

Joint Publication 3-13.1



Electronic Warfare



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EXECUTIVE SUMMARY COMMANDER'S OVERVIEW

- **Provides an Overview of Electronic Warfare**
 - **Describes Organizing for Joint Electronic Warfare**
 - **Explains Planning Joint Electronic Warfare**
 - **Discusses Coordinating Joint Electronic Warfare**
 - **Addresses Multinational Aspects of Electronic Warfare**
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Overview of Electronic Warfare

Military operations are executed in an environment complicated by increasingly complex demands on the electromagnetic spectrum.

All modern forces depend on the electromagnetic spectrum (EMS). The military requirement for unimpeded access to, and use of, the EMS is the key focus for joint electromagnetic spectrum operations (JEMSO), both in support of military operations and as the focus of operations themselves. **Electronic warfare (EW) is essential for protecting friendly operations and denying adversary operations within the EMS throughout the operational environment.**

Military Operations and the Electromagnetic Environment

JEMSO are the coordinated efforts of EW and joint electromagnetic spectrum management operations (JEMSMO) to exploit, attack, protect, and manage the electromagnetic operational environment (EMOE). The impact of an EMOE upon the operational capability of military forces, equipment, systems, and platforms is referred to as electromagnetic environmental effects. It encompasses all electromagnetic (EM) disciplines to include electromagnetic compatibility; electromagnetic interference; EM vulnerability; electromagnetic pulse (EMP); electronic protection (EP); hazards of EM radiation to personnel, ordnance, and volatile materials; and natural phenomena effects such as sunspots, lightning, and precipitation static.

As with the operational environment, the goal of the joint force commander (JFC) is to shape and control the electromagnetic operational environment.

Role of Electronic Warfare Across the Range of Military Operations

The term EW refers to military action involving the **use of EM energy and directed energy (DE) to control the EMS or to attack the enemy. EW consists of three divisions:** electronic attack (EA), EP, and electronic warfare support (ES).

Electronic Attack

EA refers to the division of EW involving the use of **EM energy, DE, or antiradiation 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.

Electronic Protection

EP refers to the division of EW involving actions taken **to protect personnel, facilities, and equipment** from any effects of friendly, neutral, or enemy use of the EMS, as well as naturally occurring phenomena that degrade, neutralize, or destroy friendly combat capability.

Electronic Warfare Support

ES refers to the division of EW 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 EM energy for the purpose of immediate threat recognition, targeting, planning, and conduct of future operations.

Principal Electronic Warfare Activities

The principal EW activities have been developed over time to exploit the opportunities and vulnerabilities inherent in the physics of EM energy. The principal activities used in EW include the following: countermeasures, EM battle management (EMBM), EM compatibility; EM deception; EM hardening, EM interference resolution, EM intrusion, EM jamming, EMP, EM spectrum control, electronic intelligence collection, electronic masking, electronic probing, electronic reconnaissance, electronics security, EW reprogramming, emission control, JEMSO, JEMSMO, low-observability/stealth, meaconing, navigation warfare (NAVWAR), precision geolocation, and wartime reserve modes.

Electronic Warfare Capabilities and Potential Effects

As an adaptive and responsive form of disruptive or destructive fires, EA's purpose is to gain and maintain friendly advantage within the EMOE and ensure requisite friendly access to the EMS. EW may adversely affect friendly forces when not properly integrated and coordinated. EW is employed to create decisive, standalone effects, or to support military operations by generating various levels of control, detection, denial,

deception, disruption, degradation, exploitation, protection, and destruction.

Electronic Warfare's Role in Irregular Warfare

During irregular warfare, adversaries may operate with unsophisticated electronic means to achieve their objectives. EW can influence the adversary, friendly population, and neutral population, with the joint force commander's (JFC's) information operations (IO) message, in effort to change/win popular support.

Electronic Warfare's Role in Information Operations

EW contributes to the success of IO by using offensive and defensive tactics and techniques in a variety of combinations to shape, disrupt, and exploit adversarial use of the EMS while protecting friendly freedom of action.

Electronic Warfare's Role in Space Operations

Since space-based operations depend on the EMS, EW must be considered. Most operations in space beyond uncontested communications, physical maneuvering, and uncontested EM collection involve some form of EW.

Electronic Warfare's Role in Cyberspace Operations

Since cyberspace requires both wired and wireless links to transport information, both offensive and defensive cyberspace operations may require use of the EMS for the enabling of effects in cyberspace. Due to the complementary nature and potential synergistic effects of EW and computer network operations, they must be coordinated to ensure they are applied to maximize effectiveness.

Electronic Warfare's Relationship to Navigation Warfare

EW produces NAVWAR effects by protecting or denying transmitted global navigation satellite system or other radio navigation aid signals.

Directed Energy

DE is an umbrella term covering technologies that produce concentrated EM energy and atomic or subatomic particles. A **DE weapon** is a system using DE primarily as a means to incapacitate, damage, disable, or destroy enemy equipment, facilities, and/or personnel.

Intelligence and Electronic Warfare Support

The distinction between whether a given asset is performing an ES mission or an intelligence mission is determined by who tasks or controls the collection assets, what they are tasked to provide, and for what purpose they are tasked. ES and signals intelligence (SIGINT) operations often share the same or similar assets and resources, and may be tasked to simultaneously collect information that meets both requirements.

Organizing for Joint Electronic Warfare

Responsibilities

How joint staffs are organized to plan and execute electronic warfare is a prerogative of the JFC.

EW planning and operations can be divided among multiple directorates of a joint staff based on long-, mid-, and near-term functionality and based upon availability of qualified EW personnel. **Long-range planning** of EW normally occurs under the plans directorate of a joint staff, while **near/mid-term planning and the supervision** of EW execution normally falls within the purview of the operations directorate of a joint staff (J-3).

Joint Electronic Warfare Organization

Joint Force Commander's EW Staff (JCEWS). The JCEWS is headed by the command electronic warfare officer (EWO), who is designated as the JCEWS chief. The JCEWS develops operation plans (OPLANs) and concept plans and monitors routine EW operations and activities.

Joint Electronic Warfare Cell. The JFC may designate and empower a joint electronic warfare cell (EWC) to organize, execute, and oversee conduct of EW.

Joint Frequency Management Organization

Each geographic combatant commander is specifically tasked by policy to establish a frequency management structure that includes a **joint frequency management office (JFMO)** and to establish procedures to support planned and ongoing operations. To accomplish these tasks, each supported combatant commander establishes a JFMO, typically under the cognizance of the communications system directorate of a joint staff, to **support joint planning, coordination, and operational control of the EMS** for assigned forces.

Organization of Intelligence Support to Electronic Warfare

At the national level, organizations and agencies such as the Central Intelligence Agency, National Security Agency/Central Security Service, National Geospatial-Intelligence Agency, and Defense Intelligence Agency are constantly seeking to identify, catalog, and update the electronic order of battle (EOB) of identified or potential adversaries. The joint intelligence operations center responds to theater-level EW-related intelligence requirements and forwards requests that require national-level assets to the defense collection coordination center or other national-level organizations according to established procedures. The intelligence directorate of a joint staff (J-2) [at the subordinate joint force level] normally assigns one or more members of the staff to act as a liaison

between the J-2 section and the IO cell where EW planners are normally assigned.

Service Organization for Electronic Warfare

Each Service has a different approach to organizing its forces.

Army

The Army is organized to work in the structure of an electronic warfare working group with the foundation of the group centered on the EWO, the EW technician, and the EW specialist, who comprise the electronic warfare coordination cell (EWCC).

Marines

Marine EW assets are integral to the Marine air-ground task force (MAGTF). The MAGTF command element task organizes and coordinates EW systems to meet MAGTF EW needs and ultimately achieve the JFC's objectives.

Navy

Navy EW is executed by surface ships, aircraft, and submarines organized in strike groups. For each strike group, the IO warfare commander is responsible for coordinating and integrating EW, typically through the strike group EWO, into naval and joint operations.

Air Force

Within the Air Force component, dedicated EW support assets conduct a variety of EA, EP, and ES operations and support suppression of enemy air defenses (SEAD) and IO mission areas. These are all under the operational control of the commander, Air Force forces.

Planning Joint Electronic Warfare

Joint electronic warfare is centrally planned and directed and decentrally executed.

EW is a complex mission area that should be fully integrated with other aspects of joint operations in order to achieve its full potential. Such integration requires careful planning. EW planners must coordinate their planned activities with other aspects of military operations that use the EMS, as well as third party users that EW does not wish to disrupt.

Electronic Warfare Planning Considerations

Some of the considerations for planning EW in support of military operations include EMS management, EW support of SEAD, EW support against a nontraditional threat, EW reprogramming, electronic masking, interoperability, rules of engagement (ROE), unintended consequences, meteorological and oceanographic considerations, and chemical, biological, radiological, and nuclear considerations. Since EW activity may create effects within and throughout the entire EMS, joint EW planners

must closely coordinate their efforts with those members of the joint staff who are concerned with managing military EMS use. EW activities frequently involve a unique set of complex issues. There are Department of Defense directives and instructions, laws, rules, law of armed conflict, and theater ROE that may affect EW activities. Commanders should seek legal review during all levels of EW planning and execution, to include development of theater ROE.

*Joint Electronic Warfare
Planning Process*

In order to be fully integrated into other aspects of a planned operation, the EWC conducts joint EW planning beginning as early as possible and coordinates it with other aspects of the plan throughout the joint operation planning process. Proper EW planning requires understanding of the joint planning and decision-making processes; nature of time constrained operations; potential contributions of EW; and employment of joint EW. During execution, EW planners must monitor the plan's progress and be prepared to make modifications to the plan as the dynamics of the operation evolve.

*Electronic Warfare
Planning Guidance*

Planning guidance for EW is included as tab D (EW) to appendix 3 (Information Operations) to annex C (Operations) of the OPLAN. EW plans should identify the desired EM profile; identify EW missions and tasks to Service or functional component commanders; evaluate adversary threats; and reflect the guidance, policies, and EW employment authorities.

*Electronic Warfare
Planning Aids*

There are a number of automated planning tools available to help joint EW planners carry out their responsibilities. These tools can be divided into three broad categories: databases, planning process aids, and spatial and propagation modeling tools. **Databases** can assist EW planners by providing easy access to a wide variety of platform-specific technical data used in assessing the EW threat and planning appropriate friendly responses to that threat. **Planning process aids** include aids that automate OPLAN development and automated frequency management tools. Geographic information systems [**spatial and propagation modeling tools**] enable analysis and display of geographically referenced information.

Coordinating Joint Electronic Warfare

Once a plan has been approved and an operation has commenced, the preponderance of electronic warfare staff effort shifts to electromagnetic battle management.

EMBM includes continuous monitoring of the EMOE, EMS management, and the dynamic reallocation of EW assets based on emerging operational issues. Normally, this monitoring is performed by personnel on watch in the joint operations center (JOC).

Joint Electronic Warfare Coordination and Control

At combatant commands and subordinate unified commands, the J-3 is primarily responsible for the EW coordination function. The EW division of the J-3 staff should engage in the full range of EW functions to include deliberate planning; day-to-day planning and monitoring of routine theater EW activities in conjunction with the combatant command's theater campaign plan; and crisis action planning in preparation for EW as part of emergent joint operations. Since EW is concerned with **attacking personnel, facilities, or equipment (EA); protecting capabilities and EMS access (EP); and monitoring, exploiting, and targeting use of the EMS (ES)**, EW staff personnel have a role in the **dynamic management** of the EMS, via tools and processes, during operations. A **comprehensive and well-thought-out joint restricted frequency list and emission control plan** are two significant tools that **permit flexibility of EW actions** during an operation without compromising friendly EMS use. The **electronic warfare control authority**, the senior EA authority in the operational area, develops guidance for performing EA on behalf of the JFC.

Service Component Coordination Procedures

Components requiring electronic warfare support from another component should be encouraged to directly coordinate that support when possible.

When the JFC has chosen to conduct operations through functional components, the functional component commanders will determine how their components are organized and what procedures are used. EW planners should coordinate with the functional component electronic warfare elements to determine how they are organized and what procedures are being used by functional component forces.

<i>Army</i>	The Army Service component command or Army component operations staff office (Army division or higher staff) plans, coordinates, and integrates EW requirements in support of the JFC's objectives.
<i>Marines</i>	The MAGTF headquarters EWCC, if established, or the MAGTF EWO, if there is no EWCC, is responsible for coordination of the joint aspects of MAGTF EW requirements.
<i>Navy</i>	The Navy operations directorate is responsible for all Navy EW efforts and provides coordination and tasking to task forces assigned.
<i>Air Force</i>	Air Force requirements for other component EW support are established through close coordination between the JFC's EWC and the commander, Air Force forces' operations directorate (or equivalent operations directorate) or plans directorate (or equivalent plans directorate), in coordination with the Director for Intelligence, A-2.
<i>Special Operations Forces</i>	Requirements from special operations units for EW support will be transmitted to the joint force special operations component command JOC for coordination with the joint force special operations component command IO cell.
<i>United States Coast Guard</i>	During both peacetime and war, joint operations may include United States Coast Guard (USCG) assets that possess EW capabilities. Coordination with USCG assets should be through assigned USCG liaison personnel or operational procedures specified in the OPLAN or operation order.
<i>Electronic Warfare and Intelligence, Surveillance, and Reconnaissance Coordination</i>	It is vital that all prudent measures are taken to ensure EMS activities are closely and continuously deconflicted with ES and intelligence collection activities. The J-2 must ensure that EW collection priorities and ES sensors are integrated into a complete intelligence collection plan .
<i>Electronic Warfare and Interagency Coordination</i>	Although there may not be intentional targeting of the EMS, inadvertent and unintentional interference may wreak havoc on the systems being used to support the execution of interagency operations. As such, constant and detailed coordination is essential between EW activities and relevant interagency organizations.

Multinational Aspects of Electronic Warfare

As in joint operations, electronic warfare is an integral part of multinational operations.

US planners should integrate US and partner nations' EW capabilities into an overall EW plan, provide partner nations with information concerning US EW capabilities, and provide EW support to partner nations. The planning of multinational force (MNF) EW is made more difficult because of security issues, different cryptographic equipment, differences in the level of training of involved forces, and language barriers.

Multinational Force Electronic Warfare Organization and Command and Control

The multinational force commander (MNFC) **provides guidance for planning and conducting EW operations to the MNF** through the operations directorate's combined EWCC.

Multinational Electronic Warfare Coordination Cell with Allies and Other Friendly Forces

The MNFC should include EWOs from supporting MNFs within the EWCC. Should this not be practical for security reasons or availability, the MNFC should, based on the mission, be prepared to provide EW support and the appropriate liaison officers to the multinational units.

Electronic Warfare Mutual Support

Exchange of SIGINT information in support of EW operations should be conducted in accordance with standard NATO, American, British, Canadian, Australian Armies Program, and Air and Space Interoperability Council procedures, as appropriate. **Exchange of EOB** in peacetime is normally achieved under bilateral agreement. **Reprogramming** of EW equipment is a national responsibility. However, the EWCC chief should be aware of reprogramming efforts being conducted within the MNF.

Releasability of Electronic Warfare Information to Multinational Forces

A clear, easily understood policy on the disclosure of EW information requested by multinational partners should be developed by the commander's foreign disclosure officer as early as possible.

CONCLUSION

This publication provides joint doctrine for the planning, execution, and assessment of electronic warfare across the range of military operations.

