENSE COMMAND AND CONTROL SYSTEMS  
(TOC/AMDCCS)

PROJECT MANAGER, WARFIGHTER INFORMATION NETWORK - TACTICAL (WIN-T)

SAN DIEGO FLEET AIR/AREA CONTROL & SURVEILLANCE FACILITY SAN DIEGO (FACSFAC)

SPACE AND MISSILE DEFENSE BATTLE LAB, HUNTSVILLE, AL AND COLORADO SPRINGS, CO

SPACE WARFARE CENTER

SPACE WARFARE SYSTEMS COMMAND (SPAWARSSYSCOM)

SURFACE WARFARE DEVELOPMENT GROUP (SWDG)

THEATER AIR COMMAND AND CONTROL SIMULATION FACILITY (TACCSF)

TRADOC ANALYSIS COMMAND - (TRAC)

TRADOC PROGRAM INTEGRATION OFFICE ARMY BATTLE COMMAND SYSTEM (TPIO-ABCS):

(This Page Blank)

## **Annex K — Experiment Lessons Learned**

Lessons learned presented here are in the Joint Universal Lessons Learned format for standardization.

### **Title: OPFOR Rules of Engagement (ROE)**

Observation: OPFOR rules of engagement (ROE) and personas of OPFOR senior leadership were not well defined prior to execution resulting in differing views on allowable game play.

Discussion: OPFOR rules of engagement were not agreed upon prior to execution. This caused conflicting views between Blue, Red, and the JECG as to what could and could not be executed during the experiment. This impacted the OPFOR's ability to execute certain planned events (night attacks, anti-access) while also adding artificiality to the game scenario. A second key issue with ROE was the disagreement on the personas of the senior OPFOR leadership. The OPFOR senior players acted in a manner that the Blue and JECG thought was consistent with the expectations of a different adversary than that defined for the experiment.

Lessons Learned: Blue and Red ROE and character personas need to be discussed and agreed upon prior to execution to minimize differences in views of game play and impacts/effects of Blue actions on the adversary

Recommendation: Hold JECG and OPFOR focus sessions prior to execution to discuss allowable ROE and game play so all players understand the rules coming into the experiment.

### **Title: OPFOR Reaction Time**

Observation: The OPFOR was not able to adversely influence the deployment of Blue assets into the JOA.

Discussion: All TPFDD flow into the area was scheduled with no simulation modeling to allow interdiction.

Lessons Learned: Time jump from C to C+16 did not provide the OPFOR the ability to react to Blue deployment. The JTF Blue-Red cell did not have sufficient time available to monitor indicators in order to predict OPFOR actions.

Recommendation: Find some method to simulate the iterative TPFDD planning process. Start with a full up, unconstrained flow of the TPFDD plan. Then have a high level model degrade the TPFDD flow. Allow for the recalculation of the TPFDD, and run it through the TPFDD computer.

**Title: Video Media Objectivity**

Observation: The simulated media outlet, World New Network (WNN), did not appear to be objective in representing both the Blue and OPFOR views in the experiment. Most of the focus tended to be representative of Blue actions, intentions, and effects, not on OPFOR actions, intent, and effects.

Discussion: The WNN was envisioned by the experimental design group to represent both the Blue and OPFOR views on events and actions. Although this initially appeared to be the direction of the media, it became one-sided about half-way through the experiment and tended to focus on Blue actions and Blue expected effects. In some cases this caused incorrect reports on effects against the OPFOR (what was reported as effects was not what was observed by the OPFOR as effects). The WNN focus tended to target a U.S. audience, not a world audience. Had there been a cell that represented third party interests (European nations, regional nations, public opinions), the effects of the WNN broadcasts may have been recognized as counter to Blue interests.

Lessons Learned: Media needs to meet the needs of both the Blue and OPFOR

Recommendation: Ensure WNN is representative of both sides in an experiment. Consider the possibility of having two opposing news networks.

**Title: Experiment Play Classification Level**

Observation: The overall classification of the experiment was SECRET. However there were systems employed on the Blue side that required SCI access for operators.

Discussion: Use of systems requiring SCI access created problems in discussing battle damage assessment, since few personnel had SCI access. Consideration should be given on the use of such highly classified systems with regard to the limited audience available to discuss the operation of these systems. If these systems will be used in an experiment, then their employment should be adjudicated within a controlled group and published to the Blue and OPFOR.

Lessons Learned: Use of highly classified systems creates problems with adjudicating and discussing effects in Effects Based Operations.

Recommendation: Either limit actions to those at the exercise classification level or ensure effects on highly classified actions are adjudicated in a controlled group with representatives on both the Blue and OPFOR sides.

**Title: Third Party Grey Cell**

Observation: MC02 required use of all elements of DIME (Diplomatic, Information, Military, and Economic). To fully understand and play those elements of



national power, a Grey cell may be required that plays the role of third party entities (Blue allies, regional governments, world public opinion, U.S. public opinion).

Discussion: Experimenting on use of all elements of national power requires determining effects on world opinion to include the U.S. populace, world populace, foreign allies, and other foreign governments. The effects Blue and OPFOR have on these third party entities should be played in order to fully understand the cause and effect of diplomatic, information, and economic actions. For example, Blue's actions in MC02 resulted in natural resources price jumps and stock market drops that effected the entire world. The pressures on Blue to resolve the situation would be great and third party actions or injects would add realism to the scenario.

Lessons Learned: Need to incorporate third party injects into the exeriment to fully play the cause and effects of DIME actions. Set up Grey cell to allow assessment of Blue and Red D, I, E actions on other regional actors.

Recommendation: Establish a Grey cell that acts as an independent group that injects third party effects and reactions to Blue and OPFOR events.

**Title: Simulation-Live Event Tie-in**

Observation: As sequenced, early live events tied in with the simulation models disrupted the JTF planning process.

Discussion: The early tie-in of live events such as the airborne drop caused a multitude of unrealistic events to occur in order for the JTF to prepare the battlefield properly. Since sufficient time was not available to prepare the battlefield, OPFOR was directed to reposition IADS assets or turn them off so that the airborne drop could occur in a benign environment. There was not sufficient time available for the JTF to properly set the conditions. Similarly, this caused inadequate time to be available for the JTF to apply all possible diplomatic, information, and economic elements of national power.

Lessons Learned: Live events should be tied-in to the scenario at a later time such that all elements of national power can be employed and to allow the JTF sufficient time to set the conditions for the live event to occur in proper context. Alternatively, live events could be played, but disconnected from the scenario. Live events should not drive the experiment; there were many actions, events, and outcomes that were not realistic to capabilities and real world scenarios.

Recommendation: If experiment sponsors require live events, ensure the placement of the live event in the timeline makes sense and does not negatively impact the scenario. Alternatively, consider a two-phased experiment design: phase one highly scripted and connected to pre-planned live operations; phase two unscripted and fought in simulation only.

**Title: Red and Blue Daily MSEL Processes**

Observation: Analysts did a great job talking through the Red and Blue MSEL each morning during the Analysts Rally.

Discussion: This type of daily MSEL review provided the Analysts and SMEs a focus for the day.

Lessons Learned: The review of the MSELs each morning added better Situational Awareness for the analysts.

Recommendation: Continue this type of morning briefing in future experimentation.

**Title: Boil Down Conducted in the Form of Work Shops Process**

Observation: The 'Boil Down' sessions conducted in the form of Work Shops at the conclusion of the MC02 were excellent.

Discussion: The focused post-event discussions, i.e. 'Boil Down' sessions, were used as a time to talk through the horizontal and vertical roles and relationship among the HQ staff and the components.

Lessons Learned: The 'Boil-Down' sessions were a valuable additional data source.

Recommendation: At the end of each experiment, schedule multiple 'Boil-Down' sessions.

**Title: Analyst Use of the Collaborative Information Environment**

Observation: Analysts full use of the collaborative tools facilitated the assessment process.

Discussion: Analysts conducted all of their recurring meetings and coordination efforts on the collaborative tools. This allowed for the quicker synthesis of the experiment data and fully supported the execution needs. It allowed for a quicker dissemination of daily insights, which in turn gave better situational awareness.

Lessons Learned: Analysis team use of the collaborative tool gave the team a high level of situational awareness and enabled valuable dialogue between analysts at Suffolk and dispersed SMEs and data collectors.

Recommendation: Continue to use the collaborative information environment with analysts in all future experiments.

**Title: Post Experiment After Action Review**

Observation: Post Experiment AAR was valuable.

Discussion: The post experiment AAR brought senior players into one location for a final discussion on experiment insights. This proved to be a valuable source of information for insights at the conclusion of the experiment. In past experiments only daily and weekly AARs were conducted.

Lessons Learned: Post experiment AAR sessions were novel and allowed senior players another venue to offer insights into the experiment. This became a valuable additional data source for the analysts.

Recommendation: make post-experiment AARs a standard procedure.

**Title: Surveys - Participant Overload**

Observation: Experiment participants were "surveyed-out."

Discussion: Participant survey data may contain a sizeable amount of "cheerless compliance" in survey completion most likely due to several factors including a failure to crosscheck surveys between analysts, the high demands on the staff to respond to the commander's needs, and the intensity of the battle rhythm. These factors combined to impact the quantity and quality of the participant responses.

Lessons Learned: Event planners must allow time for assessment reviews and survey completion as part of the battle rhythm. Warfighting experiments require participant participation in data collection.

Recommendation: Establish assessment and survey completion time in the battle rhythm

(This Page Blank)

## **Annex L — Senior Concept Developer/Mentor Observations**

**MC02 Execution Senior Concept Developer Observations**

**Millennium Challenge 2002 OPFOR After Action Report**

*This Annex is available from USJFCOM/J9 to eligible DoD and other government agencies only.*

(This Page Blank)

## **Annex M — Service Input**

This Annex lists the comments submitted by the Services: USMC - Marine Corps Combat Development Command, USA - Training and Doctrine Command, USN - Navy Warfare Development Command and USAF — Air Force Experimentation Office. These comments were submitted by the Services after reviewing a draft of the MC02 final report. An accompanying USJFCOM response is included where appropriate.

### **USMC — United States Marine Corps Combat Development Command**

Assessment Area 3 - Assure Access into and through the battlespace. The USMC position has been, and continues to be, that in the absence of a formal joint validation of the MC02 federation of models for the purpose of conducting tactical, operational, and weapon system effectiveness analysis, modeling and simulation should not be used beyond the purpose of serving as a vehicle to enhance training.

*USJFCOM: The models and simulations used in MC02 went through an internal testing and accreditation process. The tests provided sufficient data on the technical and functional characteristics of the federation to allow its accreditation by USJFCOM and its use during MC02 execution. Additionally, the findings and recommendations contained in this report were based on a combination of different data sources. These sources included responses to warfighter surveys, SME surveys, and in-focus and azimuth-check sessions with senior leaders. The use of multiple sources of data is described in the report.*

Assessment Area 6 - Standing Joint Force Headquarters (SJFHQ). There remain issues surrounding the SJFHQ. The relationship of the SJFHQ staff to the regional combatant commander staff, its role in day-to-day and operational planning, as well as manpower structure to man the SJFHQ, continue to be issues of concern. Although supporting the concept of a SJFHQ, the Marine Corps believes that there is no demonstrated requirement for growth in joint manpower for the SJFHQ.

Assessment Area 7 - Operational Net Assessment (ONA). The USMC recognizes the capabilities and limitations of ONA relative to MC02. The tremendous efforts on the part of the US Army to develop the intelligence preparation of the battlefield process throughout the 1970's and 1980's should not be lost during the refinement of the ONA concept. The Marine Corps effort to develop the art of warfighting has been a transformation of its own. The Commander's battlespace area evaluation (CBAE) within the Marine Corps planning process is the result of a long study of warfighting and how to improve upon the older, 15-step planning model. While ONA is designed to use existing intelligence products, these efforts should not be lost in the quest to field ONA. The Marine Corps supports further experimentation with ONA and believe there is great potential to apply the lessons learned from ONA in order to develop a more effective IPB and CBAE process for the 21<sup>st</sup> century.

Assessment Area 8 - Effects Based Operations (EBO). The fundamental issue with EBO, since its inception, has been identifying the "control" within the experiment and what EBO is meant to accomplish. Effects have always been a fundamental part of mission analysis and course of action development within our planning process. However, there is great potential to lose sight of

CBAE analysis when focusing solely on effects during planning and execution. Without a detailed analysis of critical vulnerabilities, and the tactical, operational, and strategic centers of gravity, effects can be disjointed and not effectively synchronized. If EBO is to be a key transformational concept, it must show value added to the existing planning process through a comparative experiment. The results of this experiment should demonstrate the viability of EBO and whether it should be adopted as a new method of warfighting, a modification of existing methods, or indicative that existing methodologies remain most effective. The Marine Corps recommends that the EBO concept be staffed among the Services, regional combatant commanders, Joint Staff, and agencies in order to facilitate greater understanding and gain approval.

*USJFCOM: The EBO concept remains a concept under development. As such, it continues to be the subject of experiments and is a focal point for discussion with the Services and combatant commanders. This discussion and future experimentation will contribute to the refinement of the EBO concept and ultimately the determination of its utility and viability.*

Assessment Area 1 Challenges - Establish and Maintain Information Superiority. USMC and USJFCOM concur in the relevance and importance of the Common Relevant Operational Picture (CROP).

Assessment Area 2 Challenges - Rapidly Set Conditions for Decisive Operations. While the USMC and USJFCOM are in agreement with this section, it must be understood that this has always been and will continue to be an implied task for the warfighter. Lift, be it strategic or intra-theater, will always be the limiting factor and will serve as a constraint during the planning process.

Assessment Area 4 Challenges (conduct decisive Effects Based Operations), Assessment Area 5 Challenges (Sustain the Force), Assessment Area 9 Challenges (Collaborative Information Environment), Assessment Area 10 Challenges (enhance interagency perspective within SJFHQ), Assessment Area 11 Challenges (Joint Theater Logistics Management), Assessment Area 12 Challenges (Joint Initiatives), and Assessment Area 13 Challenges (Joint Intelligence, Surveillance, and Reconnaissance): Concur with overall assessment.

---

## **USA — Training and Doctrine Command**

General Comments: The Army welcomed participation in Millennium Challenge 2002, the first ever large-scale joint field experiment conducted by USJFCOM and the Services. The Army Transformation Experiment 2002 (ATEX02) was the Army's experiment nested within MC02. MC02 / ATEX02 highlighted the increased capabilities that the Army's new interim force, the Stryker Brigade Combat Team, brings to the joint war fight as a highly mobile and lethal early entry force coupled with the forced entry capability of the 82nd Airborne Division, providing the JTF commander (US Army III Corps) with the increased capability of conducting operations that are more rapid and decisive than before.



While the Army generally concurs with the findings and recommendations contained in this report, it does offer some additional insights and recommendations.

Finally, USJFCOM should not associate the term findings with results derived solely from MC02. As a complex, multi-echelon, live-virtual-simulated field experiment there were many confounding factors that constrain the validity of the results. At best, results from such an event can be considered insights. They only rise to the level of a finding when collaborated across multiple events/experiments.

*USJFCOM: The text in the Executive Summary and Chapter 8 of the report has been modified to emphasize that MC02 was the culmination of a series of precursor experiments. The MC02 experiment design was derived from these experiments that documented the performance of concepts. Consequently, while the specific MC02 report findings and recommendations are supported by and directly linked to MC02 data, they are part of a larger experimentation campaign.*

#### General Comments Deployment:

The Final Report does not outright address the intense competition for strategic lift before, during, and after the operation. This is such an important issue that also has long-term funding implications if the DoD is going to attempt to rectify some of the deficiencies observed at the joint level in MCO2. Without sufficient lift mediums, JFCOM is relegated to using a set of constrained deployment options, processes, etc. as it attempts to improve the deployment efficiency of our forces.

*USJFCOM: The report recognizes the competition for strategic lift before, during, and after the operation and in Assessment Area 2 Finding 1 states, "... the MC02 joint force deployment planning procedures did not improve joint force planning or help develop the JTF TPFDD."*

The Final Report does address that legacy deployment and sustainment systems used in MCO2, which limited the joint forces' ability to conduct RDO. Part of this problem, as the report addresses, is attributed to the lack of "user-friendly" decision support tools for the deployment planners in the combatant commands, at the JTF, and at TRANSCOM to conduct feasibility screening of operational COAs as they are being drafted, track deployment of forces, and manage the deployment of force effectively and efficiently. JOPES is a good example of a system that needs to be revised-cumbersome to use. Similarly, the final report identifies a true need for trained JOPES operators in all of the participating organizations in a joint exercise.

The Final Report spends a great deal of time and paper addressing the roles, functions, and locations of deployment personnel in the SJFHQ, JLTMC, and other "experimental" organizations. In fact, JFCOM apparently formed an impromptu "deployment cell" in the JTLMC to address pressing strategic lift issues at hand. The joint deployment process and all of the personnel and information systems thereof are so critical to establishing the conditions for a successful operation that the leadership needs to pay immediate attention to these areas. Without technological improvements in information systems and personnel to operate them, JFCOM's ability to effectively plan for and track deployment operations remains constrained. The final report does recommend the continued development of the JFCR to improve the deployment planning process.

Assessment Area 1 Establish and Maintain Information Superiority (IS):

JFCOM findings indicate that the CJTF was able to attain a high state of situational awareness (SA) as a result of operating in a Collaborative Information Environment (CIE). Supporting evidence focuses primarily on the high utility of the IWS tool that enabled collaboration and on the Common Relevant Operational Picture (CROP), which is defined and operationalized as the SPPS (the web portal used by the JTF to post and display relevant information) in the MC02 report. Situational awareness was assessed largely on the ability to communicate the commander's intent and for the CJTF to receive feedback that his intent was understood and resultant actions were consistent with this intent. "...if the JTF has an accurate, complete, and timely picture of the commander's intent, then it has achieved a significant degree of situational awareness."

Recommendation: The Common Operational Picture (COP) should play a central role in achieving IS and SA, with collaborative tools serving as enablers. The USJFCOM MC02 report placed stronger emphasis on the CROP and IWS (collaboration tool) for achieving SA. SA is much more than having a common understanding of the commander's intent. The COP plays a critical role in achieving SA and enhancing the quality of the collaboration process. While situational awareness is enhanced through effective collaboration, the accurate and dynamic updating of information on the COP is a key element of this collaboration. For the Army, the COP provides the basis for achieving situational understanding that, in turn, allows the commander to make decisions. The commander applies judgment to the COP to achieve situational understanding that supports his decision-making. (FM 6-0) SA, as addressed in this report, is too narrow in scope. SA is much more than disseminating and understanding the commander's intent via collaborative tools.

*USJFCOM: Text has been added to Chapter 7, Assessment Area 1 to reemphasize the importance of the COP. The COP, which is incorporated into the collaborative information environment, does play a critical role in achieving situational understanding. Of note, Assessment Area 1, Recommendation 2 advocates resolving definitions for terms associated with information superiority.*

Assessment Area 5 – Sustain the Force:

"ISBs and host nation support were used efficiently to minimize the logistics footprint in the JOA." The experimental construct for MC02 did not provide the logistics rigor to challenge the Army's CSS concepts and doctrine for the Stryker Brigade Combat Team (SBCT). For example, the exercise design never required the ARFOR to provide Army Support to Other Services (ASOS), and the SBCT did not operate at full operational distances. ASOS and operational distances would likely have a commensurate impact on the size of the logistics footprint in the JOA, if the SBCT was tasked in accordance with its doctrinal design.

Recommendation: More work is required to draw conclusive insights on the CSS impacts on the logistic footprint in Rapid Decisive Operations. Incorporate ASOS and operational distances in future experiments.

Assessment Area 9 – Collaborative Information Environment (CIE):

After reviewing the USJFCOM CROP White Paper and Chapters 3 and 7 of the USJFCOM MC02 Final Report, the common definition of CROP and COP and the role they play in achieving SA within the CIE is unclear. The SPPS is not an effective implementation of the CROP, as defined: "The CROP presents timely, fused, accurate, assured, and relevant information that can be tailored to meet the requirements of the joint force."

Recommendation: JFCOM engage the services in further conceptual work to achieve common definitions and understanding of CROP, COP, and knowledge management and their relationship to/within the collaborative information environment. Concept development efforts should focus initially on the intent/objectives of these concepts, followed by the development of processes (such as knowledge management and COP management), and finally, on the selection of tools to support these processes.

Annex C – Assessment Plan:

The JFCOM assessment effort was focused primarily on the JTF and the components. The Services were primarily focused on the components and below. There was little sharing of data and emerging insights between the two efforts. Given the more integrated nature of future joint operations a similar integrated analysis process must be undertaken to fully understand the implications of emerging joint warfighting concepts.

Recommendation: Additional work is required to develop methods and procedures to plan and conduct synchronized and integrated joint analysis during joint experiments. During MC02, JFCOM and the Services de-conflicted some of their efforts and shared LNOs, but never got to an integrated joint analysis effort. Such an effort should be JFCOM-led with full Service participation and should include:

- The development of a joint taxonomy for experimentation
- A process to create a joint analysis plan, driven by a methodology for identifying and selecting joint study issues
- Initiatives to synchronize/integrate JFCOM and service data collection processes along with policies for the sharing of data before, during, and post-experiment
- Collaboration of emerging insights during the conduct of the experiment
- A process for producing a joint report rather than (or at least in addition to) separate JFCOM and service reports
- Continued refinement of JFCOM implementation of Model-Exercise-Model (M-E-M) and synchronization with service experiment efforts. We must create a more collaborative environment for the development of and sharing of data and insights about emerging joint and service warfighting concepts.

Annex H – Model and Simulation Federation:

This annex does not provide sufficient lessons learned about the development and use of the Joint Experiment Federation during MC02. This was a highly successful M&S effort from which many valuable lessons were learned and should be recorded in the MC02 report.

Recommendation: This annex should outline M&S standards for experimentation that should be developed so that future federations meet the analytic requirements of warfighting experiments.

The Army, in response, offers as a starting point—the standards being developed under the AT-CDEP:

- Expand the use of analytic models in experimentation
- Utilize certified/classified data
- Refine the use of the model-exercise-model (M-E-M) paradigm in joint experimentation to improve the fidelity and accuracy of the results
- Document and enforce technical standards that enable envisioned plug-n-play capabilities required to quickly modify M&S federations to meet the requirements of various experiment objectives and execution types
- Ensure federations are adequately tested to verify results being produced. Document results of testing as part of experiment report so that strengths and limitations of M&S tools are fully understood by analysts and decision makers

Experiment federation capabilities should be expanded to incorporate aggregate models rather than be purely entity-based federations. Balancing the use of aggregate and entity-based models in future federations has many advantages:

- Aggregate models can be used to establish an operational context within which tactical activities occur. This operational context provides a baseline scenario across which multiple tactical vignettes can be run and increases the consistency of the experimental design
- Aggregate models can be used to control entity level simulations and provide higher echelons of command and control. Employing automated decision-making within an aggregate model provides an efficient mechanism to control large numbers of entities. This is especially useful for controlling large numbers of opposing forces
- Aggregate models can be used to provide and manage capabilities that are not available at the tactical level (e.g. operational fires, sensor fields, etc.)
- Aggregate models can provide the capability to assess the impact of tactical unit actions/reactions in the context of a campaign. Additionally, including an aggregate model in experiment federations allows the efficient capturing of results data. The aggregate model can then be employed within an M-E-M framework to conduct specific post-exercise analysis using data consistent with what actually occurred in the experiment
- The employment of aggregate models to represent higher and adjacent elements that are not the primary focus of the experiment can assist in reducing the overhead required to run an experiment. Eliminates a portion of response cell requirements and reduces costs

*USJFCOM: The development and description of modeling and simulation federation standards for future experimentation is beyond the purview of the MC02 report.*

Throughout the report, there is frequent mention of the "poor ISR models" limiting achievement of some experiment objectives. Models that can effectively integrate live and simulated environments and those that integrate Service models will look for the "lowest common denominator." This is a result of the use of Higher Level Architecture (HLA), which ties models together using common protocols versus using a synchronization protocol. ISR is quickly diluted in this construct either by limiting the model classification level to Secret or by using non-ISR specific models (e.g., EADSIM) or both.

Recommendation: JFCOM work with the Services to improve JISR TTP and to develop joint and Service models and in live/simulations integration. We need a common "road ahead."

Annex K – Experiment Lessons Learned:

Live events with experiments such as MC02 should not be disconnected from the scenario as one of these lessons learned indicates. Synchronized and well-integrated live events infuse a degree of realism and friction into purely simulated activities that can be leveraged to gain more accurate feedback, rather than declaring this too hard and disconnecting live events from the scenario, JFCOM and the services should be exploring exercise and experiment control processes to more effectively integrate them into the experiment.

Recommendations:

- Collaborative tools should be leveraged to integrate the analysis efforts of JFCOM and the services.
- The solution to JFCOM gaining more accurate data from experiment activities and remote (i.e. service experiment) locations is not to send more J9 personnel to collect it. The solution is to integrate data collection and analysis processes so that a more synchronized and resource effective approach can be taken to collecting the data necessary to support joint, JFCOM and service experiment objectives.
- No mention was made in this section of the requirement to improve the synchronization and integration of exercise control functions between JFCOM and the Services. The Army operated experiment control groups/technical support cells at distributed locations (The National Training Center, Ft Irwin, CA; Ft Bragg, NC; Camp LeJeune, NC; Nellis, AFB, NV; and TASC, JFWC, Suffolk, VA) during the execution of MC02. There was no direct linkage from JFCOM to any of these cells. The Army M&S Control Group, a sub group of the overall Army Experiment Control Group, did have JFCOM personnel and equipment to ensure the viability of the Army Federation at NTC and the Star Wars Complex at NTC run by operations group had JFCOM representatives, as well, and a ISW system, but that was the extent of interaction and control.

*USJFCOM: A more comprehensive set of lessons learned derived from all of the Services' experimentation experiences can be discussed at future forums.*

---

**USN — Navy Warfare Development Command**

General Comment: All background Navy information (participating commands, locations and nodes etc.) is accurate and complete.

General Comment: There is balanced coverage of Service inputs and pictures of Navy participation.

General Comment: Positive comments on SJFHQ, ONA, JFI, and CIE. ONA, JFI and CIE concepts continue to be cornerstones of the JFCOM experimentation focus. Reinforces the need to ensure Navy concept development and experimentation stays synchronized with this work.

General Comment: Overall, the report is well written. Only significant Navy issue is how the access part is portrayed (Assessment Area 3 – Assured Access Into and Through the Battlespace). Concur with all general findings and recommendations.

Assured Access: There was accurate and balanced coverage of the opening salvo of hostilities by CJTF-S (Red) on U.S. forces, particularly JFMCC. JFCOM points out the fact that the CROP and M&S fidelity did not support tactical level actions and the JFMCC had done sufficient detailed planning for the anti-access phase, but “there was an apparent failure at the JTF level to assimilate and integrate the JFMCC JOA entry plan into a coherent JTF level plan.” It was noted that most ship casualties were from a combination of CDCMs, mines and swarm attacks. It was also noted 11 ships were destroyed by enemy missile attacks, but 76% of offensive enemy missiles were destroyed in flight.

What the report fails to point out is that Assured Access was never an objective or initiative of the experiment. Additionally, the discussion of Assessment Area 3, Finding 6 (“Blue had moderate success in providing operational air, space and missile defense”) is not consistent with the discussion of experiment design and simulation shortfalls in Assessment Area 1 (Establish and Maintain Information Superiority), Finding 4 (“While operating in the collaborative environment the JTF was able to minimize, but not prevent, surprise attacks by opposing forces”).

*USJFCOM: Assured Access was not an initiative, but it was identified as a warfighting objective in Chapter 3. The perceived inconsistency between Assessment Area 3 and the discussion of shortfalls in Assessment Area 1 is addressed in the next comment.*

In the Assured Access area of the report, nothing is mentioned about the federation of models and intelligence white cell support that were used, which did not provide the level of intelligence support (tactical indications & warning) that would be available in real world ops. Given a more realistic tactical I&W capability, the Blue forces would probably have received indicators of the Red preemptive attack. The finding in the Information Superiority area that “Because of these (intelligence support & simulation) anomalies, few valid insights can be gained by trying to deduce more out of these events.” makes Finding 6 in the Assured Access area problematic.

*USJFCOM: The discussion statement in Assessment Area 1 that includes “...few valid insights can be gained...” overstates the limitations discussed in Chapter 6 and has been deleted. Text has been modified in Assessment Area 3 to state that the results (as are all results) are presented in the context of the experimental limitations and assumptions as presented in Chapter 6.*

---

## USAF — Air Force Experimentation Office

Executive Summary: Critical. The statement in the Joint Fires Initiative (JFI) section of the Executive Summary, “The JTF targeting cell could direct the most available and most appropriate shooter to destroy the target without a cumbersome process of manually passing the target information across components” implies that the JTF targeting cell exercised direct tactical execution control over joint forces. The joint targeting process employed in MC02 provided for

the functional components, not the JTF targeting cell, to “direct” assigned forces to attack targets. These attacks were coordinated through the deliberate or time critical targeting process.

As written, this statement does not reflect the way tactical control was exercised during MC02. Neither the MC02 concepts, nor the agreed procedures called for the JTF staff to exercise direct tactical control over joint forces. The functional components exercised tactical control over assigned and attached forces.

Recommendation: Change the statement to read, “The common picture enabled the functional components to quickly coordinate and task the most appropriate shooter to attack emerging, time critical targets.”

*USJFCOM: Text in the Executive Summary of the report has been modified to clarify the JTF's role in 'control over joint fires'. During MC02, the JTF targeting process operated in a 'by exception only' mode, monitoring the actions of the components as described, intervening only if deemed necessary. The intent, using the collaboration system, was to have all critical decision makers aware of all information at all times, so no intervention decisions would be necessary. While almost all missions were executed in this manner, the JTF commander did intervene in one instance. Furthermore, functional components were critical members of the virtual JTF targeting cell.*

Executive Summary: Substantive. The sentence “The JISR concept increased the JTF's ability to synchronize intelligence, surveillance, and reconnaissance operations, but the tools provided require more development before fielding system” does not accurately reflect the intention of the JISR effort.

Accuracy. There was no stated intent to develop a JISR tool from MC02. While lessons learned from MC02 may influence the development such tools, this was not the focus of the JISR effort at the time.

Recommendation: Remove or change reference to “tools provided require more development before fielding the system.”

*USJFCOM: Text in Chapter 3 and Chapter 7, Assessment Area 13 of the report has been modified to clarify the role of the tools that are associated with the JISR concept. While JISR tools may not have been the original or primary focus of assessment of the JISR concept, their use and potential value became relevant to the overall assessment of the JISR concept as the experiment progressed.*

Executive Summary/Assessment Area 7 (ONA): Substantive. The sentence “Its value was somewhat mitigated by lack of clear concept definition and understanding” is missing the importance of lack of data.

Accuracy. Incomplete data was another contributing factor in the ONA concept not providing significant value added to planning process. The ONA assessment section (AA7) of the report acknowledges the lack of “A concentrated ONA repository of analyzed and unanalyzed information focused on a specific topic or geographical area did not exist.”

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

Recommendation: Add to the sentence stating the lack of data was also a major mitigating factor.

*USJFCOM: Text in Chapter 7, Assessment Area 7 of the report has been modified to address the importance of incomplete data and its relevancy to assessing the ONA concept.*

Executive Summary: Substantive. “The top priority of this challenge should be to develop a tool that allows the JTF to visualize the interrelationship of the systems.” Sentence fails to acknowledge that “data,” along with the tools, is a major requirement of ONA.

Accuracy. We contend that the TTPs required to generate and maintain data must precede tool development as a top priority in the ONA effort.

Recommendation: Change sentence to read that the data should be the top priority or just as important as improving the visualization piece.

*USJFCOM: Text in the Executive Summary has been modified to address the importance of generating and maintaining data and its relationship to ONA tool development.*

Assessment Area 13: Substantive. Document needs to define scope of JISR that was experimented during the MC02 event.

Clarity. Need to provide those unfamiliar to MC02 the limited scope of JISR experimentation. That is, many believe JISR covers the whole gamut of intelligence, surveillance, and reconnaissance to include intelligence production, analysis, TPED, etc. However, the JISR concept used in this experiment was narrowly focused on collection management, ISR operations, etc.

Recommendation: Clarify the JISR activities that were addressed during MC02.

*USJFCOM: Text has been inserted in Chapter 3 that defines the experimental scope of the JISR concept.*

Assessment Area 4, Finding 2, Recommendation 16: Administrative. The paragraph beginning “Overall the majority of respondents said the use of ADOCS as a common targeting toolset had great potential.” The last sentence reads, “Due to the potential ADOCS showed during this experiment, it should be fielded as a targeting tool.”

ADOCS is transitioning through FIOP to the service systems of record. The word interim should be submitted to keep the recommendations consistent throughout the report. See (in other areas) where it states again that ADOCS is being fielded as an interim TST toolset

Recommendation: The word “interim” should be added so the sentence reads, “Due to the potential ADOCS showed during this experiment, it should be fielded as an interim targeting tool.”

*USJFCOM: In Chapter 7, Assessment Area 4, the word “interim” has been added when referencing the fielding of ADOCS. Recommendation 16 includes the word “interim.”*



## Annex N — Index

| A                                                                                                                                                                                                                                                                                       | C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AAR ..... 114, 123, 176, 250, 5                                                                                                                                                                                                                                                         | CC..... 208, 249, 250, 298, 299, 395                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| ADOCSi, 20, 110, 113, 118, 119, 122, 123,<br>124, 127, 129, 131, 132, 134, 135, 141,<br>148, 150, 167, 206, 294, 299, 330, 331,<br>351, 356, 363, 364, 365, 366, 367, 376,<br>378, 387, 440, 444, 1, 17, 10, 19, 36, 41,<br>1, 9, 23, 27, 29, 30, 33, 35, 36, 37, 38, 39,<br>50, 52, 79 | CIE ... ii, iii, v, vi, viii, 14, 15, 19, 46, 50, 52,<br>53, 55, 56, 57, 58, 60, 61, 64, 66, 67, 69,<br>70, 71, 72, 74, 77, 78, 79, 80, 85, 86, 90,<br>95, 108, 109, 110, 111, 113, 117, 118,<br>119, 121, 122, 123, 124, 126, 127, 131,<br>132, 133, 135, 137, 140, 141, 146, 148,<br>149, 151, 158, 159, 160, 162, 163, 172,<br>173, 181, 197, 199, 205, 208, 222, 226,<br>227, 228, 229, 230, 231, 232, 296, 330,<br>331, 332, 333, 334, 337, 338, 341, 342,<br>343, 346, 348, 349, 354, 355, 357, 359,<br>363, 374, 375, 377, 378, 382, 385, 386,<br>387, 388, 389, 390, 391, 392, 393, 394,<br>399, 402, 403, 404, 411, 412, 413, 421,<br>443, 3, 9, 15, 19, 2, 3, 5, 25, 27, 28, 19,<br>63, 77, 81 |
| After Action Review 76, 163, 241, 242, 400,<br>415, 427, 8, 3, 5                                                                                                                                                                                                                        | COA ... 17, 21, 70, 74, 76, 79, 103, 137, 158,<br>173, 174, 195, 203, 209, 213, 221, 222,<br>269, 290, 291, 323, 324, 330, 331, 332,<br>333, 334, 335, 336, 337, 338, 340, 342,<br>343, 347, 348, 352, 390, 392, 424, 4, 25,<br>26, 27, 28, 50                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Air Tasking Order ..... 18, 5, 34, 88                                                                                                                                                                                                                                                   | COE197, 201, 205, 213, 231, 232, 340, 2, 19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| AJC2 ..... 164, 1, 11                                                                                                                                                                                                                                                                   | Collaboration.... 79, 105, 110, 113, 117, 118,<br>122, 123, 124, 126, 127, 133, 141, 145,<br>167, 350, 359, 376, 382, 383, 384, 391,<br>439, 442, 446, 1, 15, 16, 17, 18, 20, 45,<br>65, 66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Army Transformation Experiment.... 175, 18                                                                                                                                                                                                                                              | Collaborative.. ii, iii, 14, 62, 67, 85, 86, 119,<br>122, 148, 159, 172, 184, 230, 344, 349,<br>351, 354, 360, 377, 392, 399, 400, 402,<br>431, 434, 446, 3, 9, 15, 19, 20, 2, 3, 6, 10,<br>11, 12, 28, 30, 31, 34, 39, 15, 16, 17, 26,<br>30, 32, 52, 54, 4                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Assessment..... 351, 352                                                                                                                                                                                                                                                                | Collaborative Information Environment....ii,<br>iii, 14, 62, 67, 74, 86, 113, 148, 159, 230,<br>351, 354, 377, 399, 400, 402, 434, 435,<br>446, 9, 15, 19, 2, 3, 6, 28, 31, 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Assured Access .... 10, 67, 86, 105, 159, 182,<br>231, 351, 433, 435, 437, 1, 14, 15, 24, 36                                                                                                                                                                                            | Combat Assessment ..... 3, 28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| ATEX ..... 175                                                                                                                                                                                                                                                                          | Command and Control ... 24, 25, 53, 62, 163,<br>164, 167, 206, 233, 238, 355, 358, 370,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| ATO 35, 37, 38, 39, 113, 114, 115, 116, 121,<br>125, 129, 131, 143, 149, 167, 356, 18, 30,<br>5, 6, 11, 30, 34, 61, 62, 88                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Azimuth Check... 75, 90, 109, 125, 132, 163,<br>241, 256, 329, 335, 400                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| B                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>Baseline Collective Assessment</i> ..... 164                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Battle rhythm..... 86                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Battlespace 89, 213, 275, 10, 16, 40, 42, 5, 9,<br>10, 13, 16, 24, 28, 32, 36, 52, 60, 61, 65,<br>68, 75, 86, 87, 88                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| BCA ..... 164                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| BCCWG. 162, 185, 186, 197, 205, 207, 208,<br>209, 226, 227, 229, 231, 234                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| BDA .... 35, 37, 38, 109, 110, 112, 113, 121,<br>122, 123, 124, 125, 134, 135, 142, 144,<br>145, 146, 150, 211, 245, 246, 247, 254,<br>255, 300, 338, 345, 346, 350, 1, 18, 19,<br>36, 4, 62, 73, 88                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Blue Forces..... 9, 23, 80, 365, 14, 15                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Blue/Red Cell ..... 209, 210, 27                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Bomb Damage Assessment..... 2                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Branches..... 113, 114                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| BRC..... 209, 210, 226, 227, 346                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

372, 382, 440, 1, 3, 11, 15, 17, 18, 21, 22,  
23, 27, 2, 11, 37, 39, 12, 7, 1, 14, 24, 28,  
29, 33, 56, 57, 59, 67, 84, 1, 2, 3  
Command Group..... 14, 162, 201, 206, 233,  
234, 395, 403  
Common Operational Picture..... 354, 393, 4,  
19, 28, 42, 18, 32, 39  
Common Relevant Operational Picture..... 9,  
153, 256, 264, 4, 11, 19, 42, 5  
Compel ..... 267, 294  
CONEMP ..... 166, 168, 233  
CONOPS 16, 20, 76, 78, 134, 150, 154, 159,  
166, 167, 200, 232, 415, 437, 19, 3, 4, 5,  
10, 11, 12, 13, 14, 15, 25, 30, 31, 32, 50,  
63, 64, 65, 86  
CONPLAN..... 135, 137, 167, 168, 176, 345,  
420, 4  
Contingency Plan ..... 409  
COP..... 1, 14, 20, 40, 44, 45, 62, 63, 64, 90,  
122, 141, 167, 205, 354, 355, 356, 358,  
359, 363, 364, 365, 366, 367, 368, 369,  
370, 375, 378, 385, 393, 4, 19, 6, 8, 28,  
29, 34, 36, 42, 6, 1, 7, 9, 21, 23, 26, 27, 57  
COSCOM..... 7, 196  
Critical Enablers..... 242, 257, 258  
CROP ... 9, 11, 14, 17, 20, 22, 53, 55, 58, 62,  
63, 64, 67, 68, 80, 90, 119, 153, 155, 156,  
159, 167, 168, 173, 221, 228, 330, 331,  
347, 349, 350, 354, 356, 357, 358, 359,  
363, 370, 377, 378, 379, 380, 381, 382,  
389, 397, 414, 416, 417, 418, 419, 432,  
434, 447, 4, 11, 19, 3, 6, 8, 10, 14, 16, 21,  
25, 28, 29, 30, 34, 37, 39, 1, 5, 1, 9, 19,  
21, 23, 30, 32, 50, 60, 62, 67

**D**

Database . 40, 41, 44, 85, 158, 241, 268, 276,  
277, 307, 308, 310, 311, 375, 434, 19, 20,  
24, 25, 34, 6, 7, 8, 29, 37  
Database Login..... 241, 307, 308, 310, 311  
Decision Cycle ..... 14  
Decision Support Tools 11, 85, 87, 414, 436,  
55  
Defeat ..... 267, 294, 5  
Deficiency Analysis ..... 125, 150, 5  
Deploy ..... 76, 154, 415, 66

Deployment.... iii, vii, 20, 21, 74, 76, 78, 79,  
85, 86, 87, 154, 158, 159, 190, 226, 235,  
236, 414, 415, 420, 421, 422, 423, 427,  
428, 429, 431, 435, 436, 16, 23, 28, 15  
Desired Effects ..... 5  
DIE ... 87, 110, 135, 136, 148, 150, 151, 299,  
348, 19  
DIME.... 16, 18, 26, 90, 91, 92, 95, 105, 108,  
110, 111, 112, 136, 239, 243, 245, 267,  
271, 272, 278, 282, 294, 302, 303, 312,  
313, 336, 337, 339, 340, 341, 345, 352,  
408, 411, 5, 10, 13, 2, 16, 24, 26, 27, 18,  
77, 2, 3  
DOTMLPF . 70, 86, 105, 148, 149, 159, 231,  
264, 265, 352, 393, 394, 411, 435, 440,  
446, 20, 1, 2, 4, 9, 14, 19, 28, 34, 39, 48,  
52, 60, 75, 85, 88  
DST ..... 414, 415, 416, 33

**E**

EA... 17, 18, 24, 90, 122, 138, 167, 192, 204,  
211, 345, 350, 351, 4, 20  
EAC 113, 122, 123, 125, 136, 144, 150, 207,  
210, 211, 226, 227, 319, 337, 338, 339,  
340, 341, 342, 343, 345, 346, 347, 348,  
350, 20, 28  
EBOii, iv, v, vi, 9, 10, 11, 16, 18, 22, 26, 62,  
68, 81, 85, 86, 90, 98, 105, 106, 108, 110,  
111, 112, 113, 120, 121, 123, 124, 125,  
135, 136, 138, 147, 148, 149, 150, 151,  
158, 159, 163, 165, 167, 172, 173, 177,  
179, 182, 183, 184, 186, 230, 231, 232,  
239, 242, 248, 256, 258, 265, 267, 268,  
296, 302, 329, 335, 336, 345, 350, 352,  
383, 385, 389, 394, 399, 407, 412, 429,  
434, 6, 20, 1, 2, 3, 5, 6, 7, 9, 12, 18, 19,  
20, 25, 1, 2, 3, 4, 6, 9, 10, 33, 35, 57, 59,  
60, 61, 76, 77, 79, 88  
EBP... 16, 17, 21, 22, 90, 125, 167, 186, 198,  
329, 330, 331, 332, 336, 338, 339, 340,  
342, 351, 6  
Education..... 232, 264, 330, 352  
Effects Assessment..... 17, 90, 111, 121, 122,  
123, 125, 136, 144, 145, 150, 167, 210,  
211, 214, 216, 230, 329, 430, 20, 28

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

|                                                                                        |                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                       |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Effects Assessment Cell .                                                              | 121, 125, 144, 145, 210, 211, 430                                                                                                                                                                                                                                                                                  | 407, 408, 409, 410, 411, 2, 31, 32, 63, 64, 67                                                                                                                                                                                                                                                              |                                                                                                                                                       |
| Effects Packages.....                                                                  | 112, 137                                                                                                                                                                                                                                                                                                           | IAC .                                                                                                                                                                                                                                                                                                       | 13, 16, 18, 19, 178, 190, 197, 201, 202, 205, 206, 213, 231, 232, 233, 315, 341, 385, 400, 401, 404, 406, 407, 409, 410, 411, 10, 23, 25, 27, 1       |
| Effects Tasking Order .....                                                            | 13, 287, 333, 343, 400, 6, 9, 21, 4, 78                                                                                                                                                                                                                                                                            | IMO .....                                                                                                                                                                                                                                                                                                   | 69, 172, 389, 393, 22                                                                                                                                 |
| Effects-Based Operations....                                                           | iv, 9, 10, 16, 60, 68, 80, 108, 148, 159, 230, 329, 351, 6, 20, 1, 2, 6, 18, 25, 14, 6, 9, 13, 16, 32, 35, 57, 65                                                                                                                                                                                                  | Influence.....                                                                                                                                                                                                                                                                                              | 267, 294, 303, 336, 77                                                                                                                                |
| Effects-Based Planning .....                                                           | 16, 90, 185, 198, 329, 332, 6                                                                                                                                                                                                                                                                                      | Information Management Officer .....                                                                                                                                                                                                                                                                        | 22                                                                                                                                                    |
| Electronic Warfare .....                                                               | 7, 23, 3                                                                                                                                                                                                                                                                                                           | Information Operations .....                                                                                                                                                                                                                                                                                | iii, vi, 2, 93, 112, 142, 147, 167, 173, 174, 191, 192, 195, 212, 213, 399, 440, 7, 9, 12, 14, 22, 23, 7, 20, 39, 14, 15, 16, 4, 1, 2, 3, 4, 6, 64, 1 |
| Enhanced Decision-Making .....                                                         | 288                                                                                                                                                                                                                                                                                                                | Information Operations Cell.....                                                                                                                                                                                                                                                                            | 212                                                                                                                                                   |
| ETO .....                                                                              | 13, 20, 21, 110, 113, 114, 115, 120, 121, 122, 124, 129, 130, 131, 136, 140, 149, 150, 179, 196, 202, 203, 204, 212, 216, 217, 218, 221, 223, 224, 230, 247, 287, 288, 289, 296, 303, 314, 315, 322, 323, 333, 340, 343, 344, 346, 348, 350, 400, 424, 425, 429, 6, 12, 21, 18, 21, 24, 27, 28, 30, 34, 35, 51, 78 | Information Superiority 9, 14, 15, 52, 53, 54, 62, 66, 67, 147, 150, 162, 166, 182, 185, 189, 192, 204, 206, 230, 233, 236, 302, 414, 445, 446, 9, 22, 14, 12, 2, 6, 8, 10, 27, 33                                                                                                                          |                                                                                                                                                       |
| EW.....                                                                                | 143, 204, 212, 7, 3                                                                                                                                                                                                                                                                                                | Information Superiority Group.                                                                                                                                                                                                                                                                              | 14, 150, 162, 192, 204, 206, 233, 251, 302, 345, 445, 446, 9, 2, 6                                                                                    |
| <b>F</b>                                                                               |                                                                                                                                                                                                                                                                                                                    | Information Workspace.....                                                                                                                                                                                                                                                                                  | 9                                                                                                                                                     |
| Force Protection .....                                                                 | 202, 226, 235                                                                                                                                                                                                                                                                                                      | Information/Knowledge Management Group .....                                                                                                                                                                                                                                                                | 204, 11                                                                                                                                               |
| Forward Headquarters.....                                                              | 165, 187, 188                                                                                                                                                                                                                                                                                                      | Infrastructure.....                                                                                                                                                                                                                                                                                         | 31, 39, 85, 14, 26, 12, 18, 1, 16, 63                                                                                                                 |
| FRAGO .....                                                                            | 60, 61, 115, 131, 140, 296, 8                                                                                                                                                                                                                                                                                      | Interagency iv, 2, 13, 18, 19, 23, 26, 86, 136, 148, 159, 165, 178, 190, 242, 339, 347, 351, 361, 377, 389, 399, 400, 403, 406, 411, 412, 413, 434, 9, 10, 2, 3, 5, 6, 23, 27, 30, 31, 1, 4, 7, 32                                                                                                          |                                                                                                                                                       |
| <b>G</b>                                                                               |                                                                                                                                                                                                                                                                                                                    | Interagency Community..                                                                                                                                                                                                                                                                                     | iv, 13, 361, 377, 9, 10, 27                                                                                                                           |
| General Officer.....                                                                   | 21, 439, 1                                                                                                                                                                                                                                                                                                         | IO...vi, vii, 93, 105, 106, 109, 112, 115, 117, 118, 142, 143, 144, 145, 146, 147, 151, 167, 174, 186, 191, 192, 194, 195, 198, 202, 203, 204, 206, 212, 213, 219, 221, 222, 233, 236, 237, 297, 313, 340, 342, 344, 346, 348, 350, 392, 440, 7, 9, 14, 22, 20, 21, 39, 18, 1, 2, 3, 4, 5, 6, 7, 64, 85, 88 |                                                                                                                                                       |
| GO .....                                                                               | 206, 232, 234                                                                                                                                                                                                                                                                                                      | IOC .....                                                                                                                                                                                                                                                                                                   | 212, 213, 227                                                                                                                                         |
| <b>H</b>                                                                               |                                                                                                                                                                                                                                                                                                                    | IS 9, 52, 58, 85, 117, 123, 142, 144, 145, 150, 158, 181, 192, 193, 194, 199, 204, 206, 222, 227, 230, 231, 236, 385, 402, 424, 9, 22                                                                                                                                                                       |                                                                                                                                                       |
| High Payoff Target List.....                                                           | 116, 18                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                       |
| High Speed Vessel ..                                                                   | 11, 23, 76, 153, 157, 22                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                       |
| HNS.....                                                                               | 83, 197                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                       |
| Host Nation Support... 86, 99, 159, 197, 226, 434                                      |                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                       |
| HPTL.....                                                                              | 116, 18                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                       |
| HSV 4, 11, 76, 77, 83, 96, 153, 157, 167, 22, 12, 43, 44, 46                           |                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                       |
| <b>I</b>                                                                               |                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                       |
| IA.. 85, 86, 87, 136, 158, 159, 227, 340, 371, 399, 400, 401, 402, 403, 404, 405, 406, |                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                       |

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

ISB..... 9, 75, 77, 79, 87, 156, 415, 15, 34  
ISG .112, 123, 162, 189, 191, 192, 193, 194,  
195, 202, 203, 204, 205, 206, 210, 216,  
219, 230, 235, 236, 319, 445, 446, 2, 4, 37  
ISR.vi, 10, 22, 24, 34, 48, 62, 68, 91, 95, 98,  
99, 100, 101, 106, 110, 121, 122, 123,  
124, 131, 144, 145, 148, 150, 192, 203,  
204, 213, 216, 219, 230, 236, 237, 343,  
350, 402, 439, 441, 442, 443, 444, 445,  
446, 447, 3, 7, 10, 16, 35, 36, 40, 41, 42,  
5, 6, 1, 5, 10, 13, 35, 36, 37, 38, 39, 73, 75  
IWS....iii, 54, 56, 57, 58, 62, 64, 65, 69, 113,  
117, 118, 119, 121, 122, 123, 124, 127,  
129, 131, 132, 135, 141, 148, 167, 173,  
214, 215, 228, 294, 330, 356, 357, 359,  
360, 361, 369, 376, 377, 378, 379, 381,  
382, 384, 387, 388, 390, 399, 403, 404,  
407, 416, 418, 439, 444, 9, 34, 41, 1, 15,  
16, 18, 19, 20, 26, 27, 34, 35, 36, 37, 38,  
39, 51, 52, 65, 78, 81

**J**

J419, 160, 196, 214, 226, 420, 421, 422,  
425, 427, 3  
JCB ... 58, 114, 116, 119, 122, 126, 137, 140,  
211, 213, 214, 215, 217, 221, 224, 227,  
288, 297, 346, 349, 350, 377, 378, 5, 6, 7  
JCBWG ..... 215, 227  
JCMC ..... 167, 216, 227, 443, 444, 37  
JDCAT .75, 89, 90, 109, 163, 312, 313, 314,  
315, 316, 317, 318, 319, 320, 321, 322,  
323, 324, 325, 326, 327, 399, 23  
JECG 2, 8, 34, 35, 36, 37, 38, 40, 54, 59, 68,  
76, 82, 83, 111, 146, 154, 166, 190, 193,  
296, 348, 429, 441, 23, 2, 3, 4, 5, 9, 10,  
11, 17, 1, 3, 4, 84, 1  
JEMPRS-NT.....ii, 57, 71, 377, 378, 440, 11,  
37, 1, 26, 27, 28, 48  
JFACC.....2, 6, 8, 23, 24, 44, 94, 96, 97, 98,  
114, 116, 118, 122, 125, 126, 129, 130,  
131, 132, 144, 147, 198, 218, 255, 354,  
371, 372, 375, 384, 391, 429, 11, 23, 5, 8,  
39, 10, 5, 6, 7, 14, 50, 71, 86  
JFE..... 98, 117, 131, 218, 349, 442  
JFEWG ..... 217, 218, 227

JFI.ii, 22, 108, 110, 131, 132, 148, 150, 440,  
23, 10, 36, 1, 9, 29, 30, 31, 32, 34, 35, 38,  
52, 88  
JFLCC .... 1, 5, 8, 23, 24, 25, 61, 96, 97, 113,  
114, 115, 118, 126, 130, 131, 143, 147,  
149, 157, 185, 198, 199, 298, 310, 311,  
350, 354, 356, 366, 368, 371, 372, 383,  
392, 418, 422, 429, 433, 11, 23, 5, 8  
JFMCC1, 4, 8, 20, 23, 59, 92, 94, 96, 97, 98,  
103, 114, 115, 116, 118, 121, 130, 131,  
137, 138, 140, 142, 143, 144, 145, 147,  
153, 157, 255, 275, 297, 310, 311, 330,  
354, 356, 365, 369, 370, 371, 373, 375,  
376, 429, 11, 23, 5, 8, 3, 33  
JIACG..... ii, iv, vii, 8, 16, 18, 19, 68, 90, 99,  
108, 111, 129, 135, 136, 143, 148, 149,  
150, 190, 206, 230, 231, 232, 233, 242,  
256, 312, 313, 314, 317, 318, 319, 320,  
321, 322, 336, 337, 339, 340, 399, 400,  
401, 402, 403, 404, 405, 406, 407, 408,  
409, 410, 411, 412, 23, 3, 26, 31, 32, 17  
JIM ..... 343  
JIPB 98, 297, 314, 316, 334, 335, 10, 26, 33,  
80  
JIPTL..... 114, 116, 125, 18  
JISC..... 58, 218, 219, 220, 226, 227, 345  
JISE ... 204, 211, 216, 226, 346, 350, 442, 35  
JL Tools..... 159, 418, 433, 434  
JLMC..19, 76, 154, 173, 174, 414, 415, 418,  
419, 420, 421, 422, 426, 427, 428, 429,  
430, 432, 435, 3  
JOA..... 48, 75, 76, 79, 80, 81, 82, 83, 84, 85,  
86, 87, 90, 91, 92, 93, 94, 95, 99, 101,  
103, 104, 106, 112, 113, 119, 122, 126,  
130, 137, 138, 141, 148, 153, 154, 155,  
156, 157, 158, 159, 176, 197, 203, 313,  
339, 344, 351, 356, 397, 414, 415, 416,  
420, 422, 434, 435, 10, 6, 14, 16, 17, 18,  
20, 21, 22, 24, 33, 34, 10, 12, 16, 11, 12,  
22, 54, 67, 70, 1  
JOC.203, 213, 220, 223, 227, 319, 323, 346,  
347, 348, 350, 351, 369, 392, 421, 423,  
425, 429, 442, 444, 27, 37  
Joint Collection Management Cell..... 216  
Joint Coordination Board ... 56, 60, 213, 214,  
215, 288, 377, 2, 3, 4

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

Joint Coordination Board Working Group ..... 215  
Joint Experiment Control Group 8, 415, 1, 3, 10, 1  
Joint Fires Element..... 217  
Joint Fires Element Working Group ..... 217  
Joint Fires Initiative..ii, v, 22, 108, 124, 126, 131, 148, 440, 23, 10, 36, 1, 8, 9, 29  
Joint Force Targeting ..... 122, 173  
Joint Information Superiority Center ..... 218, 345  
Joint Integrated Tasking Order..... 149  
Joint Integration Matrix..... 343, 344  
Joint Intelligence Support Element . . 226, 35  
Joint Intelligence, Surveillance, Reconnaissance ..... 230, 88  
Joint Interagency Coordination Group..ii, iv, 149, 317, 399, 400, 23, 3, 31, 32  
Joint Logistics Management Center ... 19, 76, 414, 415, 420, 425, 3  
Joint Operations Area..... 76  
Joint Operations Center.... 18, 166, 219, 220, 235, 369, 421, 442, 41  
Joint Planning Center ... 18, 20, 21, 174, 202, 221, 336, 421, 423  
Joint Psychological Operations Task Force ..... vi, 2, 8, 23  
Joint Special Operations Task Force..... 2, 24  
Joint Standard Operating Procedures ..... 166  
Joint Tactical Actions. 100, 112, 142, 11, 12, 20  
Joint Total Asset Visibility... 11, 20, 85, 431, 24, 54  
JOPES. 85, 87, 202, 203, 423, 424, 430, 431, 435, 436, 54, 56  
JPC ..... 20, 21, 143, 174, 198, 202, 213, 221, 222, 227, 314, 315, 317, 318, 319, 323, 330, 336, 337, 338, 339, 340, 341, 342, 343, 345, 346, 347, 348, 350, 421, 423, 428, 435, 436  
JPOTF... 2, 8, 23, 25, 96, 97, 198, 23, 5, 8, 5, 6, 7, 47  
JSOP ..... 20, 76, 78, 155, 164, 166, 167, 168, 170, 171, 172, 203, 205, 233, 414, 416, 420, 423, 424, 429, 435, 436, 24, 15, 22, 23, 33

JSOTF..... 2, 8, 23, 24, 96, 97, 98, 113, 115, 116, 126, 130, 131, 137, 139, 141, 149, 199, 250, 255, 335, 354, 371, 372, 376, 392, 422, 440, 24, 5, 8, 12, 39, 1, 49, 50, 51, 52, 53, 71, 72, 73  
JTA 106, 137, 141, 142, 146, 147, 11, 24, 20  
JTAV .. 11, 20, 85, 431, 433, 436, 24, 54, 55, 56

**K**

KIMP .. 65, 69, 166, 168, 172, 193, 205, 233, 378, 379, 380, 382, 385, 386, 389, 390, 392, 393  
KM ..... 69, 70, 192, 193, 199, 204, 205, 206, 212, 237, 376, 378, 379, 380, 382, 385, 386, 390, 391, 392, 395, 424, 425, 27  
KMG..... 162, 189, 191, 193, 202, 204, 205, 206, 237  
Knowledge Base..... 241, 245, 264, 265, 434  
Knowledge Information Management Plan ..... 65, 205, 379  
Knowledge Management..... 14, 48, 69, 159, 162, 166, 167, 172, 185, 189, 202, 205, 206, 233, 237, 302, 359, 376, 379, 385, 386, 389, 414, 27, 64

**L**

LARB 19, 20, 21, 80, 86, 159, 224, 225, 227, 230, 414, 420, 422, 425, 426, 427, 428, 429, 434, 436, 3  
LNO 163, 196, 206, 227, 228, 229, 391, 403, 404, 73  
LOG..... 167  
Log CROP 20, 75, 80, 81, 86, 153, 154, 155, 156, 157, 159, 160, 264, 357, 414, 416, 417, 418, 420, 425, 430, 434, 54  
Logistic Action Response Board... 19, 423, 3  
Logistics .ii, v, 11, 19, 20, 21, 24, 68, 76, 77, 79, 80, 85, 86, 87, 96, 129, 153, 154, 155, 159, 162, 167, 173, 191, 192, 196, 198, 202, 205, 206, 224, 225, 230, 233, 377, 380, 382, 395, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 428, 429, 430, 435, 436, 439, 8, 24, 2, 3, 6, 10, 16, 21, 22, 32, 33, 35, 36, 10, 12, 1, 53, 54, 55, 68

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

Logistics Action Response Board .... 80, 159,  
224, 225, 414, 426  
Logistics Support Group 162, 191, 414, 424,  
425

**M**

M&S ...33, 34, 37, 41, 44, 45, 75, 89, 91, 98,  
108, 109, 110, 112, 113, 122, 123, 124,  
125, 131, 144, 150, 151, 312, 338, 345,  
371, 419, 431, 24, 10, 1, 4, 6, 9, 11, 61, 62  
Maritime Tasking Order..... 114, 25  
METOC..... 204, 25  
Mission Analysis..... 403, 25  
MOE... 17, 122, 342, 345, 346, 348, 350, 12,  
41, 88  
MOP ..... 17, 345, 346, 350, 12  
MTO113, 114, 115, 116, 121, 125, 129, 131,  
144, 149, 167, 25

**N**

N-A-E Link .....276, 277  
Nodes..... 268, 276, 279, 296, 303, 81

**O**

Observation .... 58, 62, 64, 65, 66, 69, 84, 85,  
104, 146, 158, 244, 246, 247, 250, 256,  
261, 263, 264, 296, 297, 298, 299, 350,  
378, 382, 384, 385, 386, 389, 409, 410,  
435, 445, 1, 2, 3, 4, 5  
ONA ...ii, v, 2, 13, 15, 16, 17, 26, 50, 67, 68,  
81, 85, 90, 98, 106, 108, 110, 113, 117,  
118, 119, 120, 123, 124, 126, 127, 135,  
136, 144, 148, 149, 150, 156, 158, 166,  
167, 168, 175, 176, 179, 182, 183, 184,  
192, 197, 200, 202, 203, 204, 216, 217,  
230, 231, 232, 236, 239, 240, 241, 242,  
243, 244, 245, 246, 247, 248, 249, 250,  
251, 252, 253, 254, 255, 256, 257, 258,  
259, 260, 261, 262, 263, 264, 265, 266,  
267, 268, 269, 270, 271, 272, 273, 274,  
275, 276, 277, 278, 279, 280, 281, 282,  
283, 284, 285, 286, 287, 288, 289, 290,  
291, 292, 293, 294, 296, 297, 298, 299,  
300, 301, 302, 303, 304, 305, 306, 307,  
308, 309, 310, 311, 312, 313, 314, 315,  
316, 317, 318, 319, 320, 321, 322, 323,

324, 325, 326, 329, 330, 331, 333, 334,  
335, 336, 337, 338, 339, 345, 350, 352,  
385, 389, 393, 395, 396, 399, 401, 411,  
412, 418, 434, 439, 7, 13, 14, 25, 1, 2, 3,  
5, 6, 9, 10, 12, 18, 24, 25, 26, 27, 30, 34,  
35, 38, 1, 11, 12, 15, 2, 9, 37, 38, 51, 52,  
61, 62, 76, 77, 78, 79, 80, 81, 87  
ONA Current Summary ..... 252, 282  
ONA Database 252, 263, 267, 268, 269, 270,  
276, 282, 302, 305, 395, 79, 80  
ONA Knowledge Base ... 241, 242, 244, 245,  
254, 260, 262, 264, 273, 276, 282, 294,  
302, 304, 434  
ONA Matrix ... 241, 252, 267, 282, 302, 304,  
395, 396  
ONA Products ..... 241, 267  
ONA References ..... 241, 252, 267, 282, 395  
ONA Today .... 241, 252, 261, 267, 282, 304,  
307, 308, 310, 311  
ONA Tool..... 439, 10, 2, 76, 77, 78, 79, 81  
Operational Combat Assessment ... 108, 110,  
123  
Operational Net Assessment ...ii, v, 2, 15, 67,  
148, 158, 166, 167, 230, 239, 297, 299,  
314, 351, 5, 13, 25, 1, 2, 6, 23, 35, 39, 40,  
1  
Operational-Level..... 13  
Operations Group ... 2, 14, 19, 162, 178, 196,  
203, 206, 233, 414, 420, 422, 425, 435, 3,  
38, 39  
Operations Order..... 14  
Operations Security ..... 87  
OPFOR vii, viii, 9, 26, 34, 36, 38, 44, 48, 81,  
82, 83, 88, 93, 95, 98, 99, 102, 108, 111,  
112, 116, 125, 126, 127, 128, 129, 135,  
136, 137, 138, 139, 140, 141, 142, 144,  
145, 146, 156, 205, 274, 275, 279, 316,  
317, 318, 325, 343, 348, 365, 25, 3, 4, 5,  
6, 1, 2, 9, 10, 11, 12, 13, 14, 15, 16, 17,  
18, 6, 62, 1, 2, 3, 1  
OPORD ..... 221, 14  
OPSEC ..... 104, 204, 87

**P**

PAO..... 143, 192, 196, 197, 201, 212, 11

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

PEL..... 21, 60, 74, 113, 114, 115, 116, 120,  
121, 124, 125, 150, 217, 218, 286, 287,  
288, 291, 322, 333, 334, 338, 350, 352,  
425, 445, 26, 18, 24, 26, 38, 39  
PG... 162, 189, 191, 192, 194, 196, 198, 202,  
203, 204, 206, 220, 230, 235, 236  
Planning Tool ..... 12, 39, 49  
Plans Group 14, 78, 150, 162, 175, 192, 196,  
202, 206, 233, 263, 302, 414, 415, 422,  
424, 425, 429, 436, 39, 62  
PME.....iv, 149, 245, 256, 264, 265, 266  
PMESII. 16, 17, 26, 90, 91, 95, 98, 100, 101,  
110, 112, 120, 148, 239, 240, 243, 245,  
252, 267, 271, 272, 273, 274, 279, 282,  
294, 301, 302, 303, 312, 313, 315, 316,  
317, 318, 336, 337, 339, 340, 341, 352,  
13, 14, 2, 6, 17, 18, 19, 23, 24, 26, 27, 18,  
77  
Political-Military ..... 19, 32  
POLMIL ..... 166  
Predictive Analysis..... 113, 123, 150  
PREPO 75, 76, 77, 80, 81, 83, 84, 85, 87, 54  
Prioritized Effects List 21, 60, 213, 287, 333,  
26  
Professional Military Education.....iv  
Psychological Operations.....vi, vii, 25, 14  
PSYOP ... 112, 142, 143, 167, 204, 212, 297,  
14, 20

**R**

Rapid Decisive Operations.....ii, vi, 76, 153,  
154, 164, 167, 404, 415, 439, 5, 15, 26, 1,  
2, 34, 1, 12, 32, 34, 39, 50, 63  
RCC ..... 230, 242  
RDOii, iii, iv, vi, vii, 1, 9, 10, 11, 13, 14, 15,  
16, 18, 21, 22, 26, 47, 52, 60, 66, 67, 72,  
76, 77, 81, 87, 90, 91, 92, 93, 95, 101,  
102, 105, 106, 111, 115, 135, 136, 137,  
147, 153, 154, 155, 158, 160, 164, 165,  
166, 179, 209, 239, 340, 405, 406, 407,  
415, 421, 422, 423, 439, 447, 6, 11, 13,  
15, 26, 1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 13, 14,  
16, 21, 22, 23, 33, 34, 1, 9, 12, 13, 14, 15,  
16, 17, 18, 1, 2, 3, 6, 9, 10, 11, 19, 33, 49,  
52, 56, 60, 61, 63, 79, 84, 85, 88

Redviii, ix, 20, 26, 28, 35, 36, 38, 44, 83, 93,  
95, 100, 123, 125, 138, 144, 145, 157,  
235, 243, 251, 267, 271, 272, 273, 274,  
289, 290, 301, 302, 303, 308, 310, 312,  
315, 316, 317, 318, 322, 323, 325, 326,  
337, 338, 343, 347, 350, 386, 395, 396,  
446, 24, 27, 4, 1, 2, 3, 4, 5, 6, 7, 9, 11, 14,  
17, 18, 3, 4, 12, 30, 35, 63, 77, 1, 3, 4  
Regional Combatant Command ..... 242, 254  
Regional Combatant Commander ..... 254  
Request For Information ..... 51  
Resources ..... 85, 147, 268, 294, 9, 54, 81  
RFI 69, 175, 313, 390, 391, 395, 422, 425, 2,  
4, 37, 51, 60  
Rhythm ..... 172, 362, 376, 384, 22, 33  
ROE 105, 106, 113, 114, 125, 157, 220, 222,  
223, 227, 19, 30, 9, 10, 17, 18, 27, 1  
ROEWG ..... 223, 224

**S**

SA... 113, 179, 180, 184, 192, 193, 199, 201,  
204, 207, 208, 211, 220, 221, 229, 230,  
231, 236, 247, 348, 349, 351, 392, 410,  
414, 416, 425, 26, 12, 28, 50, 56, 57, 58,  
59, 79, 80  
SCD 146, 241, 247, 250, 251, 256, 259, 264,  
296, 297, 298, 299, 312, 400, 401, 404,  
407, 408, 410  
SCI..... 146, 233, 40, 20, 52, 2  
Senior Concept Developer/Mentor..... 1  
Senior Concept Developers.....viii, 114, 141,  
163, 164, 401, 441, 444, 445  
Sensitive Compartmented Information 26, 85  
Sequels ..... 113, 114, 137  
Shared Point Portal Server ..... 379  
Situation Awareness ..... 44  
Situational Awareness..... 55, 124, 135, 141,  
148, 26, 8, 14, 37, 41, 36, 39, 56, 78, 79, 4  
SJA ..... 196, 197, 201, 224  
SJFHQ... ..ii, iv, 1, 13, 14, 16, 20, 23, 26, 67,  
72, 76, 78, 85, 87, 149, 150, 154, 158,  
162, 163, 164, 165, 166, 167, 168, 169,  
170, 172, 174, 175, 176, 177, 178, 179,  
180, 181, 182, 183, 184, 185, 187, 188,  
189, 190, 191, 192, 193, 194, 195, 196,  
197, 198, 199, 200, 201, 202, 203, 204,

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 205, 206, 207, 209, 210, 211, 212, 214,<br>218, 222, 224, 226, 227, 228, 229, 230,<br>231, 232, 233, 234, 235, 242, 261, 263,<br>264, 270, 275, 284, 296, 297, 302, 310,<br>311, 335, 351, 376, 380, 388, 392, 393,<br>399, 402, 411, 412, 414, 415, 421, 422,<br>423, 424, 425, 428, 434, 435, 436, 446,<br>447, 1, 2, 7, 11, 14, 15, 27, 1, 2, 3, 5, 9,<br>12, 22, 23, 36, 38, 1, 2, 3, 4, 6, 8, 13, 16,<br>18, 19, 20, 21, 22, 23, 27, 28, 32, 36, 40,<br>48, 53, 54, 57, 59, 61, 63, 68, 77, 79, 81,<br>84, 85, 86, 87, 88                                                | 301, 330, 336, 340, 380, 384, 403, 423,<br>426, 431, 432, 444, 1, 4, 1, 3, 4, 6, 18, 55,<br>56, 77, 81, 84                                                                                                                                                                         |
| SME 63, 65, 89, 90, 100, 101, 105, 109, 115,<br>117, 121, 131, 134, 136, 138, 139, 142,<br>144, 145, 157, 163, 168, 170, 173, 174,<br>175, 176, 177, 179, 180, 181, 182, 184,<br>186, 187, 190, 192, 193, 194, 195, 196,<br>197, 198, 200, 202, 203, 204, 205, 207,<br>208, 209, 211, 212, 214, 216, 217, 219,<br>220, 221, 223, 224, 225, 226, 227, 228,<br>232, 250, 251, 256, 259, 290, 296, 297,<br>298, 299, 312, 329, 332, 336, 338, 339,<br>340, 341, 342, 343, 344, 345, 347, 348,<br>359, 397, 399, 417, 418, 425, 426, 441,<br>27, 8, 4, 50, 51, 52, 57, 72, 73, 75 | SPPS iii, v, 20, 69, 75, 89, 90, 109, 113, 123,<br>127, 141, 148, 167, 191, 229, 252, 282,<br>294, 302, 304, 306, 307, 308, 309, 310,<br>330, 331, 357, 370, 376, 377, 379, 381,<br>382, 386, 387, 388, 389, 390, 397, 399,<br>418, 444, 15, 27, 41, 19, 35, 36, 37, 39,<br>77, 81 |
| SOF.... 4, 24, 28, 43, 44, 100, 121, 126, 127,<br>130, 138, 190, 204, 236, 249, 250, 12, 19,<br>39, 4, 8, 29, 50, 51, 52, 53, 70, 71, 72, 73,<br>74, 75, 76                                                                                                                                                                                                                                                                                                                                                                                                                   | SQL ..... 241, 267, 310                                                                                                                                                                                                                                                            |
| SOSA..v, 136, 202, 204, 211, 239, 251, 263,<br>268, 269, 276, 281, 301, 346, 350, 77, 87                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Standing Joint Force Headquarters ..ii, 1, 67,<br>76, 154, 162, 164, 206, 233, 302, 351,<br>400, 415, 27, 1, 2, 22, 8, 13, 27, 36, 48,<br>53, 57, 63                                                                                                                               |
| SOSA Cell..... 239                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | STO 109, 112, 142, 146, 151, 202, 235, 440,<br>27, 2, 3, 5, 6, 7, 83, 84, 85, 86, 87, 88                                                                                                                                                                                           |
| Special Operations Forces..... 23, 70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Strategic Airlift..... 203                                                                                                                                                                                                                                                         |
| Special Technical Operations..... 109, 27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Strategic Lift..... 162, 424, 428, 429                                                                                                                                                                                                                                             |
| Spiral 233, 36, 37, 38, 39, 41, 177, 180, 245,<br>4, 84                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Strategic-Level ..... 15                                                                                                                                                                                                                                                           |
| Spiral 3 ... 1, 33, 38, 41, 59, 79, 94, 116, 144,<br>149, 163, 164, 167, 168, 169, 170, 171,<br>173, 175, 176, 177, 178, 179, 180, 181,<br>183, 185, 186, 187, 188, 191, 194, 195,<br>196, 197, 198, 207, 210, 212, 213, 214,<br>215, 216, 218, 219, 220, 222, 223, 224,<br>225, 228, 241, 243, 245, 247, 252, 253,<br>257, 258, 260, 261, 262, 263, 267, 268,<br>269, 272, 273, 274, 275, 276, 277, 281,<br>283, 287, 289, 290, 291, 293, 294, 297,                                                                                                                          | STRATLIFT..... 203, 206, 233, 235                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Structured Query Language ..... 241, 267                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Subject Matter Experts 26, 76, 89, 109, 133,<br>185, 334, 441, 11, 12, 38, 1, 50                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>T</b>                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Tactical-Level..... 16                                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Target Folders .... 440, 20, 21, 12, 18, 1, 8, 9,<br>22, 37, 61, 62                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | TBM28, 45, 93, 99, 104, 125, 126, 139, 150,<br>27, 12, 39, 12, 16, 1, 70, 72, 73                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Time Sensitive Target ..... 22, 108, 130, 148,<br>223, 224, 28, 36, 22, 29, 33                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Time Sensitive Targets..... 130, 148, 224, 22                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | TPFDD ..... 21, 76, 77, 78, 79, 81, 82, 95, 99,<br>106, 203, 221, 421, 423, 424, 428, 429,<br>430, 431, 432, 433, 435, 16, 28, 15, 10,<br>55, 56, 69, 1                                                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Training 1, 2, 8, 31, 33, 36, 85, 86, 159, 166,<br>167, 231, 232, 239, 242, 257, 258, 260,<br>264, 281, 282, 284, 285, 294, 298, 328,<br>337, 367, 384, 385, 435, 17, 19, 20, 21,<br>24, 25, 27, 3, 2, 11, 14, 15, 40, 52, 54, 57,<br>75, 78, 84, 87, 1                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Transition ..... 34, 226, 267, 401                                                                                                                                                                                                                                                 |



U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

TST..... 22, 58, 59, 108, 110, 115, 116, 117,  
118, 119, 124, 125, 126, 130, 131, 132,  
133, 134, 135, 150, 224, 227, 442, 445,  
16, 28, 18, 19, 29, 30, 31, 33, 34, 35, 50,  
71, 72, 73, 75

TST Cell ..... 131, 224

TTP..... 20, 76, 110, 130, 133, 150, 159, 172,  
206, 392, 412, 413, 423, 429, 435, 436,  
28, 33, 11, 53

**U**

UJTL..... 163, 165, 172, 173, 179, 190, 201,  
203, 205, 208, 213, 220, 222, 223, 226,  
229, 312, 435, 5, 8, 14

Universal Joint Task List..... 163, 1, 5, 14, 41  
Update 56, 58, 214, 217, 246, 251, 260, 275,  
373, 7, 44, 47

USS CORONADO ..... 1, 4, 8, 34, 163, 187,  
188, 353, 354, 356, 377, 388, 1

**V**

Visualization. 244, 246, 250, 337, 23, 26, 36,  
30, 34, 35, 37

Vulnerabilities ..... 396, 14, 12

**W**

Warfighting Challenge 53, 55, 61, 75, 76, 90,  
91, 92, 95, 109, 110, 111, 112, 153, 154,  
164, 243, 267, 286, 288, 329, 357, 358,  
359, 400, 415, 435, 441, 5, 6, 7, 9, 14, 15,  
16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27,  
28, 30, 31, 32, 33, 40

White Cell ..... 242, 386, 387, 388, 10

WME .... ix, 26, 28, 111, 114, 123, 125, 126,  
137, 140, 146, 341, 348, 376, 447, 3, 10,  
13, 14, 16, 12, 72

(This Page Blank)

## **Annex O — Distribution List**

Aerospace Command and Control, Intelligence, Surveillance, and Reconnaissance Center  
Aerospace Defense Command  
Air Force Command and Control Training and Innovation Group  
Ballistic Missile Defense Organization  
Battle Lab Support Element (MCCS-FBB)  
Central Intelligence Agency  
Commandant, Air War College  
Commandant, Army War College  
Commandant, Joint Forces Staff College  
Commandant, National Defense University  
Commandant, Naval War College  
Commandant, U.S. Coast Guard  
Commander, 82<sup>nd</sup> Airborne Division  
Commander, Carrier Group Eight  
Commander, Carrier Group Three  
Commander, III Corps  
Commander, Joint Communications Support Element  
Commander, Joint Interoperability Test Command  
Commander, Joint Task Force Civil Support  
Commander, Naval Air Systems Command  
Commander, Naval Air Warfare Center Weapons Division  
Commander, Second Fleet  
Commander, Special Operations Command Joint Forces Command  
Commander, Third Fleet  
Commander, Training and Doctrine Command  
Commander, U.S. Analysis and Experimentation Planning Group  
Commander, U.S. Army Forces Command  
Commander, U.S. Atlantic Fleet  
Commander, U.S. Central Command  
Commander, U.S. European Command  
Commander, U.S. Forces Korea  
Commander, U.S. Marine Corps Forces Atlantic  
Commander, U.S. Marine Corps Forces Pacific  
Commander, U.S. Northern Command  
Commander, U.S. Pacific Command  
Commander, U.S. Pacific Fleet  
Commander, U.S. Southern Command  
Commander, U.S. Special Operations Command  
Commander, U.S. Strategic Command  
Commander, U.S. Transportation Command  
Commander, US Joint Forces Command Intelligence Directorate (J2)  
Commander, US Joint Forces Command Operations, Plans, Logistics, and Engineering  
Directorate (J3/J4)

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

Commander, US Joint Forces Command Strategy and Analysis Directorate (J5)  
Commander, US Joint Forces Command, Command, Control, Communications, and Computer Systems Directorate (J6)  
Commander, US Joint Forces Command Joint Training Directorate (J7)  
Commander, US Joint Forces Command Joint Requirements and Integration Directorate (J8)  
Commanding General, I Marine Expeditionary Force  
Commanding General, II Marine Expeditionary Force  
Commanding General, Marine Corps Combat Development Command  
Commanding General, Marine Corps Warfighting Laboratory  
Defense Advanced Research Projects Agency  
Defense and Information Systems Agency  
Defense Intelligence Agency  
Defense Threat Reduction Agency  
Deputy Chief of Naval Operations Plans, Policy, and Operations (N3/N5)  
Deputy Under Secretary of Defense, Advanced Systems and Concepts  
Director, Joint Advanced Warfighting Program  
Director, National Security Agency  
Director, U.S. Army TRADOC Analysis Center  
Headquarters Air Combat Command  
Headquarters Air Force Wargaming and Experimentation Division  
Headquarters Department of the Army  
Headquarters Twelfth Air Force  
Joint C4ISR Battle Center  
Joint Forces Intelligence Command  
Joint Frequency Management Office, Atlantic  
Joint Personnel Recovery Agency  
Joint Warfare Analysis Center  
Joint Warfighting Center  
National Defense University, Institute for National Strategic Studies  
National Guard Bureau  
National Imagery and Mapping Agency  
National Reconnaissance Office  
Naval Surface Warfare Center  
Office of Assistant Secretary of the Navy Research, Development, and Acquisition  
Office of Management and Budget  
Office of Naval Research  
Office of the Under Secretary of Defense, Acquisition and Technology  
Office of the Under Secretary of Defense, Advanced Systems & Concepts  
Office of the Under Secretary of Defense, Comptroller  
Office of the Under Secretary of Defense, Defense Research and Engineering  
Office of the Under Secretary of Defense, Deputy director Theater Assessments & Planning  
Office of the Under Secretary of Defense, Operational Net Assessment  
Office of the Under Secretary of Defense, PA&E  
Office of the Under Secretary of Defense, Personnel and Readiness  
Office of the Under Secretary of Defense, Policy  
Office of the Under Secretary of Defense, Science & Technology

U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report

President, Institute for Defense Analyses  
Program Executive Officer Theater Surface Combatants  
Space and Naval Warfare Systems Command  
U.S. State Department

(This Page Blank)

(This Page Blank)



**FOR OFFICIAL USE ONLY**