

30 NOVEMBER 2007

Certified Current, 3 November 2010
Operations



ELECTRONIC WARFARE (EW) OPERATIONS

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RELEASABILITY: There are no releasability restrictions on this publication.

OPR: HQ AF/A5RE

Certified by: HQ USAF/A5R
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Supersedes AFI10-706, 23 August 2001

Pages: 29

This Air Force Instruction (AFI) reflects updated guidance based on joint *Electronic Warfare (EW)* doctrine found in Joint Publication (JP) 3-13.1, 25 January 2007, USAF AFDD 2-5.1, *EW Operations*, 5 November 2002 and Air Force Policy Directive (AFPD) 10-7, *Information Operations*, 6 September 2006. In addition to doctrinal changes, the Air Force has also undergone a number of institutional changes that present new equipping, manning, and training challenges for conducting EW operations into the 21st century. This AFI provides updated operational guidance associated with personnel, infrastructure, readiness as well as the fielding of improved EW capabilities. This instruction applies to the US Air Force, the Air National Guard (ANG), and Air Force Reserve (AFRC) organizations. Major Commands (MAJCOMS), field operating agencies (FOAs), and direct reporting units (DRUs) may supplement this instruction. Send proposed supplements or recommended changes to this instruction to Headquarters (HQ) Air Force Deputy Chief of Staff for Air, Space, Information Operations, Plans and Requirements (A3/5), Director of Operational Capability Requirements (A5R), 1480 Air Force Pentagon, Washington, DC 20330-1480; email to the AF/A5RE Workflow (AFA5RE@pentagon.af.mil). Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 37-123, *Management of Records* and disposed of in accordance with the *Air Force Records Disposition Schedule (RDS)* located at <https://afrims.amc.af.mil/>

SUMMARY OF CHANGES

This document has been substantially revised in its entirety. Primary areas of change include the deletion or revision of doctrinal and operational EW procedures, new requirement guidance via the Joint Capabilities Integration and Development System (JCIDS) process (transition from capability-based planning to capability-based requirements), and revised organizational structure as well as terms. Note that USAF definitions of some EW terms may vary at times from joint definitions (Ref to **Attachment 1**, Terms).

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1. Introduction: The United States Air Force vision for electronic warfare (EW) operations is to dominate critical portions of the electromagnetic (EM) spectrum at times and places of its choosing. To this end, this AFI focuses on personnel, systems, associated infrastructures, and readiness as it relates to the requirements process for improved EM spectrum capabilities.

1.1. AFPD 10-7 describes Information Operations (IO) as the integrated application of electronic warfare, Network Warfare Operations (NW Ops), and Influence Operations (IFO) to influence, disrupt, or deny adversarial human and automated decision making while protecting our own. As a sub-element, EW can stand alone in a traditional function, or can enable, support, and enhance its sister IO elements. Proper execution of EW activities is critical when supporting a desired NW Ops or IFO results (Ref to *Information Operations*, AFDD 2-5), the operational level continues to be optimal place for the synchronization of IO activities (Ref to [Attachment 2](#), USAF EW Support to Joint Task Forces).

1.1.1. The historical foundation for Air Force EW traditionally remains in the support of *Counterair Operations*, AFDD 2-1.1. *Electronic Warfare's* (AFDD 2-5.1) primary function is to support counterair through the process of countering Integrated Air Defense Systems (IADS), suppression of an enemy's air defenses (SEAD), and disrupting military Command & Control (C2) nodes or platform "end-game" self-protection measures -- all involve EM spectrum dominance. Equal weight will be given to each in order to find, fix, track, target and engage (F2T2E) "anti-access" systems across the entire sequence of the "kill chain".

1.1.2. During long duration irregular warfare operations, the focus will shift to EM spectrum capabilities countering the proliferation of commercial technologies used by state and non-state actors. In many cases, these emerging target sets will not translate into challenging "anti-access" capabilities.

1.1.3. As traditional EW capabilities begin to overlap into other cyber areas (i.e., IFO, NW Ops or Counterspace), our ability to address the growing list of networks using commercial technologies has also expanded. Emerging non-IADS targets may now include non-military leadership networks, commercial/media networks, positioning, navigation, timing networks, and others as directed by a combatant commander (CCDR).

1.2. JP 3-13.1 states that EW is a military action involving use of electromagnetic or directed energy (DE) to attack the enemy. Electromagnetic energy is not limited to radar/radio frequencies (RF) but includes infrared (IR), visible light, ultraviolet (UV), and other less-used portions of the EM spectrum. Offensive and defensive DE are the umbrella terms that cover technologies related to the production of a beam of concentrated electromagnetic energy or atomic/subatomic particles.

1.3. EW includes three major subdivisions.

1.3.1. Electronic Attack (EA) involves the use of electromagnetic energy, DE, or anti-radiation weapons to attack personnel, facilities, or equipment. The primary effects achieved by EA are deception, disruption, denial, degradation and destruction. Creating precise EA effects will also require utilization of a battle management function. This includes spectrum management to ensure electromagnetic spectrum deconfliction in multiple dimensions (e.g. time, altitude and distance).

1.3.1.1. EA includes any actions taken to prevent or reduce an enemy's effective use of the EM spectrum. Techniques include jamming, electromagnetic deception, or direct attack of an enemy's electronic capabilities through the employment of weapons that use either electro-

magnetic energy or DE (e.g. lasers, radio frequency, high power microwave [HPM] weapons, and particle beams) as their primary disruptive or destructive mechanism.

1.3.1.2. Examples of EA systems include: EC-130H, EA-6B, EA-18G (along with other Joint Airborne Electronic Attack (JAEA) elements), F-16CJ with High-Speed Anti-Radiation Missile (HARM), chaff, flares, self-protection jamming systems, Directed Infrared Countermeasures (DIRCM), Large Aircraft Infrared Countermeasures (LAIRCM), active towed decoys, the active denial system (ground and airborne variants), counter remote/radio controlled improvised explosive devices (RCIED) systems, HPM, and high voltage/current spike weapons.

1.3.2. Electronic protection (EP) involves means taken to protect personnel, facilities, and equipment from the effects of friendly or enemy employment of EA or other EM spectrum capabilities (such as an electromagnetic pulse [EMP]) that have the potential to degrade, neutralize, or destroy friendly combat capability. Examples of EP include: frequency/pulse repetition frequency (PRF) agility, laser eye protection (LEP), or autonomous low-cost optical augmentation (ALCOA).

1.3.3. Electronic warfare support (ES) involves actions tasked by, or under direct control of, an operational commander to search for, intercept, identify, and locate sources of intentional and unintentional radiated electromagnetic energy for the purpose of immediate threat recognition, targeting, planning, and conduct of future operations.

1.3.3.1. Examples of ES systems include: radar and laser warning receivers (RWR/LWR), the HARM targeting system, sensors forward capabilities, Rapid Attack Identification, Detection and Reporting System (RAIDRS), EC-130H low/mid-band receiver sub-system, or the Battlefield Laser Detection System (BLADES).

1.3.3.2. Achieving dominance in ES will require enhancements to on and off-board technologies. A key step will be the fusion of multiple intelligence sources to improve the fidelity and timeliness of electronic intelligence (ELINT) data. This is critical for minimizing the time required to find, fix, track, target, engage, and assess (F2T2EA) targeted IADS and non-IADS emitters.

1.3.3.3. Future tasking, processing, exploitation, and dissemination (TPED) systems also need to be designed with improved ES in mind. Examples of concepts contributing to this include the following: Air Combat Command's (ACC) Sensors Forward Concept of Operations (CONOPS) a subset of Non-traditional Intelligence, Surveillance, and Reconnaissance (NTISR), the National Security Agency's (NSA) ELINT Modernization Program, the National/Tactical ELINT Integration Cell, and improved Specific Emitter Identification (SEI) capabilities and concepts.

1.4. EW employs the following doctrinal tenets to be effective.

1.4.1. Control — Achieved by means of effective management and coordination of friendly EW systems that protect friendly use of and deny adversary access to key areas of the electromagnetic spectrum. In effect, military forces need to use a variety of methods and tactics to maintain asymmetric advantages. The prime expansion area for improving control of EW resources will come through the Electronic Warfare Battle Management (EWBM) function.

1.4.2. Exploit — To exploit is to use the EM spectrum to the advantage of friendly forces. Friendly forces can use deception, disruption, denial, degradation and destruction in varying

degrees to impede the adversary's decision loop. For instance, one may use electromagnetic deception to convey misleading information to an enemy or use an enemy's electromagnetic emissions to locate and identify the enemy.

1.4.3. Enhance — To enhance is to use EW as a force multiplier. Enhancers are those intangibles that allow EW to function as a force multiplier, from self-protection to operational attack, thus greatly improving the likelihood of mission success on multiple levels of conflict. The primary example of an EW enhancer is the training function.

2. Personnel: This chapter provides guidance to commanders concerning specialized manning, readiness, proficiency and associated training expertise to increase the Air Force's ability to maximize each component of EW operations.

2.1. Air Force EW personnel must be ready to operate at the strategic, operational, and tactical levels of warfare. To maintain a professional fighting force requires personnel with in-depth knowledge of their EW specialty and an awareness of the other IO disciplines. Career progression should permit development of this expertise and familiarization of these disciplines within individual career paths. This knowledge and experience will be tracked so personnel are readily identifiable for additional training opportunities or assignments. To ensure adequate expertise is available the following tasks will be accomplished.

2.1.1. The primary method for identifying and tracking rated EW expertise (Air Force wide) is the Air Force Specialty Code (AFSC). Individuals not in possession of an Electronic Warfare Officer (EWO) AFSC but having critical EW expertise will be distinguished via an "E" prefix to their primary AFSC.

2.1.1.1. Air Force Major Commands (MAJCOM) A3 (Operations) Divisions will identify which non-EWO AFSC officer positions require specialized EW knowledge and experience to their A1 (manpower) counterparts. These positions include but are not limited to pilots, navigators, and operators (space control expertise), along with EW-related platform maintenance, intelligence, acquisition and engineers.

2.1.1.2. The Director of Current Operations and Training (A3O) has oversight for "E prefix" management including recruiting, training, assignments, and career development studies or reports. Contact your local manpower office to obtain details on the current Unit Manning Document (UMD) with "E" prefixes attached to MAJCOM authorized AFSCs.

2.1.2. Commands will manage their respective EW force structure to ensure their organizations have available resources for all documented UMD positions.

2.1.3. Personnel readiness demands that properly trained and qualified individuals are placed where they are most needed. Commands utilizing Special Experience Identifiers to fill IO Career Force billets will also ensure their EWOs are easily identifiable and distinguishable from those with Network Warfare Operations or Influence Operations proficiency in order to meet Air Force A3/5 operational tasks IAW AFD 10-4, *Air & Space Expeditionary Force Presence Policy*.

2.2. Commanders will use exercises, evaluations, training feedback, and inspections to identify organizational personnel shortfalls. Annually, unit commanders will assess their EW manpower requirements (operations, maintenance/logistics, intelligence, and associated support staffs). MAJCOMS will collate and forward this information across their respective communities before sending it on to Headquarters Air Force (HAF) A3O follow-on action. In turn, HAF directorates will:

- 2.2.1. A30 will assess manning of positions requiring EW expertise as well as assess authorized billets against MAJCOM requirements.
- 2.2.2. A1M will determine strength of relationships between man-hours and work load factors, determining the number of requirements earned, correct grades and skill levels.
- 2.3. High levels of expertise are required for the proper employment of EW systems. Consequently, commanders outside the Combat Air Force (CAF) will ensure their non-EW specialties are familiar with traditional Air Force EW operations in order to design, acquire, or test systems as well as provide intelligence support, reprogram systems, or to perform other critical EW planning tasks.
- 2.4. Proficiency in traditional Air Force EW operations begins with having quality training programs. Training programs must have attainable objectives that are specific, relevant, and necessary. They must address full-spectrum operations and use the full range of training devices, local training operations, and exercises to hone individual skill sets.
- 2.5. Basic, continuation, advanced, and senior levels of EW training will correspond to requirements at the tactical, operational, and strategic levels of warfare.
- 2.5.1. Basic Level Training: Air Education and Training Command (AETC) has oversight for conducting basic EWO training. The primary method for qualification will be the completion of the appropriate formal training course listed in the Education and Training Course Announcement (ETCA).
- 2.5.2. Continuation Training: MAJCOMS, at all levels will define both individual and crew EW training requirements.
- 2.5.2.1. For rated individuals (EWO AFSC) continuation training will be daily, weekly, or quarterly for all personnel assigned to wing/squadron levels. Training will be outlined in each aircraft platform's respective 11-series Air Force instructions.
- 2.5.2.2. Individuals holding an "E" prefix and used to fill a EW-related Request for Forces (RFF) from the acquisition, engineering, test and evaluation, communications or intelligence communities will be mission ready IAW MAJCOM or Numbered Air Force (NAF) guidance prior to deployment.
- 2.5.3. Advanced Level Training: The CAF, in coordination with AETC, has oversight for advanced EW training above the unit level to provide an in-depth knowledge of national assets, EA targeting, and joint/combined operations necessary to equip the commander with integrated EW capabilities in an effort to meet operational objectives.
- 2.5.4. Senior Level Training: AETC will continue to provide an upper-level programs that focuses on the integration of full-spectrum IO and Cyber capabilities into the campaign plan.
- 2.6. Coalition operations create unique challenges on the battlefield. Therefore the entire Air Force EW community will maintain awareness of foreign system capabilities to determine their interoperability within a coalition environment.
- 2.7. The culmination of EW effectiveness and integration is best evaluated during exercises and will address Force Application (FA) and Force Protection (FP) Tactics, Techniques, and Procedures (TTP) to measure how well specific EW capabilities support Air Expeditionary Force (AEF) requirements.

2.7.1. Exercises can take on many levels of sophistication ranging from unit-level exercises to AEF preparation. Whenever possible, the 57th Adversary Tactics Group and similar OPPOSING FORCE (OPFOR) organizations will be incorporated to emulate adversary EW from ground, air, space, or cyberspace. Exercise scenario developers must take into account EW targets and effects in the battlespace since non-kinetic attacks are challenging to integrate into scripts.

2.7.2. Large force exercises (i.e., Red, Blue or Green Flags) will incorporate both offensive and defensive EA activities. SERENE BYTE reprogramming activities should be considered for inclusion during all large force exercises. Where possible, activities should include joint and/or combined environments to involve the other Services and allied partners.

2.8. Organizations employing EW resources should regularly analyze their EW training and their associated enablers to modify or establish new training requirements as needed. MAJCOMS will assess the quality of EW training and identify any gaps or shortfalls.

2.9. Evaluations and inspections will be used in identifying unit-training gaps or shortfalls. Examples include local, higher level standardization and evaluation assessments as well as Inspector General (IG) inspections.

3. Supporting Infrastructures: This chapter provides guidance to agencies charged with EW test and evaluation or database management associated with EW systems.

3.1. Testing of EW related mission data software changes, minor system software changes, and minor hardware changes must be conducted in accordance with the processes outlined in AFI 99-103, *Capabilities Based Test and Evaluation*.

3.2. EW related testing must occur in the most operationally representative environment practical. Therefore the Air Force Foreign Materiel Program (FMP) will provide representative systems to the maximum extent possible.

3.2.1. Test and evaluation relies on support from the Foreign Materiel Acquisition (FMA) and Foreign Materiel Exploitation (FME) to provide data on the technical and operational vulnerabilities of foreign systems.

3.2.2. A systematic understanding of the concept of threat employment, capability, and proliferation is necessary to determine the FME priority for acquisition of new adversary systems or upgrades to older systems. FME conclusions will be incorporated into the appropriate target and threat analysis documents. In the future, prioritization will expand beyond the classic EW view to include the exploitation of non-IADS emitters.

3.3. Electronic Warfare Integrated Reprogramming (EWIR) is a systematic process designed to increase aircrew survivability and mission success while operating in an environment characterized by friendly, neutral, and hostile systems that use the EM spectrum. EWIR provides the Commander, Air Force Forces (COMAFFOR), Joint Force Air Component Commander (JFACC) or Combined Force Air Component Commander (CFACC) as well as units a timely and accurate means to detect and identify and respond to electromagnetic emissions. EWIR functions within the scope of electronic warfare (EW) are governed by AFI 10-703, *Electronic Warfare Integrated Reprogramming*.

4. Readiness: The readiness level of EW systems extends beyond the operational commander to senior Air Force leadership. Therefore lead MAJCOMS are charged with the responsibility of conducting readi-

ness assessments of EW systems associated with their weapons platforms on no less than an annual basis. Assessments will also be conducted on support equipment as well as training devices.

4.1. Air Force Materiel Command (AFMC) or Air Logistic Centers (ALCs) having EW self-protection (Defensive EA) systems within their portfolio will coordinate with the respective MAJCOM requirements communities on state of health reports identifying key system shortfalls, gaps or future trends. These reports will be forwarded onto AF/A30, A5R, A5X or A4M for follow-on Air Staff actions.

4.2. MAJCOMS will establish readiness standards for EW systems based on their operational requirements to ensure sufficient numbers of fully mission capable systems are available to meet operational commitments. Commanders will assess their EW systems by evaluating them against MAJCOM guidance and input the results into the Defense Readiness Reporting System (DRRS).

4.3. Equipment readiness for MAJCOMS having specific self-protection (Defensive EA) systems (i.e., ALQ-135, ALQ-131, ALQ-172, or AAR-47) or Offensive EA targeting systems (i.e., AN/ASQ-213 / HARM Targeting System [HTS]) will be established by its respective A3 division.

4.3.1. EW system assessments for fighter aircraft will be accomplished via the COMBAT SHIELD program. Other aircraft types should model their assessments after the COMBAT SHIELD example whenever possible.

4.3.2. Visiting assessment teams, similar to those used by COMBAT SHIELD, should be used to the maximum extent possible for annual certification or pre-deployment system ring outs.

4.4. Units will take advantage of all opportunities to exercise their respective systems and support equipment to determine readiness status.

4.5. IG programs will evaluate and report the readiness of unit EW systems, associated maintenance equipment, and associated training devices.

5. Capabilities-Based Planning: This section reflects the changes resulting from the implementation of the Joint Capabilities Integration and Development System (JCIDS) process and how it relates to the fielding of improved EW capabilities. JCIDS is a key component of the Capabilities-Based Planning (CBP) process and operates hand-in-hand with the Planning, Programming, Budgeting and Execution (PPBE) processes. The guidance contained in this document does NOT take precedence over that found in AFI 10-601, *Capabilities-Based Requirements Development* when validating EW requirements. In addition, information from this document will be used in concert with the guidance found in AFI 10-602, *Determining Mission Capability and Supportability Requirements* and AFI 10-604, *Capabilities-Based Planning*.

5.1. Today the Air Force defines a set of focused capabilities to describe how its air, space or cyber-space operations, along with associated effects, are conducted in a series of CONOPS.

5.1.1. Commands will field EW related systems that achieve a desired result in order to dominate the electromagnetic spectrum in support of Global Strike (GS), Global Persistent Attack (GPA), Global Mobility, Space & C4ISR, Homeland Security, Agile Combat Support or Nuclear Response CONOPS (Refer to AFI 10-604).

5.1.2. Developers, operators, planners, or Subject Matter Experts (SMEs) involved with developing new EW systems must fully understand the technical environment when deploying them in the field. Their employment must be deconflicted with other capabilities being employed in or across

the entire battlespace to prevent fratricide or collateral damage to neighboring frequencies (Ref to Para 2.3.).

5.2. A variety of FA methods are needed to counter an opponent's use of the EM spectrum. Command sponsored CONOPS and requirements documentation should never limit themselves to single solutions. Instead, they need to examine the benefits provided by employing a Family of Systems (FoS) or System of Systems (SoS) approach to fill identified gaps or shortfalls.

5.3. These same components can also support FP functions (i.e., counter-fires, Cruise Missile Defense (CMD), or a counter RCIED mission).

6. Responsibilities: This chapter defines the roles and responsibilities of Air Force organizations charged with current operations or the fielding of EW capabilities.

6.1. The Deputy Chief of Staff for Air, Space, Information Operations, Plans and Requirements (A3/5) will:

6.1.1. Be accountable for the United States Air Force IO policy, doctrine, strategy as well as prioritization of operational capabilities. Serve as the office of responsibility for all Air Force IO doctrine, organization, training, materiel, leadership, personnel and facilities (DOTMLPF) actions. With the exception of the unique EW element, the DOTMLPF process for all other IO elements is delegated to the Director of Information Operations (A3O-C).

6.1.2. Employ an Integrated Product Team (IPT) approach to act as an internal Functional Capabilities Board (FCB) for cross MAJCOM EW issues. IPTs will be chartered to identify and prioritize EW issues to ensure the Air Force is organized, trained, and equipped to conduct combat operations. They have the role of mapping EW expeditions into the Capabilities Risk and Review Assessment (CRRA) and JCIDS processes as appropriate. On occasion they will report their findings/recommendations to the Air Force Requirements for Operational Capabilities Council (AFROCC), which may direct a lead MAJCOM to develop the appropriate JCIDS documentation. (Refer to AFI 10-601, *Capabilities-Based Requirements Development*).

6.2. AF/A5R will:

6.2.1. Provide oversight for the Air Force Capabilities-Based Requirements process as defined in AFI 10-601; which leads to future research, development, test, and evaluation (RDT&E) or the procurement of resources.

6.2.2. Assume operational sponsorship for validated FP/FA concepts and associated requirements using organic Air Force EW systems.

6.2.3. Provide the operational perspective (delegated by A3/5) on Foreign Military Sales (FMS) issues involving U.S. built EW systems or support elements (includes software products).

6.2.4. Work with SAF/AQ, SAF/AA and AF/A8 to resolve requirements and/or programmatic issues associated with EW programs (includes related Special Access Programs or SAPs).

6.2.5. Facilitate the staffing and coordination of EW requirements documentation. In addition, ensure that validated IO requirements compete within the JCIDS process.

6.3. AF/A5RE will:

- 6.3.1. Be accountable for the overall coordination and dissemination of Air Force Electronic Warfare policy, doctrine, strategy, force structure, and capabilities; tasked with the administrative oversight for all IO requirements during their approval process.
- 6.3.2. Communicate the USAF operational vision for EW to internal Air Force agencies; disseminate operational guidance concerning EW capabilities, gaps or shortfalls across the various missions, organizations, and functions of the Air Force. Document, articulate, and advocate current and future EW requirements within the Air Force corporate process.
- 6.3.2.1. Act as the A3/5 Chairperson for the Electronic Warfare - Executive Steering Group (EW-ESG) to include: charter maintenance, agenda content, minute distribution, and follow-on actions. Besides traditional A3 and A5 representation, this IPT will include membership from the development centers as well as Test and Evaluation (TE) organizations.
- 6.3.2.2. Communicate the Air Force's EW policy, doctrine, and future force structure to external organizations; ensure future Air Force EW desires are correctly articulated within appropriate Joint Chiefs of Staff (JCS) or Office of Secretary of Defense (OSD) requirements documentation.
- 6.3.3. In coordination with AF/A3O, develop and integrate current policy for operational deployments, rated EW career field management, training/range instrumentation, or other supporting elements to satisfy Air Force and joint operational requirements.
- 6.3.4. In coordination with SAF/XC and on behalf of A3/5, advocate for Advanced Concept Technology Demonstrations (ACTD), Applied Technology Demonstrations (ATD), or other technology demonstrations that fall under the EW umbrella.
- 6.3.5. Engage with the acquisition, research, sustainment, and testing communities to ensure they have adequate A3/5 guidance concerning the future direction of the Air Force's EW requirements.
- 6.3.6. Act as the A3/5 focal point to leverage and integrate new EW technologies; evaluate innovative EW concepts, plans, and operational demonstrations of these concepts, recommend policy, programming, budgeting, organizational training (including TTP), and equipping actions.
- 6.3.7. In coordination with AF/A3S provide SME to other U.S. Government agencies (e.g., Department of Homeland Security [DHS], Department of Transportation [DOT]) concerning the Air Forces EW programs.
- 6.3.8. In coordination with AF/A5X, review all EW related deployment planning policy, Unit Type Code (UTC) development, and associated OPLANS or CONOPS.
- 6.3.9. Monitor future threat assessments and recommend corrective actions, as required. Implement anticipatory actions in capability-based planning efforts.
- 6.3.10. In coordination with AF/A2X, track preparation of the Air Force's EW portions of the General Defense Intelligence Program (GDIP), Congressional Budget Justification Books (CJB), National Intelligence Program (NIP), and the Military Intelligence Program Congressional Justification Books (CJB).
- 6.3.11. In coordination with AF/A2Z ensure all ES related products are supportable by the appropriate Air Force or other OSD intelligence agencies.

- 6.3.12. In coordination with SAF/AQP and AF/A8P, ensure EW resources associated with traditional EA or ES systems are planned, programmed, and budgeted either independently or as part of an overarching IO/SAP acquisition program. Ensure programs are consistent, complementary, and represent a balanced blend of current requirements and anticipated needs on behalf of the A3/5.
- 6.3.13. Develop and coordinate the A3/5 operational perspective on all FMS requests concerning U.S. EW systems or associated equipment. In addition, monitor and make recommendations on DE technology transfer requests.
- 6.3.14. Develop and coordinate the A3/5 operational perspective concerning the request and prioritization of EW related purchases made under the FMA program.
- 6.3.15. Provide the A3/5 perspective for the assessment of coalition EW interoperability issues. Recommend courses of action to accommodate effective and timely participation in coalition operations.
- 6.3.16. In coordination with SAF/LLW, SAF/AQP, or AF/A8P, respond to Congressional, OSD and JCS inquiries on EW programmatic/operational issues on behalf of A3/5.
- 6.3.17. Synchronize all aspects of the EWIR process IAW AFI 10-703.
- 6.4. The Deputy Chief of Staff for Logistics, Installations and Mission Support (A4/7) will:
- 6.4.1. Review weapon system support equipment requirements to ensure acquisition and sustainment programs consider common support equipment to preclude the continuing proliferation of peculiar support equipment, including Automatic Test System and Automatic Test Equipment.
- 6.4.2. Establish a focal point within A4/7 to facilitate the review of EW capabilities-based requirement documentation.
- 6.4.3. Act as lead agent for funding and fielding for replacement of existing unsustainable common aircraft support equipment.
- 6.4.4. Monitor the “State of Health” and common sustainment issues associated with organic EW systems and associated equipment.
- 6.4.5. Support the EW-ESG as defined within the IPT’s charter.
- 6.5. The Director of the Air Force Test and Evaluation (T&E) will:
- 6.5.1. Have responsibly over need infrastructures used to verify developmental and operational test and evaluation IAW “The Defense Acquisition Guidebook” and AFI 99-103, Capability-Based Test and Evaluation.
- 6.5.2. Direct U.S. EW system interoperability assessments and function as lead agent for the T&E activities that directly support capabilities development.
- 6.5.3. Establish a focal point within HAF T&E community to review organic EW capabilities-based requirements; ensure support and sustainment of both Key Performance Parameters (KPPs) and Key System Attributes (KSAs) are measurable and sustainable.
- 6.6. The Deputy Chief of Staff, Manpower and Personnel (A1) through the Air Force Personnel Center (AFPC), and in coordination with A3O and career field managers, track EW expertise along with having responsibility for EWO AFSCs and “E” prefix maintenance.

6.7. The Assistant Secretary of the Air Force for Acquisition (SAF/AQ) will:

6.7.1. Provide direction and oversight of acquisitions involving EW-related operational programs (excludes space-related EW capability) IAW AFI 63-101, Operations of Capabilities-Based Acquisition Systems.

6.7.2. Support the EW-ESG as defined within the IPT's charter.

6.8. The office of the Undersecretary of the Air Force, Director of Space Acquisition (SAF/USA) will:

6.8.1. Provide direction and oversight of space acquisition to include program direction, system management, and upgrades in space control capabilities.

6.8.2. Assist Air Staff or MAJCOMS in documenting, articulating, and advocating for space-related EW requirements to the Joint Staff, OSD, other Services, or Congress.

6.9. The office of the Undersecretary of the Air Force, Director for International Affairs (SAF/IA) will:

6.9.1. To the greatest extent possible, SAF/IA has responsibility for the sale of U.S. built EW systems to foreign governments meeting both CCDR and customer requirements for use in coalition operations.

6.9.2. SAF/IA will coordinate with A3/5 for the Air Force's operational perspective regarding FMS issues involving U.S. built SEAD or self-protection systems and associated paraphernalia (i.e., OFP/software).

6.9.3. Direct the development of FMS EWIR database (EWIR DB) for system Mission Data File (MDF) reprogramming to ensure a degree of coalition interoperability until such time as theater forces can provide EW system mission data file updates.

6.10. The office of the Secretary of the Air Force, Warfighting Integration and Chief Information Officer (SAF/XC) will:

6.10.1. Integrate the EWBM architecture into the Global Information Grid (GIG).

6.10.2. Coordinate with appropriate HAF, MAJCOM, and AFMC organizations to incorporate Air Force EW initiatives into Joint/Air Force experimentation and acquisition activities.

6.10.3. Through the Air Force Frequency Management Agency (AFFMA), plan, obtain, and preserve access to the electromagnetic spectrum for Air Force EW related activities.

6.10.4. Support the EW-ESG as defined within the IPT's charter.

6.11. AFMC will perform the following activities for EW systems (except for space-related systems).

6.11.1. Coordinate on AF warfighter urgent operational needs and Air Force capability documents to ensure the identified capability is technologically sound, testable, sustainable, and affordable.

6.11.2. Oversee the execution of Operational Flight Program (OFP) software upgrades to fielded Air Force EW systems (i.e., ALQ-131/ALR-56M).

- 6.11.3. Accomplish hardware upgrades to fielded Air Force EW systems in response to identified requirements that cannot be satisfied through software upgrades.
 - 6.11.4. Fund and sustain common EW ground test sets and test procedures.
 - 6.11.5. Fund and sustain common EW related training and range equipment.
 - 6.11.6. Identify EW-related sustainability shortfalls to the appropriate MAJCOM.
 - 6.11.7. Serve as the OPR for EW developmental test and evaluation (DT&E) training to maintain an adequate supply of properly trained EW developmental testers.
 - 6.11.8. Air Force Research centers (i.e., AFRL) will have dedicated R&D facilities to facilitate the rapid development of Quick Reaction Capabilities (QRC) that go beyond traditional EW functions. QRC or "Clip-in" capabilities will continue to be a "challenge" since their success is measured by the Air Force's ability to rapidly adapt its EW capabilities to emerging IADS and non-IADS emitters.
 - 6.11.9. Ensure Reliability, Availability, and Maintainability for Pods and Integrated Systems (RAMPOD) data is available for analysis of support and sustainment shortfalls. RAMPOD is a reliability, availability, and maintainability logistics engineering support system for electronic attack pods and integrated systems.
 - 6.11.10. The staff judge advocate of AFMC (or designee from the legal office supporting the SPO) will prepare "draft" legal reviews of DE weapons or prepare legal analyses of selected issues relating to such weapons and forward to SAF/GCI and USAF/JAO (except for special access program legal reviews, which are forwarded to SAF/GCI) on a timely basis in accordance with AFI 51-402, Weapons Review.
 - 6.11.11. Provide combined Air Force and FMS EW support IAW AFI 10-703.
 - 6.11.12. Support the EW-ESG as defined within the IPT's charter.
- 6.12. Lead Commands for specific weapon systems as specified in AFPD 10-9, Lead Operational Command Weapons System Management, will:
- 6.12.1. Coordinate with A3/5 during development of CONOPS employing EW capabilities.
 - 6.12.2. Be responsible for requirements documentation, resources identification, and prioritizing (EW upgrades or new systems) to better control, exploit or enhance our EM spectrum capabilities.
 - 6.12.3. Execute mission data upgrades on a timeline appropriate to the urgency of the change and provide upgrades to gained Air Reserve Components (ARC) before any real-world deployments.
 - 6.12.4. Conduct Force Development Evaluations in order to determine EW system gaps or shortfalls in operations and training.
 - 6.12.5. Document and staff EW effectiveness shortfalls identified in contingency operations.
 - 6.12.6. Provide readiness standards and effectiveness data for unique systems.
 - 6.12.7. Fund, field, and sustain EW-specific ground test sets, test procedures, and technician training.
 - 6.12.8. Fund, field, and sustain appropriate equipment for conducting EW sustainment along with gained ARC.

- 6.12.9. Identify opportunities for the development of common and interoperable support equipment, especially the Automatic Test System or other programs with other Services.
 - 6.12.10. Fund EW system upgrades and the operational sustainment.
 - 6.12.11. Properly man and fund EW assessment programs.
 - 6.12.12. Establish inspection procedures to allow IG inspection and validation of unit EW reporting.
 - 6.12.13. Identify EW skills and billets required for specific needs.
 - 6.12.13.1. Assign qualified EW personnel to specified command billets.
 - 6.12.13.2. Conduct a periodic review of EW authorizations.
 - 6.12.14. Resolve training shortfalls where possible and submit annual reports on the status of resolution to the A3/5.
 - 6.12.15. Develop formal EW training to cover individual, unit, and senior officer training tailored to the command's specific mission(s).
 - 6.12.16. To the greatest extent possible, perform EW training assessments during large force exercises.
 - 6.12.17. Develop EW training assessments for evaluations and inspections.
 - 6.12.18. Capabilities derived requirements for a new EW system must be accompanied with command-sponsored analysis. This analysis will have sufficient "rigor" to ensure combat simulations are realistic enough to provide the decision maker with quality data upon which to base their decisions.
 - 6.12.19. Assist Air Force CONOPS organizations in identifying and prioritizing EW capability shortfalls or gaps.
 - 6.12.20. Participate (normally as lead) on High Performance Team (HPT) actions associated with requirements development.
 - 6.12.21. Support the EWIR process IAW AFI 10-703.
- 6.13. Using Commands, as specified in AFD 10-9, Lead Command Designation and Responsibility for Weapons System, will:
- 6.13.1. Plan and program operationally effective and suitable CONOPS that control, exploit and enhances the Air Force spectrum capabilities IAW GS, GPA, Global Mobility, Space & C4ISR, Homeland Security, Agile Combat Support, or Nuclear Response CONOPS.
 - 6.13.2. Ensure assigned MAJCOM, NAF, or Warfighting Headquarters (WFHQ) have a core number of EW experienced personnel prepared to support or act as liaison's to the Electronic Warfare Coordination Cell (EWCC).
 - 6.13.3. As available participate in HPT actions associated with EW requirements development.
 - 6.13.4. Support Modeling and Simulation (M&S) analyses as required for the lead command's EW requirements.
 - 6.13.5. Support the EWIR process IAW AFI 10-703.

6.14. Implementing Commands (AFMC / Space & Missile Command [SMC]) will:

- 6.14.1. Field operationally effective and suitable EW programs to control, exploit and enhance Air Force spectrum capabilities IAW GS, GPA, Global Mobility, Space & C4ISR, Homeland Security, Agile Combat Support, and Nuclear Response CONOPS.
- 6.14.2. Provide core/support HPT members, as appropriate, for EW requirements development.
- 6.14.3. Assist the lead MAJCOM in developing and preparing AoA studies.
- 6.14.4. To the greatest extent possible, employ M&S tools to effectively measure needed EW requirements to support the CBP process.
- 6.14.5. Assist the lead command concerning EW acquisition and sustainment phases.
- 6.14.6. Accomplish cross-MAJCOM commonality for similar EW test and support equipment.
- 6.14.7. Air Force Space Command (AFSPC) organizations charged with performing acquisition related activities for space systems, will coordinate with A3/5 through the Deputy Director for Space Operations (A3OS) on EW-specific space control policy, guidance, requirements, and programmatic issues.

6.15. Air Combat Command (ACC) will:

- 6.15.1. Assume operational lead for the Combat Air Force's (CAF) on innovative EW concepts or sustainment (current & future) actions IAW AFD 10-9. Ensure that EW gaps/shortfalls identified by the CRRRA process or other AoA methods with common FA or FP functions are properly coordinated across the MAJCOMS.
- 6.15.2. As appropriate, coordinate and comment on relevant EW doctrine, policy, operational sustainment, requirements derivation or programmatic issues with the appropriate HAF agencies (A3O, A4M, A5R, A5X and SAF/AQ).
- 6.15.3. Allocate electronic attack pods and emitters for the Electronic Combat Ranges (ECR). ACC should advocate for USAFE/PACAF submissions for common EW resources since their smaller size makes the establishment of dedicated programs impractical.
- 6.15.4. Be the operational proponent for the Electronic Warfare Assessment Program known as COMBAT SHIELD and be prepared to advise other MAJCOMS on the establishment of similar activities.
- 6.15.5. Be the designated lead for Air Force EWCC integration and associated training.
- 6.15.6. Build operational-level EW training objectives for Flag and USAF Weapons School exercises; including advanced and campaign-level training.
- 6.15.7. Move towards scalable, modular, and interoperable EW equipment.
- 6.15.8. Maintain the Centralized Aircraft Survivability System (CASAS) as a key support tool to EW operations. This mission planning tool requires continuous assessments in order to reflect platform survivability in an ever-changing threat environment.
- 6.15.9. Host annual CAF and Senior Leader Conferences (CAFSEWC and SLEWC) as well as supporting the EW-ESG as defined within its charter.

6.16. Air Force Special Operations Command (AFSOC) will coordinate with ACC and Mobility Air Forces (MAF) concerning common EW systems and training range emitter requirements. AFSOC will support the EW-ESG as defined within the IPT's charter.

6.17. AMC will coordinate with ACC and AFSOC agencies concerning common EW systems and training range emitter requirements. AMC will support the EW-ESG as defined within the IPT's charter.

6.18. Air Education and Training Command (AETC) will:

6.18.1. Provide appropriate undergraduate courses for awarding EWO AFSCs.

6.18.2. Be the focal point for developing, conducting, and evaluating initial EW skills training, advanced technical training, and graduate academic education programs to include flight training.

6.18.3. Coordinate with ACC (includes PACAF and USAFE), MAF, AFSOC, or AFSPC (as required) regarding development of advanced level EW academic programs or senior leadership EW training courseware.

6.18.4. Coordinate on Air Force EW requirement documentation or other Service requirements that may have direct training implications.

6.18.5. Coordinate with CAF (ACC is designed lead) regarding common EW equipment and support of annual assessment requirements.

6.18.6. As appropriate, provide HPT membership, for undergraduate EW training issues that arise during the requirements process.

6.18.7. Support the EW-ESG as defined within the IPT's charter.

6.19. The Air Force ISR Agency will:

6.19.1. Coordinate with the Deputy Chief of Staff for Intelligence (AF/A2), A3O, A5R or MAJCOM counterpart's concerning the programming of NIP resources used in support of EW operations.

6.19.2. Ensure the Air Force Information Operations Center (AFIOC) examines supports the EWIR process along with Flagging Operations IAW AFI 10-703.

6.19.3. Ensure the National Air and Space Intelligence Center (NASIC) accomplishes the following;

6.19.3.1. Validates Aircrew Training Devices (ATDs) threat databases to ensure proper function and fidelity of the simulators' EW functions IAW 5600-series DOD and MAJCOM guidance.

6.19.3.2. In coordination with the ISR Agency and A2, collect and maintain data on all laser incidents involving Air Force aircraft. This data collection is necessary to fully understanding the nature of the threat and to develop countermeasures.

6.20. Air Force Operational Test and Evaluation Command (AFOTEC) will manage and conduct Air Force EW-related OT&E in accordance with AFI 99-103, Capabilities Based Test and Evaluation.

CARROL H. CHANDLER, Lt Gen, USAF
DCS, Air, Space and Information
Operations, Plans & Requirements

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

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CJCSI 3170.01F, *Joint Capabilities Integration and Development System*, 1 May 07

CJSM 3212.02B, *Performing Electronic Attack in the United States and Canada for Tests, Training, and Exercises*, 15 Oct 03

CJSM 3320.01B, *Joint Operations in the Electromagnetic Battlespace*, 25 March 06

AFPD 10-4, *Air & Space Expeditionary Force Presence Policy*, 16 Jun 04

AFPD 10-6, *Mission Needs and Operational Requirements*, 31 May 06

AFPD 10-7, *Information Warfare*, 6 Sept 06

AFPD 10-9, *Lead Command Designation and Responsibility for Weapons System*, 8 Mar 07

AFPD 63-2, *Automatic Test System and Equipment*, 19 Jul 94

AFI 10-601, *Mission Needs and Operational Requirements Guidance and Procedures*, 31 Jul 06

AFI 10-602, *Determining Mission Capability and Supportability Requirements*, 18 Mar 05

AFI 10-604, *Capabilities Based-Planning*, 10 May 06

AFI 10-703, *Electronic Warfare Integrated Reprogramming (EWIR)*, 31 Oct 01

AFI 16-201, *Foreign Disclosure of Classified and Unclassified Military Information to Foreign Government and International Organizations*, 1 Dec 04

AFI 51-402, *Weapons Review*, 13 May 94

AFI 63-101, *Operations Of Capabilities Based Acquisition System*, 29 Jul 05

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AFDD 2-5, *Information Operations*, 11 Jan 05

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JP 3-13.1. *Electronic Warfare*, 25 Jan 07

JP 3-51, *Joint Doctrine for Electronic Warfare*, 7 Apr 00

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AFMAN 99-112, *Electronic Warfare Test and Evaluation Process*, 27 Mar 95

Abbreviations and Acronyms

ACC—Air Combat Command

ACTD—Advanced Concept Technology Demonstrations
AEA SOS—Airborne Electronic Attack System of Systems
AEF—Air Expeditionary Force
AETC—Air Education and Training Command
AFFMA—Air Force Frequency Management Agency
AFI—Air Force Instruction
AFIOC—Air Force Information Operations Center
AFMC—Air Force Materiel Command
AFOTEC—Air Force Operational Test and Evaluation Center
AFPD—Air Force Policy Directive
AFROCC—Air Force Requirements for Operational Capabilities Council
AFSC—Air Force Specialty Code
AFSOC—Air Force Special Operations Command
AFSPC—Air Force Space Command
AIA—Air Intelligence Agency
ALCOA—Autonomous Low-Cost Optical Augmentation
AMC—Air Mobility Command
ANG—Air National Guard
AoA—Analysis of Alternatives
ATD—Aircrew Training Devices / Applied Technology Demonstration
BCD—Battlefield Coordination Detachment
C2ISR—Command and Control Intelligence, Surveillance and Reconnaissance
C2W—Command and Control Warfare
CAF—Combat Air Forces
CAS—Close Air Support
CBP—Capabilities Based Planning
CIS—Communications Interface Shelter
CMD—Cruise Missile Defense
CoA—Courses of Action
CCDR—Combatant Commander
CONUS—Continental United States
CRRA—Capabilities Review & Risk Assessment

DAG—Defense Acquisition Guide book
DE—Directed Energy
DIRCM—Directed Infrared Countermeasures
DMO—Distributed Mission Operations
DOD—Department of Defense
DOTMLPF—Doctrine, Organization, Training, Materiel, Leadership, Personnel & Facilities
D5—Deception, Disruption, Denial, Degradation and Destruction
DRRS—Defense Readiness Reporting System
EA—Electronic Attack
EM—Electromagnetic
EMI—Electromagnetic Interference
EMP—Electromagnetic Pulse
EP—Electronic Protection
ES—Electronic Warfare Support
ETCA—Education and Training Course Announcement
EW—Electronic Warfare
EWAP—Electronic Warfare Assessment Program
EWBM—Electronic Warfare Battlemanagement
EWCA—Electronic Warfare Coordination Authority
EWCC—Electronic Warfare Coordination Cell
EW-ESG—Electronic Warfare Executive Steering Group
EWIR—Electronic Warfare Integrated Reprogramming
EWIRDB—Electronic Warfare Integrated Reprogramming Database
EWO—Electronic Warfare Officer
F2T2EA—Find, Fix, Track, Target, Engage & Assess
FA—Force Application
FMA—Foreign Materiel Acquisition
FME—Foreign Materiel Exploitation
FMP—Foreign Materiel Program
FMS—Foreign Military Sales
FP—Force Protection
GCCS—Global Command and Control System

GPA—Global Persistent Attack
GS—Global Strike
HAF—Headquarters Air Force
HARM—High-Speed Anti-radiation Missile
HFIS—Hostile Fire Indicating System
HPM—High Powered Microwave
HPT(s)—High Performance Team(s)
IA—International Affairs
IED—Improvised Explosive Devices
IFO—Influence Operations
IO—Information Operations
IR—Infrared
IRCM—Infrared Countermeasures
ISR—Intelligence, Surveillance and Reconnaissance
IW—Information Warfare
JAEA—Joint Airborne Electronic Attack
JADO—Joint Air Dominance Organization
JCEWS—Joint Force Commander’s Electronic Warfare Staff
JCS—Joint Chiefs of Staff
JFACC—Joint Force Air Component Commander
JFC—Joint Force Commander / Joint Functional Concept
JIC—Joint Integrating Concept
JMEM—Joint Munitions Effectiveness Manuals
JOC—Joint Operating Concept
JRFL—Joint Restricted Frequency List
JROC—Joint Requirements Oversight Council
JSC—Joint Spectrum Center
LAIRCM—Large Aircraft Infrared Countermeasures
LEP—Laser Eye Protection
LO—Low Observable
LWR—Laser Warning Receivers
MAF—Mobility Air Forces

MAJCOM—Major Command

MANPAD—Man-Portable Air Defense System

MASINT—Measures and Signatures Intelligence

MD—Mission Data

MEDUSA—Multi-Function Electro-Optics for Defense of U.S. Aircraft

M&S—Modeling and Simulation

NAF—Numbered Air Forces

NASIC—National Air and Space Intelligence Center

NTISR—Non-Traditional Intelligence, Surveillance and Reconnaissance

NW OPS—Network Warfare Operations

OFP—Operational Flight Program

OPFOR—Opposition Force

OT&E—Operational Test and Evaluation

PE—Program Element

PLAID—Precision Location and Identification

PNT—Positioning, Navigation and Timing

PRF—Pulse Repetition Frequency

QRC—Quick Reaction Capability

RAMPOD—Reliability, Availability, and Maintainability for Pods and Integrated Systems

R&D—Research and Development

RCIED—Remote/Radio Controlled Improvised Explosive Devices

RCS—Radar Cross Section

RDT&E—Research, Development, Test, and Evaluation

RF—Radio Frequency

RWR—Radar Warning Receivers

SAF—Secretary of the Air Force

SAP—Special Access Programs

SEAD—Suppression of Enemy Air Defenses

SEI—Specific Emitter Identifier

SIGINT—Signals Intelligence

SME—Subject Matter Expert

STO—Special Technical Operations

TE—Test and Evaluation

TTP—Tactics Techniques and Procedures

UTC—Unit Type Code

UV—Ultraviolet

Terms

NOTE: The purpose of this glossary is to help the reader understand the terms used in this publication. It is not intended to encompass all pertinent terms. Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, and the *Air Force Glossary* (<https://www.doctrine.Air-Force.mil/Library/AirForceGlossary.asp>) contain standardized terms and definitions for Department of Defense and United States Air Force use.

Air Force Concept of Operation (Air Force CONOP)—An Air Force Concept of Operation is the highest Service-level concept comprising a commander's assumptions and intent to achieve desired effects through the guided integration of capabilities and tasks that solve a problem in an expected mission area. Joint Force Commanders employ Air Force Concepts of Operations through Air Expeditionary Forces to fight and win wars.

Air Force CONOP Sponsor—The Air Staff Directorate or Air Force Major Command responsible for developing any AIR FORCE CONOP in support of the Air Force CBP process.

Capabilities-Based Planning (CBP)—CBP is planning under uncertainty to provide capabilities suitable for a wide range of challenges and circumstances, all designed to achieve certain battlespace effects. The Air Force uses a capabilities-based planning process (AF/A5X leads the Air Force's Capabilities Review & Risk Assessment [CRRA]) based on analysis to identify required capabilities and capability objectives. Joint Capabilities Integration and Development System (JCIDS) analysis and A5X capabilities-based planning are primary contributors to the Air Force planning process, but top-down direction, urgent warfighter needs, technological opportunities, and experiments and demonstrations provide other means for identifying the need for a new capability.

Capability—The ability to achieve an effect to a standard under specified conditions through multiple combinations of means and ways to perform a set of tasks.

Capability Gap—Those synergistic resources as measured by employing DOTMLPF analysis currently unavailable but potentially attainable for future operational tasks.

Capability Objective—The grouping of like capability shortfalls and gaps that allows senior leaders to make decisions on a common capability topic requiring improvement.

Capability Shortfall—A lack of full military utility needed by an operational user to effectively execute a task.

COMBAT SHIELD—System level assessments of the CAF fighter fleet with the dual goals of reporting to Air Force leadership on the overall state of EW health of the fighter fleet and providing unit commanders with on-site analysis and feedback on the readiness of their EW defensive and targeting systems. Not applicable to AFSPC.

Cyberspace—A domain characterized by the use of electronics and the EM spectrum to store, modifies, and exchange data via networked systems and associated physical infrastructures.

Distributed Mission Operations (DMO)—A readiness initiative to train warfighters as they expect to fight, maintain combat readiness, conduct mission rehearsal in an environment as operationally realistic as necessary; and provide support to operations.

Electromagnetic pulse (EMP)—Is the generation and radiation in a transmission medium of a very narrow and very high-amplitude pulse of electromagnetic noise. The term is associated with the high-level pulse because of a nuclear detonation and with an intentionally generated narrow, high-amplitude pulse for EA applications. In nuclear detonations, the EMP signal consists of a continuous spectrum with most of its energy distributed throughout the low frequency band of 3 to 30 kHz.

Electronic Order of Battle (EOB)—A listing of all the electronic radiating equipment of a military force giving location, type function, and other pertinent data.

Electronic Warfare (EW)—Any military action involving the use of electromagnetic (EM) and directed energy (DE) to control the EM spectrum or to attack the enemy. The three major subdivisions within EW are: electronic attack (EA), electronic protection (EP), and electronic warfare support (ES).

Electronic Warfare Coordination Authority (EWCA)—The Joint Force Commander (JFC) designee for the coordination of all Electronic Warfare activities within the theater of operations.

Electronic Warfare Coordination Cell (EWCC)—A specialized portion of the Air Operations Center (AOC) dedicated to achieving a commander's EW related objectives for the electromagnetic spectrum.

Electronic Warfare Integrated Reprogramming (EWIR)—A systematic process for operational commanders to respond to a dynamic threat environment. It gives all Air Force units a timely and accurate means to respond to expected and unexpected electronic emissions, changes in air defense tactics, and unique mission requirements. These EWIR responsibilities include procedures for changes in tactics, employment guidance, electronic warfare (EW) equipment (software/hardware), aircrew training and training devices (i.e. threat simulators, threat emitters) and other support systems.

Electronic Warfare System—Defined as the databases, emitter collection devices, publications, hardware, software, support equipment, training devices and ground-based simulators, battle management, mission data tools and/or mission reconstruction equipment used to conduct EW in support of the Air Forces operational functions.

Family-of-Systems (FoS)—A set or arrangement of independent systems that can be arranged or interconnected in various ways to provide different capabilities. The mix of systems can be tailored to provide desired capabilities, dependent on the situation.

Functional Capabilities Board (FCB)—A permanently established body that is responsible for the organization, analysis, and prioritization of joint warfighting capabilities within an assigned functional area. The FCB is chaired by a Joint Staff Flag Officer/General Officer, with O-6 level participation from all Services.

HQ USAF CONOPS Champion—Headquarter Air Force focal point for Service-level CONOPS and the basket of capabilities described and required by that CONOPS. The Champion promotes the attainment and sustainment of essential Air Force capabilities required to achieve the effects needed by Joint Force Commanders (JFC) to fulfill their assigned missions. The Champion is also responsible for leading the Capabilities Review and Risk Assessment (CRRA) process, advocating Air Force CONOPS, effects, and capabilities in all Department of Defense, Joint Staff, and Air Staff CBP processes, and informing the Air Force Corporate and the Planning, Programming, Budgeting, and Execution System processes.

Information Operations—"The integrated employment of the core capabilities of electronic warfare, computer network operations, psychological operations, military deception, and operations security, in concert with specified supporting and related capabilities, to influence, disrupt, corrupt or usurp adversarial human and automated decision making while protecting our own." (JP 1-02) *Information operations are the integrated employment of the core capabilities of influence operations electronic warfare operations, network warfare operations, in concert with specified integrated control enablers, to influence, disrupt, corrupt or usurp adversarial human and automated decision making while protecting our own.* (AFDD 2-5) (Italicized definition applies only to the Air Force and is offered for clarity)

Initial Capabilities Document—Documents the need for a materiel approach, or an approach that is a combination of materiel and non-materiel, to satisfy specific capability gap(s). The ICD summarizes the results of the DOTMLPF and policy analysis and the DOTMLPF approaches (materiel and non-materiel) that may deliver the required capability.

Integrated Architectures—An architecture consisting of multiple views or perspectives (operational view, system view, and technical view) that facilitates integration and promotes interoperability across family of systems and System of Systems and compatibility among related architectures.

Interoperability—The ability of systems, units or forces to provide data, information, materiel, and Services to and accept the same from other systems, units or forces and to use the data, information, materiel and Services so exchanged to enable them to operate effectively together. NSS and ITS interoperability include both the technical exchange of information and the end-to-end operational effectiveness of that exchanged information as required for mission accomplishment.

Joint Capabilities Board (JCB)—The JCB functions to assist the JROC in carrying out its duties and responsibilities. The JCB reviews and, if appropriate, endorses all JCIDS and DOTMLPF proposals prior to their submission to the JROC. The JCB is chaired by the Joint Staff, J-8 Director of Force Structure, Resources, and Assessment.

Joint Capabilities Integration and Development System (JCIDS)—A Joint concepts-centric process that supports the Joint Chiefs of Staff and the JROC in identifying, assessing, and prioritizing joint military capability needs and identifying integrated DOTMLPF solutions (materiel and non-materiel) to fill those needs within the DoD CBP process. Additionally, JCIDS is a key element in the Chairman's effort to realize the initiatives directed in the Transformation Planning Guidance.

Joint Functional Concept (JFC)—An articulation of how a future Joint Force Commander will integrate a set of related military tasks to attain capabilities required across the range of military operations. Although broadly described within the Joint Operations Concepts, they derive specific context from the Joint Operating Concepts and promote common attributes in sufficient detail to conduct experimentation and measure effectiveness.

Joint Integrating Concept (JIC)—A description of how a Joint Force Commander 10-20 years in the future will integrate capabilities to generate effects and achieve an objective. A JIC includes an illustrative CONOPS for a specific scenario and a set of distinguishing principles applicable to a range of scenarios. JICs have the narrowest focus of all concepts and distill JOC and JFC-derived capabilities into the fundamental tasks, conditions, and standards required to conduct Capabilities-Based Assessment (CBA).

Joint Operating Concept (JOC)—An articulation of how a future Joint Force Commander will plan, prepare, deploy, employ, and sustain a joint force against potential adversaries' capabilities or crisis situations specified within the range of military operations. Joint Operating Concepts guide the

development and integration of Joint Functional Concepts to provide joint capabilities. They articulate the measurable detail needed to conduct experimentation and allow decision makers to compare alternatives.

Joint Requirements Oversight Council (JROC)—The JROC approves all JCIDS documents with a Joint Potential Designator of "JROC Interest". The JROC may, at its discretion, review other programs at the request of SecDef, USD, USecAF, and Dir of Central Intelligence MRB. The JROC establishes, disbands, and combines FCBs. The JROC will also determine which functional area(s) are assigned to each FCB and the lead organization responsible for chairing each FCB. The JROC is chaired by VCJCS and is comprised of the Service Vice Chiefs.

Material Solution—A defense acquisition program (non-developmental, modification of existing systems, or new program) that satisfies identified operator capabilities.

Network Warfare Operations—Network warfare operations are the integrated planning and employment of military capabilities to achieve desired effects across the interconnected analog and digital portion of the battlespace. Network warfare operations are conducted in the information domain through the dynamic combination of hardware, software, data, and human interaction. (AFDD 2-5)

Operational Test and Evaluation (OT&E)—Testing and evaluation conducted in as realistic an operational environment as possible to estimate the prospective system's operational effectiveness and operational suitability. In addition, OT&E provides information on organization, personnel requirements, doctrine, and tactics. Within the Air Force, the Air Force Operational Test and Evaluation Center (AFOTEC), conducts OT&E.

Operational View (OV)—A view that describes the joint capabilities that the user seeks and how to employ them. The OV also identifies the operational nodes, the critical information needed to support the piece of the process associated with the nodes, and the organizational relationships.

Proficiency—Estimate used during capability analysis that answers the question "How well do we perform a given task (miles, minutes, percent, etc.)?" Together, proficiency and sufficiency ratings will be used to determine overall health and risk of a capability to achieve an effect.

RAMPOD—Operational R&M Assessment System supports all facets of maintaining, testing, integrating, and evaluating changes to field data collection software programs (RCS). These programs currently support the ALQ-131/184/188 ECM Pods, ALE-40/45/47 chaff/flare systems.

Spectrum Management—Involves planning, coordinating, and managing use of the EM spectrum through operational, engineering, and administrative procedures. Its objective is to enable electronic systems to perform their functions in the intended environment without causing or suffering unacceptable interference.

Sponsor—Domain owner responsible for all common documentation, periodic reporting, and funding actions required for supporting the capabilities, development, and acquisition process for a specific capability proposal.

System-of-Systems (SoS)—A set or arrangement of interdependent systems that are related or connected to provide a given capability. The loss of any part of the system will degrade the performance or capabilities of the whole.

Sufficiency—Estimate used during capability analysis that answers the question "Do we have enough (troops, aircraft, supplies, etc.)?" Together, sufficiency and proficiency ratings will be used to determine overall health and risk of a capability to achieve an effect.

User—An operational command or agency that receives or will receive benefit from the acquired system. Combatant Commanders and their Service component commands are the users. There may be more than one user for a system. Because the Service component commands are required to organize, equip, and train forces for the Combatant Commanders, they are seen as users of systems. The Chiefs of the Services and heads of other DOD components are validation and approval authorities and are not viewed as users.

Attachment 2

USAF EW SUPPORT TO JOINT TASK FORCES

A2.1. This attachment provides Service guidelines to commanders concerning Air Force EW during contingency operations. As always, JCS guidance takes precedence over the information provided in this attachment.

A2.2. Operations IRAQI FREEDOM (OIF) and ENDURING FREEDOM (OEF) continually demonstrated why the Air Force needs a fully trained core of EWCC experts to coordinate and execute operational EW activities to meet Joint Force Commander (JFC) objectives.

A2.2.1. The EWCC will work closely with the Joint Force Commander's Electronic Warfare Staff (JCEWS) or component equivalents (as designated by the lead service) to provide SMEs on USAF EW capabilities.

A2.2.2. It will coordinate as appropriate with the CAOC plans/operations divisions, IO, Space, Intel, Battlefield Coordination Detachment (BCD), J-6, or other cells as required by its assigned JFC function(s).

A2.3. Air Force EWCC manning will be fully integrated.

A2.3.1. The Chief of the EWCC will be a senior Air Force EWO and designated by the appropriate component commander. This designated individual will be the CAOC EW focal point to ensure proper coordination within the IO Cell and other Specialty Teams. As a minimum, the Chief will be cleared and briefed into Special Technical Operations (STO); and strong consideration should be given to COAL WARFIGHTER (CW) in-brief. All other EWCC personnel will be cleared to TS/SCI.

A2.3.2. Manning levels must be commensurate with the scale of EW operations being conducted. In order to function correctly, liaison links must be established with supporting commands as well as EW specialists from correlating capabilities and other employed EW elements.

A2.3.3. The EWCC will be the Air Force's primary agency for the deconfliction of intentional EM emissions across Services and other Coalition partners participating in the Joint Operational Construct.

A2.3.4. Inside the War Fighting HQ (WFHQ), the EWCC will provide critical Air Force SMEs on the following items:

Deliberate/Crisis Action Planning

CONPLAN/OPLAN

TET/Strategy - Air Operations Directive (AOD)

Master Air Attack Plan (MAAP) - Air Tasking Order (ATO)

EW Spins - Rules of Engagement (ROE)

Joint Restricted Frequency List (JRFL)

Jamming Control Authority (JCA)

EWBM Activities as directed by the JFC

Electronic Warfare Integrated Reprogramming (EWIR) in respective AORs

A2.4. The Air Force EWCC can be called upon to act as the joint force commander's mechanism for coordinating and executing EW operations within a theatre of operations including those involving a Combined Joint Task Force (CJTF). Responsibilities include EW planning, coordination/monitoring, source of advice, line-of-fire deconfliction, as well as the traditional EA activities normally reserved for offensive air operations and defensive activities associated with the FP mission.

A2.5. In order to synchronize combat operations, constant liaison with the ground maneuver, intelligence, and communications staffs/elements is essential for the EM spectrum environment.

A2.5.1. The EWCC must be located in a secure area for the handling and storage of sensitive intelligence material, within close proximity to component IO Staff, Operations, Space, Intelligence (MAS-INT/SIGINT) and Communications Interface Shelter (CIS) staff cells.

A2.5.2. Elements of the EWCC must be an integral part of a NAF headquarters/Component Staff during peacetime to enable OPLAN development, exercise planning and conducting effective EW training.

A2.6. All operational analyses revealing EW gaps, shortfalls, and benchmark best practices will be documented as lessons learned and will be incorporated into the Air Force Advanced Lessons Management System (ALMS) Observation format, located at <http://www.a9.hq.smil.mil/a9/>, no later than 48 hours after observation occurrence.