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OF THE AIR FORCE**

**DEPARTMENT OF THE AIR FORCE  
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**Operations**

**ELECTROMAGNETIC  
SPECTRUM OPERATIONS**

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This publication implements Department of Defense Instruction (DoDI) 3222.03, DoD Electromagnetic Environmental Effects (E3) Program; Department of Defense Directive (DoDD) 3610.01, Electromagnetic Spectrum Enterprise Policy, DoDD 3222.04, Electronic Warfare (EW) Policy; DoDI 4650.01, Policy and Procedures for Management and Use of the Electromagnetic Spectrum and is consistent with the guidance established with National Telecommunications and Information Administration (NTIA), Manual of Regulations and Procedures for Federal Radio Frequency Management (also known as “Redbook”). This Department of the Air Force Policy Directive (DAFPD) is consistent with Headquarters Air Force Mission Directive (HAFMD) 1-18, *Assistant Secretary of the Air Force (Installations, Environment and Energy)*, DAFPD 13-6, *Space Policy*, DAFPD 17-2, *Cyberspace*, AFPD 63-1, *Integrated Life Cycle Management*, AFPD 91-2, *Safety Programs*, and AFPD 91-4, *Directed Energy System Safety*. This (DAFPD) provides guidance for the United States Air Force (USAF) and United States Space Force (USSF) use of Electromagnetic Spectrum Operations (EMSO) to enhance resiliency, responsiveness, and agility of operations and permits the conduct of operations at a given time and place without prohibitive interference while affecting an adversary’s ability to do the same. In addition, EMSO will enable support to and achievement of Department of Defense (DoD), combatant commanders’, and other commanders’ objectives and effects. This publication applies to all civilian employees and uniformed members of the Regular Air Force, the Air Force Reserve, the Air National Guard, the USSF, and those with a contractual obligation to abide by the terms of Department of the Air Force (DAF) publications. If this publication conflicts with DoD or with joint guidance, the joint publication will take precedence. Ensure all records generated as a result of processes prescribed in this publication adhere to Air Force Instruction (AFI) 33-322, *Records Management and*

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## 1. Overview.

1.1. This directive establishes the DAF policy for electromagnetic spectrum (EMS) superiority governance, management, capability development, operations and sustainment, and capability divestment. In addition, this directive designates USAF Major Command (MAJCOM) and USSF Field Command (FLDCOM) roles and responsibilities for these capabilities in support of objectives and effects. This policy also provides the Director, Electromagnetic Spectrum Superiority, AF/A2/6L, and Director, Cyber Operations and Spectrum Integration, SF/COO/S6C, the authority to fulfill the duties established in federal laws and DoD issuances.

1.2. The EMS is a maneuvering space and physical environment that exists regardless of human interaction. It consists of physical and temporal properties characterized by frequency, waveform, power, and time. It can be managed, occupied, and selectively controlled like other physical environments where natural and artificial factors affect actions in and through the EMS. The EMS is pervasive and permeating, linking all military operations in and across the air, land, maritime, cyberspace, and space warfighting domains in which warfighting concepts such as mass, maneuver, and fires are employed. The EMS is finite, and the increasing demand from military, civilian, and commercial users create congestion by increasing the number and density of electromagnetic (EM) emitters. Operations in the EMS are constrained and framed by physics, technology, and policy and are governed by domestic law and international legal obligations. Technology, and the continually changing regulatory environment make new portions of the EMS accessible and exploitable. The EMS is contested and dynamic, allowing potential adversaries to deny us the freedom of maneuver and action essential to U.S. and multinational operations.

1.3. The physical EM environment is comprised of all naturally occurring, friendly, neutral, and enemy EM radiation within the area of operations. The DAF provides forces and capabilities to employ EMSO ensuring friendly forces' intended usage of the EMS while creating effects such as detection, denial, degradation, deception, and destruction against an adversary. EMSO involves the synchronized employment of electromagnetic warfare, signals intelligence, spectrum management, and additional functions for controlling and defending EMS access throughout the air, land, maritime, cyberspace, and space warfighting domains to enable tactical, operational, and strategic advantage.

1.4. EMSO, employed appropriately, enables the attainment of EMS superiority. EMS superiority is the degree of control that permits secure, reliable conduct of operations at a given time and place in the EMS without prohibitive interference from the opposing force.

## 2. Policy. The Department of the Air Force (DAF) will:

2.1. Achieve EMS superiority using EMSO to enable exploitation of the physical electromagnetic environment to execute, enhance, and support DAF and combatant commands' core missions and support U.S. Strategic Command (USSTRATCOM) in accomplishing its specific EMSO responsibilities.

2.2. Execute EMSO to support joint and coalition warfighter operations, increase the effectiveness of its core functions, and increase resiliency and survivability. Successful execution of EMSO requires integrated and synchronized execution of EW (electromagnetic attack, electromagnetic protection, and electromagnetic support), space operations, signals intelligence, electromagnetic battle management, spectrum management, and additional functions for controlling the EMS throughout the air, land, maritime, cyberspace, and space warfighting domains.

2.3. Integrate EMS superiority concepts into the USAF, USSF, and joint military strategy, plans, doctrine, operations, exercises, system architectures, electromagnetic spectrum-dependent (S-D) systems' development, and functional and professional military and civilian training and education so DAF personnel can use electromagnetic S-D systems as intended in any relevant electromagnetic environments.

2.4. Enable MAJCOMs and FLDCOMs to organize, train, and equip forces to provide EMSO subject matter experts for operations and planning to combatant and component commanders, as required.

2.5. Enable MAJCOMs and FLDCOMs to organize, train, and provide EMS subject matter experts in acquisition and system development efforts to ensure spectrum management awareness, concepts, and design/integration requirements are embedded through the entire weapons life cycle.

2.6. Develop and employ common electromagnetic systems' architectures, standards, and protocols to ensure friendly-force interference mitigation (inclusive of infrastructure related systems) and deliver desired warfighting effects within an electromagnetic environment via electromagnetic battle management.

2.7. Develop, acquire, and field electromagnetic and directed energy weapons capabilities; operational tactics, techniques, and procedures; maintenance procedures; and associated education, readiness training, and practical exercises for tactical, operational, peacetime, and joint and coalition training at the National Space Test and Training Range and National Space Test and Training Complex to enable joint EMSO.

2.8. Develop platforms and systems that operate in the EMS (i.e., electromagnetic S-D systems) using common architecture interfaces and protocols that result in the ability of systems, equipment, and devices using the electromagnetic spectrum to operate in their intended environments without causing or suffering unacceptable or unintentional degradation because of electromagnetic radiation or response.

2.9. Procure resilient electromagnetic S-D platforms and systems that can counter or indicate service degradation to the operator due to intentional interference (e.g., jamming) or unintentional interference (e.g., blue force electromagnetic interference, and atmospheric and space-based weather) and provide this information for electromagnetic battle management and other situational awareness capabilities.

2.10. Acquire each electromagnetic S-D platform or system's data sufficient to characterize its employment in an electromagnetic operational environment to assess emerging threats to systems and determine impacts to DAF missions resulting from reallocation or reprioritized spectrum access.

- 2.11. Sustain readiness by developing and maintaining an EMSO force structure with the proper rank/grade and specialty allocations of military and civilian personnel, training and educating mission-ready professionals, regularly exercising wartime system capabilities, and equipping and maintaining an infrastructure capable of supporting high operations tempo levels.
- 2.12. Integrate Air Reserve Component strategic and operational EMSO capabilities to perform steady-state and surge operations.
- 2.13. Foster strong relationships with allies and partners to maximize the exchange of EMSO information in support of mutual interests.
- 2.14. Develop common architectures, systems, or procedures that permit electromagnetic S-D platforms' or systems' data to be used by other U.S. government and international partners, as appropriate, to facilitate U.S. and partner interoperability while minimizing the data's risk of exploitation.
- 2.15. Comply with U.S. and host nation spectrum regulations and obtain applicable authorizations before operating electromagnetic S-D systems.
- 2.16. Identify and mitigate regulatory, technical, and operational spectrum supportability risks in accordance with DoDI 4650.01.
- 2.17. Use environmental intelligence of the atmospheric and space-based weather environment to optimize EMSO.

### **3. Roles and Responsibilities.**

- 3.1. Administrative Assistant to the Secretary of the Air Force (SAF/AA) will:
  - 3.1.1. Coordinate with AF/A2/6L and SF/COO/S6C on all EMS superiority policy.
  - 3.1.2. Coordinate with AF/A2/6L and SF/COO/S6C on the administration of special access programs for EMSO and related all-domain capabilities.
- 3.2. Assistant Secretary of the Air Force for Acquisition, Technology and Logistics (SAF/AQ) will:
  - 3.2.1. Establish a focal point within AQ to address acquisition matters related to EMS superiority with consultation from Assistant Secretary of the Air Force for Space Acquisition and Integration (SAF/SQ) on space-related acquisitions.
  - 3.2.2. Participate in the DAF EMS governance structure. Support EMS working groups or decision-making bodies as defined in their respective charters.
  - 3.2.3. With consultation from SAF/SQ on space-related considerations, serve as the OPR for the Science & Technology and Research, Development, Testing, and Evaluation (RDT&E) aspects of EMS superiority capabilities, including providing direction, guidance, and supervision over all matters about the formulation, review, approval, and execution of plans, policies, and programs relative to research, development, production, and acquisition of EMSO programs.

3.2.4. With support from SAF/SQ on space-related programs, enable the delivery of EMSO capabilities in accordance with decisions made by the DAF Corporate Structure for the USAF and USSF, DoD, and Congress, to include management of funds allocated for acquisition programs within the RDT&E appropriation.

3.2.5. Create incentives for industry partners to provide actionable information on electromagnetic performance and control for their S-D systems. Advocate for the necessary visibility of the DAF and DoD into the spectrum behavior of industry solutions, while respecting and protecting their essential proprietary information.

3.2.6. Be responsible for validating DAF EMSO programs comply with regulations and laws.

3.3. Office of the Secretary of the Air Force, Chief Information Officer (SAF/CN) will:

3.3.1. Participate in the DAF EMS governance structure.

3.3.2. Support EMS working groups or decision-making bodies as defined in their respective charters.

3.3.3. Review spectrum supportability risk assessments and provide recommendations when appropriate.

3.3.4. Provide representatives to the Interdepartment Radio Advisory Committee and its substructure.

3.3.5. Ensure spectrum management interests are represented on the Military Command, Control, Communications, and Computers Executive Board, its panels, and working groups.

3.4. Deputy Undersecretary of the Air Force, International Affairs (SAF/IA) will:

3.4.1. Establish a focal point within International Affairs to address foreign military sales of United States (US) EW systems and other US S-D systems that provide foreign governments with a degree of EMS control.

3.4.2. Participate in the DAF EMS governance structure. Support DAF EMS working groups or decision-making bodies as defined in their charters.

3.4.3. Coordinate with AF/A2/6L, SF/COO/S6C, Office of the Assistant Secretary of Defense for Space Policy and others as required on EW system export policy.

3.4.4. Coordinate with AF/A2/6L, Analysis, Partnerships & Engagements (AF/A2/6A), Deputy Chief of Space Operations for Intelligence (SF/S2) and SF/COO/S6C on EMSO to develop foreign disclosure policy and guidance to support effective EMS-related information sharing and employment of EMSO with allies and partners.

3.5. Assistant Secretary of the Air Force for Space Acquisition and Integration (SAF/SQ) will:

3.5.1. Be responsible for global positioning system acquisition programs and processes, spectrum allocations and processes, spectrum planning and integration with positioning, navigation, and timing architectures, coordination with emitters/providers for radio-frequency compatibility and interoperability, and spectrum protection concerning bands with positioning, navigation, and timing application.

3.5.2. As authorized, coordinate with the International Telecommunications Union for frequency deconfliction and orbital slot allocations consistent with DoDI 4650.01 and NTIA Redbook procedures.

3.5.3. Participate in the DAF EMS governance structure. Support DAF EMS working groups or decision-making bodies as defined in their charters.

3.6. Deputy Chief of Staff, Manpower, and Personnel and Services (AF/A1), Deputy Chief of Space Operations for Human Capital (SF/S1) will:

3.6.1. Establish a focal point within both AF/A1 and SF/S1 to address EMS Workforce and personnel matters related to EMS superiority.

3.6.2. Coordinate with AF/A2/6L and SF/COO/S6C on the career field and management of EMS subject matter experts.

3.7. Deputy Chief of Staff for Intelligence, Surveillance, and Reconnaissance and Cyber Effects Operations (AF/A2/6) and Deputy Chief of Space Operations for Intelligence (SF/S2), will:

3.7.1. Establish a focal point within AF/A2/6 and SF/S2 to address intelligence matters related to EMS superiority and coordinate with Joint Electromagnetic Warfare Center, the National Air and Space Intelligence Center, and the National Space Intelligence Center as required.

3.7.2. Ensure AF/A2/6L and SF/COO/S6C are informed of intelligence capability and capacity issues related to attaining and maintaining EMS superiority.

3.7.3. Participate in the DAF EMS governance structure. Support DAF EMS working groups or decision-making bodies as defined in their charters.

3.8. Director, Electromagnetic Spectrum Superiority (AF/A2/6L) will:

3.8.1. Lead the USAF in obtaining and maintaining EMS superiority across air, space, and cyberspace domains through coordination across missions, core-functional, and cross-functional capability areas.

3.8.2. Lead USAF guidance and oversight of EMS superiority doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy issues.

3.8.3. Advise on doctrine and develop policy, guidance, strategy, capability development, and investment priorities to attain and maintain EMS superiority.

3.8.4. Ensure EMSO requirements and capabilities are integrated across the USAF.

3.8.5. Develop and oversee implementation of USAF EMS superiority policy and guidance.

3.8.6. With the support of the DAF EMS governance structure, ensure alignment of EMS superiority goals and objectives across USAF functional mission areas and cross-functional teams.

3.8.7. Oversee all USAF EMS-related training for the EMS subject matter expert career field, as well as general force training.

- 3.8.8. Serve as the staffing OPR for EMS-related documents that address EMSO, and other capabilities when necessary.
  - 3.8.9. Manage the USAF EMS Professional Career Force (military and government civilians) concerning the performance of EMS-related activities in coordination with other career field managers.
  - 3.8.10. Serve as the USAF EMSO Functional Manager for designated EMS capabilities/programs and advise career field managers for the EMSO-centric AF Specialty Code career fields, in accordance with DAFI 36-2670, *Total Force Development*.
  - 3.8.11. Serve as an advocate for DAF EMS superiority equities within the Joint Capabilities Integration and Development System, DAF Corporate Structure, and DAF capabilities development processes.
  - 3.8.12. Serve as the USAF OPR for EMS superiority Program Objective Memorandum submission through the DAF Corporate Process.
  - 3.8.13. Coordinate all USAF programmatic actions related to EMS superiority with the Deputy Chief of Staff, Plans and Programs (AF/A8) or other panel chairs as appropriate and submit required changes through the DAF Corporate Structure, Office of the Secretary of Defense and Joint Staff, as required.
  - 3.8.14. Coordinate with AF/A2/6 on the integration of EMSO activities into planning, execution, and assessment to enable information warfare.
  - 3.8.15. Establish USAF working groups, as necessary, to address specific EMS superiority issues or topics.
  - 3.8.16. Support USSTRATCOM in accomplishing its specific EMSO responsibilities as requested.
- 3.9. Deputy Chief of Staff for Intelligence, Surveillance, and Reconnaissance and Cyber Effects Operations, Chief, Partnerships and Engagements Division (AF/A2/6AE) will:
- 3.9.1. Develop intelligence disclosure policy and guidance in coordination with SAF/IA, AF/A2/6L, SF/S2 and SF/COO/S6C to support EMS-related intelligence sharing requirements with allies and partners.
  - 3.9.2. Coordinate on SAF/IA, AF/A2/6L and SF/COO/S6C requirements and proposals for policy related to export of EW systems and disclosure of other categories of classified military information.
- 3.10. Director, Cyber Operations and Spectrum Integration (SF/COO/S6C) will:
- 3.10.1. Lead the USSF in obtaining and maintaining EMS superiority across air, space, and cyberspace domains through coordination across missions, core-functional and cross-functional capability areas.
  - 3.10.2. Establish USSF working groups, as necessary, to address specific EMS superiority issues or topics.
  - 3.10.3. Ensure EMSO requirements and capabilities are integrated across the FLDCOMs.

- 3.10.4. Develop and oversee implementation of USSF EMS superiority policy and guidance.
  - 3.10.5. Ensure alignment of EMS superiority goals and objectives across USSF functional mission areas and cross-functional teams.
  - 3.10.6. Serve as the USSF OPR for EMS superiority Program Objective Memorandum submission through the DAF Corporate Process.
  - 3.10.7. Coordinate all USSF programmatic actions related to EMS superiority with the Chief Strategy and Resourcing Officer (SF/CSRO) or other panel chairs as appropriate and submit required changes through the DAF Corporate Structure, Office of the Secretary of Defense and Joint Staff, as required.
  - 3.10.8. Manage the USSF EMS Professional Career Force concerning the performance of EMS-related activities in coordination with other career field managers.
  - 3.10.9. Serve as the USSF EMS Superiority Functional Managers for designated EMS capabilities/programs and advise the career field managers for the EMSO-centric USSF Specialty Code career fields, in accordance with DAFI 36-2670.
  - 3.10.10. Execute USSF acquisition spectrum management policy and interface with the USAF Spectrum Management Office (AF/A2/6LS).
  - 3.10.11. Support the Space Development Agency and Space Rapid Capability Office as requested.
  - 3.10.12. Support USSTRATCOM in accomplishing its specific EMSO responsibilities as requested.
- 3.11. Deputy Chief of Staff for Operations (AF/A3) and Chief Operations Officer (SF/COO) will:
- 3.11.1. Provide subject matter expertise and coordination on EMS superiority issues related to DAF and combatant command operations and deployment and employment of electromagnetic warfare and with EMS-related systems.
  - 3.11.2. Work with Air Education and Training Command and Space Training and Readiness Command to develop appropriate EMS superiority training and require all DAF EMS superiority staff, units, and career field/force personnel to complete EMS superiority training.
  - 3.11.3. Develop and implement EMSO readiness metrics for all DAF combat capabilities that operate in the EMS.
  - 3.11.4. Participate in the DAF EMS governance structure. Support DAF EMS working groups or decision-making bodies as defined in their charters.
- 3.12. Deputy Chief of Staff, Air Force Futures (AF/A5/7) and Chief Strategy and Resourcing Officer (SF/CSRO) will:
- 3.12.1. Coordinate with AF/A2/6L, SF/COO/S6C, and the EW/EMS Capability Development Team on EMS superiority capability development issues.

3.12.2. Coordinate with Electromagnetic Spectrum Superiority Advanced Programs (AF/A2/6LZ) and SF/COO/S6C on EMS superiority requirements processes, documents, and issues.

3.12.3. Participate in the DAF EMS governance structure. Support DAF EMS working groups or decision-making bodies as defined in their charters.

3.13. Deputy Chief of Staff for Plans and Programs (AF/A8) and Chief Strategy and Resourcing Officer (SF/CSRO) will:

3.13.1. Establish and maintain EMS Superiority equities within existing Service programming panel structure to address planning and programmatic matters related to EMS superiority, and function as liaison with AF/A2/6L and SF/COO/S6C..

3.13.2. Participate in the DAF EMS governance structure.

3.13.3. Support DAF EMS working groups or decision-making bodies as defined in their charters.

3.13.4. Ensure EMSO planning and programming are integrated across the MAJCOMs and FLDCOMs.

3.14. Director, Department of the Air Force Studies & Analysis (SAF/SA), and Space Force Analysis (SF/CTIO/S9) will:

3.14.1. Coordinate EMS superiority capability development issues related to modeling and simulation with AF/A2/6L and SF/COO/S6C.

3.14.2. Participate in the DAF EMS governance structure. Support DAF EMS working groups or decision-making bodies as defined in their charters.

3.15. Director of Test and Evaluation (AF/TE) and Space Force Test and Evaluation (SF/TE) will:

3.15.1. Coordinate with AF/A2/6L, SF/COO/S6C, and other organizations on EMS superiority capability development and sustainment issues related to air and space test and evaluation.

3.15.2. Participate in the DAF EMS governance structure. Support DAF EMS working groups or decision-making bodies as defined in their charters.

3.16. All MAJCOMs and FLDCOMs will:

3.16.1. Establish a focal point within the MAJCOM and FLDCOM headquarters (HQ) to address matters related to EMS superiority and function as the MAJCOM and FLDCOM liaison with AF/A2/6L and SF/COO/S6C.

3.16.2. Participate in the DAF EMS governance structure. Support DAF EMS working groups or decision-making bodies as defined in their charters.

3.17. Air Combat Command will:

3.17.1. Establish a focal point within HQ Air Combat Command to address matters related to EMS superiority and function as the MAJCOM liaison with AF/A2/6L.

3.17.2. Support USAF EMS-related working groups or decision-making bodies as their charters define.

- 3.17.3. Lead EMS environment intelligence integration into EMS operations and activities.
  - 3.17.4. Support integration of EMSO into the USAF Warfare Center's academic training and exercises.
  - 3.17.5. Develop, update, and maintain EMSO training course information in the Joint Training Course Database according to Joint Staff guidance.
  - 3.17.6. Coordinate with the HQ Air Education and Training Command, HQ Air Combat Command, and Air National Guard schoolhouses to refine/modify, review, validate, and approve course objectives and education requirements.
  - 3.17.7. Provide global recommended sourcing solutions and feasibility risk analyses as defined by Global Force Management Implementation Guidance, DAFI 10-401, *Operations Planning and Execution*, and Joint Staff directives supporting joint force provider responsibilities.
  - 3.17.8. In coordination with appropriate functional authorities, ensure sufficiently proficient EMSO capabilities are available to Air Force forces and air operations center/operations center.
  - 3.17.9. Coordinate testing and evaluation of emerging EMSO capabilities for operational forces, national agencies, and the acquisition community.
  - 3.17.10. Develop EMSO tactics, techniques, and procedures for joint and USAF operational planners supporting current and future operations.
- 3.18. Space Operations Command will:
- 3.18.1. Establish a focal point within HQ Space Operations Command to address matters related to EMS superiority and function as the FLDCOM liaison with SF/COO/S6C.
  - 3.18.2. Support USSF EMS-related working groups or decision-making bodies as their charters define.
  - 3.18.3. Lead EMS environment intelligence integration into EMS operations and activities.
  - 3.18.4. Support integration of EMSO into Space Warfighting Analysis Center's academic analysis, modeling, wargaming, and experimentation.
  - 3.18.5. Provide global recommended sourcing solutions and feasibility risk analyses as defined by Global Force Management Implementation Guidance, DAFI 10-401, and Joint Staff directives supporting joint force provider responsibilities.
  - 3.18.6. In coordination with appropriate functional authorities, ensure sufficiently proficient EMSO capabilities are available for presentation to combatant command space components.
  - 3.18.7. Develop EMSO tactics, techniques, and procedures for joint and USSF operational planners to support current and future operations.
- 3.19. Air Education and Training Command will:
- 3.19.1. Develop and execute initial EMSO training and education.

3.19.2. Develop and execute EMSO training and education throughout professional military education.

3.19.3. Participate in, and chair when appropriate, utilization and training workshops and USAF Training Planning Team when addressing EMSO training requirements.

3.20. Space Training and Readiness Command will:

3.20.1. Participate in and chair, when appropriate, utilization and training workshops and USSF Training Planning Team when addressing EMSO training requirements.

3.20.2. Develop, update, and maintain EMSO training course information in the Joint Training Course Database according to Joint Staff guidance with support from HQ USSF and FLDCOMs.

3.20.3. Develop and execute EMSO training and education throughout professional military education.

3.20.4. Coordinate with the other FLDCOMs and the career field managers on Space Training and Readiness Command -provided EMSO training to solicit input to refine/modify, review, validate, and approve course objectives and training/education requirements.

3.20.5. Coordinate testing and evaluation of emerging EMSO capabilities for operational forces, national agencies, and the acquisition community.

3.20.6. Develop and maintain USSF EMSO doctrine.

3.21. Air Force Materiel Command will:

3.21.1. Establish a focal point within HQ Air Force Materiel Command to address matters related to EMS superiority and function as the MAJCOM liaison with AF/A2/6L.

3.21.2. Support USAF EMS-related working groups or decision-making bodies as their charters define.

3.21.3. Develop acquisition guidance for EMSO systems and include expectations for industry partners to give USAF operators the necessary privileges in EMSO solutions, while respecting and protecting any essential proprietary information of industry-provided systems.

3.21.4. Acquire, develop, and provide the subject matter expertise necessary to assist the Air Force Materiel Command centers (specifically Air Force Life Cycle Management Center and Air Force Research Laboratory), the Program Management Office and Air Force forces and air operations center/operations center to explore alternative developmental courses of action for new capabilities, as well as ensure integration of EMSO into weapon systems' RDT&E.

3.21.5. Utilize common architectures, standard interfaces, and protocols in the acquisition of EMS S-D systems to enable interoperability and improve technology insertion.

3.21.6. Organize, train, and equip acquisition forces to provide EMSO subject matter experts for planning, development, and sustainment of EMSO capabilities in support of operations and planning to combatant and component commanders, as required.

3.21.7. Ensure EMSO mid-term and long-term research and technology shortfall issues are adequately addressed through the Air Force Research Laboratory.

3.21.8. Maintain and communicate a list of spectrum management interests, priorities, trends, and capability gaps to inform Headquarters Air Force, MAJCOMs, and Space Systems Command of all relevant EMSO Science and Technology (S&T) and Research, Development, Test, and Evaluation (RDT&E) efforts.

3.21.9. Ensure protection of human subjects in all EMS research by conducting all such activities through the Air Force Research Laboratory. Acquisition plans for such activities will include appropriate resourcing for human research protection oversight in accordance with DoDI 3216.02. *Protection of Human Subjects and Adherence to Ethical Standards in DoD Conducted and Supported Research.*

3.22. Space Systems Command and Space Development Agency will:

3.22.1. Develop acquisition guidance for EMSO systems and include expectations for industry partners to give USSF operators the necessary privileges in EMSO solutions, while respecting and protecting any essential proprietary information of industry-provided systems.

3.22.2. Utilize common architectures, standard interfaces, and protocols in the acquisition of EMS S-D systems to enable interoperability and improve technology insertion.

3.22.3. Provide the subject matter expertise necessary to assist the Space Systems Command Program Executive Officer (PEOs) to explore alternative developmental courses of action for new capabilities, as well as ensure integration of EMSO into weapon systems' RDT&E.

3.22.4. Ensure EMSO mid-term and long-term research and technology shortfall issues are adequately addressed to the Chief Technology and Innovation Officer.

3.22.5. Inform USSF and FLDCOMs of all relevant EMSO S&T and RDT&E efforts to Chief Technology and Innovation Officer/Science, Technology and Research (CTIO/STR).

3.23. ANG will:

3.23.1. Coordinate EMSO education and training with HQ Air Combat Command, HQ Air Education and Training Command, and Air Reserve Component to support EMSO mission readiness requirements defined by DAF.

3.23.2. Comply with USAF MAJCOM responsibilities as defined in [paragraph 3.16](#) through [paragraph 3.16.2](#).

3.23.3. Comply with USAF MAJCOM, direct reporting unit, and field operation agency responsibilities as defined in [paragraph 3.24](#) through [paragraph 3.24.7](#).

3.24. All USAF MAJCOMs, Direct Reporting Units, and Field Operating Agencies will:

3.24.1. Coordinate with AF/A2/6L to develop new EMSO initiatives into joint, coalition and USAF experimentation and acquisition activities.

- 3.24.2. Appoint MAJCOM functional managers and program managers for EMSO. Direct Reporting Units and Field Operating Agencies are only required to appoint program managers.
- 3.24.3. Assist Headquarters Air Force in performing their doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy capability development responsibilities, as required.
- 3.24.4. Organize, train, and equip EMSO career field/forces and capabilities to include readiness assessment and evaluation functions and leading integration of EMSO into all mission areas.
- 3.24.5. Integrate EMSO into the strategic planning process and assist with developing EMSO guidance and enabling concepts.
- 3.24.6. As appropriate assist combatant commands, component-MAJCOMs/component-numbered air forces, or air operation centers with synchronizing and deconflicting EMSO effects with other respective functional/geographical MAJCOMs.
- 3.24.7. Coordinate EMSO with AF/A3 on all exercise and training requirements.
- 3.25. All USSF FLDCOMs, Direct Reporting Units, and Field Operating Agencies will:
- 3.25.1. Coordinate with SF/COO/S6C to develop new EMSO initiatives into joint, coalition and USSF experimentation and acquisition activities.
- 3.25.2. Appoint FLDCOMs functional managers and program managers for EMSO. Direct Reporting Units and Field Operating Agencies are only required to appoint program managers.
- 3.25.3. Organize, train, and equip EMSO career field/forces and capabilities to include readiness assessment and evaluation functions and leading integration of EMSO into all mission areas.
- 3.25.4. Integrate EMSO into the strategic planning process and assist with developing EMSO guidance and enabling concepts.
- 3.25.5. As appropriate assist combatant commands, component space forces or air operation centers with synchronizing and deconflicting EMSO effects.
- 3.25.6. Coordinate EMSO with SF/COO on all exercise and training requirements.

FRANK KENDALL  
Secretary of the Air Force

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

DoDD 3610.01, *Electromagnetic Spectrum Enterprise Policy*, 04 September 2020

DoDI 3216.02, *Protection of Human Subjects and Adherence to Ethical Standards in DoD-Conducted and -Supported Research*, 29 June 2022

DoDI 3222.03, DoD Electromagnetic Environmental Effects (E3) Program, 25 August 2014

DoDD 3222.04, *Electronic Warfare Policy*, 26 March 2014

DoDI 4650.01, *Policy and Procedures for Management and Use of the Electromagnetic Spectrum*, 09 January 2009

DoDI 8420.02, *DoD Satellite Communications*, 03 August 2023

JP 3-0, *Joint Operations*, 18 June 2022

JP 3-09, *Joint Fire Support*, 10 April 2019

JP 3-85, *Joint Electromagnetic Spectrum Operations*, May 2020

HAFMD 1-18, *Assistant Secretary of the Air Force (Installations, Environment and Energy)*, 10 July 2014 (Note: Air Force Doctrine can be found at <https://doctrine.af.mil/>)

AFDP 3-13, *Information in Air Force Operations*, 1 February 2023

DAFPD 10-9, *Lead Command/Lead Agent Designation and Responsibilities for United States Air Force Weapon Systems, Non-Weapon Systems, And Activities*, 25 May 2021

DAFPD 13-6, *Space Policy*, 05 December 2023

DAFPD 17-2, *Cyberspace*, 27 October 2020

AFPD 63-1, *Integrated Life Cycle Management*, 07 August 2018

AFPD 91-2, *Safety Programs*, 03 September 2019

AFPD 91-4, *Directed Energy System Safety*, 17 January 2020

DAFI 10-401, *Operations Planning and Execution*, 13 January 2021

DAFI 36-2670, *Total Force Development*, 25 June 2020

AFI 33-322, *Records Management and Information Governance Program*, 23 March 2020

Manual of Regulations & Procedures for Federal Radio Frequency Management, *National Telecommunications and Information Administration*, January 2021 Edition - January 2023 Revision

***Prescribed Forms***

None

*Adopted Forms*

DAF Form 847, Recommendation for Change of Publication

*Abbreviations and Acronyms*

**AFPD**—Air Force Mission Directive

**DAF**—Department of the Air Force

**DAFPD**—Department of the Air Force Policy Directive

**DoD**—Department of Defense

**DoDD**—Department of Defense Directive

**DoDI**—Department of Defense Instruction

**EM**—Electromagnetic

**EMS**—Electromagnetic Spectrum

**EMSO**—electromagnetic spectrum operations

**EW**—electromagnetic warfare

**E3**—Electromagnetic Environmental Effects

**HAFMD**—Headquarters Air Force Mission Directive

**RDT&E**—Research, Development, Testing, and Evaluation

**S-D**—spectrum-dependent

**S&T**—science and technology

**U.S.**—United States

**USAF**—United States Air Force

**USSF**—United States Space Force

*Office Symbols*

**AF/A1**—Air Force Deputy Chief of Staff, Manpower, Personnel and Services

**AF/A2/6**—Air Force Deputy Chief of Staff, Air Force Intelligence, Surveillance, Reconnaissance and Cyber Effects

**AF/A2/6A**—Analysis, Partnerships & Engagements

**AF/A2/6AE**—Deputy Chief of Staff for Intelligence, Surveillance, and Reconnaissance and Cyber Effects Operations, Chief, Partnerships and Engagements Division

**AF/A2/6L**—Director, Electromagnetic Spectrum Superiority

**AF/A2/6LS**—Electromagnetic Spectrum Superiority Air Force Spectrum Management Office

**AF/A2/6LZ**—Electromagnetic Spectrum Superiority Advanced Programs

**AF/A3**—Air Force Deputy Chief of Staff, Operations

**AF/A5/7**—Air Force Deputy Chief of Staff, Air Force Futures  
**AF/A8**—Air Force Deputy Chief of Staff, Plans and Programs  
**AF/TE**—Director of Test and Evaluation  
**CTIO/STR**—Chief Technology and Innovation Officer/Science, Technology and Research  
**FLDCOM**—Field Command  
**HQ**—Headquarters  
**MAJCOM**—Major Command  
**OPR**—The office of primary responsibility  
**SAF/AA**—Secretary of the Air Force Administrative Assistant  
**SAF/AQ**—Assistant Secretary of the Air Force for Acquisition, Technology and Logistics  
**SAF/CN**—Office of the Secretary of the Air Force, Chief Information Officer  
**SAF/IA**—Deputy Undersecretary of the Air Force, International Affairs  
**SAF/SA**—Director, Department of the Air Force Studies & Analysis  
**SAF/SQ**—Assistant Secretary of the Air Force for Space Acquisition and Integration  
**SF/COO**—Chief Operations Officer  
**SF/COO/S6C**—Director, Cyber Operations and Spectrum Integration  
**SF/CSRO**—Chief Strategy and Resourcing Officer  
**SF/CTIO/S9**—Space Force Analysis  
**SF/S1**—Deputy Chief of Space Operations for Human Capital  
**SF/S2**—Deputy Chief of Space Operations for Intelligence  
**USSTRATCOM**—U.S. Strategic Command

### *Terms*

**Cyberspace Operations**—The employment of cyberspace capabilities whose primary purpose is to achieve objectives in or through cyberspace. (JP 3-0)

**Defensive Space Operations**—Actions taken to preserve friendly freedom of action in space.

**Directed Energy**—An umbrella term covering technologies that relate to the production of a beam of concentrated electromagnetic energy or atomic or subatomic particles. See also directed-energy weapon effects on a target. (JP 3-85)

**Electromagnetic Attack**—Division of electromagnetic warfare involving the use of electromagnetic energy, directed energy, or anti-radiation weapons to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability and is considered a form of fires. See also electromagnetic warfare. (JP 3-85)

**Electromagnetic Battle Management**—The dynamic monitoring, assessing, planning, and directing of operations in the electromagnetic spectrum in support of the commander's concept of operation. (JP 3-85)

**Electromagnetic Environment**—The resulting product of the power and time distribution, in various frequency ranges, of the radiated or conducted electromagnetic emission levels encountered by a military force, system, or platform when performing its assigned mission in its intended operational environment. (JP 3-85)

**Electromagnetic Interference**—Any electromagnetic disturbance, induced intentionally or unintentionally, that interrupts, obstructs, or otherwise degrades or limits the effective performance of electromagnetic spectrum-dependent systems and electrical equipment. (JP3-85)

**Electromagnetic Operational Environment**—A composite of the actual and potential electromagnetic energy radiation, conditions, circumstances, and influences that affect the employment of capabilities and the decisions of the commander. It includes the existing background radiation (i.e., electromagnetic environment) as well as the friendly, neutral, adversary, and enemy electromagnetic systems able to radiate within the electromagnetic area of influence. This includes systems currently radiating or receiving, or those that may radiate, that can potentially affect joint operations.

**Electromagnetic Protection**—Division of electromagnetic warfare involving actions taken to protect personnel, facilities, and equipment from any effects of friendly or enemy use of the EMS that degrade, neutralize, or destroy friendly combat capability. See also electromagnetic warfare. (JP 3-85)

**Electromagnetic Spectrum (EMS)**—The range of all types of electromagnetic radiation. (National Aeronautics and Space Administration)

**Electromagnetic Spectrum-Dependent Systems**—All electronic systems, subsystems, devices, and equipment that depend on the use of the spectrum to properly accomplish their functions. (DoDD 3610.01)

**Electromagnetic Spectrum Management**—The operational, engineering, and administrative procedures to plan and coordinate operations within the electromagnetic operational environment. (JP 3-85)

**Electromagnetic Spectrum Operations**—Coordinated military actions to exploit, attack, protect, and manage the electromagnetic environment. (JP 3-85)

**Electromagnetic Spectrum Professional**—A member of the EMS Workforce who has achieved and maintained a demonstrated standard of expertise in EMS-related core skills.

**Electromagnetic Spectrum Superiority**—That degree of control in the electromagnetic spectrum that permits the conduct of operations superiority at a given time and place without prohibitive interference while affecting a threat's ability to do the same.

**Electromagnetic Support**—Division of electromagnetic warfare involving actions tasked by, or under direct control of, an operational commander to search for, intercept, identify, and locate or localize sources of intentional and unintentional radiated electromagnetic energy for immediate threat recognition, targeting, planning and conduct of future operations. See also electromagnetic warfare. (JP 3-85)

**Electromagnetic Warfare**—Military action involving the use of electromagnetic and directed energy to control the electromagnetic spectrum or to attack the enemy. (JP 3-85)

**Electromagnetic Spectrum Workforce**—The totality of personnel required to staff the EMS Enterprise.

**Fires**—The use of weapon systems or other actions to create specific lethal or nonlethal effects on a target. (JP 3-09)

**Information Warfare**—The AF term for the military capabilities employed in and through the information environment to deliberately affect adversary human and system behavior and to preserve friendly freedom of action during cooperation, competition, and conflict (AFDP 3-13).

**Office of Primary Responsibility (OPR)**—That office ensures that training is valid and current, including directly supporting HQ Air Force with information operations, military deception, military information support operations, and operational security efforts.