U.S. ARMY

Multi-Domain Operations Range Guide
For Company Grade through Field Grade Leaders

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1. Forward:

Multi-Domain Operational (MDO) lessons learned from recent conflicts demonstrate innovation in amassing capabilities where quantity has a quality all its own. Low density, high demand, expensive, and exquisite systems, once identified, are quickly removed off the battlefield at a scale and pace exceeding the other's ability to rapidly reconstitute. During the Army's last two decades of combat, it was practically alone in the electromagnetic spectrum (EMS); and yet units still experienced EMS fratricide – jamming themselves. Today, the EMS is congested, contested, and complex affecting a commander's scheme of maneuver to command and control. Intelligence, signal, space, and electromagnetic warfare (EW) must be integrated into the fires chain and the protection warfighting function (WfF). Commanders must be able to see themselves to control their emissions and defeat the enemy's ability to sense, identify, locate, and target them. This is critically important when observations from current conflicts around the world show there are eight minutes from identification in the EMS to artillery impacting on the detected location of said emission. The Army's ability to counter these innovative and emergent threats not only requires cutting-edge, modular, integrated equipment supported by an agile Intelligence and EW software reprogramming enterprise, but an overarching training strategy that informs all WfF. Commanders will now have an EMS enabled ability to find (adversary Electromagnetic Support (ES)), fix (adversary Electromagnetic Attack (EA)), and finish adversary with lethal fires.

Quarterly Combat Training Center (CTC) observations regularly identify that EW and Signals Intelligence (SIGINT) formations are not integrated in the Brigade Combat Team (BCT) scheme of maneuver during rotations. This is primarily due to a lack of understanding of how to incorporate these enablers into individual and collective training at home station. BCTs traditionally either have an organic capability or tasked EW and SIGINT PLT from an EMIB to support their rotation. If these formations are not a part of the BCT's train up at home station, they will not be incorporated correctly during the CTC rotation. Military Intelligence Training Strategy (MITS) and Cyber Electromagnetic Warfare Training Standards (CEWTS) provide the framework for Military Intelligence and EW capabilities to certify. The final tier of this training strategy is integration at the BCT level.

The U.S. Army Intelligence Center of Excellence (USAICoE) and Cyber Center of Excellence (CCoE) developed the MDO Range Guide to inform and enable the training of Soldiers, crews, units, and commanders at home station in intelligence and electromagnetic warfare (I&EW) specific tasks. It draws from the MITS, CEWTS, Training Circular 25-8: Army Ranges, and other authoritative documents. The guide identifies the resources, training aids, key enablers, approvals, and local authorities necessary to plan, direct, execute, and evaluate units performing specific missions, development of training objectives through specification of minimum standards of performance, and in assessing MDO training needs. In support of the Army's campaign of learning, it stands as a living document and takes a building block approach, categorizing missions into different levels reflecting different degrees of combat readiness. For each mission, an evaluation training outline describes the concept of

operation, general conditions under which the mission is performed, the training and evaluation standards by which performance of the mission is measured, performance-oriented training objectives, and support requirements such as targets, training aids, spectrum, air space, threat emulators, and maneuver areas to conduct training or evaluation relative to the mission-related intelligence and EMSO tasks. The guide offers several uses cases for Soldier and units to reference, as well as outlines the roles, duties, staff coordination, and approval timelines required to execute successful training.

2. Overview

Effective live training, carried out to a high doctrinal standard, is the cornerstone of readiness and operational success. The Army's authoritative source for ranges, TC 25-8, states:

"Live fire training instills confidence in combat weapons systems through immediate, realistic feedback. Ballistic confidence is readily observable. Dominating the full spectrum – as important as seizing and holding terrain – demands a cognitive confidence that is not readily observable. It must be built. Multi-Domain Operations Live Fire refines the framework for scaled, realistic, combined arms maneuver in a Live Training Environment which best represents and replicates operational conditions that Commanders, units, and warfighters can expect to face in combat within complex, contested, and congested environments across multiple domains at home station. This must include air, ground, space, EMS, and cyberspace to employ cross-domain lethal and non-lethal fires, build cohesion of Warfighting Functions (WfF), and deliver a convergence of capabilities to achieve desired effects."

Therefore, unit training must account for the EMS, which serves as a maneuver space essential for facilitating control within the Operational Environment (OE) and impacts all portions of the OE and military operations. Military training and operations are executed in an environment complicated by increasingly challenging demands and constraints on the EMS. Just as in the physical domains and in cyberspace, military forces maneuver and conduct operations within the EMS to achieve tactical, operational, and strategic advantage. Freedom of maneuver and action within the EMS are essential to U.S. and multinational operations. The training of critical tasks that individual, crew, platoon, and companies must accomplish to be combat ready is directly related to the availability and capability of live-fire ranges and maneuver areas. Live-fire ranges and facilities are key to the development of war time skills. Electromagnetic Spectrum Operations (EMSO) ranges will be even more important for units in the future as they must be able to be deployed and operational within ninety-six hours in a combat zone.

3. Guide, Purpose, and Scope

a. This guide is a living document meant to inform/assist the Army in two activities:

(1) Provide Company Grade leaders, at the Battalion and below, with a succinct "How To" guide, list of resources and enablers, and recommendations for coordinating and leveraging such resources to plan and conduct training on a MDO range. Sections 6 and 7 of this guide are specifically designed for this purpose.

(2) Enable Field Grade leaders, at Brigade through Corps, with recommendations on resources and methodologies to plan and conduct MDO range training, especially Virtually and Constructively. Section 8 of this guide is customized to achieve this.

b. This guide does not enable all domains to be trained, rather it provides Soldiers and units with the tools, techniques, templates, and ability to incorporate more than they currently can with an emphasis on Intelligence, Signals Intelligence (SIGINT), Electromagnetic Warfare (EW), and Countering Adversary EW.

c. This guide is applicable to all Army Posts, Camps, Stations, with an emphasis on Forces Command (FORSCOM) units stationed in the Continental United States (CONUS). The Army will focus on integration of the Land and Cyberspace domains, while enabling the integration and synchronization of Space, Air, and Maritime domains. EMSO throughout all the domains is an additional key training aspect.

d. Science vs. Art

(1) Army TC 25-8 Appendix K details the importance of integrating MDO across the force, including detailed descriptions on fielded systems and equipment utilized in MDO operations. This overarching doctrine sets the stage for the importance of the realistic, detailed training required to prepare our Army for future conflict.

(2) This MDO Range Guide is an important tool, assisting commanders in visualizing and developing MDO training, regardless of their branch or mission. Additionally, it provides leaders and staff with a blueprint to further refine training objectives designed to enhance the readiness of the unit. The MDO Range guide enables commanders to increase creativity in their training plan and boost their ability to conduct realistic MDO training to best prepare a unit to meet mission objectives.

e. An effective MDO Range will enable Soldiers, units, and commanders to operate in a challenging environment where communications are denied, mobile communication devices are targeted, and unit Global Positioning System (GPS), if still operational, may provide inaccurate information and location. MDO Range training will provide realistic training to understand the EMS effect on friendly operations and the necessity to identify threat intelligence, surveillance, and reconnaissance (ISR) and Electromagnetic Interference (EMI) capabilities, so that units can establish effective emissions control (EMCON) procedures to continue operations in a contested environment.

4. Organizations and Facilities to Support Training

At home station locations, there are a myriad of training resources and enablers that Soldier and units must coordinate and leverage for I&EW training.

a. Mission Training Complex

The team at the Mission Training Complex (MTC) will assess your training goals and broader requirements for military training. They will help with scheduling and planning, including the creation of scenarios and the coordination of various training exercises across different levels. Tailoring their recommendations to align with your specific objectives and intentions, they will suggest a combination of simulation, stimulation, gaming, and virtual training tools, along with a structured plan for advancing and refining your training over time.

b. Foundry (Intelligence Warfighting Function Foundry Operated by INSCOM)

Foundry supports the sustainability and lethality of Army formations through national to tactical database access and Intelligence Community (IC) credentials which ensures Tier 2 and Tier 1 validated MI Soldiers meet ASCC training and theater pre-deployment requirements. The Program enables a Commander's certification of the Intelligence Warfighting Function through the Military Intelligence Training Standards (MITS), in support of LSCO and MDO Readiness Standards under REARMM to assist in achieving Army readiness. Foundry supports Culminating Training Events (CTE) such as WFX events and MCTC rotations, as well as Army modernization (Joint Warfighter Assessments (JWAs), Project Convergence, and the Fort Huachuca MDO Range support. The program supports transformation in contact, given the direct and incidental support provided to ACOMs/ASCCs/DRUs and to the Training Support System (TSS). Foundry supports training on MDO requirements such as support to target detection (35S Soldiers), support to target development (35G Soldiers), and support to ISR, combat assessment, analytic tradecraft, data analytics, and interoperability (35F Soldiers). Foundry trains Soldiers against emerging or growing requirements such as the CUAS threat set, intelligence support to space, intelligence support to Cyber, and intelligence support to non-lethal targeting. Expertise in Foundry sets conditions for the delivery of modernized intelligence systems at home station and the need for national to tactical system integration. Foundry delivers Intelligence Community (IC) capabilities to the tactical and operational force. Foundry, as used in this guide, is the current (3rd Quarter, Fiscal Year 2024) construct controlled and operated by INSCOM.

c. Range Operations

Range Operations oversees the secure and effective utilization of training lands and ranges by various entities including tenant activities, the Army Reserve and National Guard, other branches of the military, and Government agencies. It establishes maintenance schedules for range, target, and maneuver lands to guarantee their safe, efficient, and sustainable usage. Additionally, Range Operations manages and

coordinates training facilities, controls access and egress, and ensures compliance with range safety requirements and procedures.

d. Training Support Center

The Training Support Center (TSC) offers comprehensive services, serving as a one-stop destination for a diverse range of Training Aids, Devices, Simulators, and Simulations (TADSS) along with other pertinent training facilitators. These training facilitators include resources like IEWTPT, other Army Programs of Record (PORs), and commercial off the shelf (COTS) equipment for consideration. These resources are essential for commanders to achieve training objectives, meet standards, and execute successful operations in a constantly evolving spectrum of conflicts. Catering to Active Duty, Reserve Components, National Guard, ROTC, and other authorized entities, including U.S. Government and civilian organizations, the TSC extends its one-stop training support services within the geographical boundaries outlined in AR 350-52.

5. Airfield and Airspace Managers

a. Air is a critical domain to integrate into MDO training. This section describes procedures to request the use of aerial assets including ground, spectrum, and air (both manned and unmanned aircraft systems) in support of MDO training at the company and battalion level.

b. All airspace is designated by the Federal Aviation Administration (FAA) and controlled by an Air Route Traffic Control Center (ARTCC).

c. All airspace activities are scheduled and approved through the Air Traffic and Airspace (AT&A) Officer, and where necessary, in coordination with ARTCC. When a request is received from an organization, the request will be deconflicted by the AT&A Officer with range operations or the Airfield Manager, whomever is responsible for controlling the local airspace.

d. Identify all aerial assets and their role in the operation. Both Manned and Unmanned Aircraft operations are coordinated thru the Airspace Manager for access to airspace and the Airfield Manager/Commander for access to the airfield and its ground support. Some airspace requests will require Federal Aviation Administration approval.

e. Coordination for aviation fuel is provided by Logistics Readiness Center (LRC). Airfield Base Ops can assist with coordination.

f. Voice communication equipment, not provided with the aerial asset/system and frequencies are provided by the Land Mobile Radio (LMR) manager. Alternate communication methods for airspace deconfliction can be accomplished through standard UHF/VHF/FM capable radios.

g. Develop a Concept of Operations (CONOPS) for all aircraft. A CONOP identifies the desired end state for individual, crew, and unit level collective tasks in order to define the external support required, including all communications networks, mesh systems, air and ground systems, denied environment systems. It explains how the systems connect and enable the training, as well as how the unit and commander will measure the success of the training.

h. Use of Unmanned Aircraft Systems (UAS) within the geographical confines of any DOD installation, requires the system be owned by or under contract with the DoD or be on the DoD Blue List, for "cleared UAS on DoD installations". https://www.diu.mil/blue-uas-cleared-list. See additional attached UAS references.

i. For UAS operations, it is incumbent upon the Soldiers and unit to schedule time to meet with their local Spectrum Manager (SM), at the local Post, Camp, Station, Range, or Training Area that provides frequency and spectrum oversight and management for the designated training range and area. The SM uses multiple databases, the National Telecommunications and Information Administration (NTIA) Guidance for Channel & Allotment Plans, and FCC & FAA Concurrences to identify frequencies available at Service Members location. SM can also assist with any Electronic Attack Request for 'jammers' participating in your exercise.

j. Approval and scheduling of an airspace complex doesn't imply exclusive use of the airspace. Other activities under joint-use positive control of ATC may be permitted to transit through parts of the airspace free of hazards or conflicting operations, following the guidelines of Federal Aviation Regulation part 73 and FAA ATC Order 7110.65. Exclusive use of these areas is only authorized in emergencies, for safety reasons, or when the user's operation is incompatible with other airspace users.

6. Spectrum

a. For live, open air I&EW training, spectrum is a critical enabler that can determine the success and failure of a unit training event. The CONUS spectrum is heavily congested (for additional information see Appendix E – US Frequency Allocations Chart). This section describes procedures to request Spectrum and EA support for MDO training at home station. It is important for units to integrate the SM into unit planning early.

b. In planning and preparation for a training event, Soldier and units will identify all over-the-air emitters to include radios for communication, C2-UAS (UL & DL), threat emitters, simulators, sensor backhaul systems, EA devices, radars, mesh networks etc. This includes nomenclature, make, and model, as well as any certifications documents from Military Command, Control, Communications, and Computers Executive Board (MC4EB) the unit has for the equipment, DD1494 (Application for Spectrum Support), and Joint Frequency-12 (J/F-12) Number. The Spectrum Certification System database is the central archive repository for all DoD Spectrum certification system data, including information from the J/F-12 Application for Equipment Frequency Allocation.

c. Develop CONOPS for all over-the-air emitters and identify the desired training end state for individual, crew, and unit level collective task within the EMS environment. The CONOP is the unit's ability to identify all communications nodes and networks, mesh systems, air and ground systems, denied environment systems, and explain how the systems and scenario connect and tie together.

d. Arrange and allocate time to meet with your local SM responsible for overseeing and managing Spectrum operations within your area of operations, whether it's a Post, Camp, Station, Range, or Training Area. The SM will be able to tell you what frequencies are available for your equipment identified in your CONOP. The SM uses multiple databases to include: The National Telecommunications and Information Administration (NTIA) Guidance for Channel & Allotment Plans, and FCC & FAA Concurrences, to identify frequencies available for your equipment at your location. The SM can also assist with any EA Request for "jammers" participating in your exercise.

Pro Tip: Begin planning, coordination, and deconfliction early, as Lead times on Spectrum (frequency) Request or EA Request can be upwards of 120 days.

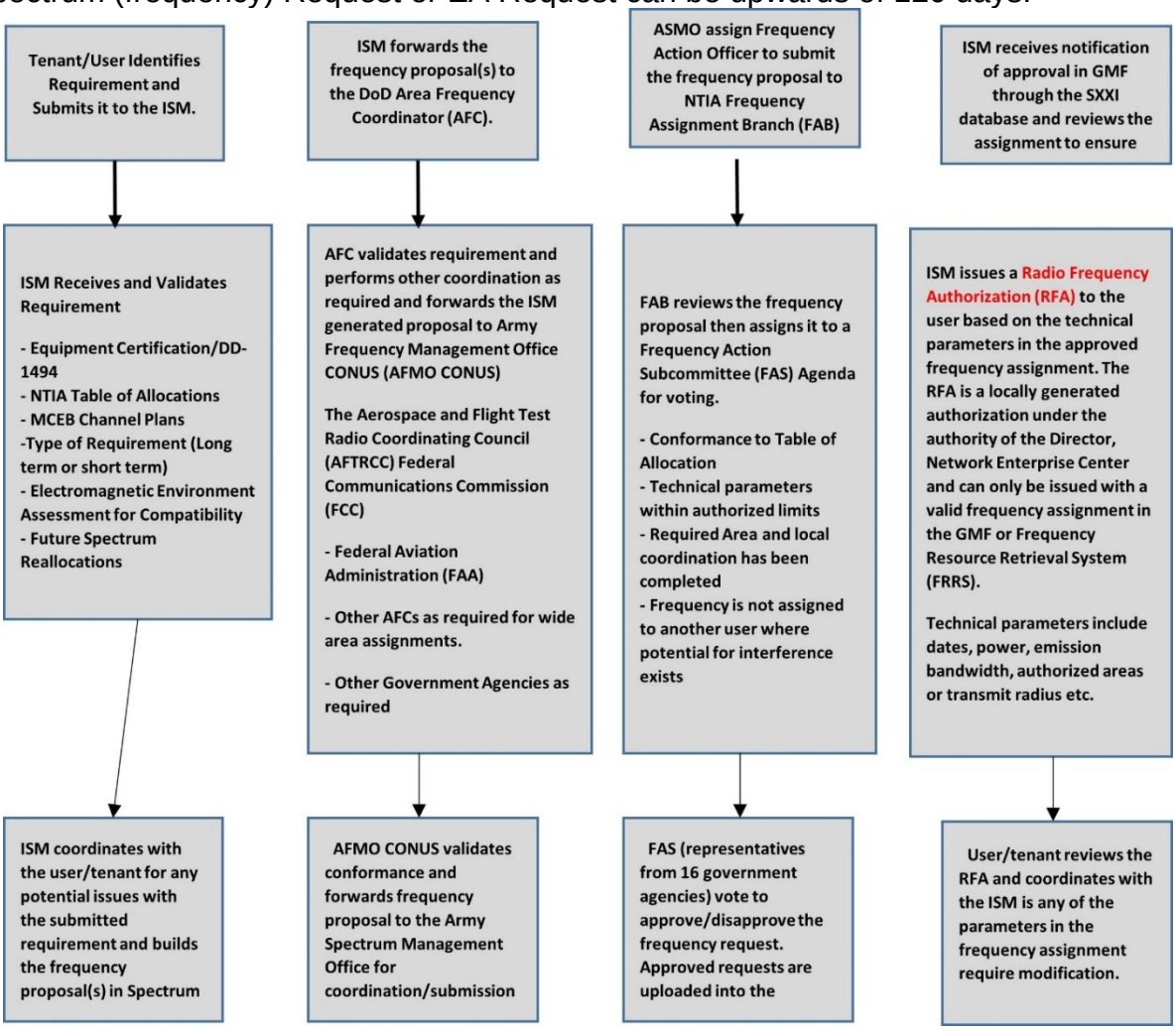


Figure 1. Frequency Assignment Lifecycle.

7. Directed Energy Training Requirements

Any firing of a weapon, or laser/directed energy from a terrestrial or aerial platform within the confines of an installation range complex, will require prior notification be given to the DPTMS to assist the firing unit with creation of surface danger zones or safety measures required for the event. All firing, or directed energy, events must be scheduled in RFMSS in accordance with DA Pam 385-63. All aerial/terrestrial laser/directed energy operations should be covered in a separate, installation specific laser/directed energy SOP.

8. System and Equipment to Support Multidomain Operations Training

a. Project Manager Cyber Test and Training (PM CT2) and Threat Systems Management Office (TSMO) Multi-Domain Operations Environment

(1) What: The MDO-E Federated System of Systems, managed by the Program Executive Office Simulation, Training and Instrumentation (PEO STRI), offers an integrated L, V, C environment. This includes the Expeditionary Live-Virtual-Constructive Command and Control (XLCC) Common Operating System (COS) with Exercise Control (EXCON), the Threat Battle Command Force (TBCF) with live threat C3 capabilities, and the Intelligence and Electronic Warfare Tactical Proficiency Trainer (IEWTPT). These components provide simulated multi-intelligence BLUFOR and OPFOR critical tasking, generating a synthetic electromagnetic environment. Most if not all, home station Foundry sites have IEWTPT, Intelligence Low Overhead Driver (I-LOD), and (MAST). XLCC and TBCF are STRI assets out of Huntsville, Alabama. Most MTCs have IEWTPT and the Warfighter Intelligence Module (WIM). These systems are largely used at the CTCs and for developmental and operational tests across the Army. XLCC and TBCF can be leveraged through the TSMO, but CTCs and tests take priority over unit exercises and TSMO support could quickly become expensive for a unit.

(2) Why: Integrating IEWTPT into training allows for a more robust threat scenario since there is no way to feasibly replicate all the threat emissions in a real-world environment. IEWTPT can push data to GEOINT and All-Source Soldiers, as well. Further, including TBCF and XLCC creates an easily synchronized/commanded and controlled scenario and provides a way to battle-track friendly and enemy emissions, live or virtual, in real-time.

(3) Timelines and Requirements: Requires up to 90-day lead time.

(4) Who can assist: Individual – Joint Exercises: L, V, C: Battalion-Corps. Can also submit engagement request on PEO STRI Webpage. https://www.peostri.army.mil/Forms/IndustryPartnerEngagementRequestForm

b. Expeditionary Live-Virtual-Constructive Command and Control (XLCC)

(1) What: XLCC serves as the central command and control (C2) platform, integrating various tools to combine live, virtual, and constructive elements for realistic and immersive testing and training events. It acts as the COP, facilitating monitoring and control. XLCC includes an LVC-EW component to link with TBCF, IEWTPT, and the Electronic Warfare Planning and Management Tool (EWPMT). This setup reduces FORSCOM requirements by simulating division enablers and improves training by integrating early with ongoing modernization efforts.

During live training, XLCC's Tactical Engagement Simulation System (TESS) EXCON generates lifelike battlefield effects by integrating training capabilities such as MILES, HITS, and STE, along with threat emitters and combat simulations. It offers both constructive and virtual overlays, enabling live forces to request and respond to fires using ExCIS or by simulating casualty effects with One Semi-Automated Forces (OneSAF). Additionally, XLCC features real-time data collection, device monitoring, control, and data sampling capabilities. It also provides tactical scenario playback during and after events, facilitating rapid after-action review reports.

(2) Where: XLCC is an expeditionary server stack that can be deployed or used at a fixed location. Current fixed locations are Fort Cavazos and Fort Huachuca.

(3) Why: To enable comprehensive interactions across the Multi-Domain Operations (MDO) spectrum, the system facilitates seamless integration of live, virtual, and constructive elements. This permits virtual entities like Digital Twins to engage with live systems within a battlefield environment. This capability extends to real-time casualty assessment across various system types.

(4) Timelines and Requirements: Up to a 90-lead time (installation dependent) to allow for scenario planning and integration efforts.

(5) Who: Product Manager (PdM) Instrumentation Management Office (IMO), Project Manager Cyber, Tet, and Training (PM CT2) / PEO STRI

c. Intelligence and Electronic Warfare Tactical Proficiency Trainer

(1) What: IEWTPT is the U.S. Army’s Program of Record (POR) for training and simulating the Land, Space, Cyber EW, and Air domains as well as the information and human dimensions. IEWTPT provides a realistic simulated mission environment at all echelons, allowing for accurate replication of land power. IEWTPT operates in a low-overhead configuration and can receive scenario data from more extensive constructive simulations, including Joint Land Component Constructive Training Capability (JLCCTC) and future Next Generation Constructive (NGC) capabilities. IEWTPT provides simulation of the enemy, terrain, weather, civil considerations, and other significant aspects critical to the operational environment that will ultimately impact the maneuver commander’s operation.

(2) IEWTPT provides the Maneuver Commander with the ability to train and employ Electronic Attack (EA), Electronic Support (ES), and Electronic Protection (EP) through the disclosure of EMS signatures within a live and constructive environment. Appropriate EMS employment will impact a training audience's ability to defend and react to non-lethal effects. Signal/EW message traffic received from IEWTPT & EWPMT can be utilized ISO EA if the information is adjudicated and processed promptly with the assistance of EXCON. From the lessons learned, the lack of EMS discipline has resulted in the organization's compromise of multiple CPs as units grapple with best practices supporting C2 Fix and C2 Next. Maneuver Commanders must request the employment of IEWTPT and EWPMT in order to stress MDO effects on Joint and Army capabilities across echelons.

Reference: https://www.peostri.army.mil/intelligence-electronic-warfare-tactical-proficiency-trainer-iewtpt

(2) Why: Military Intelligence units need a means to simulate an opposing force on their ground stations and provide the soldiers operating the Intelligence and Electronic Warfare (IEW) systems a realistic picture of the battlefield. Using this realistic picture, soldiers can conduct analysis, write and file reports, change tasking of the sensor vehicle and do any of the tasks that could be done on the IEW system receiving real-world data. When integrated into a large-scale exercise driven by a constructive simulation, the MI soldier provides man-in-the-loop analysis to the intelligence battle staff, which in turn will result in increased realism for the training audience. Training in a realistic fight requires representation of a volume and realism not achievable using solely live assets. IEWTPT models sensors and intelligence processes from the tactical to strategic levels to drive operations. IEWTPT fills critical intelligence warfighter training gaps at home stations for Human Intelligence, Signals Intelligence, Geospatial Intelligence, Electronic Warfare, and All Source Intelligence. It directly supports individual, crew and collective training in support of mission command and unified land operations. Additionally, IEWTPT allows simulated electronic attacks, which enhances operational security while training, and avoids lengthy approval processes.

Systems supported by IEWTPT:

- Electronic Warfare Planning and Management Tool (EWPMT);
- Joint Land Component Constructive Training Capability (JLCCTC);
- Distributed Common Ground System – Army (DCGS-A);Prophet;
- Enhanced Medium-Altitude Reconnaissance & Surveillance System (EMARSS);
- Airborne Reconnaissance Low (ARL);
- Intelligence and Security Command (INSCOM) Foundry;
- Tactical Ground Station (TGS)

(3) Timelines and Requirements: Lead time depends on the size of the scenario and if it has been built for prior exercises. Recommend 90-365 days depending on the size and complexity of the scenario.

(4) Who: Down to company echelon

(5) POC: Range simulation center personnel located at your local MTC or Foundry (dependent on which is resident at your home station).

d. Electronic Warfare Planning and Management Tool

(1) What: The EWPMT serves as the commander's tool for controlling, managing, and visualizing EW/EMS effects to assert dominance within the EMS. It is utilized by the Commander, Electronic Warfare Officers, and Electromagnetic Spectrum Managers to plan, coordinate, integrate, and synchronize cyber electromagnetic activities. EWPMT empowers EW Subject Matter Experts (SMEs) to remotely control and manage EW assets during offensive and defensive electromagnetic attack (OEA/DEA) operations, as well as EW and spectrum management operations (SMO) across intelligence, operations (Movement and Maneuver), and Signals in support of MDO.

(2) Why: Conducting EW involves controlling and synchronizing sensors, jammers, and radio nets. Utilizing the modeling and simulation capabilities within EWPMT allows commanders to comprehend their EMS footprint and how the threat perceives them. This supports the brigade's Military Decision-Making Process, contributes to the successful engagement of high-payoff targets, provides effective tools for spectrum management, and enhances the brigade commander's and staff's situational awareness of the electromagnetic OE.

(3) Who: Down to battalion echelon

(4) Timelines and Requirements: Requires up to 90-day lead time to ensure local simulation center has the EWPMT software.

(5) POC: Range simulation center personnel and/or PdM EWI / PM EW&C / PEO IEW&S.

Pro Tip: EWPMT controls live assets, but also can control virtual & constructive assets when operated with IEWTPT.

e. Threat Battle Command Force (TBCF)

(1) What: TBCF integrates distributed C2 operations while upholding valid Threat Tactics, Techniques, and Procedures (TTP) during Test & Evaluation (T&E) and training events. TBCF, TSMO's unclassified, threat-validated system, furnishes command,

control, and communications (C3) capabilities for the OPFOR. TBCF is employed to facilitate Testing and Evaluation, Training missions, and CTC rotations.

(2) Why: TBCF is continually integrating with new threats. TBCF is integrated with threats that provide, but are not limited to, the following capabilities:

- Direction Finding (Line of Bearing, Angle of Arrival, Time Difference of Arrival)
- Jamming (including GPS Jammers and UAS Payload Jammers)
- Radar (Long Range, Short Range, various RF bands)
- Integrated Air Defense Systems (IADS)
- Fire Units (Foreign-sourced, Simulated, MILES enabled)
- Ground Sensors
- Cellular Networks

Who: TBCF systems are deployed as both fixed and mobile Tactical Operations Centers (TOCs):

- Fixed Deployments
- White Sands Missile Range (WSMR – NM)
- National Training Center (NTC – Ft. Irwin, CA)
- Joint Readiness Training Center (JRTC – Ft. Johnson, LA)
- Joint Multinational Readiness Center (JMRC – Hohenfels, Germany) (deployment pending)
- STRI Agile Acquisition Response (STAAR) laboratory (Ft. Cavazos, TX)
- Mobile Deployments
- Threat Higher Headquarters (THQ) (2)
- Platform – Sheltered HMMWV with 2 operator positions
- Purpose - Mobile TBCF
- Deployed – From WSMR
- Command Post Vehicles (CPV) (4)
- Platform – Sheltered HMMWV with 2 operator positions
- Purpose - Mobile TBCF
- Deployed - 3 from WSMR; 1 at NTC year round
- Tactical Network Extensions
- Integrated Network Extension Trailers (INET) (4)
- Platform – Trailer
- Purpose – Extend Tactical and Instrumentation Networks
- Deployed – From WSMR

(3) When: TBCF must be requested 90 days prior to event from PEO STRI CT2 TSMO Operations.

(4) User Interfaces.

(a) Threat (COP) – A real time, map based, visualization that provides situational awareness, instrumentation, command and control (C2), and After-Action Review (AAR) functionality for threats.

(b) Threat Interfaces – Threat specific displays and controls used to monitor and/or control threat activities.

(c) Data Collection – Display focused on supporting threat data recording and playback

(5) Communications

(a) RF Tactical Network – A targetable ("Red"), threat validated, mesh network with interference avoidance capability used to convey threat information between TBCF and integrated threats.

(b) RF Instrumentation Network – A non-targetable ("white") mesh network used to convey threat Health & Status information to TBCF for maintenance and range safety.

(c) Hard-wired Network – TBCF systems also support connections via Ethernet

(6) Software Development Kit

(a) Environment - A virtualized TBCF system used by threat providers to support their threat integration and test efforts.

(b) Documentation – Instructions that support threat providers in setting up and operating the virtual TBCF system.

(c) Sample Software – Working examples of threat services for major threat categories (e.g., RADAR, Jammer, Integrated Air Defense System, Ground Sensors, Camera).

(d) Data Format – Information is exchanged using Protocol Buffers – a language-neutral, platform-neutral, mechanism for serializing structured data.

9. Capabilities to Enabling MDO

a. This section is intended for Company Grade leaders at the Battalion level and below to facilitate EMSO MDO training in real-world conditions using established Army ranges. EMS is at the heart of modern military operations and is the essential link between the land, air, naval, space, and even cyber domains. At the base of all operational functions (remote sensing telecommunications, navigation, etc.), it also enables the delivery of offensive or defensive effects through EW.

b. Recent strategic and technological developments have increased the difficulty of operating in the EMS. Analysis of modern threats and operational lessons learned indicate the threat has developed on three levels:

(1) leading actors in the EMS field who would like to acquire total domination

(2) regional powers intent to increase their capacity to deny access;

(3) and non-state actors relying most often on dual-use technology.

e. EMS Defined:

The EMS is the range of all frequencies of electromagnetic radiation. The electromagnetic radiation consists of oscillating electric and magnetic fields characterized by frequency and wavelength. This radiation has fascinating properties: it can be visible or invisible, move at speeds approaching that of light, cross certain obstacles or, on the contrary, bounce off them (thus indicating their presence), transport energy or data (Refer to Figure 1 below “Electromagnetic Spectrum).

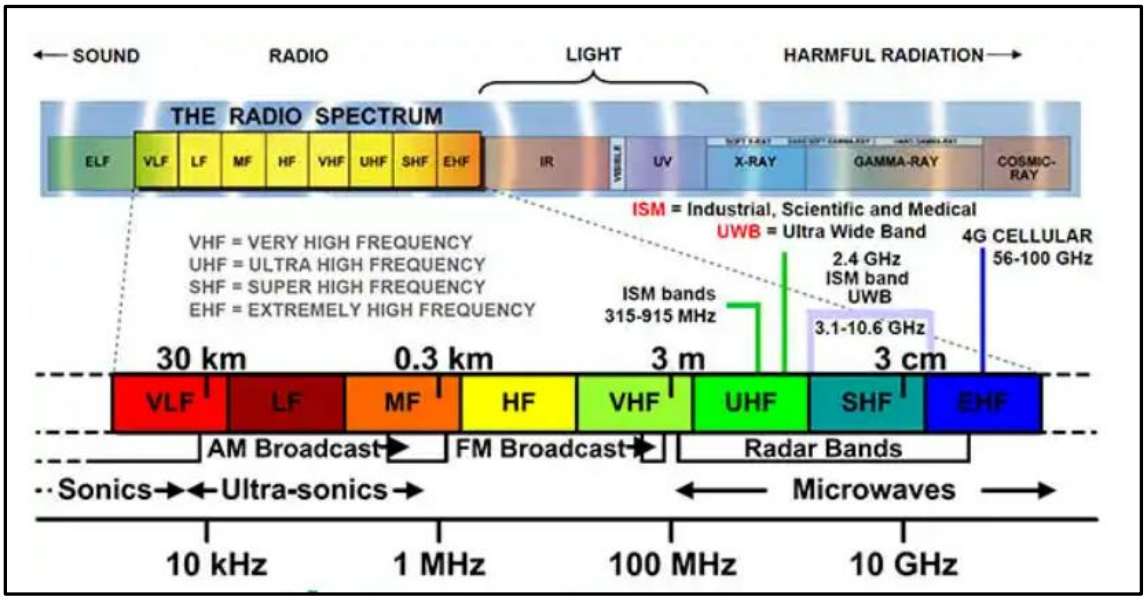


Figure 3 - Electromagnetic Spectrum

f. Today’s acute and pacing threats view EW as an essential tool for gaining and maintaining information superiority over its adversaries. Our adversaries employ world-class EW forces that support denial and deception operations and allow identification, interception, disruption, and, in combination with traditional fires, destruction of adversary command, control, communications, and intelligence capabilities.

(1) Near peers have fielded a wide range of ground-based EW systems to counter GPS, tactical communications, satellite communications, and radars. Additionally, their EW fuse with cyber operations enables their forces to corrupt and

disable computers and networked systems as well as disrupt use of the EMS. Our adversaries aspire to develop and field a full spectrum of EW capabilities to counter Western Command, Control, Communications, Computers Intelligence, Surveillance and Reconnaissance (C4ISR) and weapons guidance systems.

(2) Near peers utilize their Electromagnetic Attack (EA) capabilities from their National, Strategic, to their maneuver brigade level that can affect all EMS capabilities used by a friendly operational and tactical unit. Army Platoons, Companies, and Battalions should expect communications degradation and GPS intermittence, and integrate these conditions into training.

10. Consolidated MDO Timeline

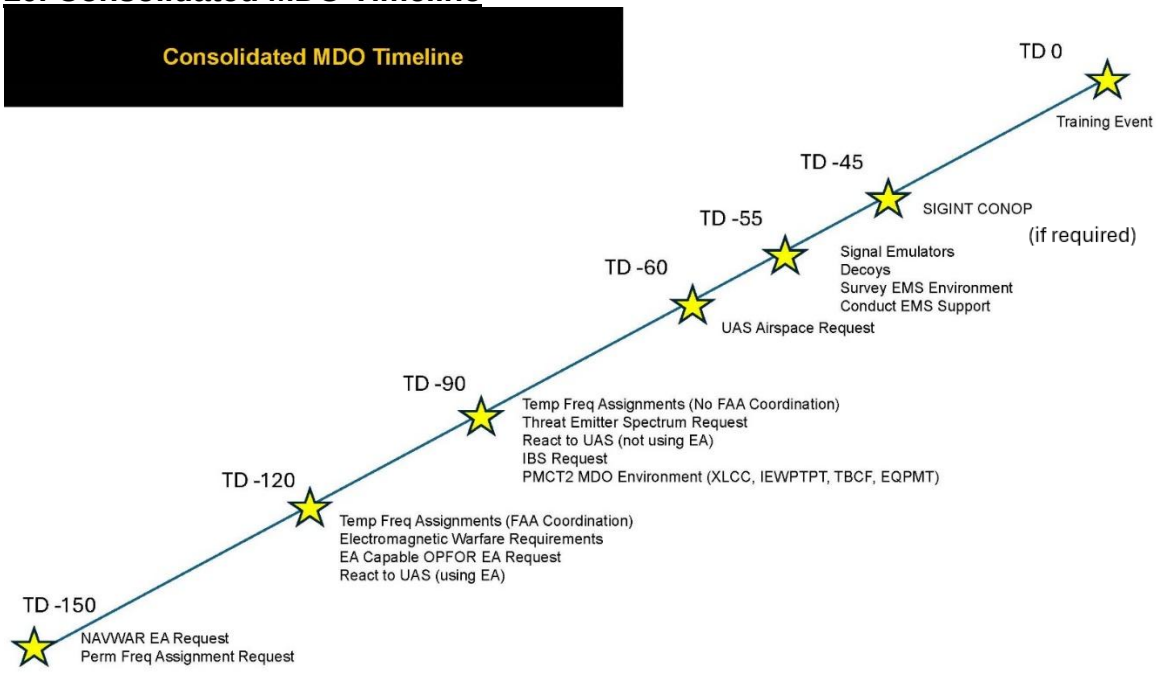


Figure 4. Consolidated MDO Timeline

11. MDO Collective Training Use Cases

(1) In MDO training, the application of use cases is paramount. The Military Intelligence Training Strategy (MITS) and Cyber Electromagnetic Warfare Training Strategy (CEWTS) both provide the standard on detailed use cases to ensure that training systems meet the diverse needs of military personnel from the Squad to Brigade level operations. These use cases encompass scenarios such as SIGINT Tactical Exercise, EW Team STX, Technical Control and Analysis Cells (TCAC) and Process Exploitation Dissemination (PED) Lane, MDO Targeting Lane, and Mounted and Dismounted SIGINT/EW Team STX. By delineating these interactions, use cases enable Soldiers to align training systems with the operational requirements and objectives of MITS and CEWTS, resulting in more effective and realistic training environments.

(2) EMS coordination must take place from 90 to 365 days in advance, depending on the installation, between the Installation Spectrum Manager and the Army Spectrum Management Office (ASMO) for EA clearance requests. Without prior EA clearance for designated ranges on each installation, there will not be enough time for units to received EA authorization. Units must frequently coordinate and maintain awareness of EA request approvals with the Installation Spectrum Manager prior to planning MDO range events.

a. Installation Spectrum Managers have the responsibility for managing the installation EA requests for all MDO ranges. Yearly approval process must begin 120 days from expiration to continue uninterrupted unit training execution.

b. Once the Installation Spectrum Manager has an approved EA request for their training ranges, then units can submit their individual training EMS/EA request based on the 8-step training model process for all training events.

a. SIGINT STX

(1) Description: SIGINT Collection Teams (SCT) provide SIGINT collection, exploitation, and limited analysis to generate actionable intelligence. They detect, track, and locate targets and provide SIGINT support to operations, utilizing organic VMAX systems, as well as BEAST+ and Kraken. SCTs will be evaluated IAW the Military Intelligence Training Strategy (TC 2-19.403 (Ch. 9)) Tier 3 tasks:

- 34-TM-0713 Perform a (SIGINT) Survey.
- 34-TM-0700 Perform Voice Communications Intercept or Radio Direction Finding (RDF) at a Collection Site.

(2) Crawl: The SCT will execute all Tier 3 tasks only using organic systems. EXCON will limit EMS emissions to 10-20 separate signals during the collection window. Develop/execute site-plan for best collection locations, conduct Pre-Combat Inspections (PCI) and tactical movement to hide sights, analyze Signals of Interest (SOI) list from Technical Control and Analysis Center (TCAC), and establish communications with TCAC and Battalion TOC. Once complete, analyze signal environment and report to TCAC via SPOT report (SPOTREP).

(3) Walk: SCT will execute tasks using all available systems. EXCON will limit EMS emissions to 30-40 separate signals during the collection window. Analyze signal environment and report to TCAC via SPOTREP, adjust hide sites based on guidance and RF environment, create running list of known enemy signals.

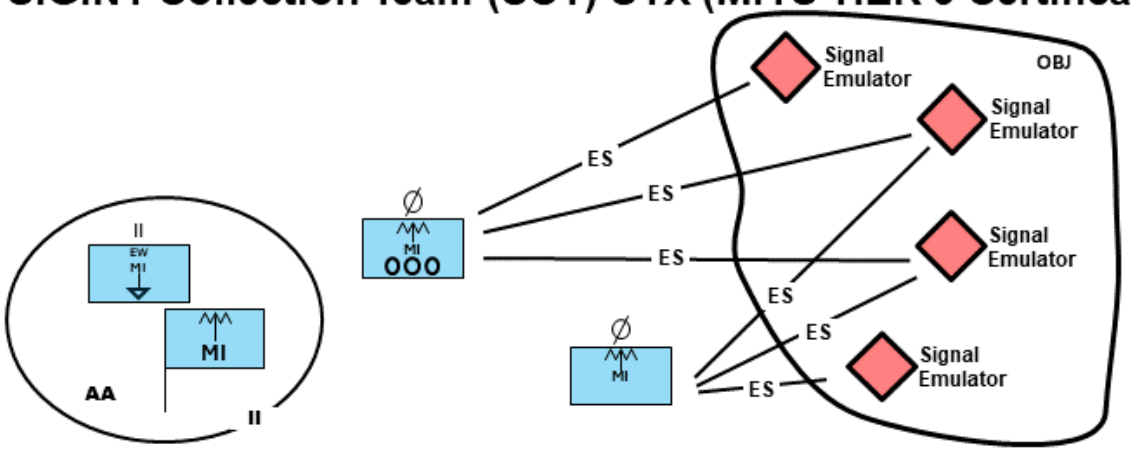
(4) Run: SCT will execute tasks using all available systems. EXCON will limit EMS emissions to 60-70 separate signals during the collection window. Teams will report to TCAC via SPOTREP and provide Battalion TOC awareness of jamming effects. EXCON will introduce more complex signal types.

(5) Night Considerations: Team(s) will execute the same crawl/walk/run progression during night cycles to include emphasis on noise and light discipline.

(6) Lane Support:

- Scenario Products (to include an EOB, HPTL), OC Handbook with Task List and GO/NO Criteria.
- Transportation Support Plan.
- Hide Site locations and Dig Request.

SIGINT Collection Team (SCT) STX (MITS TIER 3 Certification)



Training Day 1	Training Day 2	Training Day 3	Training Day 4	Training Day 5
•The SCT executes all Tier 3 tasks only using organic systems. •EXCON limits EMS emissions to 10-20 separate signals during collection window. •Develop/execute site-plan for best collection locations, •Conduct PCI and tactical movement to hide sights, •Analyze signals of interest (SOI) list from TCAC and establish communications with TCAC and BN TOC •Analyze signal environment and report to TCAC via SPOT report	•SCT executes tasks using all available systems. •EXCON limits EMS emissions to 30-40 separate signals during collection window. •Analyze signal environment and report to TCAC via SPOT report •Adjust hide sites based on guidance and RF environment •Create running list of known enemy signals	•All TD 2 events •EXCON limits EMS emissions to 60-70 separate signals during collection window. •Teams report to TCAC via SPOT report and provide BN TOC awareness of jamming effects •EXCON introduces more complex signal types	•All TD 3 events •Conducted during night cycles to emphasizing noise and light discipline.	•AAR •Redeployment

Tasks:
SIGINT collection teams (SCT) provide SIGINT collection, exploitation, and limited analysis to generate actionable intelligence. They detect, track, and locate targets and provide SIGINT support to operations, utilizing organic VMAX systems, as well as BEAST+ and Kraken.

Conditions:
Field environment STX lanes approximately 2-3 km in length to support both mounted and dismounted maneuver.

Standards:
SCTs will be evaluated IAW the Military Intelligence Training Strategy (TC 2-19.403 (Ch. 9)) Tier 3 tasks:
34-TM-0713 Perform a Signals Intelligence (SIGINT) Survey
34-TM-0700 Perform Voice Communications Intercept or Radio Direction Finding (RDF) at a Collection Site

Resources:
- Scenario Products (to include an electronic order of battle, HPTL), OC Handbook with Task List and GO/NO Criteria
- Threat Emitters
- Frequency Request
- SCONOP

Figure 5. SCT STX (MITS TIER 3 Certification)

b. Electromagnetic Warfare Team STX

(1) Description: An EW team, consisting of 2 PAX, equipped with the BEAST+ system will be located separate from the SIGINT Collection Team to triage and communicate critical combat information, targeting information, as well as provide EA capabilities without harming SIGINT receivers and ability to provide BDA feedback. The EW team will be validated on the following crew-level tasks IAW the FORSCOM Electronic Warfare Training Strategy (CEWTS – Tier 3):

- Tier 3B, Table II, Task 1: Conduct EW/CST Synchronization.
- Tier 3B, Table III, Task 2: Provide CST Support to EW Operations.
- Tier 3B, Table IV, Task 1: Assess and Refine EW Effects.
- Tier 3C, Table III, Task 2: Conduct Tactical EW Operations.
- Tier 3C, Table IV, Task 1: Conduct an Electromagnetic Operational Environment Assessment.
- Tier 3C, Tables V/VI, Task 1: Conduct EW in Support of Operations.

(2) Crawl: The EW team will execute all Tier 3 tasks only using organic systems. EW Team will identify emission locations for 3 signals of interest (SOI) by coordinating cuts/fixes during the collection window. Validated locations relevant to the scenario targeting plan will be relayed to the Ground Forces Commander (GFC).

(3) Walk: The EW team will execute all Tier 3 tasks using organic, joint, and national resources. EW Team will identify emission locations for 5 SOI and locate 1 jamming source by coordinating cuts/fixes. EW Team perform EA 3 times during the collection window to herd threat communication systems onto pre-planned frequencies.

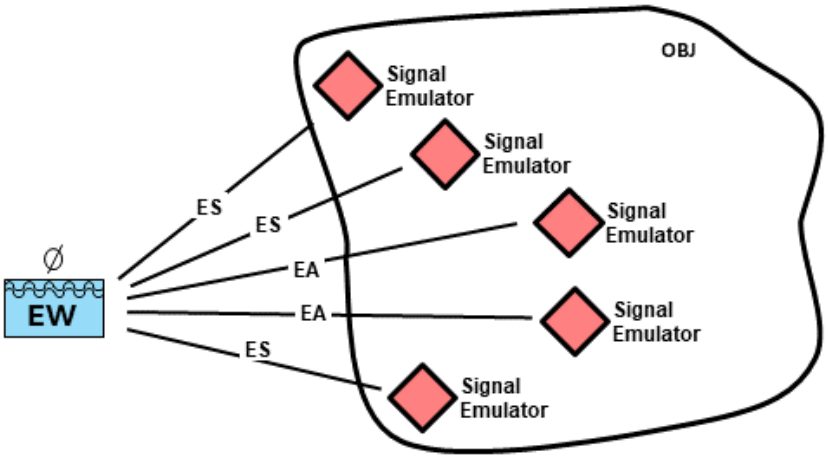
(4) Run: The EW team will execute all Tier 3 tasks using organic, joint, and national resources. EW Team will identify emission locations for 5 SOI and locate 3 jamming sources by coordinating cuts/fixes. EXCON will introduce unknown signals and emission spoofing to mimic hybrid/civilian activity. EW Team will perform EA 5 times during the collection window to herd threat communication systems onto pre-planned frequencies.

(5) Night Considerations: Team(s) will execute the same crawl/walk/run progression during night cycles to include emphasis on noise and light discipline.

(6) Lane Support:

- Scenario Products (to include an electronic order of battle, HPTL), OC Handbook with Task List and GO/NO Criteria.
- Transportation support plan.
- Hide Site Locations and Dig Requests.

Electronic Warfare Team STX (EWTS TIER 3 Certification)



Training Day 1	Training Day 2	Training Day 3	Training Day 4	Training Day 5
•The EW team will execute all Tier 3 tasks only using organic systems. •EW Team will identify emission locations for 3 signals of interest (SOI) by coordinating cuts/fixes during the collection window. Validated locations relevant to the scenario targeting plan will be relayed to the GFC	•The EW team will execute all Tier 3 tasks using organic, joint, and national resources. •EW Team identifies emission locations for 5 SOI and locates 1 jamming source by coordinating cuts/fixes. •EW Team perform electronic attack (EA) 3 times during the collection window to herd threat communication systems onto pre-planned frequencies.	•All TD 2 events •EW Team •Identifies emission locations for 5 SOI and increases location count to 3 jamming sources by coordinating cuts/fixes. •EXCON introduces unknown signals and emission spoofing to mimic hybrid/civilian activity. •EW Team increases EA to 5 times during the collection window.	•All TD 3 events •Conducted during night cycles to emphasizing noise and light discipline.	•AAR •Redeployment

Tasks:

An EW team, consisting of 2 PAX, equipped with the BEAST+ system will be located separate from the SIGINT Collection Team to triage and communicate critical combat information, targeting information, as well as provide EA capabilities without harming SIGINT receivers and ability to provide BDA feedback.

Conditions:

Field environment STX lanes approximately 2-3 km in length to support both mounted and dismounted maneuver.

Standards:

The EW team will be validated on the following crew-level tasks IAW the FROSCOM Electronic Warfare Training Strategy (EWTS – Tier 3):

Tier 3B, Table II, Task I: Conduct EW/CST Synchronization
Tier 3B, Table III, Task 2: Provide CST Support to EW Operations
Tier 3B, Table IV, Task 1: Assess and Refine EW Effects
Tier 3C, Table III, Task 2: Conduct Tactical EW Operations
Tier 3C, Table IV, Task 1: Conduct an Electromagnetic Operational Environment Assessment
Tier 3C, Tables V/VI, Task 1: Conduct EW in Support of Operations

Resources:

- Scenario Products (to include an electronic order of battle, HPTL), OC Handbook with Task List and GO/NO Criteria
- Threat Emitters
- Frequency Request

Figure 6. EW Team STX (CEWTS TIER 3 Certification)

c. Technical Control and Analysis Cells (TCAC) and Process Exploitation Dissemination (PED) Lane

(1) Description: The TCAC will provide technical control, in-depth analysis, integration, and synchronization of SIGINT operations in a distributed environment to de-conflict ongoing national-to-tactical SIGINT operations and to maximize support to the Commander through access to the SIGINT enterprise. TCAC lane will consist of x2 dismounted Prophet systems and x1 TROJAN. TCAC/PED lanes will be evaluated IAW the Military Intelligence Training Strategy (TC 2-19.403 (Ch. 8)) Tier 3 tasks and corresponding DA Form 7860 Cryptological Support Team scorecard:

- 34-TM-0820 Manage Tactical Signals Intelligence (SIGINT) Collection.
- 34-SEC-3041 Assess Signals Intelligence (SIGINT) Collection.
- 34-SEC-3042 Develop Signals Intelligence (SIGINT) Products.

(2) Crawl: Establish TSCIF and connectivity via TDN2 (receive data from IEWTPT), establish SOI list for SCTs, validate Communications PACE plan with SCTs and Battalion TOC. Receive and analyze data via SPOTREP from SCT Team and IEWTPT, report data via reporting channels (KL/TACREP).

(3) Walk: Receive and analyze data via SPOT report from SCTs and IEWTPT, report data via reporting channels (KL/TACREP), validate SIGINT input to Common Intelligence Pictures / Common Operating Pictures (CIPs/COPs), and deconflict overlapping collection, signal errors and attenuation issues.

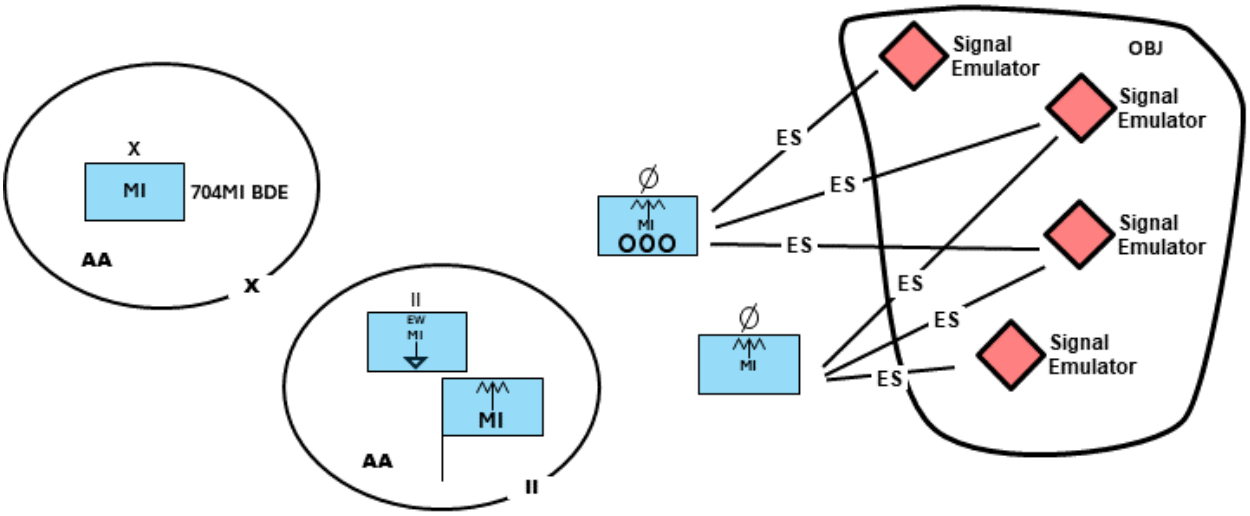
(4) Run: Receive higher volume of data from SCTs and IEWTPT. EXCON will introduce more complex signal types. Develop target nominations and reporting based on all available SIGINT data (ground/joint assets and National Technical Means).

(5) Night Considerations: Team(s) will execute the same crawl/walk/run progression during night cycles to include emphasis on noise and light discipline.

(6) Lane Support:

- TSCIF Request/Army SIGINT Exercise Request Message.
- Vehicle support to move between SCT/TCAC and PED teams.
- Maintainer Support for Connectivity Issues/Sustainment for Fuel.
- IEWTPT feed for Scenario Injects.

TCAC and PED STX (MITS TIER 3 Certification)



Training Day 1	Training Day 2	Training Day 3	Training Day 4	Training Day 5
•Establish TSCIF and connectivity via TDN2 (receive data from IEWTPT) •Establish SOI list for SCTs, validate COMMS PACE plan with SCTs and BN TOC. •Receive and analyze data via SPOT report from SCT Team and IEWTPT, report data via reporting channels (KL/TACREP).	•Receive and analyze data via SPOT report from SCTs and IEWTPT •Report data via reporting channels (KL/TACREP), validate SIGINT input to CIP/COP, •Deconflict overlapping collection, signal errors and attenuation issues.	•Receive higher volume of data from SCTs and IEWTPT. •EXCON introduces more complex signal types. •Develop target nominations and reporting based on all available SIGINT data (ground/joint assets and national/IOSA).	•All TD 3 events •Conducted during night cycles to emphasizing noise and light discipline.	•AAR •Redeployment

Tasks:
The TCAC will provide technical control, in-depth analysis, integration, and synchronization of SIGINT operations in a distributed environment to de-conflict ongoing national-to-tactical SIGINT operations and to maximize support to the Commander through access to the SIGINT enterprise

Conditions:
Field environment STX lanes approximately 2-3 km in length to support both mounted and dismounted maneuver

Standards:
TCAC/PED lanes will be evaluated IAW the Military Intelligence Training Strategy (TC 2-19.403 (Ch. 8)) Tier 3 tasks and corresponding DA Form 7860 Cryptological Support Team scorecard:
34-TM-0820 Manage Tactical Signals Intelligence (SIGINT) Collection
34-SEC-3041 Assess Signals Intelligence (SIGINT) Collection
34-SEC-3042 Develop Signals Intelligence (SIGINT) Products
*PED (SIGINT) tasks/processes are dependent on the MDO Targeting and Targeting Support Lanes. Once these have more specific criteria, the PED tasks will be refined.

Resources:
- Scenario Products (to include an electronic order of battle, HPTL), OC Handbook with Task List and GO/NO Criteria
- Threat Emitters
- x2 dismounted Prophet systems
- x1 TROJANx2

Figure 7. TCAC and PED STX (MITS TIER 3 Certification)

d. MDO Targeting Lane Concept:

(1) Description: MDO Targeting Cell supports the Decide, Detect, Deliver and Assess (D3As) process in support of Division Command Post by providing multi-discipline dynamic targeting support to the Decide function, multi-discipline analysis to the Detect function, streamlines desired effects to the Deliver function, and provides analysis to the Assess function.

Provides multi-discipline targeting support ISO the D3A process. Generates Target Information Folders (TIFs) for High Payoff Targets (HPT) and High Value Targets (HVT). Streamlines delivery of effects to HPTs and HVTs. Provides analysis on Combat Assessment (CA) Battle Damage Assessment (BDA) (BDA, re-attack recommendation).

The MDO Targeting Cell is assigned to support the Division targeting process by providing multi-discipline dynamic targeting support, multi-discipline analysis, streamlining desired effects, and providing analysis on CA. The cell has the Operations Order (OPORD) or Fragmentary Order (FRAGORD), Intelligence Preparation of the Environment (IPOE) products, the Commander's Priority Intelligence Requirements (PIR), critical information requirement (CCIR), and targeting guidance. The MDO Targeting Cell is postured to support multiple Command Posts (CPs) depending on mission requirements.

(2) Crawl: Given analog base order and IPOE products from Higher Commands (HICOMs), the MDO Targeting Cell will conduct predictive analysis of enemy scheme of maneuver and conduct target development ISO approved HPTL/HVTL by generating a TIF containing a target summary and supporting multi-discipline intelligence reporting to streamline delivery of effects to HPTs/HVTs during each phase, as well as submit Request for Coordination (RFCs) and/or coordinates re-tasking of ISR assets to provide analysis on CA.

(3) Walk: MDO Targeting produces the same products as the crawl phase but will additionally execute one of each sensor-to-shooter battle drills IAW Division G2 Targeting (DIV G2T) Tactics, Techniques, and Procedures (TTPs) (ELINT, MTI, OSINT, CF, SALUTE). The evaluator of the targeting lane will review proper execution of battle drills.

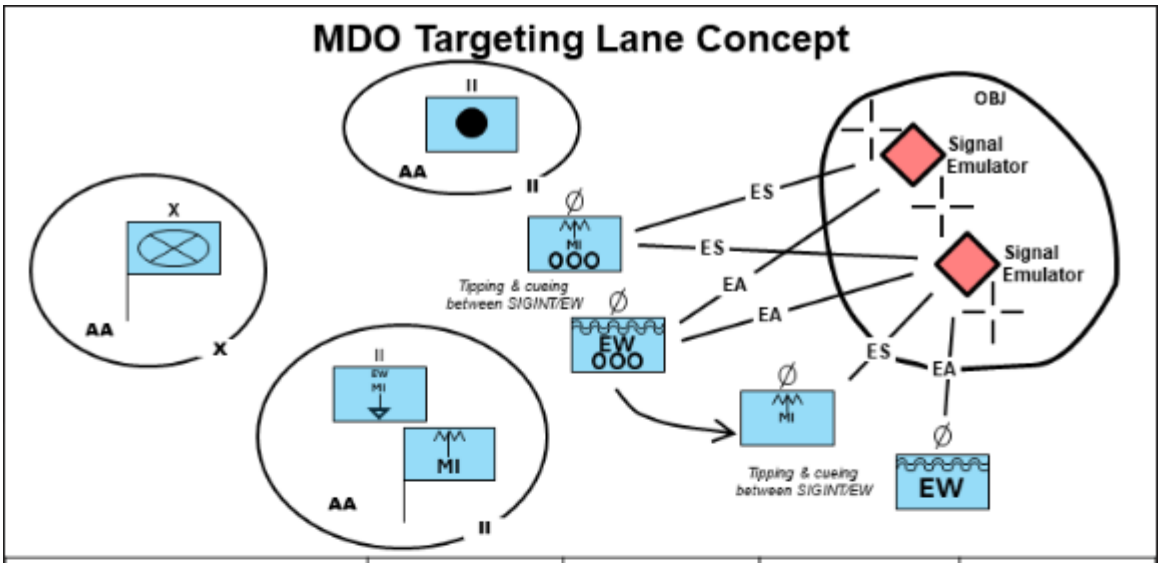
(4) Run: The MDO Targeting Cell will execute at least three of each sensor-to-shooter battle drills, while previously created TIFs.

(5) Night Considerations: Team(s) will execute the same crawl/walk/run progression during night cycles to include emphasis on noise and light discipline.

(6) Lane Support:

- 1x SIPR/PMFWS per 2x 35Fs.

- 1x MaxVision (GWS) per 2x 35Gs.
- Working SIPR tokens and MAVEN accounts for all Targeting Cell Soldiers.
- Base order/IPB products including a friendly Scheme of Maneuver.
- Threat Emitters: (STRATOMIST, MAGPIE, TREX, T/RX, etc.).
- FSE
- Habitual Supporting BCT Fires Battalion (FDC at a minimum)



Training Day 1	Training Day 2	Training Day 3	Training Day 4	Training Day 5
•MDO Targeting Cell conducts predictive analysis of enemy scheme of maneuver and conduct target development ISO approved HPTL/HVTL by generating a target information folder (TIF) containing a target summary and supporting multi-discipline intelligence reporting to streamline delivery of effects to HPTs/HVTs during each phase, as well as submit RFCs and/or coordinates re-tasking of ISR assets to provide analysis on CA	•MDO Targeting produces the same products as the crawl phase but will additionally execute one of each sensor-to-shooter battle drills IAW DIV G2T TTPs (ELINT, MTI, OSINT, CF, SALUTE). The evaluator of the targeting lane will review proper execution of battle drills.	•MDO Targeting produces the same products as the crawl phase but will additionally execute one of each sensor-to-shooter battle drills IAW DIV G2T TTPs (ELINT, MTI, OSINT, CF, SALUTE). The evaluator of the targeting lane will review proper execution of battle drills.	•No changes to training during the nighttime lanes. •Lanes build back through crawl/walk/run like daytime.	•AAR •Redeployment

Tasks:
MDO Targeting Cell conducts lane training in a tactical field environment IOT gain proficiency in executing their function ISO Unit targeting process.

Conditions:
Field environment STX lanes approximately 2-3 km in length to support both mounted and dismounted maneuver.

Standards:
The intelligence element provides intelligence support to the targeting process IAW the OPORD/ FRAGO, unit SOP, and FM 3-60.
34-CO-3030: Provide Intelligence Support to the Multi-Domain Targeting
34-SEC-3177: Provide Intelligence Support to the Targeting Process
Provides multi-discipline targeting support ISO the D3A process. Generates target information folders (TIFs) for HPTs and HVTs. Streamlines delivery of effects to HPTs and HVTs. Provides analysis on Combat Assessment (CA) (BDA, re-attack recommendation).

Resources:
- Scenario Products (to include an electronic order of battle, HPTL), OC Handbook with Task List and GO/NO Criteria
- Threat Emitters
- x2 dismounted Prophet systems
- x1 TROJANx2

Figure 8. MDO Targeting Lane Concept

e. Mounted and Dismounted SIGINT/EW Team STX (BN / BDE)

(1) Description: SIGINT Collection Teams (SCT) and Electronic Warfare Teams equipped with the mounted and dismounted EW and SIGINT systems (located separately to prevent harming SIGINT receivers and ability to provide BDA) conduct integrated MITS and CEWTS Tier III CERTEX and EW Electronic Attack LFX. EW and SIGINT Teams will identify emission locations for 5 SOI and locate 3 jamming sources by coordinating cuts/fixes. EXCON will introduce unknown signals and emission spoofing to mimic hybrid/civilian activity. Upon identification of SOI, EW Team will perform Electronic Attack (EA) 5 times during the collection window to herd threat communication systems onto pre-planned frequencies.

SCTs will be evaluated according to the Military Intelligence Training Strategy (TC 2-19.403 (Ch. 9)) Tier 3 tasks:

- 34-TM-0713 Perform a (SIGINT) Survey
- 34-TM-0700 Perform Voice Communications Intercept or Radio Direction Finding (RDF) at a Collection Site

The EW team will be validated on the following crew-level tasks IAW the FROSCOM Electronic Warfare Training Strategy (CEWTS – Tier 3):
Tier 3B, Table II, Task I: Conduct EW/CST Synchronization
Tier 3B, Table III, Task 2: Provide CST Support to EW Operations
Tier 3B, Table IV, Task 1: Assess and Refine EW Effects
Tier 3C, Table III, Task 2: Conduct Tactical EW Operations
Tier 3C, Table IV, Task 1: Conduct an Electromagnetic Operational Environment Assessment

(2) Crawl: The teams will execute dismounted operations using organic systems. SIGINT Teams will identify emission locations for 3 signals of interest (SOI) by coordinating cuts/fixes during the collection window. Validated locations relevant to the scenario targeting plan will be relayed to the (GFC). Electromagnetic Survey conducted using organic systems.

(3) Walk: The teams will execute mounted operations using organic, joint, and national resources. Unit moves forward to attack by fire positions. SIGINT Teams will identify emission locations for 5 SOI and locate 1 jamming source by coordinating cuts/fixes. EW Team performs EA once during the collection window to herd threat communication systems onto pre-planned frequencies.

(4) Run: The teams will execute on the move operations using organic, joint, and national resources as unit is occupying attack by fire positions. SIGINT Teams identify emission locations for 5 SOI and locate 1 jamming source by coordinating cuts/fixes.

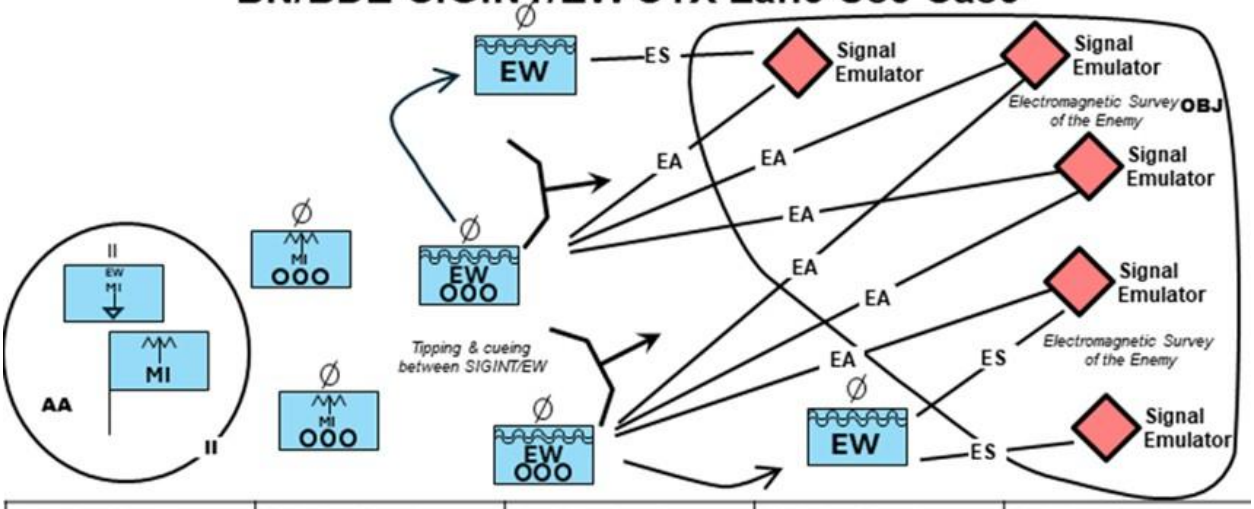
EW Team perform EA 3 times during the collection window to herd threat communication systems onto pre-planned frequencies.

(5) Night Considerations: Team(s) will execute the same crawl/walk/run progression during night cycles to include emphasis on noise and light discipline.

(6) Lane Support:

- Scenario Products (to include an electronic order of battle, HPTL), OC Handbook with Task List and GO/NO Criteria.
- Transportation support plan.
- Hide Site Locations and Dig Requests.
- 1x DRT3300
- 2x HTL Signal Intercept & Collection System
- 4x VMAX
- 4x VROD
- 2x STRATOMIST
- 2x PRD13v3
- 2x TREX Signal Emulator
- 2x Spectrum Guard
- 1x C-DEWS HADES Manpack
- 2x STRATOMIST (Push to Talk)
- P300 (2G Cellular)
- P500 (3G Cellular)
- Wide Band Transceiver

BN/BDE SIGINT/EW STX Lane Use Case



Training Day 1	Training Day 2	Training Day 3	Training Day 4	Training Day 5
TLPs •System Calibration •Site Survey •Rehearsals	**Dismounted Operations** •Identify Signals of Interest via PORB/TSIG •Conduct ES via VROD	**Mounted Operations** •Move to ABFs •Conduct ES •Refine Targets	**Electronic Attack** •DF Targets via SIGINT and ES •Conduct EA against HPT	**On The Move Operations** •Conduct ES OTM •AAR

Tasks:
SIGINT Collection Teams (SCT) and Electronic Warfare Teams equipped with the mounted and dismounted EW/SIGINT systems conduct integrated MITS/EWTS Tier III CERTEX and EW Electronic Attack LFX.

EW and SIGINT Teams will identify emission locations for 5 SOI and locate 3 jamming sources by coordinating cuts/fixes. EXCON will introduce unknown signals and emission spoofing to mimic hybrid/civilian activity. Upon identification of SOI, EW Team will perform Electronic Attack (EA) 5 times during the collection window to herd threat communication systems onto pre-planned frequencies

Conditions:
Field environment STX lanes approximately 2-3 km in length to support both mounted and dismounted maneuver.

Standards:
SCTs will be evaluated IAW the Military Intelligence Training Strategy (TC 2-19.403 (Ch. 9)) Tier 3 tasks:
- 34-TM-0713 Perform a Signals Intelligence (SIGINT) Survey
- 34-TM-0700 Perform Voice Communications Intercept or Radio Direction Finding (RDF) at a Collection Site

The EW team will be validated on the following crew-level tasks IAW the FORSCOM Electronic Warfare Training Strategy (EWTS – Tier 3):
- Tier 3B, Table II, Task I: Conduct EW/CST Synchronization
- Tier 3B, Table III, Task 2: Provide CST Support to EW Operations
- Tier 3B, Table IV, Task 1: Assess and Refine EW Effects
- Tier 3C, Table III, Task 2: Conduct Tactical EW Operations
- Tier 3C, Table IV, Task 1: Conduct an Electromagnetic Operational Environment Assessment
- Tier 3C, Tables V/VI, Task 1: Conduct EW in Support of Operations

Resources:
- 1x DRT3300
- 2x HTL Signal Intercept & Collection System
- 4x VMAX
- 4x VROD
- 2x STRATOMIST
- 2x PRD13v3
- 2x TREX Signal Emulator
- 2x Spectrum Guard
- 1x C-DEWS HADES Manpack
- 2x STRATOMIST (Push to Talk)
- P300 (2G Cellular)
- P500 (3G Cellular)
- Wide Band Transceiver

Figure 9. BN/BDE SIGINT EW STX Lane Use Case

12. Replicating and operating in a Contested and Congested Environment (to include Denied Environments).

a. Conduct Survey of Electromagnetic Spectrum Environment

(1) What: Survey of unit's EMS signature. Spectrum Guard, RFeye and other COTs solutions are commonly used.

(2) Target Audience: Squad up to Battalion during field training.

(3) Why: Provides an assessment on a unit's emissions within the EMS to assist leaders and staff with situational understanding of their electromagnetic disposition and support EP, improving EMS operational security, emission mitigation, and critical analysis of PACE plans.

(4) Timelines and Requirements: Equipment may reside in the BCT or at Foundry, 8-week prior coordination recommended to lock in support.

(5) Required Documents: May vary by post.

(6) POC: Division CEMA, Brigade CEMA, Brigade S2, Brigade S6, Foundry (dependent on where equipment resides).

(7) Who can assist: Division CEMA, Brigade CEMA / Brigade S2 or Foundry (depending on echelon being trained).

b. Reacting to Electromagnetic Interference (EMI) involves delving into the 5Ws and How, as well as incorporating the necessary Training Aids, Devices, Simulators, and Simulations (TADSS) and enablers crucial for mission success. Providing a clear Task and Purpose for the training event would indeed benefit the unit, ensuring a focused and effective approach to achieving training objectives while enhancing readiness in responding to EMI scenarios.

Near-peer adversaries possess EA capabilities ranging from their national strategic assets down to their BCT level, which can significantly disrupt all EMS capabilities utilized by a US BCT. Consequently, Army Platoons, Companies, and Battalions should anticipate communication degradation and intermittent GPS functionality.

c. Navigation Warfare (NAVWAR), Positioning, Navigation, and Timing (PNT) Denial

(1) What: Local GPS effects. The following government systems can support a PNT denied training scenario Situational Training Electronic Attack Variable Emitter (STEVE) or NAVWAR Electronic Attack Trainer (NEAT) systems are commonly used. Division/Brigade internal equipment may also exist. Commercial systems, such as the CACI Magpie, can also emit a signal that provides GPS effects.

(2) Target Audience: Squad up to Battalion during field training.

(3) Why: Replicates current near-peer capabilities likely to affect units at the tactical level.

(4) Timelines and Requirements: Spectrum request and request to Space and Missile Defense Command (SMDC) for support No Later Than (NLT) 90-days prior to event.

(5) Required Documents: EA Request Memorandum (Appendix F)

(6) POC: Installation spectrum manager for spectrum request. SMDC for equipment and personnel support if Division/Brigade do not have organic equipment.

(7) Who can assist within your unit: Brigade CEMA.

(8) To integrate effectively, consider the following approaches:

(a) Squad-Platoon Operations: Implement Positioning, Navigation, and Timing (PNT) Denial Tactics during Squad Movement to Contact. PNT denial equipment for training purposes is usually low powered to reduce the impact of the effects outside of the immediate area. Careful planning will need to be performed to determine when and where effects are desired to create the needed degradation in the environment. During GPS/PNT loss, the Squad may experience a reduced rate of march and delayed calls for fire due to navigation challenges. In addition, some systems that perform direction finding depend on PNT to know which direction they are facing. Without PNT, LOBs may be completely inaccurate. In the absence of PNT denial hardware or in environments not conducive to operating the equipment, this PNT loss can usually be simulated by disabling the PNT or unplugging the PNT puck. Regardless, it is imperative for the unit to train in strategies to recognize, counter, and mitigate the impact of PNT denial on operational effectiveness.

(b) Company-Battalion Operations: Comparable ramifications apply at the Company and Battalion levels, yet the loss of GPS/PNT may exacerbate mission command challenges, particularly in mounted formations, if Joint Capabilities Release (JCRs) are compromised, resulting in their failure to report positions. Company and Battalion Operations should practice analog battle tracking with acetate and dry erase markers, along with other strategies.

d. Opposing Force (OPFOR) equipped Electromagnetic Attack. Units provide their own OPFOR at their distinctive level. However, MDO Range CEMA Integrators can provide EA to units to simulate a denied environment.

(1) What: OPFOR capable of EA. Tactical EW System (TEWS), Versatile Radio Observation and Direction (VROD)/ VROD Modular Adaptive Transmit (VMAX), Spectrum Situation Awareness System (S2AS) Terrestrial Layered System Brigade

Combat Team (TLS BCT) Manpack, and the Modular Electromagnetic Spectrum System (MEMSS) are commonly used.

(2) Target Audience: Squad up to Battalion during field training.

(3) Why: Replicates current near-peer capabilities likely to impact units at the tactical level.

(4) Timelines and Requirements: 90 days prior. EA Request Memorandum.

(5) POC: Installation spectrum manager for spectrum request.

(6) Who can assist: Brigade CEMA.

(7) How to incorporate:

(a) Squad-Company Operations: Execute EA on the unit during an attack. Affected units should troubleshoot their radios to identify potential issues such as Communication Security (COMSEC) Cryptographic, personnel, and physical COMSEC incidents. When facing EA, the enemy has likely geolocated the unit. If feasible, seek to utilize terrain masking between the radio and assumed ground-based jammer location, while also minimizing the range between transmitter and receiver. Avoid increasing the power of radios, as attempting to overpower aerial jammers is typically ineffective unless radios are in close proximity, which may not be tactically advisable. The rate of march, mission command, and other critical functions will be adversely affected by EA.

(b) Battalion: During Battalion (BN) Home Station Training (HST), EXCON Director can direct EA on maneuver units to introduce friction. EXCON Director can also target key C2 nodes or key capabilities likely to be targeted by adversaries (RETRANS, indirect fires nodes, BN TOC) to train units to fight in a contested and congested EMS.

e. Conduct Electromagnetic Protection

(1) What: Such EP tasks include—emission control, mitigating electromagnetic environmental effects, electromagnetic compatibility, electromagnetic masking, preemptive countermeasures, and electromagnetic warfare reprogramming. These tasks require integration with spectrum management operation for frequency management and deconfliction Reference FM 3-12, 1-51.

EP is the internal efforts a unit takes to protect themselves from adversary identification or geo-location via the EMS and Electromagnetic Attack. Such EP tasks include—emission control (EMCON), mitigating electromagnetic environmental effects, electromagnetic compatibility, electromagnetic masking, preemptive countermeasures, and EW reprogramming. These tasks require integration with spectrum management operation for frequency management and deconfliction (Reference FM 3-12, 1-51). Knowing friendly unit emissions, enemy capabilities, and the effect of the environment

are the key to successfully conducting tactical EP. EP efforts are informed by electromagnetic spectrum awareness. Conducting EMCON during movement and maneuver reduces electromagnetic signatures of friendly forces' spectrum dependent communications and navigational systems during movement and maneuver. EW forces also employ sensors before a movement as preemptive countermeasures (Reference FM 3-12, 1-56).

EMCON is the selective and controlled use of electromagnetic, acoustic, or other emitters to optimize command and control capabilities while minimizing, for operations security: a) detection by enemy sensors, b) mutual interference among friendly systems, and/or c) enemy interference with the ability to execute a military deception plan (JP 3-85). Emission control enables OPSEC by: a) Decreasing detection probability and countering detection range by enemy sensors, b) Identifying and mitigating EMI among friendly spectrum-dependent devices, c) Identifying enemy EMI that allows execution of military deception planning. EMCON enables electromagnetic masking by integrating intelligence, and EW to adjust spectrum management and communications plans. A practical and disciplined emission control plan, in conjunction with other EP measures, is a critical aspect of good OPSEC. Refer to ATP 3-13.3 for OPSEC techniques at division and below. (Reference FM 3-12, 2-44).

(2) Why: Neer-peers have an ability to identify, locate, and lethally or non-lethally affect Army units due to their EMS usage. Conducting EP (or counter-EW), mitigates the risk of enemy's being able to find and effect a unit.

(3) How to incorporate at the unit: Given awareness of an OPFOR equipped with Electromagnetic Support (ES) capabilities and a predictable location, devise an EMCON strategy and movement plan to minimize the risk of the unit being geolocated.

f. Signal Emulators, Decoys, and Electromagnetic Spectrum Congestion

(1) What: Create a congested EMS or conduct Military Deception (MILDEC).

(2) Target Audience: Battalions during field problems against an EMS sensing capable OPFOR or with friendly ES equipment.

(3) Why: Introduce EMS congestion to saturate EMS-enabled ISR capabilities of either the training audience or the OPFOR. Alternatively, utilize deception tactics to compel the OPFOR to allocate time, resources, or ammunition towards false targets.

(4) Timelines & Requirements: Equipment may reside in BCT or at Foundry Site. Recommend 8-week coordination to ensure exercise support.

(5) Required Documents: May vary by post. SCONOP, CONOP, DRAW, does unit require TSCIF? Upper Enclave? Training certificates will be required. Training objectives and system requirements. Land requests, Spectrum requests to emit.

(6) POC: Brigade CEMA, Brigade S2, Foundry (dependent on which organizations controls those resources, see Chapter 8 for additional details).

(7) Who can assist: Spectrum Manager, Brigade CEMA / Brigade S2 or Foundry.

(8) How to incorporate: Units can include the use of signal emulators purpose-built to replicate friendly signals and emplace them in locations away from their operational areas. Other systems, while not made to specifically mimic friendly signals, can transmit recordings of friendly command posts and other sites, replicating what would be seen in the EMS at the actual site. Similarly, units can replicate a host of other signals to congest the environment with commercial and civilian signals to further frustrate the OPFOR.

(9) TC 25-8 provides a core list of fielded equipment and systems to enable training, but there are myriad of new Government Off-The-Shelf (GOTs) and Commercial Off-The-Shelf (COTs) solutions available. GOTs are primarily STRATOMIST or INVICTA. COTs solutions include Motorola VQT2, CACI Magpie, Viavi TRx, and Blackhorse TReX, among others. Two critical factors in determining what to use are frequency range and power output, as well as local authorities to transmit, broadcast, and irradiate Units should research their Area of Responsibility (AOR) High Payoff Target Lists (HPTL) to understand where they are going to have to detect threats to know what solution is right for their training needs. Soldiers can research their AORs on NSAnet or JWICS, pulling NGIC order of battle products. From there, specific details about systems in the electronic order of battle can be researched in CEDB and MEPED to understand the frequency range over which the threats can operate, and how they act in the spectrum. The closer a unit can model their threats, the better they can train. Surveying for single channel plain text signals will not improve a unit's ability to follow and demodulate a fast-moving frequency hopping radio, for example. STRATOMIST and INVICTA will allow a user to create a specific hop-set, as does the TRx with the appropriate software, while systems like Magpie do not. The Magpie will only stream recorded I/Q data, not allow one to design signals. Similarly, if an enemy communication system can operate from 30 MHz to 2 GHz, then a Magpie that operates from 30 MHz to 500 MHz will not allow for training against an enemy's PACE plan, since they might be at 55 MHz and move to 1.5 GHz after being jammed. Similarly, if units are incorporating airborne and overhead assets, power levels should be ample enough to reach the aircraft without being wildly unrealistic, or power levels should replicate the low-power nature of the emitter, creating rigor in how to sense the emission. Careful consideration must be taken into account when considering what devices will provide the most training value.

(10) For communication systems, the power may vary from a low-power tactical emitter operating at only one watt, or high-power, long-haul communications systems. Communications may be in the High Frequency (HF) and even Millimeter Wave (MMw) bands.

(11) Systems other than communication operate across a range spanning from Very High Frequency (VHF) to MMw, encompassing frequencies from 30 MHz to 100 GHz. Non-communication systems, like radars, demand substantial power. To cover the extensive distances necessary for detection, gathering, and non-kinetic impacts, these emulators must function with at least hundreds of Watts, to mimic even a portion of the range that these systems naturally emit. While it is possible to operate at lower powers for exposure to these signals, detection distances would be unrealistically close and not accurately replicate the necessary tactical and doctrinal distances required for training.

(12) Government and commercial threat target systems and emulators may be capable of both transmitting and receiving. The benefit of receivers is to measure, assess, and score BLUFOR weapons systems electronic attack effects on the target emitter. This function is not common with most target emitters and this adds increased cost to the system's capability. Capabilities for reception could additionally enable the recording of signals for subsequent replay, imitating a threat or generating additional BLUFOR signals to confound OPFOR analysts.

(13) It is important for Soldiers and units to determine antenna capabilities and attributes when planning, designing, and executing training. Communications will likely use omni-directional antennas or directional antennas. Non-communications will use directional or parabolic antennas. For non-communications systems, scan patterns are a key indicator of system type or function. Most emulators will not replicate a scan pattern, such as circular, conical, and raster. Units must account for these limitations in the training scenario and tasks, as well as the capabilities and performance of their weapons systems.

(14) The majority of contemporary communications threats utilize frequency hopping modes. Some threat emulators may facilitate the generation of precise hop-sets, while others might solely stream recorded data. In the case of a system that exclusively transmits recorded data, acquiring a threat to record is sometimes challenging.

(15) Alternatively, a unit has the ability to create their own signals in a separate software suite and import the signal into their emulator. There is training value in creating signals required for home station training and remaining proficient in signals theory. Commercial software, such as MATLAB or SCEPTRE, can support this training. MATLAB is a comprehensive software but is very complicated and geared towards radio frequency (RF) engineers. Data formats are also important, as emulators may use .bin, dat, .swd, data formats. Soldiers and units must grasp the specific format required by their unit's emulators and ascertain whether the systems possess the capability to convert formats. The ease of conversion, integration, and utilization holds significant importance.

(16) Emulators may use battery/solar solutions or require generator/shore power. Systems that put out a lot of power can operate off solar, but the duty cycle must be limited to make the batteries last more than a couple of hours. Battery and solar

solutions allow for maximum flexibility in emplacing threats without the need to fuel a generator, but on/off times must be carefully managed.

(17) Lastly, some emulators must be manually commanded, while most are able to be controlled over a cellular network, Silvus radio, WiFi, or other means. In the event of a “CEASE BUZZER” situation, emulators that can be turned off from reach are invaluable. Additionally, emulators may be able to be programmed to time or even activate when they enter a predetermined geolocation.

g. Integrate Electromagnetic Spectrum Operations Sensing Capabilities / Electromagnetic Support

(1) What: Integrate the use of ES / sensing equipment into formations to detect, locate, and identify enemy formations and weapons systems.

(2) Target Audience: Squad up to Brigade during field training

(3) Why: Adversaries have advanced CEMA, Aerial, Space based, and SIGINT (Intelligence) capabilities. Equipping OPFOR and including the limited and developing I&EW equipment enables a unit to train on its warfighting tasks at home station.

(4) Timelines and Requirements: Equipment organic to the unit should be used, or surrogate equipment from Foundry.

(5) Required Documents: SIGINT CONOP (SCONOP) submitted to Army Technical Control and Analysis Element (ATCAE) for collection by SIGINT personnel is required no later than 45 days prior to execution. Submit a Consolidated Exercise Support Request (CESR) if support of overhead collection is needed. SIGINT personnel conducting collection are also required to have a valid Virtual Access Request (VAR), up to date USSID/OVSC (1000, 1100, 1800) training, and be assigned roles on the unit’s Mission Correlation Table (MCT). Units must possess a SIGINT Activity Designator (SIGAD).

(6) POC: Division CEMA, Brigade CEMA, Brigade S2, Foundry, ATCAE

(7) Who can assist: Installation spectrum manager

(8) How to incorporate: Soldiers, using guidance from FM 3-0, ADRP 3-0, and JP 3-0, should perform tasks to identify collection sites, ingress and egress routes, and needed collection posture (concave, convex, lazy w), in addition to other considerations, such as their PACE plan. Once in position, Soldiers should collaborate between teams to detect and locate signals of interest, in accordance with their enemy electronic order of battle and commander’s PIRs. Ensuring communications is essential, else a team may only get a single line of bearing (LOB) with no cross-LOB from a different team, nor can they send time-sensitive enemy location information to the command post. If units incorporate other assets, particularly ones that feed into IBS, then the inclusion of IBS

receivers such as an ENTR should be considered to provide collectors additional data on emitters that may be beyond their physical or logical reach.

h. Conduct Targeting: Integrate Electromagnetic Spectrum Operations / Destroyable Emitters into Live Fire Exercises

(1) What: Varies. Multiple installations have developed low to high-cost emitters that can be emplaced on live fire ranges.

(2) Target Audience: Battalion to Brigade during live training.

(3) Why: Completely incorporating EMSO into LFX engages all available unit sensors, while practicing the targeting process readies the unit for future conflicts. These exercises involve detecting targets using EMS, delivering either lethal or non-lethal effects, and evaluating target impact (Battle Damage Assessment) through EMS or alternative methods.

(4) Timeline and Requirements: Varies by installation. (see Figure 4. Consolidated MDO Timeline for general timeline requirements)

(5) Required Documents: Environmental and Natural Resources Division (ENRD) approval (ENRD is normally located within the Garrison but contact Range Operations for confirmation). Spectrum requests, air requests, fire suppression plan.

(6) POC: Range Operations.

(7) Who can assist: Range Operations, Fire Department if necessary.

(8) How to incorporate: EW and/or SIGINT are integrated into the Intelligence/Targeting strategy. The emitter simulates a target on the HPTL and is activated based on the OPFOR plan or Master Scenario Events List (MSEL). Destroyable emitters should be placed into the impact area via quad-copters, or similar type “drones”, to minimize the need for personnel to enter an area where UXO might be present. If the intercepted signal matches the ES/SIGINT projections as outlined in the Electronic Order of Battle (EOB), then the target's position may or may not need to be more precisely determined. Rules of Engagement (ROE) dictate whether electronic geolocation alone is adequate to proceed with munitions delivery or if additional resources are necessary to confirm the emission as a legitimate target. In addition, the ROE will address the maximum allowable size of the ellipse semi-major and semi-minor that can be fired upon. This intercept, if single source is in-line with the ROE, can then be sent to the gunlines as a TIDAT, via the S2, or simply reported back as combat information.

i. React to Threat Unmanned Aircraft Systems

(1) What: Level 1-2 Unmanned Aircraft Systems (UAS) threat UAS replication for OPFOR use against Army Units

(2) Target Audience: Squad up to Battalion during field training.

(3) Why: Provides realistic threat capability to include ISR, weaponized UAS with simulated submunitions.

(4) Timelines and Requirements: 90-day coordination recommended.

(5) Required Documents: May vary by post.

(6) POC: Command and Control, Communications, Computers, Combat Systems, Intelligence, Surveillance, and Reconnaissance (C5ISR) – U.S. Army Combat Capabilities Development Command (DEVCOM) Threat UAS Branch.

(7) Who can assist: Brigade S2, G-3 Air, Airfield, Range Operations.

j. Integrated Broadcast Service

(1) What: The Integrated Broadcast Service (IBS) is a worldwide Department of Defense standard network for transmitting time-sensitive tactical and strategic intelligence and targeting data from multiple sources. IBS includes including ground, air, and space-based sensors into a common feed. The broadcast feed is available to authorized consumers at all echelons around the globe in near real time. Additionally, the IBS feed replicates over networks for processing by compatible internet protocol-based platforms to feed digital systems across the warfighting functions.

(2) Target Audience: Battalion – Corps

(3) Why: Provides Near-Real-Time (NRT) intelligence data to tactical and strategic units. It is not a collection system, but rather a delivery vehicle for previously collected data.

(4) Timelines and Requirements: IBS data can be obtained over a network connection via databases like WRANGLER, GALE, or FADE. IBS data can similarly be obtained over the air with receivers like the Embedded National Tactical Receiver (ENTR) or Join Tactical Terminal (JTT). To obtain the feed over the air, the receiver must have the appropriate cryptologic keys installed. Only authorized producers are permitted to publish to IBS.

(5) Required Documents: Dissemination Support Request (submitted internally through IBS) to produce.

(6) POC: At brigade and division echelons, the system that receives the IBS broadcast is the Tactical Intelligence Ground Station (TGS). Depending on hardware

version, the brigade S-2 and the military intelligence company have at least two organic receivers that can accept and process the IBS broadcast. At the corps level, the system is the Operational Ground Station. Currently, there is a capability to receive and process the IBS feed at the battalion level through the Global Broadcast Service. All echelons can receive the IBS feed through digital networks on the upper tactical internet.

Reference:
https://mipb.army.mil/documents/12618257/15543935/Dowds_Intel.pdf/ba0b2555-7a8a-4522-aef3-b8e87439a0ab

(7) Who can assist: The National Training Center produces a feed for the IBS broadcast in its scenarios, but it has not been widely adopted by home station training MITS enablers, the Joint Readiness Training Center, or the Mission Command Training Program. To use this broadcast capability in an exercise, there is a cumbersome process to incorporate exercise data over broadcast while using existing simulation programs of record. The process relies on expertise that is not present at every installation.

13. Electromagnetic Warfare Requirements

a. Individuals, entities, agencies, or units requiring spectrum support for EW systems to include EA, ES, and EP will provide the appropriate data to the SM with a minimum lead-time of ninety (90) days.

b. Electromagnetic Attack Process

(1) The unit coordinates with ISM and drafts EA clearance request memorandum in accordance with CJCSM 3212.02F.

(2) The unit will sign EA clearance request memo and forwards it to SM.

(3) ISM validates EA clearance request and forwards to AFC.

(4) AFC validates EA clearance request and forwards to the ASMO for forward to the FCC and FAA.

(5) FCC and FAA respond with concurrence and notching memo (a clarification of which frequencies in the requested frequency range can be used).

(6) ISM deconflicts FCC/FAA concurrence with local frequency assignments, drafts EA clearance authorization memo.

(7) ISM sends signed EA authorization to unit.

(8) Electronic Attack Request Lifecycle.

14. Electromagnetic Attack Request Process

a. To support CJCSM 3212.02F, this guidance is disseminated to Army commands on the proper submission for all Army EA test, training, and exercises requirements that will garner national federal EA authorizations from the FAA and FCC. The overall objective of this EA guidance is for Army commands to improve the EA process and comply with CJCSM 3212.02F.

b. Army commands are overall responsible for submission of each command EA request in official command memorandum to Army Spectrum Management Office (ASMO). Before submitting a command EA request, the originator (drafter) of the EA request (memorandum) shall identify in detail the testing unit's EA requirements as stated in CJCSM 3212.02F and the use of this guidance. The FAA is responsible for the safety of the national air space and FCC responsible for non-interruption of commercial telecommunications services. Because of FAA and FCC responsibilities a detail EA request will ensure ASMO can successfully complete coordination with FAA and FCC.

c. Classification markings.

(1) Army commands should be familiar with the following manual and instruction on use of Controlled Unclassified Information (CUI), UNCLASSIFIED, and compilation.

(2) Department of Defense Manual 5200.01, DoD Information Security Program Volumes 1 thru 3 Department of Defense Instruction 5200.48, Controlled Unclassified Information

(3) Do not use FOUO and CUI in same EA request or UNCLASSIFIED//CUI, CUI is the correct classification marking.

(4) Classification markings UNCLASSIFIED, CUI, or SECRET will be inserted in the header and footer of the memorandum:

d. Acronyms, Page Numbering, and Use of Tables and Figures.

(1) Acronyms used more than once in a document, at first use in a sentence spelled out the acronym proceeded by the acronym in brackets i.e. EMS. Acronyms used only once in a sentence will be spelled out i.e. Department of Defense.

Example: These challenges have exposed the reliance of U.S. Forces on the electromagnetic spectrum (EMS) and are driving a change in how the Department of Defense approaches activities in the EMS to maintain all-domain advantage.

(2) Memorandums shall be properly numbered (1, 2, 3…) at bottom and center of memorandum.

(3) Tables and Figures. Ensure each Table and Figure (map, plot, or graph) is

properly numbered, labeled, and referenced within the EA request.

e. Concurrence Responses. Army commands shall adhere and comply with (local or regional) FAA and FCC issued concurrences.

f. Operational and Technical POC. When identifying command POC, provide valid primary and secondary telephone numbers. Defense Switched Network (DSN) can be listed; however, FAA does not have DSN capabilities and can be problematic for FAA CEASE BUZZER notification.

g. EA Clearance Request Control Number. Even though CJCSM 3212.02F does not mention revisions to an EA request and to prevent duplicate EA request (memorandums). EA requests submitted to FAA and FCC which require corrections or modifications identified by the FCC and FAA. The EA request will be returned to the Army command for revision(s). The revised EA request will be identified as a “Revision” after the EA control number. Example: AMSD 21-01 – Revision 1.

h. Period of Request.

(1) EA requests are not to exceed 1 year.

(2) Months are not to be abbreviated and the correct date and month format will be used.

- Examples:
- 01 January 2024 until 31 December 2024 (for EA annual event).
- 15 January 2024 (for 1 day EA event).
- 15 January 2024 until 15 June 2024 (for 5-month EA event).

i. EA Operating Areas, Flight Routes, Altitudes, Times, and Radius of Operation. Description of the type of EA systems that will be determined for the test and training.

(1) The EA request should state what type of EA request that will occur, it can be ground based, airborne, and shipborne or a combination thereof, a submitted EA request shall clearly state whether the EA being conducted is ground based, airborne, shipborne, or combination.

(2) The EA request needs to define the geographic area in which the EA test and training will occur. The EA request needs to be clear on what the testing command attempting to achieve in the EA event. An unclear or vague EA request can impact the EA process. Details are the key to the EA request and essential for FAA and FCC to issue concurrences.

(3) The following are descriptions and examples and can be expand upon within the EA request:

- If EA is on Air Platform, need Altitude, Operating Area, Flight Path, turn points (coordinates) or center point coordinate(s) and the radius.

- If EA is on Ground, need transmitter location coordinates and antenna height above ground level (AGL) (e.g., handheld, vehicle mounted, mounted on a tower.)

- If EA is Shipborne, need Operating Area, turn points (coordinates) or center point coordinate and radius.

j. Operating Area Latitude and Longitude Formats and Frequency Unit Conversion for Latitude and Longitude are provided:

Example: Decimal Degrees Seconds

LAT / LONG
35.1408N 79.2539W
35.1406N 79.2539W
35.1494N 79.2653W
35.1494N 79.2439W
35.1319N 79.2439W
35.1319N 79.2653W

Example: Degrees, Minutes

LAT/LONG	
35° 08'26.1"N	79° 15'13.6"W
35° 08'26.1"N	79° 15'13.6"W
35° 08'58.5"N	79°15'54.7"W
35° 08'58.5"N	79° 14'38.6"W
35° 07'54.6"N	79° 14'38.3"W
35° 07'54.6"N	79°15'55.3"W

k. Route of Flight.

(1) Drafter of the EA request needs to determine if flight operations will be executed during the EA event. If flight operations are executed the Drafter shall comply with CJCSM 3212.02F, provide specific details in the EA request.

(2) If the author determines no flight operations will be executed then Not Applicable (N/A) can be applied. Example: Route of Flight: N/A

(3) Altitudes. The Drafter of the EA request shall comply with CJCSM 3212.02F, author must specify above ground level (AGL) or mean sea level (MSL) in the EA request.

(4) Topographical Layout. All Department of Defense (DoD) Test and Training ranges are not the same. The Drafter of the EA request needs to understand and identify the range(s) terrain features, infrastructures (buildings, cell towers, etc..), distances to mountains, population, borders and any other considerations that may interfere with EA event to where the EA event will occur. If the Drafter is not familiar to a particular training range, it is recommended to contact and coordinate with that training range for details that can support EA request and approval.

(5) Times. The Drafter of the EA request shall comply with CJCSM 3212.02F,

avoid using 24-hour period correct format is 0000-2359 hours and state whether timeframe is inflexible or limited and why.

(6) Expected Duration per Activity. The Drafter of the EA request shall comply with CJCSM 3212.02F, provide expected duration in minutes or hours for average EA event.

l. Positive Control: Positive control shall be provided for all EA activity.

(1) CJCSM 3212.02F is an excellent description of Positive Control and requirements.

(2) CEASE BUZZER points of contact, valid primary and secondary telephone numbers shall be identified in the EA request. If a plan EA event overlaps into the cellular frequency band services, the Drafter should not list cellular telephone numbers for CEASE BUZZER notification.

(3) Drafter should avoid utilizing military personnel cellular phone number as a CEASE BUZZER number especially when active-duty military are susceptible to orders (permanent change of station, deployments) Recommend using a valid organizational cellular and land line telephone numbers instead.

(4) FAA requirement, provide two valid CEASE BUZZER numbers, identify primary and alternate personnel. FAA does not have access to DSN ensure valid commercial numbers are identified for CEASE BUZZER notification.

(5) The EA request will identify the training ranges safety protocols, specific VHF and UHF range guarded frequencies, and monitor emergency guarded frequencies 121.5 MHz and 243MHz.

m. Frequency Requirements and Specifications.

(1) Frequencies Requested: Provide frequency or range of frequencies (tuning range). Planned Start and Stop Frequency (likely a sub band of or equal to operating band of transmitter)

(2) EA Jamming Equipment Specifications: Provide the following information for each frequency or frequency range:

(a) EA Transmitter Bandwidth and Power: Maximum transmitter output power to antenna in Watts and the associated Bandwidth. Widest Bandwidth and the associated Power in Watts. For bandwidth and power conversion from W to dBm – frequency unit conversion and bandwidth verification is provided.

Pro Tip: FAA Engineering team uses dBm for bandwidth and power. Submitted EA request using dBm will support more timely FAA approval, i.e., the FAA can save

time in converting other power units to dBm.

(b). Antenna Information (Pattern, Gain and Directivity):

- Type (e.g., parabolic dish, Yagi, Log Periodic, Dipole, Horn, etc.).
- Gain (dBi) – Required.
- Pointing (Azimuth and Elevation) – Pro Tip: Not required if antenna type is Omni.
- Beamwidth (Azimuth and Elevation) – Pro Tip: Not required if antenna type is Omni.

o. Example: Frequency Requirement Table

Table 1. Frequency Requirements

System	Frequency / Tuning Range	Max BW / PWR / TYPE	ANT / GAIN / BMW
Drone Buster	M430 – M450	30kHz / 32dBm / CW	Dipole Array / 1dBi / 120°X 60 °
	M902 – M928	50kHz / 32dBm / CW	Yagi Uda / 8dBi / 30°
	M2400 – M2485.5	100kHz / 36dBm / CW	Tapered Slot / 5dBi / 20°
	M5730 – M5875	2MHz / 36dBm / CW	Tapered Slot / 13dBi / 10°

Example: Frequency Requirement Table.

Table 1a. Frequency Requirements

System	Frequency / Tuning Range	Max BW / PWR / TYPE	ANT / GAIN / BMW
VMAX	M30 - M50	18kHz / 37dBm / CW	Dipole / 6dBi / 360° x 90°
	M140 - M144	18kHz / 37dBm / CW	Dipole / 6dBi / 360° x 90°
	M148 - M150.8	18kHz / 37dBm / CW	Dipole / 6dBi / 360° x 90°
	M162 - M165.7553	18kHz / 37dBm / CW	Dipole / 6dBi / 360° x 90°
	M165.7698 - M170	18kHz / 37dBm / CW	Dipole / 6dBi / 360° x 90°
	M430 - M450	18kHz / 37dBm / CW	Dipole / 6dBi / 360° x 90°
	M902 - M928	18kHz / 37dBm / CW	Dipole / 6dBi / 360° x 90°
	M2400 – M2485.5	18kHz / 37dBm / CW	Dipole / 6dBi / 360° x 90°
	M5725 – M5875	18kHz / 37dBm / CW	Dipole / 6dBi / 360° x 90°

Pro Tip: Table 1a, even though the Max BW / PWR / TYPE and ANT / GAIN / BMW have the same values, a single system needs to list for each individual frequency / tuning range.

p. Equipment Specifications and Configurations.

(1) To obtain equipment specifications the Drafter of the request should access Joint Spectrum Database Repository (JSDR) to review the equipment spectrum certification either in Equipment-Location Certification Information Database (EL-CID) and End-to-End Spectrum Supportability (E2ESS) formats.

(2) Access for JSDR or any other Global Electromagnetic Spectrum Information System (GEMSIS) databases a DD Form 2875 is required.

(3) Accessing the Host Nation Spectrum Worldwide Database Online (HNSWDO) is beneficial for a unit gearing up for deployment to a Geographical Combatant Commander's (GCC) Area of Responsibility (AoR). It enables them to pinpoint U.S. systems and devices that have undergone spectrum supportability assessments and received authorizations from the GCC Joint Frequency Management Offices.

q. Things to consider on EA Frequency Requirements and Equipment Specifications that will garner FAA authorization.

(1) Ensure the frequency requirements are "consistent" between Frequency Requirement Table and Transmitter Specification table.

(2) Antenna gain is required unless the power is ERP (clearly specify if ERP)

(3) Technical nomenclature is a language; it is exacting, and it matters:

(a) 430 MHz refers to a single discreet frequency.

(b) 430 MHz, 432 MHz, 434 MHz, 435 MHz refers to four discreet frequencies.

(c) 430 MHz – 435 MHz refers to a band of frequencies between and inclusive of 430 MHz and 435 MHz.

(4) Ensure all specifications have correct units and are consistent:

(a) Units of Power (Watts, dBW, dBm) (FAA prefers dBm)

(b) Frequency (Hz, kHz, MHz, GHz)

(5) Do not use a unit of power for a unit of frequency and vice versa. For instance, the bandwidth of the transmitter is 20 Watts or the power of the transmitter is 30 MHz.

(6) Maximum bandwidth cannot exceed the frequency / tuning range.

- Good Example: Frequency / Tuning Range: M430 – M450; Max BW 30kHz. 30kHz does not exceeds the M430 – M450 frequency range.

- Poor Example: Frequency / Tuning Range: M430 – M450; Max BW 445MHz. 445MHz exceeds the M430 – M450 frequency range.

r. Remarks Section. Provide a short summary of the proposed purpose of the EA event. Identify types of jamming used (i.e., noise spot, deception jamming, etc.) and any other pertinent information, such as frequency change limitations or antenna information.

(1) Good Examples:

- "The purpose of this training scenario is to replicate an OPFOR capability for command Soldiers to train on the utilization of the Drone Buster and Drone Defender systems on how to detect, defeat, and conduct reporting procedures of a threat counter-Unmanned Aircraft System (c-UAS). This training is essential in deployment preparation to support defending U.S. military installations in a Geographical Combatant Commander's Area of Responsible to include the development of the command c-UAS standing operational procedures."

- "The purpose of this request is to provide c-UAS training in support of Joint Readiness Training Center rotational units and opposition force on EA procedures prior to expeditionary deployments."

(2) Unsatisfactory Examples:

- "The purpose of this request is to train Joint Readiness Training Center rotational units and opposition force on EA procedures prior to expeditionary deployments."

- "The purpose of this request is to fly a c-UAS in a training area, learn to operate equipment, and jamming of c-UAS."

s. Miscellaneous Examples that cause extra work and non-concurrences.

(1) GPS mentioned in EA request (separate process for GPS request).

(2) Route of Flight: 500M (500M is not route of flight).

(3) One stop buzzer number provided when two are required.

(4) Coordinates for transmitter are outside of previously defined operational area.

(5) Missing information (e.g., antenna information).

(6) EA system airborne or ground/surface based not specified.

(7) Antenna Type: Model number and serial number provided.

Appendix List

Glossary

A.

A2AD – Anti-Access. Area Denial
AAR – After Action Review
AFCAZ – Area Frequency Coordinator Arizona
AFMO – Army Frequency Management Office
ANG – Air National Guard
AOR – Area of Responsibility
AR – Army Regulation
ARTCC – Air Route Traffic Control Center
ASMO – Army Spectrum Management Office
AT&A – Air Traffic and Airspace
ATC – Air Traffic Control
ATCAE – Army Technical Control and Analysis Element

B.

BCT – Brigade Combat Team
BDA – Battle Damage Assessment
BDE – Brigade
BLUFOR – Blue Force
BN – Battalion

C.

c-UAS – Counter – Unmanned Aircraft System
C2 – Command and Control
C4 – Command, Control, Communications, Computers
C5ISR – Command and Control, Communications, Computers, Combat Systems, Intelligence, Surveillance, and Reconnaissance
CCIR – Commander's Critical Incident Reports
CESR – Consolidated Exercise Support Request
CEMA – Cyber and Electromagnetic Activities
CO – Commanding Officer
COMSEC – Communication Security
CONOP – Concept of Operations
COP – Common Operations Picture
COS – Common Operating System
COTs – Commercial Off the Shelf
CP – Command Post
CUE – Integration of one or more types of ISR systems to provide information that directs follow-on collection of more detailed information by another system

D.

dbP – Decibels Peak
DEVCOM - U.S. Army Combat Capabilities Development Command
DIV – Division
DoD – Department of Defense
DPTMS – Directorate of Plans, Training, Mobilization, and Security
DRAW – Deliberate Risk Assessment Worksheet

E.

EA – Electromagnetic Attack
EMCON – Emissions Control
EMS – Electromagnetic Spectrum
EMSO – Electromagnetic Spectrum Operations
EOB – Electronic Order of Battle
EP – Electromagnetic Protection
ES – Electromagnetic Support
EW – Electromagnetic Warfare
EWPMT – Electronic Warfare Planning and Management Tool
EXCON – Exercise Control

F.

FAA – Federal Aviation Administration
FCC – Federal Communications System
FORSCOM – Forces Command
FRAGORD – Fragmentary Order

G.

GCA – Ground Control Approach
GFR – Government Flight Representative
GNSS – Global Navigation Satellite System
GOTs – Government Off the Shelf
GPS – Global Positioning System

H.

HF – High Frequency
HPTLs – High Payoff Target List
HRA – Hand Receipt Account
HST – Home Station Training
HVTL – High Value Target List

I.

IBS – Integrated Broadcast Service
IEW – Intelligence and Electromagnetic Warfare
IWETPT – Intelligence and Electronic Warfare Tactical Proficiency Trainer
ISM – Installation Spectrum Manager
ISR – Intelligence, Surveillance, and Reconnaissance

J.

JCRs – Joint Capabilities Release

L.

LFX – Live Fire Exercise
LMR – Land Mobile Radio
LRTC – Long-Range training Calendar
L/V/C – Live, Virtual, and Constructive

M.

MC4EB - Military Command, Control, Communications, and Computer Executive Board
MCT – Mission Correlation Table
MDMP – Military Decision-Making Process
MDO – Multi-Domain Operations
MEMSS – Modular Electromagnetic Spectrum System
MILDEC – Military Deception
MILDEP – Military Department
MMw – Millimeter Wave
MSEL – Master Scenario Events List
MSL – Mean Sea Level

N.

NAVWAR – Navigation Warfare
NCO – Non-Commissioned Officer
NEAT – NAVWAR Electronic Attack Trainer
NLT – No Later Than
NM – Nautical Miles
NOTAMS – Notice to Air Missions
NRT – Near Real Time
NTIA – National Telecommunications and Information Administration

O.

EOB – Electronic Order of Battle
OneSAF – One Semi-Automated Forces

OPFOR – Opposing Force
OPORD – Operations Order
OPR – Office of Primary Responsibility
OPREPs – Operations Reports
OPSEC – Operations Security

P.

PdM IMO – Product Manager Instrumentation Management Office
PEO STRI – Program Executive Office, Training and Instrumentation
PIR – Priority Intelligence Requirements
PM CT2 – Project Manager Cyber, Test and Training
PNT – Positioning, Navigation, and Timing
POC – Point of Contact
POI – Program of Instruction
POR – Program of Record

R.

RETANS – Retransmission
RFA – Radio Frequency Authorization
RFMSS – Range Facility Management Support System
RM – Resource Management
RMT – Realistic Military Training
ROE – Rules of Engagement
ROIC – Range Officer-In-Charge
RSO – Range Safety Officer

S.

S2AS – Spectrum Situation Awareness System
S&T – Science and Technology
SATCOM – Satellite Communications
SCG – Security Classification Guide
SCONOP – Security Concept of Operations
SCT – SIGINT Collections Teams
SIGAD – Signals Intelligence Activity Designator
SIGINT – Signals Intelligence
SIRs – Serious Incident Reports
SMO – Spectrum Management Office
SMDC – Space and Missile Defense Command
SOI – Signals of Interest
SOP – Standard Operating Procedure
SPS – Spectrum Planning Subcommittee
SR – Schedule Request
SRP – Sustainable Range Program

STEVE – Situational Training Electronic Attack Variable Emitter
STRAC – Standard in Training Commission
SXXI – Spectrum XXI

T.

T&E – Test and Evaluation
TADSS – Training Aids, Devices, Simulators, and Simulations
TAMIS – Total Ammunition Management Information System
TASKORD – Tasking Order
TBCF – Threat Battle Command Force
TESS – Tactical Engagement Simulation System
TEWS – Tactical Electronic Warfare System
TIF – Target Information Folder
TIP – Remote sensing and intelligence gathering tactic of identifying a potential area of interest to trigger a high fidelity sensor for collection
TLS BCT – Terrestrial Layered System Brigade Combat Team
TOC – Tactical Operations Center
TRADOC – United States Army Training and Doctrine Command
TSAID – Training Support Analysis & Integration Directorate
TSC – Training Support Center

U.

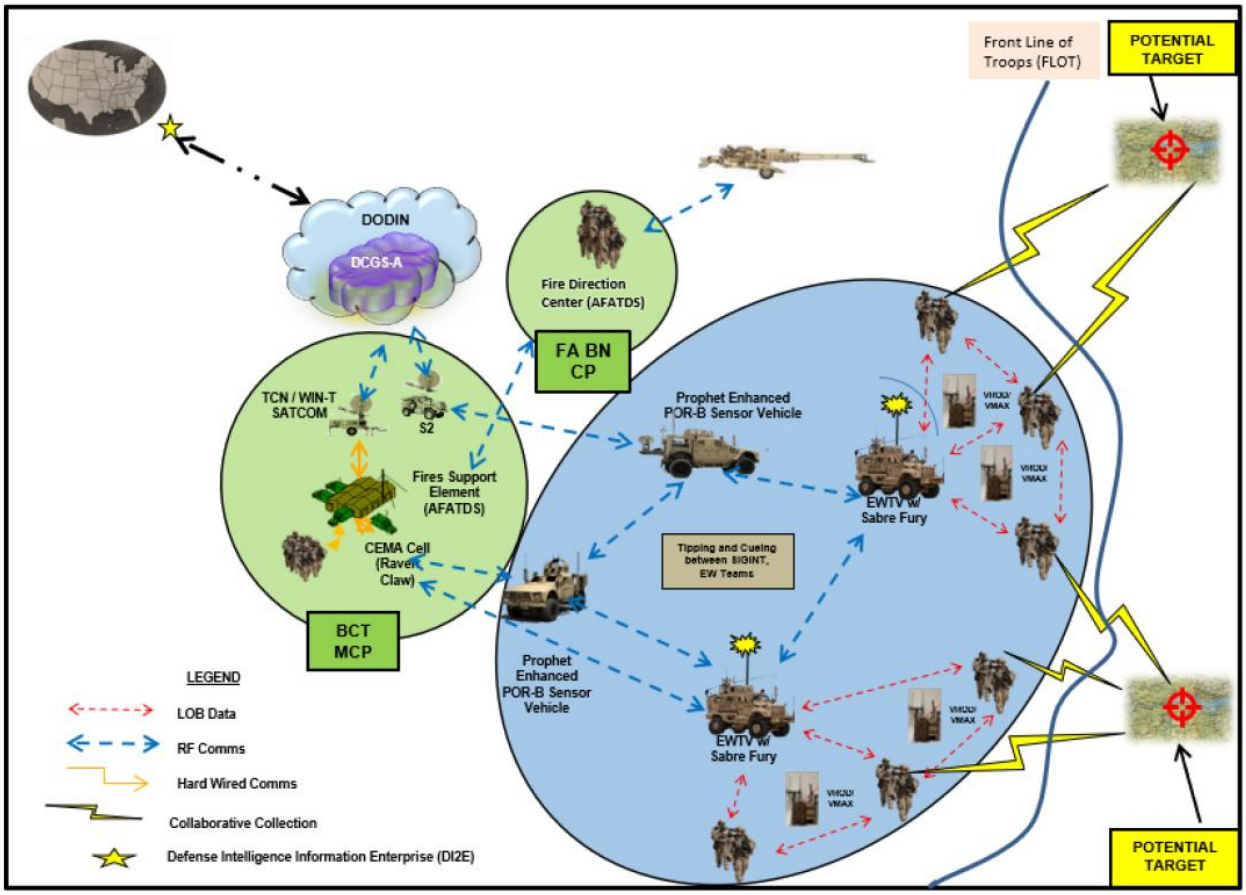
UAS – Unmanned Aircraft System
USAG – United States Army Garrison
USSOCOM – United States Special Operations Command

Z.

VAR – Virtual Access Request
VHF – Very High Frequency
VIP – Very Important Person
VROD – Versatile Radio Observation and Direction
VMAX – VROD Modular Adaptive Transmit
XLCC – Expeditionary Live-Virtual-Constructive Command and Control

Appendix A: MDO Collective Training Use Case

Mounted and Dismounted EW/SIGINT Team STX (BCT, DIV, EMIB) (MITS/CEWTS Tier III)



Enabler Support: Home Station Foundry Program, Div/Corps G39, DIV/Corps G2, Div/Corps Fires

Resources (TADS): Target Threat Emitters (STRATOMST, MAGPIE, TREX, T/RX etc.)

Required Coordination:

• **Frequency Allocation**	**90 Days**
• **Electronic Attack**	**90 Days**
• **SCONOP**	**90 Days**
• **CESR**	**45 Days**
• **NOTAM**	**90 Days**
• **Foundry Equipment Request**	**90 Days (Varies by Home Station)**
• **TSCIF Request**	**30 Days**

1. **STX Lane Scheme of Maneuver/Execution:**

a. Mounted EW systems manned and operated by EW trained personnel along with dismounted EW (VROD/VMAX/BEAST+ etc) systems carried by dismounted EW Teams monitor the (EMS) for RF emitters of interest in their Area of Operation (AO).

b. EW/SIGINT teams are TACON to units in support of mission specific objectives and operate under the direct control of BCT CEMA mission manager.

c. Target Threat Emitters (STRATOMST, MAGPIE, T/RX, TREX, DLFEN, ASI Elite etc.) along with Signals of interest (SOI) provided to the EW Teams by the Intel Team through the Enemy Electronic Order of Battle (EEOB)

d. EW systems emplaced based on Enemy Situation Template (SITEMP)

e. Line of sight analysis (LOSA) conducted to determine the primary, secondary, and tertiary location of platform to accomplish specific mission objectives. (ES or EA mission)

f. Dismounted EW operator in the EW vehicle or mounted EW/SIGINT system operator is responsible for disseminating emitter reports to all other EW teams and EW team components as well as the Command post CEMA team, and BCT S2.

g. EW/SIGINT teams detect a radio frequency from target threat emitter from the programmed target list within the load set and conducts Direction Finding (DF) of emitter.

h. EW/SIGINT team operators tip/cue detection to other team systems through tactical voice or chat to provide more robust analysis and targeting.

i. Dismounted EW operator initiates an emitter report to BCT CEMA cell through communications package into TOC Electronic Warfare Battle Management (EWBM) system/EWPMT. BCT CEMA cell disseminates tactical information to BCT staff with focus on S2, S3, and Targeting cell.

j. EW/SIGINT vehicle and Dismounted EW operator tips and cues SIGINT team by passing emitter reports to SIGINT teams for deep analysis and SIGINT exploitation.

k. Based on priority of mission SIGINT teams provide refinement of target location and pass along to BCT CEMA cell for targeting in conjunction with the Attack Guidance Matrix (AGM)

l. EWO at BCT CEMA cell analyzes information on Dismounted EW and tips/cues BCT Staff on detected RF emitters of interest BCT CEMA cell passes target information along with preapproved target packet (HVT, HPT on the AGM) to Targeting cell.

m. BCT S2 receives emitter report from multiple sources (BCT CEMA cell, SIGINT Teams) and coordinates on detected RF emitters of interest with SIGINT teams to provide more robust/detailed collection and analysis.

n. SIGINT Vehicle provides deep analysis if required (through internals if possible) and locates emitters/SOI – shares LOB via approved method to EW vehicle ES and data is manually populated on vehicle mounted EW system. Provides additional confirmation of geolocation ID with PED. (Not required for mission execution unless specified on the AGM)

o. BCT CEMA cell in collaboration with BCT S2 confirms hostile emitter (Communications Emitter Notations (CENOTs), ELINT notations (ELNOTs), and Foreign Instrument Signals Notations (FISNOT)) and de-conflicts sources for targeting.

p. BCT CEMA Cell reports confirmed hostile emitter (CENOT, ELNOT, FISNOT) to BCT Targeting Group

q. BCT Targeting Group identifies hostile emitter as a target on the HVT, HPTL with Attack Guidance specified and selects a kinetic/indirect fire response.

r. BCT CEMA Cell constructs and sends a Target Message referencing the hostile emitter to BCT Targeting Group

s. BCT Targeting Group initiates a CFF “At My Command” targeting the hostile emitter.

t. BCT FSE clears the battle space and sends a Fire Request to FA BN FDC.

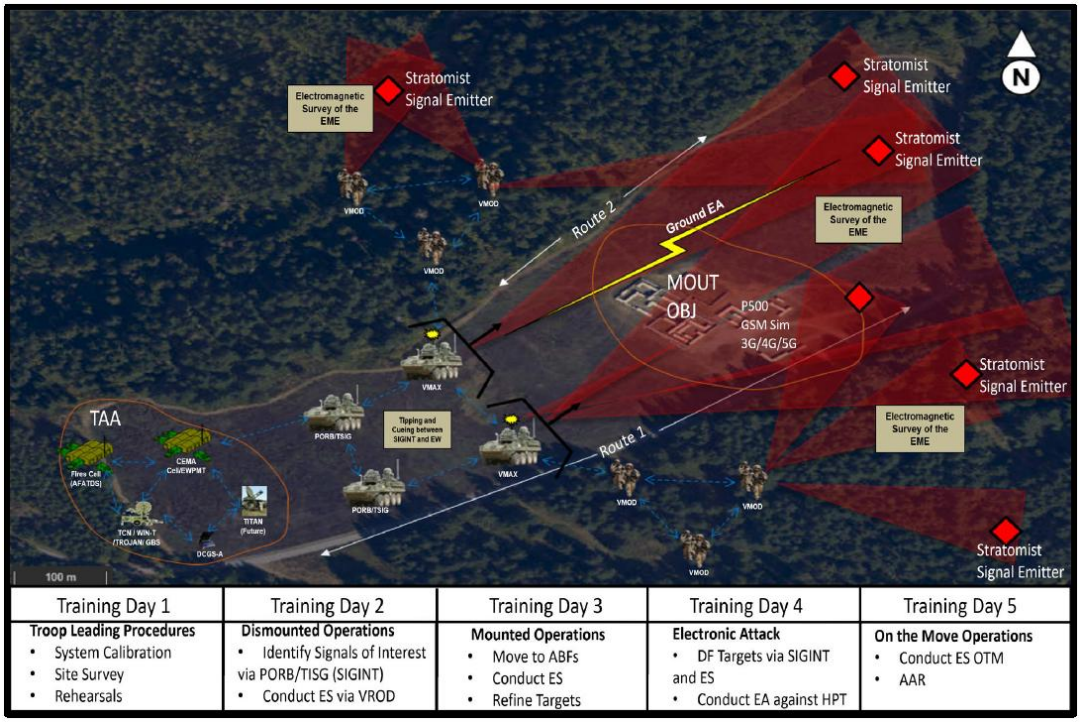
u. Fire mission proceeds and BCT FSE receives Observer Mission Update "Rounds Complete", from firing unit.

v. BCT FSE sends End of Mission (EOM) and Mission Fired Report (MFR) through the established fires chain to complete the fire mission. BCT Targeting Group is copy furnished on all mission messages.

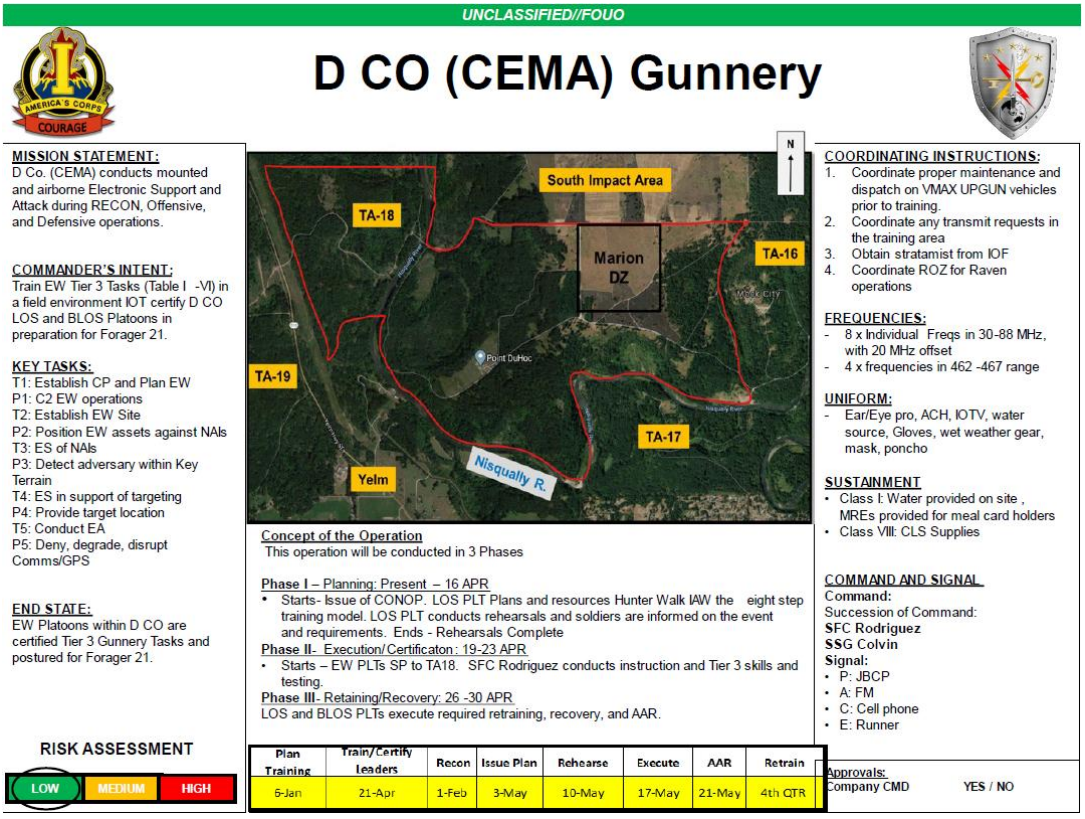
w. S2 and CEMA cells jointly assess mission effectiveness. Chain of Command notified of effects assessment.

Example 5 Day Training Model

(Add Task Purpose Method Endstate (TPME))



Training Day 1	Training Day 2	Training Day 3	Training Day 4	Training Day 5
Troop Leading Procedures • System Calibration • Site Survey • Rehearsals	**Dismounted Operations** • Identify Signals of Interest via PORB/TISG (SIGINT) • Conduct ES via VROD	**Mounted Operations** • Move to ABFs • Conduct ES • Refine Targets	**Electronic Attack** • DF Targets via SIGINT and ES • Conduct EA against HPT	**On the Move Operations** • Conduct ES OTM • AAR



UNCLASSIFIED//FOUO

D CO (CEMA) Gunnery

MISSION STATEMENT:
D Co. (CEMA) conducts mounted and airborne Electronic Support and Attack during RECON, Offensive, and Defensive operations.

COMMANDER'S INTENT:
Train EW Tier 3 Tasks (Table I -VI) in a field environment IOT certify D CO LOS and BLOS Platoons in preparation for Forager 21.

KEY TASKS:
T1: Establish CP and Plan EW
P1: C2 EW operations
T2: Establish EW Site
P2: Position EW assets against NAIs
T3: ES of NAIs
P3: Detect adversary within Key Terrain
T4: ES in support of targeting
P4: Provide target location
T5: Conduct EA
P5: Deny, degrade, disrupt Comms/GPS

END STATE:
EW Platoons within D CO are certified Tier 3 Gunnery Tasks and postured for Forager 21.

RISK ASSESSMENT
LOW MEDIUM HIGH

Concept of the Operation
This operation will be conducted in 3 Phases

Phase I – Planning: Present – 16 APR
- Starts- Issue of CONOP. LOS PLT Plans and resources Hunter Walk IAW the eight step training model. LOS PLT conducts rehearsals and soldiers are informed on the event and requirements. Ends - Rehearsals Complete

Phase II- Execution/Certificaton: 19-23 APR
- Starts – EW PLTs SP to TA18. SFC Rodriguez conducts instruction and Tier 3 skills and testing.

Phase III- Retaining/Recovery: 26 -30 APR
LOS and BLOS PLTs execute required retraining, recovery, and AAR.

Plan Training	Train/Certify Leaders	Recon	Issue Plan	Rehearse	Execute	AAR	Retrain
6-Jan	21-Apr	1-Feb	3-May	10-May	17-May	21-May	4th QTR

COORDINATING INSTRUCTIONS:
1. Coordinate proper maintenance and dispatch on VMAX UPGUN vehicles prior to training.
2. Coordinate any transmit requests in the training area
3. Obtain stratamist from IOF
4. Coordinate ROZ for Raven operations

FREQUENCIES:
- 8 x Individual Freqs in 30-88 MHz, with 20 MHz offset
- 4 x frequencies in 462 -467 range

UNIFORM:
- Ear/Eye pro, ACH, IOTV, water source, Gloves, wet weather gear, mask, poncho

SUSTAINMENT
- Class I: Water provided on site , MREs provided for meal card holders
- Class VIII: CLS Supplies

COMMAND AND SIGNAL
Command:
Succession of Command:
SFC Rodriguez
SSG Colvin
Signal:
- P: JBCP
- A: FM
- C: Cell phone
- E: Runner

Approvals:
Company CMD YES / NO

Appendix B: Integrated Broadcast System

INTELLIGENCE WITHOUT TACTICAL INTERNET

by Major Alex Dowds and Chief Warrant Officer 3 Maegan Heinicke

Editor's Note: Because of the sensitive nature of the systems discussed in this article, it was necessary for the author to omit details of their full functionality, leading to a generalized, but still valuable, discussion.

Introduction

As we train for tomorrow's fight, battalions, brigades, and divisions conduct collective training events that enable unit commanders' familiarity with the ways their formations fight and win. Units draft, refine, and validate standard operating procedures (SOPs) for the intelligence warfighting function to serve as a guide for the commander and intelligence staff. Currently, the U.S. Army is employing lessons learned from the battlefields of Ukraine, Syria, and Nagorno-Karabakh to adapt our way of fighting to where survivability relies on mobility and a communications architecture that provides maximum intelligence for the commander's decision making. Our ability to maintain momentum and survive in conflict with a peer threat will require versatile PACE[1] plans that incorporate redundant mechanisms to assimilate information and enable the commander's decision space in an environment where "first to know" becomes "first to act."

One option units should consider for their PACE plans is the Integrated Broadcast Service (IBS). Units can incorporate the IBS into their PACE plans without additional equipment requirements. This service delivers near real time intelligence to the warfighter, nearly anywhere on the globe, from an ultra-high frequency (UHF) broadcast that is timely, relevant, and targetable without an upper tactical internet connection. IBS has been delivering this type of intelligence support to the joint service for decades. The Army, through its focus on upper tactical internet and its intelligence programs of record, has eroded the knowledge base required to use this fundamental capability at the brigade and division level. Our current training and materiel prevent an otherwise well-trained and equipped force from harnessing this capability. This article seeks to convey, at an unclassified level, some of these deficiencies. It also explores opportunities for military intelligence leaders to stimulate discussion as they develop training plans in preparation for a combat training center or Mission Command Training Program rotation.

What is the Integrated Broadcast System?

The IBS is a worldwide Department of Defense standard network for transmitting time-sensitive tactical and strategic intelligence and targeting data from multiple sources, including ground-, air-, and space-based sensors, into a common feed. The broadcast feed is available to authorized consumers at all echelons around the globe in near real time. Additionally, the IBS feed replicates over networks for processing by compatible internet protocol-based platforms to feed digital systems across the warfighting functions.

Is My Unit Equipped to Use the Integrated Broadcast System?

At brigade and division echelons, the system that receives the IBS broadcast is the Tactical Intelligence Ground Station (TGS). Depending on hardware version, the brigade S-2 and the military intelligence company have at least two organic receivers that can accept and process the IBS broadcast. At the corps level, the system is the Operational Ground Station. Currently, there is a capability to receive and process the IBS feed at the battalion level through the Global Broadcast Service. All echelons can receive the IBS feed through digital networks on the upper tactical internet.

Imagery Analysts from the Geospatial Intelligence Integration Support Test and Training Detachment travel to a training site with the Army's DCGS-A Tactical Ground Station on Fort Huachuca, AZ, July 19, 2013. (U.S. Army photo by SFC Kristine Smedley)

The ownership of the TGS causes tension at some units. The TGS is a multi-function target acquisition system, equipped with an array of antennas and processors to receive full motion video, imagery, and ground moving target indicators in addition to the IBS broadcast. Many of its capabilities are geospatial intelligence (GEOINT) related, and the system falls under the GEOINT section of the Intelligence Processing Team within the modified table of organization and equipment (MTOE). However, the primary consumers of the IBS feed are signals intelligence (SIGINT) analysts. SIGINT Soldiers have their own property and systems to manage and maintain in the form of the Prophet Enhanced and the Tactical Dismounted Electronic Warfare and SIGINT (better known as TDEWS), which does not receive the IBS UHF broadcast. Since the TGS belongs to the GEOINT team, and the SIGINT team has their own property to manage, the IBS capability is often overlooked.

GEOINT teams do not train on methods for receiving the IBS broadcast feed because they do not have a requirement to use that data feed. Without the need for it, GEOINT teams deprioritize training and maintenance of the TGS's IBS capabilities. SIGINT Soldiers focus their training time on their section's architecture, versus time spent on SIGINT analysis tools. Since their MTOE systems do not receive the IBS broadcast, they do not train on it. Instead, SIGINT sections train on their tasks by accessing data over internet protocol and never have to deconflict training time on the TGS with their GEOINT counterparts. They do not train on the TGS at all, as it is out of sight, out of mind. The IBS functions of the TGS are also not a consideration for the SIGINT team during the Military Intelligence Training Strategy (MITS) certification. Therefore, when it is time for a collective training event, both the SIGINT and the GEOINT section lack the knowledge required to set up and incorporate the IBS broadcast.

Integrated Broadcast Service and Unit Training

Tier 1 and Tier 2 MITS events are the certification events that give brigade commanders confidence in the readiness of their intelligence warfighting function. However, units currently complete this certification without evaluating what intelligence obtained though the IBS broadcast can do for them. MITS does not reinforce the planning, resourcing, or training of the IBS broadcast through the brigade combat team's organic receivers, and it does not currently evaluate a unit's ability to set up and use those receivers. Instead, MITS focuses on message traffic simulation through the Intelligence and Electronic Warfare Tactical Proficiency Trainer.

The National Training Center produces a feed for the IBS broadcast in its scenarios, but it has not been widely adopted by home station training MITS enablers, the Joint Readiness Training Center, or the Mission Command Training Program. To use this broadcast capability in an exercise, there is a cumbersome process to incorporate exercise data over broadcast while using existing simulation programs of record. The process relies on expertise that is not present at every installation. It is worth noting that anecdotal evidence from the National Training Center suggests that the primary means of receiving IBS has either not functioned or rotational units have not brought it to the exercise *in the last 2 years*. The process to convert exercise traffic into the proper format (Common Message Format vs. United States Message Text Format) is time intensive using current Army simulation programs of record. If a unit intends to use the IBS broadcast, it is recommended that they start the process six months before their training rotation. To overcome this, units are encouraged to leverage their home station Foundry site and enable IBS integration using the Automated Scriptor Simulator Exercise Trainer (known as ASSET), which is funded by the National Reconnaissance Office. This significantly reduces the lead-time and personnel required to convert message traffic for seamless use of IBS.

If we want to stay true to, "train how you fight," then we need to do a much better job of making training available to units that are preparing for deployments. Units need the ability to use the IBS broadcast in training, because that is

where we validate our SOPs. The inability of units to train with the IBS broadcast during their training cycles leads to units not knowing about the functionality or lacking an adequate proficiency with it.

Conclusion

The materiel solution to enable tactical formations to receive targetable, near real time intelligence already exists. Formations need to understand and train on all the capabilities that exist within their current equipment. We are not encouraging units to train with the IBS broadcast in our culminating exercises, resulting in SOPs that lack the incorporation of IBS broadcasts, and commanders that do not know the capabilities they possess. Military intelligence leaders at all echelons must embrace the capabilities of the IBS and train for its use and purpose. The IBS capability provides added flexibility and survivability that we need to harness to succeed in our next fight.

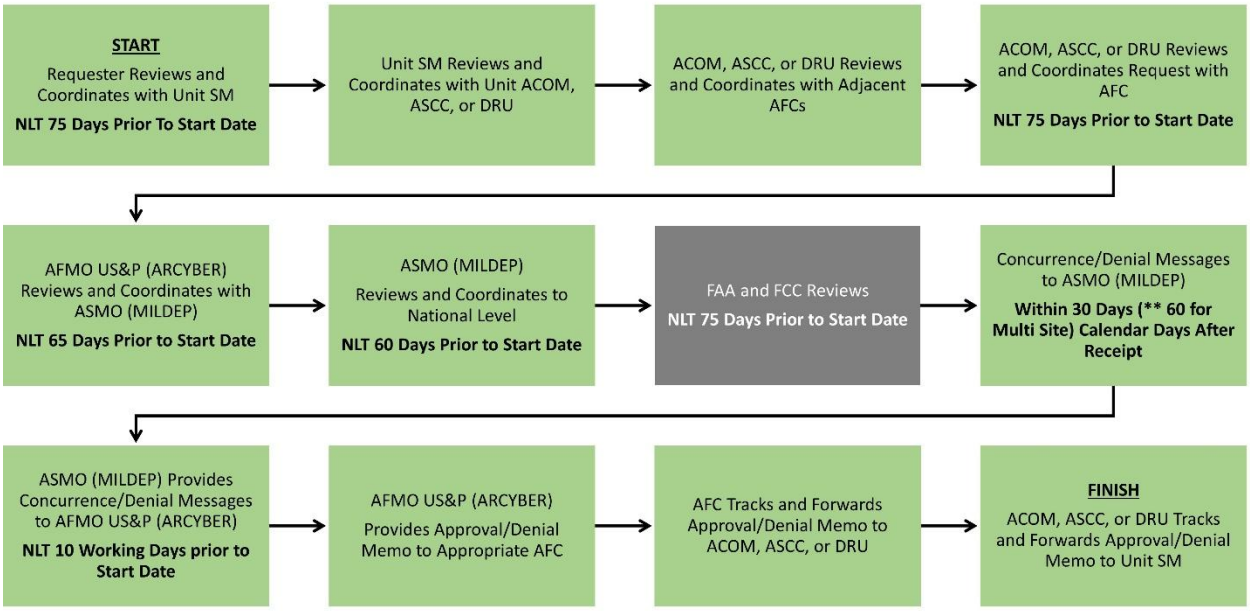
Endnote

1. A PACE plan establishes primary, alternate, contingency, and emergency methods of communications for each warfighting function, typically from higher to lower echelons. Department of the Army, Field Manual 6-0, *Commander and Staff Organization and Operations* (Washington, DC: Government Publishing Office, 16 May 2022), 6-8.

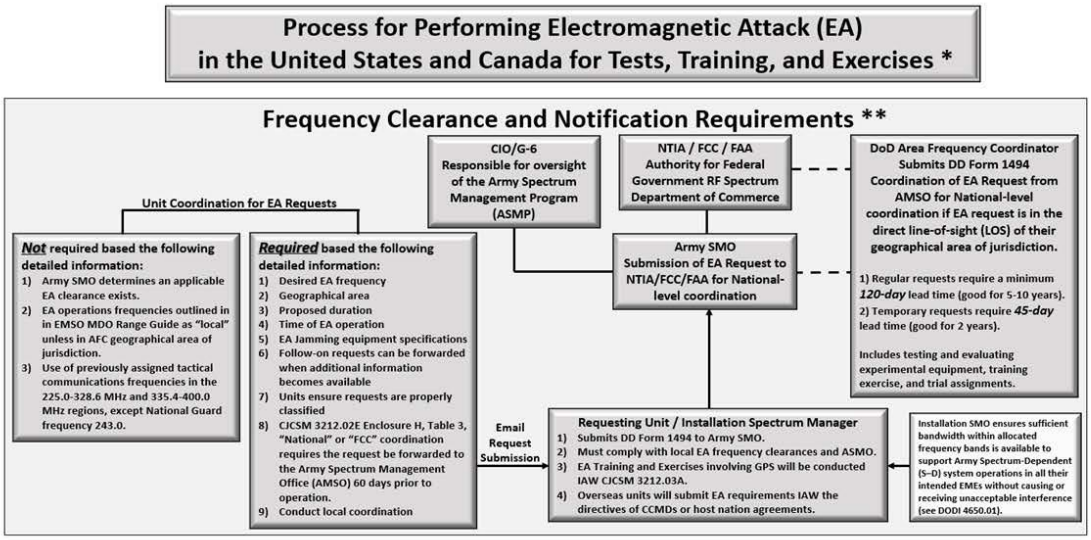
MAJ Alex Dowds is the S-2 for 1st Brigade Combat Team, 10th Mountain Division. He previously served as the 10th Mountain Division Collection Manager. He holds a master of operational studies degree from the Command and General Staff College and a master of arts in international security studies from the University of Arizona. MAJ Dowds is a graduate of the Army Intelligence Development Program-Intelligence,Surveillance, and Reconnaissance as well as the Digital Intelligence System Master Gunner Course.

CW3 Maegan Heinicke is the Fort Irwin and National Training Center Foundry director and a signals intelligence technician. She previously served as the signals intelligence officer in charge for the 1st Infantry Division, Fort Riley, KS. She is currently pursuing a bachelor's degree in legal studies.

Appendix C: Frequency Assignment Lifecycle



Appendix D: Frequency Clearance and Notification Requirements



** The Interdepartmental Radio Advisory Committee (IRAC) members shall consider the requirements of national defense. DoD EA operations are a part of national defense and once approved under the auspices of CJCSM 3212.02E should not be terminated except as specified below:

- Safety (e.g., life, flight, range)
- Harmful interference
- Operations Security
- Determination of the EA user

International Civil Aviation Organization and International Telecommunications Union regulations provide further considerations for conducting EA within international airspace but may not govern DoD Component EA operations under certain circumstances.

* CJCSM 3212.02E dtd. 17 June 2019

UNITED STATES FREQUENCY ALLOCATIONS

THE RADIO SPECTRUM

RADIO SERVICES COLOR LEGEND

- AERONAUTICAL MOBILE
- AERONAUTICAL MOBILE SATELLITE
- AERONAUTICAL RADIONAVIGATION
- AMATEUR
- AMATEUR SATELLITE
- BROADCASTING
- BROADCASTING SATELLITE
- EARTH EXPLORATION SATELLITE
- FIXED
- FIXED SATELLITE
- INTER-SATELLITE
- LAND MOBILE
- LAND MOBILE SATELLITE
- MARITIME MOBILE
- MARITIME MOBILE SATELLITE
- MARITIME RADIONAVIGATION
- METEOROLOGICAL
- METEOROLOGICAL SATELLITE
- MOBILE
- MOBILE SATELLITE
- RADIO ASTRONOMY
- RADIODETERMINATION SATELLITE
- RADIOLOCATION
- RADIOLOCATION SATELLITE
- RADIONAVIGATION
- RADIONAVIGATION SATELLITE
- SPACE OPERATION
- SPACE RESEARCH
- STANDARD FREQUENCY AND TIME SIGNAL
- STANDARD FREQUENCY AND TIME SIGNAL SATELLITE

ACTIVITY CODE

- FEDERAL EXCLUSIVE
- FEDERAL/NON-FEDERAL SHARED
- NON-FEDERAL EXCLUSIVE

ALLOCATION USAGE DESIGNATION

SERVICE	EXAMPLE	DESCRIPTION
Primary	FIXED	Capital Letters
Secondary	Mobile	1st Capital with lower case letters

This chart is a graphic single-point-in-time portrayal of the Table of Frequency Allocations used by the FCC and NTIA. As such, it may not completely reflect all aspects, i.e. footnotes and recent changes made to the Table of Frequency Allocations. Therefore, for complete information, users should consult the Table to determine the current status of U.S. allocations.

U.S. DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Office of Spectrum Management

JANUARY 2016

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Facsimile: (202) 512-2250 Mail: Stop SSOP, Washington, DC 20402-0001

* EXCEPT AERONAUTICAL MOBILE (R)

** EXCEPT AERONAUTICAL MOBILE

PLEASE NOTE: THE SPACING ALLOTTED THE SERVICES IN THE SPECTRUM SEGMENTS SHOWN IS NOT PROPORTIONAL TO THE ACTUAL AMOUNT OF SPECTRUM OCCUPIED.

Appendix F: Template for Electronic Attack Request Memorandum

Template for Electronic Attack Request Memorandum

Command Letter Header – Type font is Arial. Point size is 12

OFFICE SYMBOL DD MTH
YEAR

MEMORANDUM FOR United States Department of the Army, DCS G6, Army Spectrum Management Office, 6916 Cooper Ave., Fort Meade, Maryland 20755-6916

SUBJECT: Routine Electronic Attack (EA) Clearance Request for Nationally Controlled Frequencies in support of insert command name.

1. References:

a. CJCSM 3212.02E, Performing EA in the United States and Canada for Tests, Training, and Exercises, dated 17 June 2019

2. (U) In accordance with (IAW) Reference a, insert command name requires Army Spectrum Management Office support to conduct national federal agency EA coordination with Federal Aviation Administration (FAA) and Federal Communications Commission.

3. (U) Operational and Technical Points of Contact (POC):

a. Primary: (Military name, rank, and job title or Civilian name and job title)
Commercial:
Mobile number:
NIPRnet:
SIPRnet:

b. Alternate: (Military name, rank, and job title or Civilian name and job title)
Commercial:
Mobile number:
NIPRnet:
SIPRnet:

c. Alternate (if required): (Military name, rank, and job title or Civilian name and job title)
Commercial:
Mobile number:
NIPRnet:
SIPRnet:

4. (U) EA Clearance Request Control Number: XXXXXX EA XX-XX

5. (U) Period of Request: DD MTH YEAR until XX MTH YEAR

6. (U) EA Operating Areas, Flight Routes, Altitudes, Times, and Radius of Operation: Testing command to insert description of the type of EA systems that will be determine for the test and training. The EA request needs to be explicit on the EA systems- ground, airborne, or shipborne based (e.g., is EA on the ground, on a tower (how high on the tower), airborne (flight level), etc..

a. Operating Areas. Testing command to insert description

Table 1. (U) Operating Area

Training Range Location	Latitude and Longitude Decimal Degrees
	DD.DDDDDN DDD.DDDDDW
	DD.DDDDDN DDD.DDDDDW
	DD.DDDDDN DDD.DDDDDW
	DD.DDDDDN DDD.DDDDDW
	DD.DDDDDN DDD.DDDDDW
	DD.DDDDDN DDD.DDDDDW

Figure 1. (U)
Insert maps, plots, or graphs (if required)

b. Route of Flight. Testing command to insert flight route(s)

c. Altitudes. Testing command will insert AGL or MSL

d. Topographic Layout. Testing command will insert training range terrain details

e. Times. Testing command will insert times

f. Expected Duration per Activity. Testing command will insert description

7. (U) Positive Control: Positive control shall be provided for all EA activity.

a. "CEASE BUZZER" procedures will be in effect in accordance with CJCSM 3212.02E Enclosure G, FAA Order 7610.4, Insert Training Range name regulations, and other applicable guidance for specific geographical areas. b. Users must monitor appropriate Air Traffic Control, guarded frequencies, and emergency guarded frequencies 121.5 MHz and 243MHz at all times, and range controllers must monitor communications channels and jammers employed for frequency drift.

DRAFT

"CEASE BUZZER" calls shall be accompanied by the appropriate band and channel designators whenever possible to preclude unnecessarily causing all EA training within radio range of the "CEASE BUZZER" call to be interrupted of cease. In an event of CEASE BUZZER notification, all EA operations shall be immediately shutdown

c. Testing command will insert their own CEASE BUZZER guidance such as brief on proper EA test procedures, CEASE Buzzer operations, ground and medical evacuations, etc...

d. Prior to execution of this EA test and training event, Cease Buzzer communications shall be established; Cease Buzzer POCs are identified in Table 2.

Table 2. (U) Cease Buzzer POCs

Name and Rank	Commercial telephone	Cellular telephone
Primary:		
Secondary:		

***NOTE: Cyber Electromagnetic Activity shall ensure command cellular telephone numbers are validated for each EA annual request.*

8. (U) Frequency Requirements and Specifications. Testing command to insert list of required frequencies and specifications of EA jamming. For each system name, testing command will complete Table 3, blue, green, and yellow color codes to correspond with paragraph 9 Equipment Specification and Configurations. Additional systems will be listed in separate as Table 3.a, Table 3.b, etc...

Table 3. Frequency Requirements

System Name	Frequency / Tuning Range	Max BW / PWR (dBm) / TYPE	ANT / GAIN (dBi) / BMW

9. (U) Equipment Specifications and Configurations: Testing command will add equipment specifications to paragraph a - System Name to correspond with Table 3. Additional systems will be listed in separate paragraph b, c, etc... to correspond with appropriate Table 3.a, Table 3.b, etc...

a. (U) System Name
   i. (U) Equipment Specification

      (1). (U) Number of transmitter(s):
      (2). (U) Transmit frequency:

(3). (U) Occupied Bandwidth for each transmitter:
(4). (U) Signal Types:
(5). (U) Signal Duty Cycle:
(6). (U) Pulse Repetition Rate:
(7). (U) Pulse Duration:
(8). (U) Tone Spacing:
(9). (U) Power Input(s) to the Antenna (dBm):
(10). (U) Modulation:
(11). (U) Antenna Type(s):
(12). (U) Antenna Polarization:
(13). (U) Antenna Height(s):
(14). (U) Pointing Azimuth and Elevation:
(15). (U) Radius:
(16). (U) Main beam gain (dBi):
(17). (U) Beamwidth (BMW):
(18). (U) Site Elevation:

10. (U) Remarks Section: Testing command will provide a short summary of the proposed purpose of the EA event. Identify types of jamming used (i.e., noise spot, deception jamming, etc.) and any other pertinent information, such as frequency change limitations or antenna information.

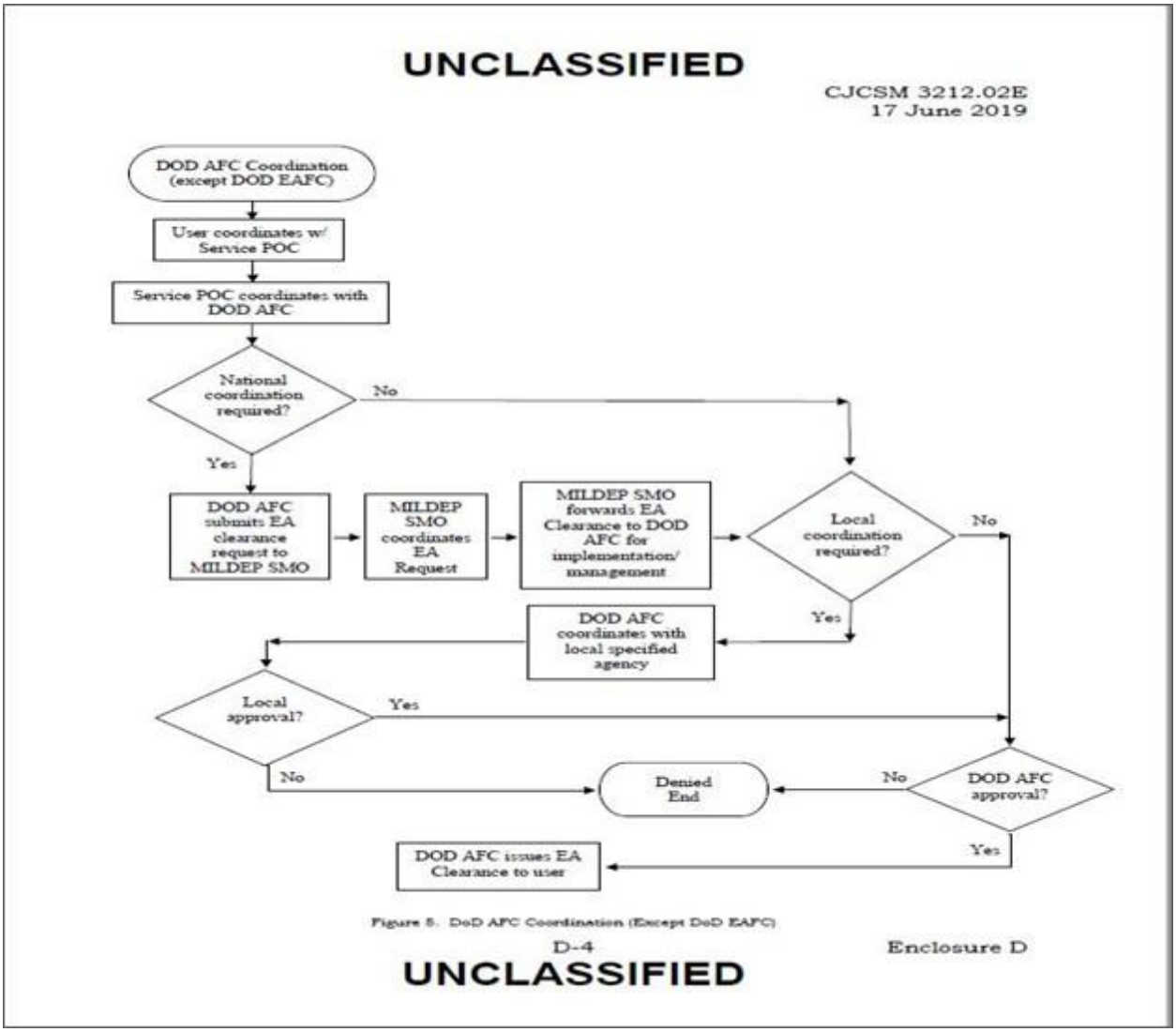
11. (U) The Point of Contact for this memorandum (Add name, rank, job title, telephone number, and NIPRnet & SIPRnet email addresses)

12. (U) The undersigned of this memorandum has certified and validated this EA request IAW Reference a.

Signature block

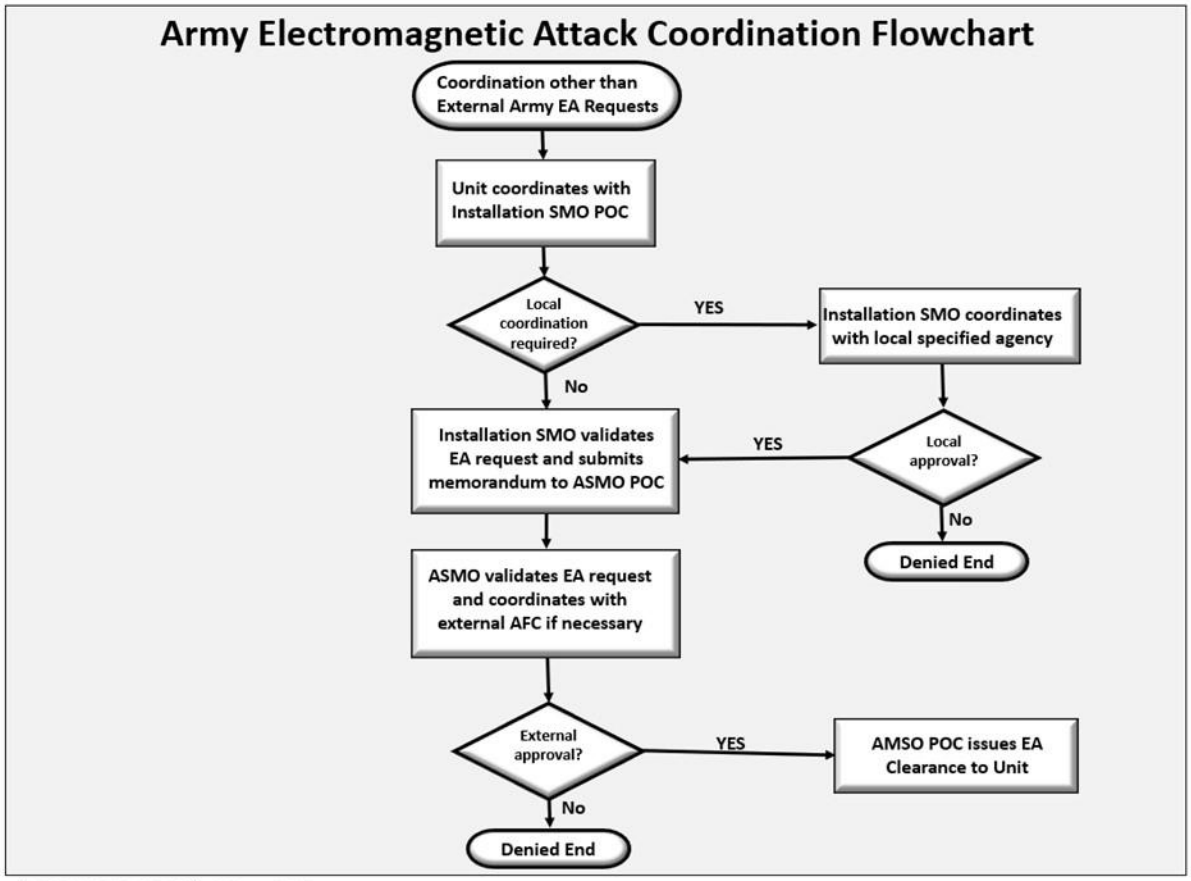
DRAFT

Appendix G: Electronic Attack Request Lifecycle



Appendix H: Army Electronic Attack Coordination Flowchart

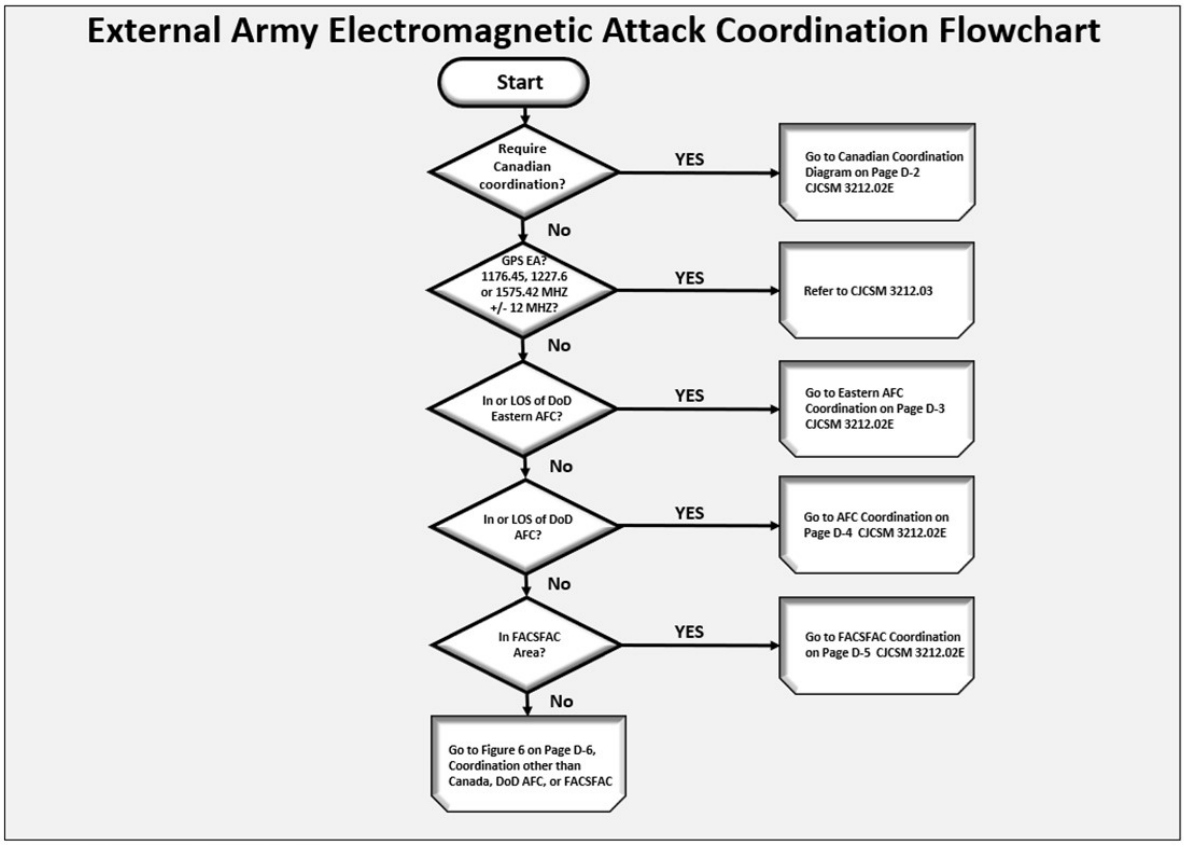
Process for Performing Electromagnetic Attack (EA) in the United States and Canada for Tests, Training, and Exercises *



* CJCSM 3212.02E dtd. 17 June 2019

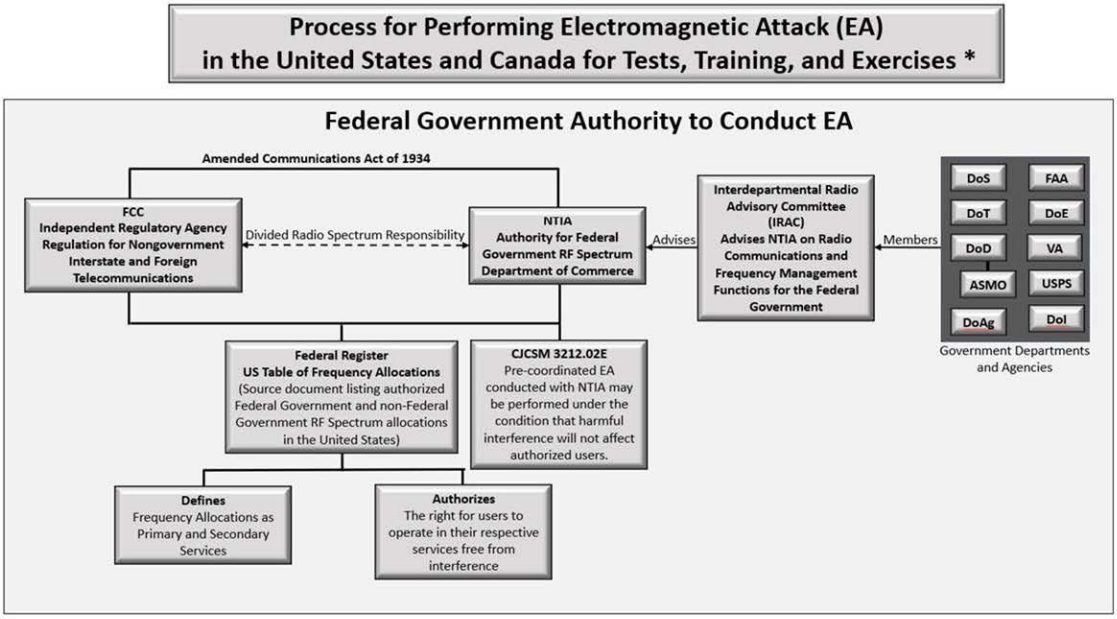
Appendix I: External Army Electronic Attack Coordination Flow Chart

Process for Performing Electromagnetic Attack (EA) in the United States and Canada for Tests, Training, and Exercises *



* CJCSM 3212.02E dtd. 17 June 2019

Appendix J: Federal Government Authority to Conduct Electronic Attack



* CJCSM 3212.02E dtd. 17 June 2019

Appendix K: MDO Training Pro Tips

MDO Training Pro Tips

Below are tips and TTPs that will help your unit have a better training event!

1. Work with your Spectrum Manager early and often!
2. Understand what aerial assets are being used and what the roles of those assets are in the operation. Coordinate with your airspace manager early and often.
3. Providing detailed CONOPS and Timelines to Range Operations, which include air and spectrum requirements, will help with any deconfliction of other training events.
4. Understanding "Stop Buzzer" procedures and how to implement, will help to reduce any Spectrum Fratricide.
5. Be prepared to provide certification documents for emitters.
6. Following the Spectrum timelines will help to ensure mission success.
7. Providing a complete list of all logistical and mission support requirements, will aid in mission success.

Appendix L: Federal Government Authority to Conduct Electronic Attack

Appendix (TBD)

TBD-1 MDO EMS Range Checklist

Officers-in-charge, range safety officers, laser safety officers and unit trainers use Tables TBD-1 through TBD-3 checklist to plan and conduct MDO using EMS live-and electromagnetic attack training. The three-part checklist is a guide; it must be supplemented by TC-25-8, AR/DA PAM 385-63, and appropriate TMs and FMs, Military Handbook 828A, local range regulations, special weapons requirements, and unit SOPs.

EMS coordination takes place a year in advance between the Installation Spectrum Manager and the Army Spectrum Management Office (ASMO) for EA clearance requests. The Installation Spectrum Manager must coordinate with the Area and Army Frequency and Spectrum Managers quarter, semi annually and annually to verify their MDO Training Rangers are approved for all emitters and EA systems. This will allow units to request training ranges without having to go through the long process of EA clearance. Without prior EA clearance for designated ranges on each installation, there will not be enough time for units to received EA authorization. Units must frequently coordinate and maintain awareness of EA requests approvals with the Installation Spectrum Manager prior to planning MDO range events.

Table -1. MDO EMS and EA Training Part I Preplanning Checklist

A. Mission analysis and execution

1. T-20: Obtain Installation Spectrum Manager approved EA clearance for designated training areas. Requested Training Area: _____

   Installation Spectrum Manager Training Area Approval Date:_____

   Installation Spectrum Manager Training Area Expiration Date: _____

2. T-16: Request Training Area approved for EA / EMS operations during 8-Step Training Process
   - a. Date of schedule operation / range:_____
   - b. TA/Range Requested through S-3/G-3

     TA/Range Name / number_____
   - c. Develop concept of operation (CONOP) for EA emitter training
   - d. Conduct training area spectrum deconfliction with adjacent training units ICW Installation Spectrum Manager
   - e. Confirmed Adjacent Unit POC information

   T-9: Confirm resources requested
   - a. Develop concept of operations for EA emitters training
   - b. Prepare and request if necessary, training resources (TADSS)
   - c. Emmiters / Targets (i.e. expendable drones, etc. ordered):

     Types:_____ Date:_____

     _____

     _____

     _____

3. T-3: Attend range-control safety briefing and range control deconfliction

   Date: _____

4. T-Week – Execute training.

Table (TBD). MDO EMS and EA Training Part I Preplanning Checklist (cont)

B.	Administrative requirements	Y	N	NA
	1. Request sufficient emitters for training based on CONOP			
	2. Verify Software "Builder" plots in EA submission request (T-16)			
	3. Sufficient time scheduled to complete training (T-16)			
	4. EA (Buzzer On) periods coordinated with Range Control (T-3)			
	5. Range-scheduling conflicts have been resolved (T-3)			
C.	**Personnel requirements**	**Y**	**N**	**NA**
	1. OIC			
	Attended safety course briefing			
	Completed unit certification			
	2. RSO			
	Attended safety course briefing			
	Completed unit certification			
	3. LRSO			
	Attended safety course briefing			
	Completed unit certification			
	4. Assistant safety officers			
	5. Medical support			
D.	**Equipment requirements**	**Y**	**N**	**NA**
	1. Range packet/ EA clearance approval memorandum received (T-12)			
	2. EA and emitter diagram/range overlay on hand (T-12)			
	EA system positions (CONOP) (T-WK)			
	EA system STX lanes (CONOP) (T-WK)			
	Emitter target locations (CONOP) (T-WK)			
	3. Range Control Radios (if required) (T-WK)			
	4. Training Publications / Training Standards / Safety Manuals			

Table (TBD). MDO EMS and EA Training Part I Preplanning Checklist (cont)

Table TBD-2. MDO EMS and EA Training Part II TA/Range Occupation				
A.	**Establish communications with Range Control**	**Y**	**N**	**NA**
	1. Verify Cease Buzzer Primary and Alternate POC for training event			
	2. Establish FM radio range control firing net			
	3. Establish FM radio range control administrative net			
	4. Establish Radio or telephone range control back-up firing net			
B.	**Medical support is present**	**Y**	**N**	**NA**
	1. Medics have communications with treatment facility			
	2. Medics have strip map from range to treatment facility			
	3. Medics (off-site) have communications with range			
	4. Medics (off-site) have strip map to range			
	5. Medics, in coordination with range OIC, select and clear air evacuation site near the range			
	6. Target locations			
C.	**Range OIC brief**	**Y**	**N**	**NA**
	1. RSO			
	2. LRSO (if required)			
	3. Safety assistants			
	4. Installation Cease Buzzer Primary and / or Alternate POC			
	4. Medical NCOIC			
	5. Assistant instructors			
	6. Vehicle commanders			
D.	**Inspect range to ensure emitters are present and operational**			
E.	**Verify impact area (if emitters are present) are clear of unauthorized personnel**			
F.	**Raise range flag (if necessary, in training / STX area of operation)**			
G.	**Check ammunition (No live-fire ammunition on non-firing range)**			
J.	**Request clearance from Range Control to commence firing**			

Table (TBD). MDO EMS and EA Training Part I Preplanning Checklist (cont)

Table TBD-3. MDO EMS and EA Training Part III Operations		Y	N	NA
A.	Communications maintained with Range Control and Cease Buzzer POC			
B.	Ammunition accountability maintained			
C.	Personnel accountability maintained			
D.	Guards on duty/alert			
E.	Cease -buzzer is called when Electromagnetic Interference is reported or when communications with Range Control is lost			
F.	Submit Meaconing, Intrusion, jamming, and Interference (MIJI) report when necessary for the unintentional disruption of the effective use of the electromagnetic spectrum by friendly, enemy, or atmospheric sources.			

Appendix M: Deliberate Risk Assessment Worksheet Example for EW STX

DELIBERATE RISK ASSESSMENT WORKSHEET

1. MISSION/TASK DESCRIPTION AND EXECUTION DATE(S)	2. DATE PREPARED
EW AIT FTX Class 24-024-25 (26MAR-28MAR2024) TA24	20240318

3. PREPARED BY

a. NAME *(Last, First, Middle Initial)*	b. RANK/GRADE	c. DUTY TITLE/POSITION
	1LT	Platoon Leader

d. UNIT	e. WORK EMAIL	f. TELEPHONE *(DSN, Commercial (Include Area Code))*
	alexander.m.enriquez.mil@army.mil	

g. UIC/CIN *(as required)*	h. TRAINING SUPPORT/LESSON PLAN OR OPORD *(as required)*	i. SIGNATURE OF PREPARER
	FM 7-22, AR 385-10, TR 350-29, 17E ISAP	

Five steps of Risk Management: (1) Identify the hazards (2) Assess the hazards (3) Develop controls & makes decisions (4) Implement controls (5) Supervise and evaluate *(Step numbers not equal to numbered items on form)*

	4. SUBTASK/SUBSTEP OF MISSION/TASK	5. HAZARD	6. INITIAL RISK LEVEL	7. CONTROL	8. HOW TO IMPLEMENT/ WHO WILL IMPLEMENT	9. RESIDUAL RISK LEVEL
+ -	Tactical Movement to/from Range (Vehicular & On Foot)	Vehicle Accident	M	Brief Soldiers on vehicle safety guidelines and responsibilities during transport. DS and Instructors will closely monitor the SMs and take action to prevent injuries.	How: Unit leaders will brief and enforce passenger rules to Soldiers. Who: Unit leaders and Range personnel.	L
+ -	Dismounted movement throughout range	Terrain: rocks, ruts, burn holes, thorns, dense brush, and creeks	M	Brief Soldiers on terrain dynamics; Obstacles clearly marked and/or removed; Proper PPE and uniform; PCC/PCIs performed.	How: Mark areas with cones, engineer tape, and/or position Unit leaders in hazard zone to deter possible injuries. Who: Unit leaders and Range personnel.	L
+ -	Dismounted movement throughout range	Adjacent Impact Zones	L	Monitor range control radio for potential impacts near TA_ _. Unit leaders will brief Soldiers on impact zones areas, response procedures, and clearly identify impact zone areas on the range map (and with engineer tape if applicable)	How: All personnel will stay/ operate within TA_ _. Unit leaders will ensure Soldiers stay on TA_ _ and maintain accountability at all times of Soldiers. Who: Unit leaders and Range Personnel.	L

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	4. SUBTASK/SUBSTEP OF MISSION/TASK	5. HAZARD	6. INITIAL RISK LEVEL	7. CONTROL	8. HOW TO IMPLEMENT/ WHO WILL IMPLEMENT	9. RESIDUAL RISK LEVEL
+ -	Dismounted movement throughout range	Severe Weather: hurricane, rain, lightning, thunder storms, tornadoes	M	Post and brief evacuation routes to shelters, ensure weather reports are up to date and briefed, maintain accountability at all times.	How: Unit leaders will brief all personnel on shelters, inspect buildings prior to use and ensure safety measures are enforced. Who: Unit leaders and Range Personnel.	L
+ -	Dismounted movement throughout range	Wildlife: insect bites, stings, and attacks, snakes	M	Hazard/Safety brief; Wildfire and insect familiarization; DEET spray; Range recon; Proper uniform and	How: Unit leaders will brief Soldiers on Wildlife policy and enforce Soldiers not to go near, touch, or taunt wildlife. Who: Unit leaders and Range Personnel	L
+ -	Dismounted movement throughout range	Cold Weather	M	Ensure Soldiers have proper layered clothing; prior cold weather injuries marked with blue boot bead and colored tape on shoulder; Adherence to weather safety work cycle matrix	How: Unit leaders will brief cold weather injury prevention slides to Soldiers. Soldiers will be properly identified and observed while in cooler temperatures. Soldiers will routinely self-assess and assess battle-buddies. Who: All personnel	L
+ -	Dismounted movement throughout range	Hot Weather	H	Soldiers uniform IAW Heat Category identified by wet bulb. Changes disseminated via radio; Ice sheets and water coolers will be on site.	How: Unit leaders will monitor wet bulb and enforce heat category measures; ensure Soldiers are hydrated, cold water jugs, and ice sheets are available on site. Training will not commence otherwise. Who: Unit leaders and Range Personnel	M

	4. SUBTASK/SUBSTEP OF MISSION/TASK	5. HAZARD	6. INITIAL RISK LEVEL	7. CONTROL	8. HOW TO IMPLEMENT/ WHO WILL IMPLEMENT	9. RESIDUAL RISK LEVEL
+ -	Dismounted movement throughout range	Concertina wire, UXO	M	Soldiers briefed on the hazards, areas, and possible UXO. Unit leaders and Range personnel will recon and mark areas with engineer tape.	How: Unit leaders and Range Personnel will brief All Personnel on hazards, areas, and identified markings. Personnel will be shown hazard areas upon dismounted movement throughout TA_ _ Who: Unit and Range Personnel	L
+ -	Dismounted movement throughout range	Slips/Trips/Falls	M	All personnel will be briefed on the terrain hazards. All hazards will be clearly marked and identified. Range personnel will recon site.	How: Range Personnel will brief all personnel on confirmed and potential terrain hazards. Unit leaders will properly mark all hazards. Who: Unit leaders and Range Personnel	L
+ -	Tactical Foot March	Rough/Unpaved Terrain	L	Soldiers briefed on route (paved and dirt roads). Lead and Trail vehicles will stage in front/behind the formation and keep respective distance from first / last personnel. ALL personnel will have reflective vest / belts to properly identify themselves.	How: Unit leaders briefed and ensures Soldiers wear PPE, seat belts and harnesses properly. Who: Unit leaders and Range Personnel	L
+ -	Tactical Foot March	Low Crossing	L	Soldiers will be briefed on possible low crossing(s). Weather will be monitored and route reconed. Soldiers will wear proper PPE.	How: Unit leaders continuously monitors weather; Soldiers are briefed on secondary routes and procedures. Who: Unit leaders and Range Personnel	L
+ -	Tactical Foot March	Vehicle Traffic	M	Certified drivers will adhere to the local and post traffic laws; Lead vehicle will signal when oncoming traffic is/are approaching formation. Unit leaders will inform Range Control/IOC of Foot March and when personnel conduct SP/ ORP.	How: Lead vehicle will signal when oncoming traffic is approaching; Unit leaders will lead the formation to ensure safety measures are taken. Who: Unit leaders and Range Personnel.	L

	4. SUBTASK/SUBSTEP OF MISSION/TASK	5. HAZARD	6. INITIAL RISK LEVEL	7. CONTROL	8. HOW TO IMPLEMENT/ WHO WILL IMPLEMENT	9. RESIDUAL RISK LEVEL
+ -	Tactical Foot March	Physical Limitations	L	Profiles are identified and perform the preparation drills IAW with FM 7-22 chapter 6 and will march staying in the limitations of their physical profile.	How: Unit leaders will identify Soldiers with physical limitations prior and during STX. Unit leaders will notify unit of Soldier(s) needing to ride in the trail vehicle. CLS will be on site. Who: Unit leaders and Range Personnel.	L
+ -	Tactical Foot March	Foot March Physical Injuries	M	Unit leaders will insure proper pacing. Soldiers injured will ride in duty van. All soldiers will checked to ensure the wear of serviceable boots and socks; correct wear, set up, and use of Rucksack with 35 pound load IAW: 670-1	How: Unit leaders will lead pacing. Soldiers injured will ride in trail vehicle behind formation; leaders will perform PCC/PCIs at each check point and RP. CLS qualified personnel on site. Medic at RP whenever possible. Who: Unit leaders and Range Personnel.	L
+ -	Tactical Foot March	Crossing Roads	M	Unit leaders will designate Road Guards with reflective vest are used to cross roads. The formation will not enter the roadway until all road guards are posted.	How: Unit leaders will lead road march and ensure all road guards wear a reflective vest. Who: Unit leaders and Range Personnel.	L
+ -	Handling of Mounted EW Equipment	Vehicle (Mounted) Equipment: Radiating Antennas and CREW Devices	M	Unit leaders will receive brief on proper stand-off distance while transmitting. All mounted equipment will be checked by leaders before/during/after PMCS.	How: Unit leaders will conduct PMCS prior to Soldiers handling equipment; Soldiers will be monitored by unit leaders at all times Who: Unit leaders and Range Personnel.	L
+ -	Handling of Mounted EW Equipment	Climbing on CREW Mounted Vehicles	M	Soldiers are briefed on hazards of falls, mounting and dismounting vehicles; All personnel will wear PPE while climbing on vehicles.	How: Unit leaders will brief fall hazards and ensure Soldiers wear proper Who: Unit leaders and Range Personnel.	L

	4. SUBTASK/SUBSTEP OF MISSION/TASK	5. HAZARD	6. INITIAL RISK LEVEL	7. CONTROL	8. HOW TO IMPLEMENT/ WHO WILL IMPLEMENT	9. RESIDUAL RISK LEVEL
+ -	Handling of Mounted EW Equipment	Radio Frequency Radiation	H	Soldiers are briefed on the proper standoff distance. Range personnel clearly mark proper radiation distance and monitor Soldiers.	How: Unit leaders will mark proper radiation distance with engineer tape and ensure Soldiers adhere to the guidelines. Who: Unit leaders and Range Personnel.	M
+ -	Handling of Mounted EW Equipment	Range Fires	M	Range personnel will attend the range briefing, monitor range radio; Water jugs on site; Range fire fighting equipment; accountability of personnel; designated fire escape route and rally point.	How: Range personnel will brief Soldiers on the fire plan(s) and Unit leaders will ensure Soldiers follow procedures. Who: Unit leaders and Range Personnel.	L
+ -	Handling of Mounted EW Equipment	Carbon Monoxide	M	Clean and inspect heater ventilation system; ensure proper ventilation of building and vehicles while running; install CO detector inside designated buildings.	How: Range personnel will ensure all facilities are marked, clean, and inspected prior to Soldiers occupying facility. Who: Unit leaders and Range Personnel.	L
+ -	Handling of Mounted EW Equipment	Fixed Site Set Up / Placing Antennas	L	Soldiers will be briefed on the proper procedure IOT safely place all required antennas. Soldiers will wear proper PPE and use four points of contact method.	How: Soldiers are briefed on safety measures when installing/handling antennas. Unit leaders will ensure all power to equipment is turned off prior to Soldier touching equipment. Who: Unit leaders and Range Personnel.	L
+ -	Night Operation Considerations	Loss of Soldier Accountability during Night Operations	M	Before STX Soldiers briefed on patrol base procedures. Soldiers briefed on Patrol Base and night movement limits/ AO. Chem lights set at AO limits.	How: Soldiers briefed on Patrol Base procedures and AO limits. Chem lights placed by Unit leaders. Who: Unit leaders	L

	4. SUBTASK/SUBSTEP OF MISSION/TASK	5. HAZARD	6. INITIAL RISK LEVEL	7. CONTROL	8. HOW TO IMPLEMENT/ WHO WILL IMPLEMENT	9. RESIDUAL RISK LEVEL
+ -	Night Operation Considerations		M	Constant Soldier Fire guard throughout the night.	How: Soldiers create Fire Guard schedule. Unit leadership adhere to Fire Guard schedule to prevent and address misconduct. Who: All personnel	L
+ -	Pyrotechnics	Brush Fire	H	Create and submit a brush fire plan to Range Control.	How: Brush Fire plan disseminated and briefed to Unit leaders. 3 Fire extinguishers to control possible uncontrolled burning Who: Unit leaders	M
+ -	Pyrotechnics	Personnel Injury	M	Pyro training and use directions	How: All Unit leaders are briefed and abide by pyro use safety measures to avoid burn and explosion injuries. Who: Unit Leaders	L

10. OVERALL RESIDUAL RISK LEVEL *(All controls implemented):*

☐ EXTREMELY HIGH ☐ HIGH ☒ MEDIUM ☐ LOW

11. OVERALL SUPERVISION PLAN AND RECOMMENDED COURSE OF ACTION

All unit leaders will closely monitor Soldiers at all times. Qualified CLS or medics will be present during all training. Range Personnel and unit leadership will report any injuries to range control immediately. Range personnel and unit leadership will constantly monitor for residual risk. All personnel on the site will receive a Safety Brief prior to being allowed on the site each day. Safety briefs will be conducted to movements. Safety briefs will include the proper wear of PPE, proper mounting/dismounting procedures, and hand and arm signals refreshers prior to working on or around equipment and vehicles. NCOICs will clearly identify training area boundaries and left and right limits with engineer tape and chem lights. Fire extinguishers present to avoid uncontrolled burning of pyro and suppression of brush fire. Fire breaks built into TA to slow and contain burning.

12. APPROVAL OR DISAPPROVAL OF MISSION OR TASK ☐ APPROVE ☐ DISAPPROVE

a. NAME *(Last, First, Middle Initial)*	b. RANK/GRADE	c. DUTY TITLE/POSITION	d. SIGNATURE OF APPROVAL AUTHORITY
	LTC	BN CDR	

e. ADDITIONAL GUIDANCE:

Appendix N: References

1. AR 210-21, Army Ranges and Training Land Program, 1 May 1997
2. AR 350-2 Operational Environment and OPFOR, 19 May 2015
3. AR 350-19, The Army Sustainable Range Program, 30 Aug 2005
4. AR 350-28, Army Exercises, 9 Dec 1997
5. AR 350-38, Policies and Management for TADSS, 2 Feb 2018
6. AR 350-50, Combat Training Center Program, 2 May 2018
7. AR 350-52 Army Training Support System, 17 Jan 2014
8. AR 351-9, Inter-Service Training, 29 Aug 2012
9. TR 350-50-3, Mission Command Training Program, 19 Apr 2018
10. TR 5-11, Models and Simulation, 16 Nov 1998
11. TP 350-70-1, Training Development in Support of the Operational Training Domain, 12 Feb 2019
12. TP 350-70-13, System Training Integration, 27 Oct 2014
13. TC 7-101, Exercise Design, 26 Nov 2010
14. TC 25-8, Training Ranges, 2 Nov 2021
15. CJCSM 3212.02E, PERFORMING ELECTRONIC ATTACK IN THE UNITED STATES AND CANADA FOR TESTS, TRAINING, AND EXERCISES
16. FM 3-90, Tactics
17. FM 2-0, Intelligence
18. ATP 2-01, Collection Management