

Transforming Operational Architecture for the Information Age

By Douglas A. Macgregor
Colonel, US Army

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Colonel Macgregor was commissioned in the US Army in 1976 after one year at the Virginia Military Institute and four years at West Point. On completion of airborne and ranger training, Colonel Macgregor served in a variety of command and staff assignments including tank company command in a mechanized infantry brigade of the 4th Infantry Division (Mech) and command of a division cavalry squadron in the 1st Infantry Division (Mech). During Desert Storm, Colonel Macgregor was awarded the bronze star with "V" device for valor while leading combat troops of the 2nd Squadron, 2nd Armored Cavalry Regiment in the battle of the 73 Easting. From November 1997 to December 1999, Colonel Macgregor served as the J5, Chief of Strategic Planning and Director, Joint Operations Center, Supreme Headquarters Allied Powers, Europe in Belgium. Colonel Macgregor's numerous decorations also include the Defense Superior Service Medal and the French Army's La medaille d'argent de la Defense Nationale.

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At the end of a century of conflict involving the use of American and Israeli military power, the question on the minds of many observers in the United States and Israel is “What has changed in military affairs?” It is a valid question and it deserves the attention of both countries as we enter the 21st Century.

In the United States, there is a predisposition to answer this question by citing advances in technology as evidence for fundamental change in warfare. But more than technology is required to change warfare. Truly revolutionary change only occurs when technology, organization, leadership and tactics change. This is why understanding the potentially revolutionary impact of changing operational architecture is critical to the armed forces. Operational architecture determines command relationships; establishes connectivity between communications nodes; provides structures for information exchange requirements (IER); and, ultimately, produces the systems architecture that determines technology and equipment needs for military organizations. Without change in the operational architecture, the American passion for technology will simply reinforce the tendency to buy new platforms and equipment for use inside old structures and organizations.¹ In fact, American reductions in defense spending since 1991 have been consistent with the American tendency to favor the tools of war over the arts of war.

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Reductions in the 1990s produced waves of organizational downsizing rather than organizational change with the result that the essential features of the traditional World War II command and control paradigm have been retained in the post-Cold War armed forces. This is not surprising. Organizational change modifies the way armed forces are commanded and controlled and change in the operational architecture of command and control determines command relationships that create or eliminate jobs for generals. One consequence of this condition has been a preference for retaining the headquarters overhead and extensive logistical infrastructure at the expense of the soldiers assigned to combat formations that deploy and fight. Although the Congress regularly criticizes the US armed services for preserving General Officer positions at the expense of ready, deployable combat power, it has yet to propose legislation to change the situation.²

This is unfortunate. New missions for today's military establishment that were either unknown or unanticipated fifty years ago make change in the command and control structure of today's World War II-based operational architecture imperative. Without fundamental change in the operational architecture that supports the single-service warfighting establishments in the US armed forces, the potential of new technology and the integration of sensors and strike platforms will not occur.³

This is especially true for American ground forces where the ongoing debate about operational architecture is at least a decade behind emerging strategic and battlefield realities. The globalization of US interests and US commitments must transform army ground forces from a single service warfighting establishment with a two theater strategic focus into a global army that can perform as an integral element of any future Joint Task Force. For this to occur sooner, rather than later, however, change in the operational architecture that commands and controls ground forces within a joint framework is key. With these points in mind, this paper seeks answers to three questions: (1) what are the essential features of the World War II architecture that survive unchanged into the present? (2)



What should a new operational architecture for ground forces look like? And, (3) will change in the operational architecture make any difference? The paper answers these questions in the context of command relationships and nodal connectivity and suggests ways in which the army could develop a new operational architecture for ground forces in the information age.

How We Got Here

To change the way armed forces are commanded and controlled, as well as the way they organize to fight, one must know the origins of the current operational architecture and why it is unsuited to today's strategic environment. To understand C2 paradigms that emerged during the last revolution in military affairs (RMA) between 1934 and 1945 and their impact on operational architecture since World War II, one needs to establish the meaning of operational architecture in this essay.

Operational architecture describes the operational elements, assigned tasks and information flows to accomplish or support a warfighting function. It defines the types of information to be exchanged; the frequency of exchange and the tasks supported by the information exchanges. This suggests that to be useful, operational architecture must:

- Identify or describe the requirement for new or improved organizational structures, systems or processes, not just describe current structures, systems or processes.
- Specify requirements in sufficient detail to guide organizational design or redesign, system acquisition or improvement, or process definition or reengineering. The requirements that are detailed in the operational architecture eventually become part of the foundation for the construction of the systems and technical architecture from which are derived the hardware and software solutions for the new command and control (C2) structure.



World War II created an American C2 structure that emphasized a linear flow of information from mission received to mission accomplished between commanders and subordinates.⁴ The resulting multi-echelon operational architecture in the US Army's Ground Forces was also geared for a 24 hour planning cycle. Each echelon of command and control from tactical to operational or battalion to army group based its daily operations on guidance from higher headquarters.⁵ This reflected the mass-mobilization character of the army. For most of the war, the army consisted of millions of citizen soldiers with limited military training whose strength stemmed from sheer numbers and firepower, rather than superior tactics or a carefully thought-out doctrine for modern maneuver warfare.

Though frequently over-taken by events in combat, victory in World War II ensured that the C2 structure with its dependence on FM-based communications along with its mass mobilization cultural underpinnings would change little after 1945. In addition, the warfighting structures that emerged from World War II were essentially single service affairs that reflected the nature of the environmental conditions in which they evolved. After 1945, strategic bombing assumed a pre-eminent role in the US Air Force. In the US Navy, warfare revolved around carrier battlegroups. In the US Army's ground combat forces, though few soldiers remained on active service, the framework of the division-based, war mobilization paradigm with all of its associated headquarters, C2 nodes and logistical infrastructure was preserved in tact.

The point of this discussion is simple. How information is used reflects both the structures of the information flow, as well as the thinking and the mentality of the people who use the information. The two influence one another and are inextricably intertwined. For the US Army, the legacy of industrial age warfare dramatically influenced both the structure and the thinking of command and control. The following anecdotes illustrate this point.



On the afternoon of March 7th, 1945, reconnaissance patrols of Combat Command B, 9th Armored Division advanced through the crumbling German defenses and captured the Ludendorff railway bridge over the Rhine at Remagen before the retreating Germans could destroy it. Word of the bridge's capture actually reached the Army Group commander, General Omar Bradley within thirty minutes. However, adjacent units on the flanks did not discover that the bridge was in American hands for several hours leaving a handful of tank and infantry companies to hold the bridge without assistance.⁶ In fact, when strong reinforcements did arrive the next day, they arrived

<u>World War II C2</u> (Remagen, 1945)	<u>Gulf War C2</u> (Desert Storm, 1991)
Theater Commander	CINC, USCENTCOM
Army Group	Army
Army	Corps
Corps	Division
Division	Brigade
Regiment	Battalion
Battalion	Company
Company	

through the vertical pipeline that responded to the top-down driven command structure rather than from the flanking units.

Bradley recognized the importance of exploiting this unanticipated development and expressed this sentiment to General Harold Bull, General Eisenhower's chief of operations, who was visiting General Bradley's headquarters. General Bull reacted almost as though he were disappointed. Bull did not share Bradley's enthusiasm for this unanticipated development.



“You’re not going anywhere down there at Remagen,” Bull told Bradley. “You’ve got a bridge, but it’s in the wrong place. It just doesn’t fit into the plan.”⁷ Bradley listened as Bull pointed out that Remagen, if exploited, would conflict with Montgomery’s deliberate Rhine crossings planned for late March and disrupt the balanced strategic plan that Eisenhower had painstakingly worked out to prevent the invasion of Germany from becoming what he called “a hasty and disorganized improvisation.”⁸

Although Bradley knew that Eisenhower’s strategic plan called for Montgomery’s troops to cross the Rhine first, he decided to appeal directly to Eisenhower for permission to use the Remagen bridge. It is interesting that while Eisenhower eventually countermanded Bull’s order on the 7th of March, Eisenhower constrained Bradley’s freedom of action by directing that Hodge’s troops do no more than create a bridgehead over the Rhine that could be “defended” by five divisions. Supreme Headquarters Allied Expeditionary Force (SHAEF) approval would be required before attempting any breakout. Reports from forward units of the 9th Armored Division of light German resistance made little difference to SHAEF.⁹

On 8 March, American forces began crossing the Remagen bridge in strength, but Bull’s initial reaction to the seizure of the bridge revealed an organizational culture shaped by the top-down, vertical nature of the operational architecture. This highly vertical architecture did not reward interactive feedback from subordinate commanders and staffs and tended to stifle initiative on the tactical level. The notion that opportunities seized by junior officers on the battlefield should be exploited to achieve operational and strategic advantage was a foreign concept to most of the US Army’s generals. The obsession with linear channels of communication that centralized control of events in the hands of senior officers miles from the action was reinforced by both the technology of communications (FM radio and telephone) and the mentality that all action must conform to a plan made in advance. Though Third Army was a notable exception to this practice, Bull’s response typified most of the thinking in the US Army at the time.



Essentially unchanged since World War II, this vertical conceptual framework of command and control continued to shape decision-making and planning processes, as well as the commander's information needs in the conflicts that erupted after World War II.¹⁰ The conduct of operations in Desert Storm during 1991 demonstrated the familiar rigidity of the essentially unchanged WW II C2 structure along with the same predisposition to execute a plan long after it had become irrelevant.

The C2 process that determined the conduct of the ground war in Southwest Asia was actually run from Third Army Headquarters in Riyadh more than three hundred miles from the front. In a C2 arrangement that was reminiscent of the Chateau Generals of World War I, the Third Army Commander, General Yeosock was positioned in Saudi Arabia at a location that was remote from the scene of the battle. General Norman Schwarzkopf subsequently criticized this arrangement as failing to induce more aggressive action by the VII Corps to trap the Iraqi Republican Guard Corps. As it turned out, Franks took little notice of the reports from subordinate headquarters that confirmed Iraqi weakness during the VII Corps' advance into Iraq. In fact, even after the battle of Khafji exposed the weakness of Iraqi ground forces, the plan for the ground war never changed.¹¹

TODAY'S OPERATIONAL ARCHITECTURE IS THE PRODUCT OF THE WORLD WAR II RMA!

- **Command relationships are numerous, redundant and vertical;**
- **Voice communications drive nodal connectivity; Example : CDRs need (2)-(5) radio nets to monitor battle and issue orders;**
- **Structure for information exchange requirements is single service in character, Minimal C2 integration with other Services;**
- **Systems architecture is overly complex and dependent on legacy system technology;**
- **Current architecture restricts flow and exploitation of information;**
- **Information capabilities are centralized at the highest level.**



Despite the fact that new communications technology might have maximized the flow of near real-time information within the VII Corps and the Third Army to facilitate a more rapid advance, it did not occur. This is because unwieldy, complex and unresponsive command arrangements resulting from anachronistic or ineffective operational architecture is a problem that only becomes apparent in crisis or conflict. Pre-war maneuvers and simulations tend to be so sterile and stylized as to conceal the underlying human element that animates operational architecture in action. In Desert Storm as at the Remagen Bridge, the rigid, multi-echelon pyramidal operational architecture combined with the thinking of the senior leaders in command to impart real rigidity to the conduct of operations.

One officer in the VII Corps expressed the sentiment of many when he said “we moved so slowly and deliberately according to a plan that was irrelevant as soon as we crossed the line of departure, we might as well have been equipped with Sherman Tanks and half-tracks.”¹² The successful escape of the Republican Guard Corps elements and their leaders to Iraq where they eventually defeated an uprising in the weeks that followed, brought to mind the observation of a Confederate general who experienced the Army of Northern Virginia’s retreat from Pennsylvania. He said: “The Union forces were so long in occupying the town (Gettysburg) and in coming forward after the repulse of the enemy, that it was generally thought they had retreated.”¹³

Of course, the experience with misguided or rigidly organized information structures is not unique to the US military establishment. The point is simply that the human element is at least as important as the formal structure of information regardless of the technology involved. The current structure is a product of the last revolution in military affairs involving FM radio, the combustion engine and aviation. Command nodes are pervasive, redundant and prohibitively expensive to modernize. But the structure of C2 and the mentality of command are also linked. This suggests that the danger of adhering to a single idea, and worse, to a predetermined plan that is irrelevant when the first shot is fired



will not change unless the operational architecture encourages teamwork and improvisation in the context of a coherent picture of Joint operations.¹⁴ **Structurally and intellectually, this suggests the need for an integrative, Joint C2 structure on the operational level that induces military leaders to interpret information and military activity in ways that result in the exploitation of capabilities across service lines.**

Where We Must Go

Organized, trained and equipped for a type of warfare that disappeared at the end of the 20th Century, the operational architecture that defines today's strategic and operational C2 of American land forces is a legacy warfighting system. The army's current theater, army, corps and division structures were designed for WW II and the requirements of a mass mobilization, industrial age war. Laminating these structures with tons of electronic hardware and computer software is unlikely to simplify command arrangements, improve readiness or reduce the response time for action of deploying ground forces. For example, brigades are still structured to deploy as part of larger divisions. And divisions, in turn, are structured to deploy as part of larger corps. A decision to deploy one without the other necessitates the selective removal of mission critical elements from one and their reallocation to another. As a result, the readiness of one or more of these formations to deploy and fight is inevitably degraded.¹⁵ This also means that the process of building trust, confidence and competence among leaders and subordinates does not occur before the operation begins. Clearly, this condition is unresponsive to the demands of the current and future strategic environments.

Some readers will ask why the US Army's operational architecture is essentially unchanged. Part of the explanation is that the United States became the world's preeminent global power in a regionally diverse world almost overnight when the Soviet State imploded. In 1991, the weakness of the Iraqi opponent during operation Desert Storm meant that the current C2 structure was never seriously tested. Today, America's key allies include all or most of the strongest economic powers in



the modern world. In fact, after 1991, the case can be made that the United States became the de facto architect of the Euro-Atlantic-Asian zone of security.¹⁶ America's position in the world today is analogous to Rome's position in the ancient world after the fall of Carthage. America has no rival. Thus, it is no surprise that American military thinking lags behind American military technology. Without competition, there is no inspiration to innovate or change.

Yet, while the relative strategic military superiority of the United States over other nations has never been greater, much of its military power has never seemed less relevant. The marginal effectiveness of long-range precision strike systems against the Yugoslav armed forces in Kosovo throws this problem into sharp relief.¹⁷ Equipped with 1970s technology, the VJ reacted to the US-led "high tech" air campaign with considerable military skill and determination.

Although the USAF could strike fixed targets with remarkable accuracy and little collateral damage, the survey of Yugoslav Army (VJ) equipment destroyed in Kosovo during the air campaign indicated that a fraction of the tanks, artillery and armored vehicles reported as destroyed during the campaign were found on the ground. In every case, the few vehicles that were struck were attacked several times indicating that they were probably reported as struck by a succession of fighter pilots from different wings.¹⁸ Air strikes under more favorable weather conditions in late April and May did not improve the air forces' performance against dispersed and expertly camouflaged Yugoslav ground forces in Kosovo.¹⁹

At the same time, assumptions about the omniscient quality of US surveillance technology in connection with concepts such as "dominant battlespace knowledge" and "information dominance" also turned out to be fallacious. In spite of NATO's enormous technological superiority in every category, its battlespace awareness was manipulated by the Yugoslav armed forces more often than expected. Strikes on decoy targets indicated that the Serbs let NATO daytime reconnaissance flights see real targets and then replaced them at night, or that US target analysts misinterpreted the



information furnished to them. Processing information is one thing, interpreting it is an art. Serb civil and military officials improvised and developed low-tech offsets that limited the effectiveness of NATO's information superiority and misled NATO collection assets. Put another way, the Yugoslav military fooled US and allied information interpreters. When human and software interpreters of intelligence information were fooled, munitions were wasted on decoy or incorrect targets and in bad assessments of the actual situation on the ground. It also affected both mission-essential tasks and battle damage assessments.²⁰

In view of this experience, the historic lesson that international pariahs like Saddam Hussein, Stalin, or Hitler cannot be bombed out of office is beginning to gain new currency. Unlike air and naval forces, armies change governments, convey ideas, values, and tangible, concrete political commitment. Armies impose laws, order and long-term strategic solutions. Armies transform the geo-strategic landscape. In conflict, armies provide the glue that holds coalitions together. During NATO's air campaign against Yugoslavia, the absence of friendly attacking ground forces meant that Yugoslav ground forces were never compelled to mass or concentrate their forces. Thousands of small, mobile Yugoslav ground elements skillfully concealed in rough terrain and marginal weather were impossible to target from high altitudes. Thus, the Yugoslav military and the security forces that sustain the Belgrade regime in power were never seriously damaged. As a consequence, the essential catalyst for conflict in Kosovo – the reactionary regime in Belgrade – is unchanged. Thus, if the Kosovo crisis teaches anything, **it is the critical necessity of operationally, integrating ground forces with air power.**

Toward a New Paradigm

New threats create new missions and requirements for the US armed forces that no single service can dominate. The exploitation of space is becoming such a critical factor in the outcome of future military conflict that US military operations without the use of space are problematic.²¹ The proliferation of



Medium Range Ballistic Missiles (MRBM) has created an immediate, serious, and growing threat to ground and naval forces. These are strategic systems and most will be armed with non-conventional warheads.²² Short-range ballistic missiles (SRBM) will also pose a serious threat to American air, land and sea forces. Many countries are producing and/or developing SRBM systems, and many have bought missiles or missile technology. Land Attack Cruise Missiles (LACM) and Unmanned Aerial Vehicles (UAV) will become more available and less expensive in the next five to ten years, resulting in greater numbers worldwide. The number of countries attempting to buy UAVs or working towards indigenous UAV development is increasing.²³

While potential opponents seek asymmetric means to cope with traditional US military strength in the air, US manned and unmanned platforms in the air and space with suites of new technology linked to stations on the ground and at sea are creating the foundation for a strike complex that will eventually encircle the earth. For instance, the Joint Direct Attack Munition (JDAM) dropped by US Air Force strike packages on Yugoslavia depended on guidance from Global Position System satellites (GPS) that also guide ground operations. Air force targeteers relied on surveillance satellites for target selection that would also provide near-real time information on enemy ground forces. Orders inside the theater, as well as the minute by minute exchange of information between US European Command, Washington and Brussels depended on space-based communications. Had American ground forces been employed, the offensive movement and coordination of ground operations with air power would have been impossible without space-based systems. Thus, emerging technologies must figure prominently in the creation of a new operational architecture.

The aforementioned mix of technologies, threats and military requirements describe a fundamentally new strategic environment for Army forces that is a dramatic change from the Cold War period. This dictates a new global mission orientation for Army forces that entails: **First, intervening militarily in areas where the US has no presence, but has**



declared strategic interests that are threatened or a real political stake in the outcome. And, second, maintaining an overseas presence in pivotal states to ensure that the US can either deter or become involved in conflicts which directly impinge on US strategic interests. This new environment is characterized by the need for geographically dispersed air, land and sea-based forces to achieve a high level of command and control coherence through both technologically and intellectually shared battlespace awareness.²⁴

Intellectually, this implies the need for an integrative structure of multi-service command and control on the operational level that induces military leaders to interpret information and military activity in ways that result in the exploitation of capabilities across service lines. In technical terms, this dictates the requirement to exchange Joint standard data over existing and planned digital information grids to facilitate planning and action among all Joint forces.²⁵

To provide the means to move information, the US Armed Forces is developing a globally interconnected, end-to-end set of information capabilities designed to process, store, disseminate and manage information that warfighters and policymakers require. This concept is referred to as the global information grid or "GIG."²⁶ The underlying notion is that this information system will assist in providing the right information in the right form to the right place and user at the right time.

Central to the success of this concept is the organization of information into two categories. These categories are planning and survival information. Survival information is information that requires immediate action. For example, space-based surveillance with the capability to detect theater ballistic missile launches can provide as much as five or six minutes' early warning to friendly forces. Clearly this would be information that must be "pushed" rapidly to forces in ports, airfields or even combat troops if they are concentrated in great numbers for offensive action. In contrast, planning information describes information that may be the basis for future action and is generally less time-sensitive and may be stored in



databases. For example, orders of battle for friendly or enemy forces, weather patterns and terrain studies would be characterized as “planning information.” This type of information must be “pulled” from multiple sources on a continuous basis. However attractive it sounds, this process will be quite challenging.

Advances in micro-circuitry, directed energy and materials are creating a new dilemma for US military leaders. C2 nodes in the battlespace where information is collected and transmitted are really distribution points that send information in all directions simultaneously. Information is not subject to the controls that existed in the industrial age. Information cannot easily be filtered or screened for its value at the next higher level. This means that at increasingly higher levels in an unchanged C2 structure, commanders must either develop the presence of mind to know what is or is not useful to them in their operational context or they must ingest and know everything or they must empower subordinates to decide and act.

All of these points make it clear that the need for functional simplicity is enormous. Masses of information flowing through sensors and aggregated by computer power into pre-formatted messages will not reach the critical points of authority in time if the complexity of the command and control structure actually impedes the flow of information. Sophisticated intelligence collection and targeting analysis are of limited value if the C2 structure to effectively exploit both is too complex and single service-oriented. Thus, a new Joint operational architecture for ground forces must accomplish several tasks:

- Integrate and exploit information and capabilities at lower levels and across service lines;
- Simplify the C2 structure to create opportunities to exploit cutting edge technologies across service lines.
- Streamline C2, be functionally based (deep/close/rear), flattened and modular;
- Exploit digital communications, not FM line of sight to drive nodal connectivity;



- Ensure Information exchange requirements are Joint;
- Cost less money to modernize and maintain than the old structure;

For Army ground forces, this means adopting a new organization for combat **within a new operational architecture** that is strategically flexible and responsive to the requirement to conduct short-warning military operations all over the world in cities, mountains, deserts or where the environment is simply different from past experience. Ideally, the structure should be modular, functionally based within a rotational readiness framework configured for Joint C4ISR as outlined in Breaking the Phalanx.²⁷ The Joint operational architecture must consistently provide the commander with useful, real-time information soon enough and in a form that assists the commander to recognize key events, formulate a response and transmit this response to his subordinates in time for implementation. Finally, these operational command and control structures should be subordinated directly to the regional CINC, in order to focus on the regional contingencies in which they are likely to play a critical role.

The world today is far too complex to suppose that an operational headquarters based in the United States can effectively go anywhere in the world and execute a broad range of complex military tasks with a minimum of notice. The resulting functionally-based Joint forward-deployed land force headquarters would then be positioned to replace the CONUS-based army division and corps headquarters that require many weeks, if not months, to deploy. Modular, functionally based, tactical ground forces could then rotate on a regular basis to the regional commands to both exercise and execute forward presence missions in the same way naval forces rotate in and out of the regional commands today.

This suggests that the US national command authorities should begin the process of building *Theaters of Joint Strategic Action* that incorporate air, land and sea component headquarters within a Joint C4ISR structure that is integrated with and subordinated to the commander-in-chief of a regional unified command. Soviet or Russian military doctrine in the



1970s identified the need for an intermediate level of command and control between the traditional Soviet front structures and the central C2 organ in Moscow – the STAVKA. Over time, this analysis produced the TVD commands. These theater C2 structures ensured that Soviet and allied forces and services within an operational command would fight as a single unified force.²⁸

In many respects, America's current unified command structure would benefit from a similar approach by creating a single, integrated, operational command structure for all the services in each regional unified command. The Israeli Defense Force (IDF) could adopt this approach to build theaters of Joint Strategic Action for the Sinai and the Golan regions. This involves streamlining the C2 structure by replacing C2 at the army, corps and division levels with a Joint Force Land Component Command (JFLCC) headquarters inside the unified command structure.

The first step in the streamlining process is to organize forces around the close/deep/rear framework. This is key to simplicity in the area of information management, as well as command and control and offers significant advantages. Each military decision maker (close/deep/rear) has a limited area of authority distinct from the others (modularity), commands pass in only one direction (hierarchical), and each decision maker determines within the higher commander's intent how to execute commands from higher authority (operational autonomy).²⁹ Most important, the close/deep/rear framework in ground forces facilitates integration with the emerging global strike complex in the air force and navy.³⁰ Army ground forces have a critical role to play in deep operations and a deep C2 structure must exist that plugs the Army into the Joint Force Air Component Commander (JFACC). Without such a structure, the Army's capacity to contribute to both theater missile defense and deep strike operations will be at risk. The complexity of pushing or pulling information that is vital to planning or survival to ground force C2 nodes is significantly reduced with the substitution of the close/deep/rear framework for the amorphous World War II structure with its many echelons and headquarters. This is particularly true for



the use of advanced tactical missiles for rocket artillery with their great range, as well as theater missile defense.

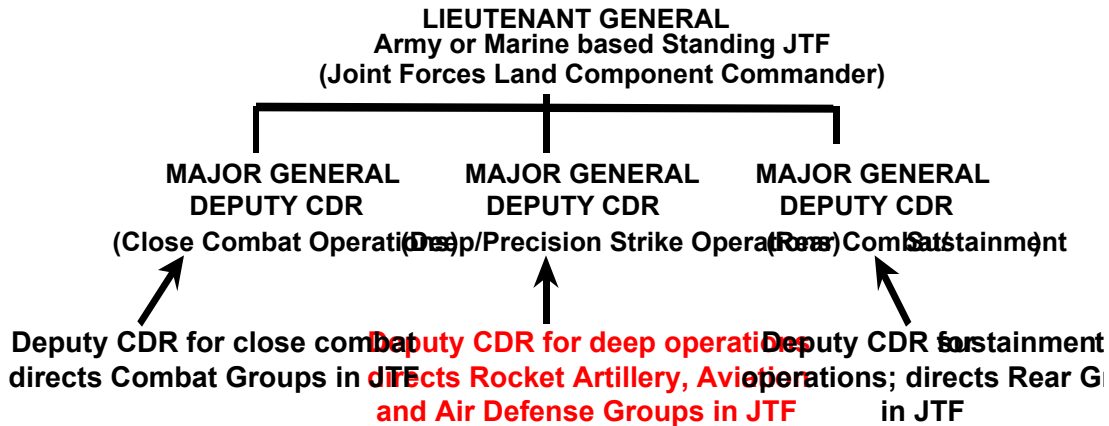
Integrating the JFLCC into the unified command means

<u>World War II C2</u> (Remagen, 1945)	<u>Gulf War C2</u> (Desert Storm, 1991)	<u>21st Century C2</u> (Information Age)
Theater Commander		CINC, Unified Command
Army Group	CINC, USCENTCOM	
Army	Army	JFLCC
Corps	Corps	
Division	Division	Combat Group
Regiment	Brigade	
Battalion	Battalion	Battalion
Company	Company	Company

that army C2 emerges within a larger “plug and play” Joint operational architecture that integrates ground, air and sea-based platforms and forces. This also rationalizes why the lieutenant general commanding the land component should have his own independent mobile headquarters element, as well as three separate autonomous, mobile headquarters under general officers. For reasons that will become clear later, in the JFLCC structure outlined here, major generals would command the close/deep/rear headquarters. Depending on the crisis, conflict or peacetime mission, one or all of these headquarters could be deployed. Ideally, these headquarters would be integrated with and subordinated to the unified regional commands and configured for rapid deployability with strategic airlift that includes wheeled armor, helicopters and satellite communications.



As seen in the illustration, one major general within the JFLCC commands the close combat forces deployed to the JFLCC. These close combat formations could consist of army tactical forces consisting of armor, airmobile infantry or attack helicopters in support of the close fight. In practice, this commander supplants the army division commander and



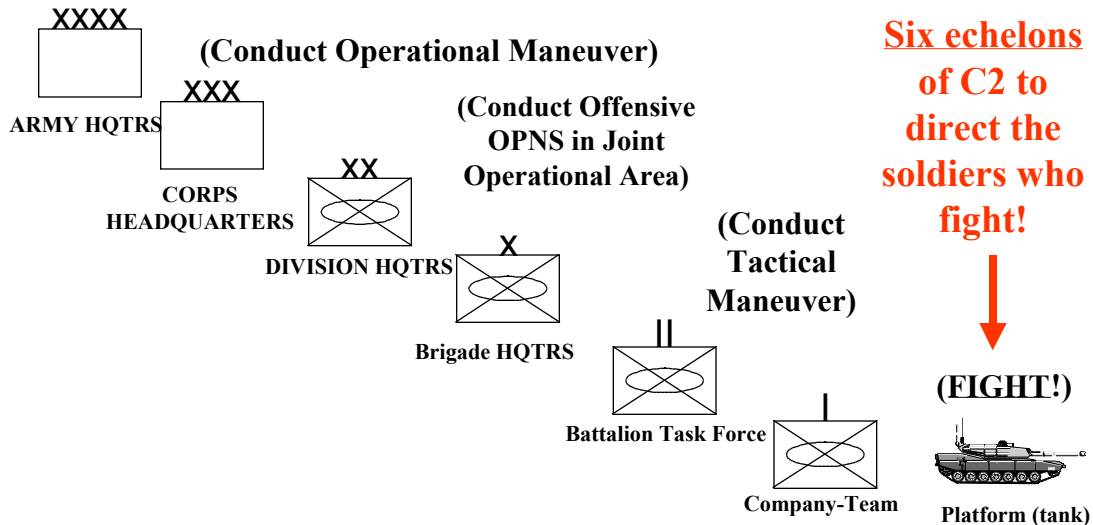
- The close/deep/rear framework facilitates integration with the emerging global strike complex in the US Air Force and US Navy.
- Army C2 exists within a larger “plug and play” Joint operational architecture that integrates ground, air and sea-based platforms.
- The deep C2 structure plugs the Army into the Joint Force Air Component Commander for strike and theater missile defense operations.

headquarters that would otherwise deploy to a regional command from the United States.

A second major general in the JFLCC commands deep combat operations. “Deep” in this context is a potentially misleading term. Time, target and effect rather than just space actually separate the “deep” and “close” fights.³¹ For a strategy of ground force maneuver to succeed, the means to employ defensive measures, as well as strike assets are critical. With the emergence of a “system of systems” global strike complex, the deep fight commander’s links to the army tactical formations, as well as to the global strike complex become pivotal. The utility of employing the acquisition radar in the Patriot PAC III system in tandem with the army tactical missile system (ATACMS) helps illustrate the advantage of integrating deep strike and missile defense assets.



Too Many Echelons - Too Slow to Decide - Too Expensive to Modernize



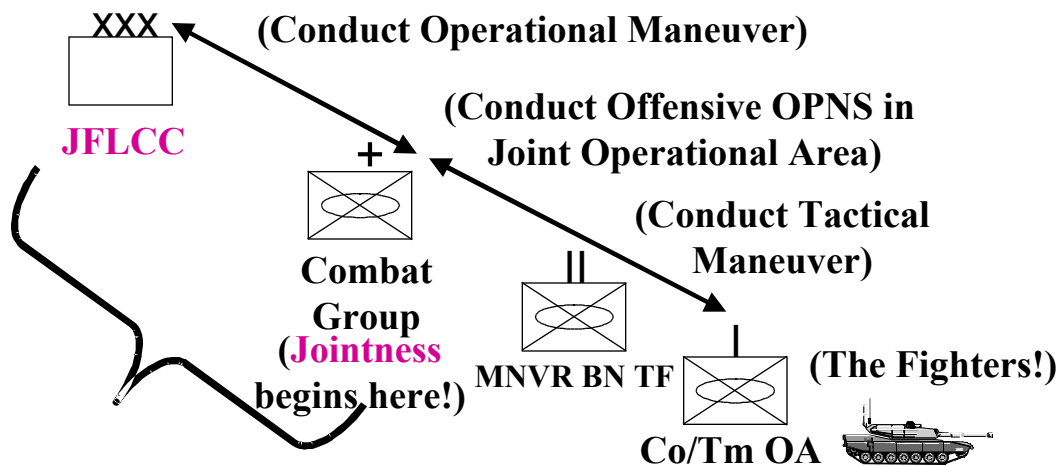
The Patriot acquisition system can provide in real-time (less than a minute) the estimated launch point for a Tactical Ballistic Missile such as a SCUD. This real-time information can be transmitted near-simultaneously via a tactical digital information link to firing batteries in a rocket artillery group. In turn, these rocket batteries can engage a mobile SCUD launcher at the estimated launch point with greater accuracy and speed than a combat air patrol operating behind the forward line of friendly forces. Readers will recall the inability of US air power to quickly target and destroy mobile SCUD launchers during Desert Storm. Integrating army strike and missile defense assets is more economical and effective in the conduct of this mission than the current practice of employing multiple combat air patrols. This also reduces the likelihood that combat air patrols will be lost to future enemy air defense capabilities. Clearly, this army deep C2 structure becomes the critical link to the JFACC who will want to exploit the capabilities residing in ground strike and maneuver forces to suppress or defeat enemy air defenses, as well as enemy missile attacks.

In the event that combat maneuver forces are assigned the mission to strike deep into enemy territory, this headquarters



would also command these maneuver elements. In practice, this suggests that the deep headquarters instead of the close combat headquarters would control airmobile formations operating in conjunction with attack helicopters to the front of advancing friendly ground forces. This deep C2 structure would be postured to de-conflict and harmonize USAF air and USA/USMC operations in the deep fight, thus preventing fratricide. When the movement of forces change the spatial disposition of ground forces, the close combat commander, or even the rear sustainment commander could assume control of these elements.

Fewer Echelons - Faster Decision Cycle - Cheaper to Modernize



Sustainment operations offer a rich field of opportunity for Joint C2 under the third major general in the structure. In the near term, some specific weaponry and technology will remain service-specific, but there are many ways for the army and the marines to share logistics support. Some of these include; cross-Service equipment, supply transportation, storage, transfer, port opening services, pre-positioning afloat and over-the-shore logistics. As seen during DESERT STORM, rationalizing the conduct of sustainment operations within a Joint C2 framework for ground forces simply institutionalizes practices that emerge under the pressure of war anyway.³² In the long-term, the transition to progressively newer forms of warfare will reinforce the need for greater independence in



tactical formations, as well as potentially eliminate the rear area, except in the sense of a communications zone (COMMZ).³³

This is one way to integrate army ground force C2 into the regional unified commands in the context of a *Theater of Joint Strategic Action*. There may also be other viable alternative approaches. However, without establishing a new horizontal operational architecture organized around information flows that are lateral and cross Service lines, the army's current command and control (C2) structures will not adjust to the continuous, fluid nature of action in the information age.³⁴ Since the way in which senior officers interpret missions and subsequently employ their armed forces dominates operations, no amount of technology will create a consistent view of the battlespace to coordinate execution of Joint operations if the right level of understanding and the integrative structure are absent. This is because the Land Component Commander on the operational level of war must shape actions in a crisis or conflict environment through the combination of threatening or actually moving forces and striking targets in combination. In addition to thousands of movable subordinate entities, land force commanders must also deal with the complexities of a thinking enemy that is reacting to their every move. Thus, commanders must be educated to a new way of Joint warfighting before their performance within an integrated structure like the one outlined here is likely to be effective. Only the commander who can delegate authority to trusted subordinates that can convert information to actionable knowledge is likely to succeed in future crisis and conflict.³⁵

Conclusions

This essay began with three questions. Answers to the first two questions indicate that the current operational architecture with its roots in World War II is totally inappropriate to the nation's security needs in the 21st Century. It was never designed to cope with the complexity of missile defense, deep operations, space-based communications and surveillance or a whole range of new emerging technologies. Integrating new technologies into this old structure to perform today's Joint warfighting missions will simply not work. A



new army organization for combat within a new joint operational architecture is vital to establish a new horizontal operational architecture organized around information flows that are lateral and cross service lines. Reorganizing the army on the tactical level into modular, functionally based formations creates the opportunity to integrate army forces within the Joint Task Force utilizing the close/deep/rear analytical framework as the intellectual basis for understanding joint warfighting from a land component perspective.

The third question, “Will change in the operational architecture make any difference?” will now be answered. Serious students of modern warfare understand that a host of factors contribute to success or failure in military operations. Focusing on only one aspect of effective warfighting - in this case operational architecture - potentially risks skewing the analysis and missing other factors of considerable importance.³⁶ For ground forces to be integrated effectively with air and naval power, change in many areas will be necessary to achieve a real revolutionary impact on warfighting in the 21st Century.

Creating more effective Joint C2 on the operational level is unlikely to make much difference if the soldiers, noncommissioned officers and junior officers in the Army’s tactical units have not been trained, educated and accustomed to make decisions and to take actions on their own initiative. Moreover, if the unit is not cohesive and a large degree of trust and mutual respect does not characterize the relationship of men to officers, then only officers will make decisions and their decisions will not be enough to achieve victory. Under the circumstances outlined above, the technological advantage afforded by new technology within a new operational architecture will end up being an “after you’re dead weapon” because the critical events after crossing the line of departure (LD) are decided in seconds at the lowest, rather than at the highest, levels.

Every soldier - to include the privates - must know how and what the company, battalion and higher commanders think and expect. This is particularly true in the age of weapons of mass destruction when soldiers must operate in smaller groups



over larger areas. However, it also applies to military units conducting peace support operations that must disperse their soldiers to be effective.

In this connection, new laptop computers with real-time video links can empower smaller formations, as well as liberate commanders from their high-tech chateaux, but they cannot convert information to actionable knowledge. Only commanders with the understanding and presence of mind to cope with chaos can do that. Still, the laptop should eliminate the excuse that in order to stay in touch with higher headquarters and all subordinate elements all the time, commanders must be located in elaborate command posts or have their eyes focused on computer screens. Sitting in front of computer screens in static headquarters encourages senior officers to meddle in the activities of subordinate headquarters and commanders in ways that are counter-productive. This is because the half-life of useful information is very short. In a real battle, the professional soldier must feel comfortable acting and then reporting what he has done.

Changing the operational architecture to alter command relationships will not be enough to revolutionize warfare any more than buying new technology will be enough to confer a revolutionary capability on the US armed forces. For real-time information and intelligence to be of any value in future battle, tactical leaders will have to be trained to exercise their initiative, to act decisively and often without orders or permission from higher headquarters. New weapons and digitized communications technology will not fulfill their promise of shaping the future battlefield to American advantage if everyone in the chain of command waits passively for orders and is not trained to take the initiative. Professional soldiers must be trained to notice, to anticipate and to exploit opportunities within a known tactical and operational mission framework.

As long as warfare remains exploratory in character, it will never be possible to foresee all contingencies, nor will the planning structures abstracted from the battlespace ever coincide precisely with conditions in combat.³⁷ In a recent



paper prepared for the Office of the Secretary of Defense, analysts highlighted the rapidly changing and chaotic nature of information age warfare.

Today, and into the foreseeable future, military organizations face a dynamic, multidimensional, and increasingly interconnected global operational environment. In addition, the characteristics of warfare continue to change as the nature of conflict adapts itself to the new operational environment. The overall readiness of our forces and leaders depends upon our ability to analyze and incorporate *current and future realities in our training programs*. We must never lose our focus at the tactical level on winning the close fight. We must realize however, that the conditions and nature of the close fight continue to change.³⁸

If the past is any guide to the future, Army ground forces will be desperately needed to operate jointly with air and naval power to deter or win regional conflict in the future. There is a growing awareness that future threats to US, Israeli and allied strategic interests will be both land-based and frequently too remote or unresponsive for the exclusive reliance on the coercive use of air and naval power. The proliferation of modern air defense and standoff attack technologies will make exclusive reliance on air and naval power less and less plausible in the future.³⁹

Without the capacity to effectively integrate space-based, sea-based and airborne striking power with ground combat power, the United States and Israel will eventually be as unprepared for the next conflict as the United States was for WW II and Korea. This is why change in the operational architecture of the armed forces is a critical step on the road to implementing a viable strategic vision for the Army, to breaking inter-service rivalry's historic stranglehold on defense, and to preserving the strategic dominance of the United States and Israel in the 21st Century.



ENDNOTES

¹ When the British first used tanks toward the end of WW I, they achieved minor successes, but could not exploit these to alter the course of the war. The full impact of tanks on the battlefield was not felt until fundamental change in the way tanks were organized, led and employed in action with other air and ground elements occurred under German and Russian leadership in WW II.

² D. Robert Worley, Shaping the Force, (Washington, DC: Johns Hopkins University, 1999) p. 41.

³ Admiral (ret) William Owens, USN, "System of Systems," Armed Forces Journal, January 1996.

⁴ James Kahan, D. Robert Worley, Cathleen Stasz, "Understanding the Commander's Information Needs," (Santa Monica, CA: RAND – 3761-A, 1989), page. 25.

⁵ The boundaries of the levels of war and conflict tend to blur and do not necessarily correspond to levels of command. Nevertheless, in the American system, the strategic level is usually the concern of the National Command Authorities (NCA) and the highest military commanders, the operational level is usually the concern of theater commands, and the tactical level is usually the focus of sub-theater commands. Essays on Air and Space Power, Volume I, (Maxwell AFB, Alabama: Air University Press, 1997), p. 13.

⁶ SLA Marshall, Men Against Fire, (Toronto, Canada: McClelland and Stewart LTD, 1947), page 92.

⁷ Norman Gelb, Ike & Monty: Generals at War, (New York, NY: William Morrow & Company, Inc., 1994), p. 404.

⁸ David Eisenhower, Eisenhower at War 1943-1945, (New York, NY: Random House, 1986), page. 716.

⁹ David Eisenhower, Eisenhower at War 1943-1945, p. 717.

¹⁰ James Kahan, D. Robert Worley, Cathleen Stasz, "Understanding the Commander's Information Needs," page. 3.



¹¹ Michael Gordon and General Bernard Trainor, The Generals' War: The Inside Story of the Conflict in the Gulf, (New York, NY: Little, Brown and Company, 1995), pages 430-431.

¹² These words were spoken to the author by Lieutenant Colonel HR McMaster on 27 February 1991. At the time, the officer was a Troop Commander with the author, then serving as the S3 in the 2nd Squadron, 2nd ACR.

¹³ Quoted by Major General Abner Doubleday in his work Chancellorsville and Gettysburg, (Stamford, CT: Longmeadow Press, 1996), originally published in 1882), p. 203.

¹⁴ Martin van Crefeld, Command in War, (Cambridge, MA: Harvard University Press, 1985, page. 195.

¹⁵ "Current Readiness Reports do not Fully Disclose Personnel Shortfalls," GAO Report to Congress, Chapter 0:2, April 1998.

¹⁶ Robbin F. Laird and Holger H. Mey, The Revolution in Military Affairs: Allied Perspectives, McNair Paper 60, April 1999, (Washington, DC: National Defense University Press, 1999), p. 5.

¹⁷ William Pfaff, "After NATO's Lies About Kosovo, It's Time to Come Clean," International Herald Tribune, May 11, 2000, page 2. Lars-Eric Nelson, "The Big Air War in Kosovo Was Costly Scandal", New York Daily News, May 12, 2000 , page 3.

¹⁸ John Barry And Evan Thomas, "The Kosovo Cover-up," Newsweek, 15 May, 2000. And see Edward N. Luttwak, "How a Splendid Little War Failed," Los Angeles Times, 23 March 2000, p. 7.

¹⁹ The Yugoslav military also employed tactics that involved turning their radars on and off quickly to trigger the launch of anti-radiation missiles, but to foil target lock-on. In the end, Air strikes did destroy bridges, factories, power lines and communications systems that will require years and billions of US and allied dollars to repair.

²⁰ Timothy L. Thomas "Kosovo and the Current Myth of Information Superiority," Parameters, spring 2000, pp. 13-29.

²¹ Inside the Pentagon, Vol. 16, no. 13, March 30, 2000, page 1.

²² Iran's flight test of its Shahab-3, based on the North Korean No Dong, and Indian and Pakistani missile and nuclear tests may spur additional interest in MRBMs. Pakistan's Ghauri MRBM from North Korea is



assessed to have a nuclear role. India recently began testing its Agni II MRBM, which is also assessed to have a nuclear role. Short- and medium-range ballistic missiles (SRBMs and MRBMs) can serve not only as a deterrent, but also as a force-multiplying weapon of war, primarily with conventional weapons but with options for delivering biological, chemical, and eventually nuclear weapons.

²³ Capabilities of the Air and Missile Threat to U.S. Forces Through 2030: Implications for Army Operations and Air and Missile Defense, US Army and Missile Command, Foreign Intelligence Division US Army Air Defense Artillery School, Threat Office, 15 November 1999. Proliferation: Threat and Response, Office of the Secretary of Defense, November 1997. Jane's Unmanned Aerial Vehicles and Targets Update 3, Jane's Information Group. Edited by Kenneth Munson, 1999.

²⁴ David S. Alberts, John J. Gartska, Fredrick P. Stein, Network Centric Warfare: Developing and Leveraging Information Superiority, (Washington, DC: DoD C4ISR Cooperative Research Program, 1999), p. 88.

²⁵ The Battle Management/Command, Control, Communication, Computer, and Intelligence (BMC4I) discussion in the draft TAMD MNS states that BMC4I must include all of these characteristics. This Operational Requirements Document (ORD) supports both the force protection and command and control mission areas. It addresses the need established in the Theater Missile Defense (TMD) Mission Need Statement (JROCM-064-91 dated 18 November 1991) and the (Draft) Mission Need Statement (MNS) for Joint Theater Air and Missile Defense (JTAMD).

²⁶ Global Information Grid, Capstone Requirements Document, Unclassified Draft Outline, 1 March 2000, page 1.

²⁷ Douglas A. Macgregor, Breaking the Phalanx: A New Design for Landpower in the 21st Century, (Westport, CT: Praeger Publishers, 1997).

²⁸ Michael Deane, Ilana Kass and Andrew Porth, "The Soviet Command Structure in Transformation," Strategic Review, Spring 1984, pp. 64-65.

²⁹ S. L. Brodsky, "Control Aspects of C2" in Selected Analytical Concepts in Command and Control, edited by John Hwang, Daniel Schutzer, Kenneth Shere, Peter Vena, (London, UK: Gordon and Breach Science Publishers, 1982), pp. 56-57.

³⁰ A more detailed examination of the JFLCC structure can be found in an article by the author entitled Command and Control for Joint Strategic Action, Joint Force Quarterly, Autumn/Winter 1998-1999, pages 25-33.



³¹ Suggested to the author in an April 98 letter from Lieutenant General Sir Rupert Smith, KCB DSO OBE QGM.

³² Commander Terry J. McKearney, USN (ret), "Rethinking the Joint Task Force," Proceedings, November 1994, p. 54.

³³ Alvin Bernstein and Martin Lubicki, "High-Tech: The Future of War? A Debate," Commentary, January 1998.

³⁴ Paul Bracken, "The Significance of DBK," in Dominant Battlespace Knowledge, edited by Stuart Johnson and Martin Libicki, (Washington, DC: National Defense University Press, 1996), p. 58-60.

³⁵ Robert S. Wood, former Dean, College of Naval Warfare Studies quoted by Donna Fore, Sonja Johns in their unpublished paper "Knowledge Warriors for the 21st Century: Catalysts for Cultural Change," John F. Kennedy School of Government, 16 May 2000, page 1.

³⁶ Robert M. Epstein, Napoleon's Last Victory and the Emergence of Modern War, (Lawrence, Kansas: University Press of Kansas, 1994), p. 183.

³⁷ The author is indebted to Dr. Fred Kagan, Assistant Professor of Military History at the US Military Academy for his suggestions contained in this paragraph.

³⁸ Office of the Secretary of Defense, Threat White Paper, (Washington, DC: US Government Printing Office, 2000), p. 2

³⁹ Collaboration among Yugoslavia, Iraq and Russia is apparently intense, and it is generating tangible results. Gen. Shahin Yassin Mohammed, commander of Iraq's air defense forces, announced on 11 May that Iraq had successfully developed and deployed the means to neutralize the U.S.HARM anti-radar missile. This is presumably the consequence of Yugoslav-Iraqi cooperation as well. See STRATFOR, 15 May, 2000.

