

Supreme Allied Commander Transformation



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NATO C2 of EW Overview and Q & A

Agenda & Rules of the Road



Agenda:

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What is Driving Change? What is C2 of EW?

Rules of the Road:

- PURPOSE: To provide context and information to industry and national program offices and answer questions regarding NATO's request for information. HQ SACT representatives will provide an overview of the capability NATO is seeking and then open the floor for questions.
- QUESTIONS: These questions should be typed into the webinar chat window and NATO representatives will answer.
- CLASSIFICATION: All information must be at a publicly releasable level.
- DURATION: The session will be an one and a half hours, we may not use all of the available time.
- RECORDING: To be as fair and transparent as possible, the sessions will be recorded and posted to the contracting portal for industry or national representatives to view at a later time.



Electromagnetic Environment (EME)





Electromagnetic Spectrum (EMS) Trends and Conditions

- EMS is Foundational to more Productive Societies & Economies
- Growing Expectations & Expanding Demand (Militarily & Commercially)

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- EMS-Enabled Capabilities are Integrated into more Systems & Business Processes
- EMS Interaction is Becoming more Dynamic & Adaptable (e.g., Software Defined)
- EMS is Increasingly Congested & Potentially Contested
- There is Increasing Proliferation of Dual-use Technologies
- EMS Capabilities, Weapons, & Threats are Multiplying
- Potential Adversaries are Investing Heavily in Capabilities to Control the EMS

Why Electronic Warfare & Electromagnetic Operations Warfare Development?





BACKGROUND:

- Nearly all NATO military platforms, systems & units rely on the Electromagnetic Spectrum (EMS)
- Military forces compete with each other, neutral actors, & adversaries for the use of the EMS

LOOKING FORWARD:

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Ensure NATO forces are "credible, networked, aware, agile, and resilient" – NATO's Framework for Future Alliance Operations

The ability to use more of the spectrum, to share the spectrum more efficiently...and to deny enemy use [of it] – NATO's Science & Technology Office

Freedom of action in the EM spectrum

Shape and exploit the electromagnetic environment

Electromagnetic spectrum exploitation, access, and control when and where needed to achieve Alliance objectives



Electromagnetic Spectrum Superiority is Essential to All NATO Operations

Isn't NATO already conducting & controlling EW

Activities?



<u>Yes, But ...</u>

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- Electromagnetic environment (EME) is changing; it is more complex & dynamic
 - Rapid advances in globally available, low-cost electronics
 - Software-defined technologies
- EME is increasingly congested & contested
 - Commercial wireless broadband demand
 - Increase in NATO militaries & civilian EMS-dependent systems
 - Friendly forces, neutral actors & adversaries all seek to use the EMS
 - Overlapping EMS parameters, time-frames, & locations
 - Growing threats
- Existing approach is challenging
 - Manpower intensive, ad hoc team of planners
 - EW / EM management & analysis tools
 - EW and electromagnetic mission data accessibility
 - EW multi-domain stakeholders are disbursed, disconnected, and stove-piped; but all work in the same EME
 - Existing planning & coordination processes
 - Integrate EW activities with operations across all domains
 - Stove-piped planning across the J2/J3/J6 and among components and other EMS users leads to operational conflicts in the EMS





Inability to maneuver in the EME Battlespace Constrains JFC's Operational Outcomes



What *will* C2 of EW provide for NATO to Retain Military Advantage in the Future Battlespace?

C2 of EW must mitigate a lack of...

- Foundational and timely electromagnetic situational awareness;
- Critical interoperability;
- Sufficient accurate and timely data and information to effectively command and control forces;
- Adequate analytical support, knowledge, and capacity;
- Robust training

C2 of EW must provide...

- <u>Command and Control Information</u> (capability to plan, direct, coordinate, synchronize, monitor, and assess EW activities fully integrated in all electromagnetic and joint operations)
- <u>Situational Awareness</u> (Recognized Electromagnetic Picture (REMP), a dynamic and accurate Electronic Order of Battle (EOB))
- <u>Decision Support & a Robust Training</u> (analytic tools to support planning and assessments, and to support rehearsals and exercising EW activities)
- Interoperability (Procedures, Architecture, Data, Standards open & modular architecture)

So That NATO Commander's are able to ...

- Shape the EME to enable friendly force operations while denying the same to the adversary
- Develop shared understanding of EME
- Ensure EW/Electromagnetic Unity of Effort / Unity of Command
- Optimize & Integrate friendly force EW activities & actions in the EME to support JFC objectives







	<u>Gap</u>		<u>Vision</u>			Operational Requirement Description			
NATO operational con understand the Electro orchestrate EW activit warfare and land, mari forces for integrated a at operationally releva	nmanders lack the omagnetic Enviro ies and actions ac itime, air, space, a nd unified action nt speed and scal	e ability to nment (EME) and cross the levels of ind cyberspace in joint operations le.	Commanders are able to effectively command and control NATO forces in joint, combined, and multinational operations in a congested, contested, and hostile EME and maintain sufficient electromagnetic superiority in order to achieve military objectives. Commanders are able to shape the EME to their advantage and ensure effective joint operations while denying the same to the adversary.			NATO commanders at all levels of warfare, appropriate to the intensity and scale of the operation, require the capability to understand the EME and plan, direct, monitor, and assess all EW activities and actions fully integrated with all electromagnetic & joint operations. This requirement will be satisfied through increased use of technology and enhanced interoperability over 6 years.			
Phase 1 Goals Provide NATO with EW Emitter Information via: •Delivery of a Reference Emitter Database (application, services, and procedures, and training)			Phase 2 Goals Provide NATO with an improved ability to conduct EW in Joint Operations via: •Provision a Recognized Electromagnetic Picture; •Provide a dynamic EOB; •Deliver improved technical and procedural interoperability; •Deliver an enhanced ability to plan, direct, monitor, and assess EW activities			Phase 3 Goals Posture NATO to improve the conduct of EMO in Joint Ops via: •Maintain Phase 1 & 2 goals •Identify EMO Capability Gaps •Develop EMO Battle Management Requirements			
		Start	Phase 2 NGM Program & Deliver C2 of	EW		loc	FOC		/
F Delive	hase 1 r: NEDB-NG	IOC FOC		Sus	tain C2	Phas of EW & Infor	se 3 m Future EMO Pr	ogram	
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2020	2021	2022	2023	2024	20	025	2026	202	27



C2 of EW Context, Vision, Benefits, Outcomes, &

Objectives



Expected Benefits

Strategic & Operational Context: The international security context is changing and operating EM environments are increasingly complex, congested, and contested

- **Perceived Shortfall**: Commanders lack the ability to adequately integrate EW into joint operations to achieve military objectives
- **Operational Vision**: Commanders are able to effectively command and control NATO forces in joint, combined, and multinational operations in a congested, contested, and hostile EME and maintain sufficient electromagnetic superiority in order to achieve military objectives. Commanders are able to shape the EME to ensure friendly forces can operate while denying the same advantage to the adversary.
- **Programmatic Vision**: Provide NATO commanders with a DOTMLPFI-coherent capability to achieve the operational vision while balancing cost, schedule, performance, and risk.
- **C2 of EW Capability**: C2 of EW shall provide a Recognized Electromagnetic Picture (REMP), a dynamic and accurate Electronic Order of Battle (EOB), and the capability to plan, direct, coordinate, synchronize, monitor, and assess all electronic warfare (EW) activities fully integrated with all electromagnetic and joint operations.
- **Desired Operational Benefits**: NATO forces will obtain improved joint operations effectiveness, reduced risk of collateral damage & fratricide, increased operation tempo, improved interoperability & readiness, and improved scalability & resilience.
- **Desired Operational Outcomes**: Increased mission assurance, reduced operational risk, and sufficient electromagnetic superiority to achieve military objectives.

Improved Joint Operations Effectiveness

• Through greater insight and awareness of the EME conditions and identification of EMS and EW factors, planning, force generation, allocation, and direction will be more compressive to reduce potential risk to missions and to forces. Also, while in execution, joint assets will be optimally postured, configured, ready, deconficted, and synchronized at increased scale and tempo to achieve military objectives.

Reduced Risk of Collateral Damage & Fratricide

• Through an enhanced common operational picture, rapid identification of friendly, enemy, and neutral emitters combined with improved interoperability to coordinate electronic warfare actions and deconflict and respond to electromagnetic interference will be enabled.

Increased Operational Tempo

• Through greater shared EME situational awareness and efficiencies of enhanced information management and automation, more rapid, higher quality decisions will be enabled.

Improved Interoperability & Readiness

• Through improved connectivity, technical and procedural interoperability and robust training, the Alliance will be confident and ready to perform EW activities and conduct EW actions before 'Day Zero'.

Improved Scalability & Resilience

• Through enhanced and efficient interoperability and collaboration, EMS and EW information and reporting will be shared and analyzed at scale and corresponding actions and resources will be federated according to operational demand.

Command and Control of Electronic Warfare: Operational View / Logical Concept (OV/NAVv4 L2-L3)





Questions

&

Backups



1 The ability to provide a shared, user-defined, recognized electromagnetic picture by:

- Incorporating electronic intelligence, electronic surveillance, and emitter information from the operational electromagnetic environment;
- Incorporating actual or potential electromagnetic spectrum actors (friendly, neutral, adversary, and unidentified; transmitters and receivers), which
 may have the ability to influence the operational electromagnetic environment;
- Incorporating electronic warfare reports, the electronic order of battle, and user-defined alerts;
- Incorporating environmental, legal/regulatory, and operational factors influencing or expected to influence the operational electromagnetic environment.

2 The ability to create and maintain a shared, user-defined, historical and dynamic near real-time electronic order of battle by:

- Incorporating friendly, neutral, and adversary, electromagnetic-spectrum-dependent/influencing systems, locations, parameters, times-ofoperation, status, and user-defined alerts;
- Incorporating unidentified electromagnetic-spectrum-dependent/influencing systems, locations, parameters, times-of-operation, status, and userdefined alerts;
- Facilitating generation of user-defined listings such as emitters of interests, coalition emitter lists, intelligence collection task lists, targeting lists; and reprogramming recommendation lists.

3 The ability to enhance planning of electronic warfare by:

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- Developing operational electromagnetic environment planning estimates;
- Enabling consideration of electromagnetic spectrum and electronic warfare factors in mission analysis and course of action development and comparison;
- Enabling operational and tactical modeling and simulation of electromagnetic spectrum and electronic warfare activities to identify operational constraints, limitations, and impacts (*this is <u>not</u> scientific or engineering design/test oriented M&S*);
- Enabling user-defined analysis of operationally required electromagnetic spectrum and electronic warfare needed/available/ready capabilities, potential gaps, control measures, anticipated conflicts, impacts, and interference across time, space, and spectrum;
- Developing prioritized intelligence collection and targeting recommendations in support of electronic warfare activities.





- 4 The ability to obtain and maintain authoritative, discoverable electronic warfare and electromagnetic spectrum information for use in the recognized electromagnetic picture, electronic order of battle, and decision support (*requirements 3 and 6*) by:
 - Providing a repository of authoritative, discoverable information containing technical descriptions of adversary EMS-dependent/influencing systems;
 - Providing a repository of authoritative, discoverable information containing technical descriptions of friendly EMS- dependent/influencing systems;
 - Providing a repository of authoritative, discoverable information containing technical descriptions of neutral EMS- dependent/influencing systems;

5 The ability to provide sustainable, survivable, scalable, and interoperable system(s) by:

- Providing operator and maintainer training solutions;
- Complying with NATO Interoperability Standards and Profiles and Federated Mission Networking requirements;
- Enabling maintenance approaches applicable for air-gapped classified network environments;
- Incorporating cybersecurity best practices and ongoing vulnerability management;
- Incorporating system resilience best practices;
- Incorporating open system architectures;

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- Enabling a scalable capability through extensible design and architecture.

6 The ability to enhance directing, monitoring, and assessing electronic warfare by:

- Comparing electromagnetic environment planning estimates against real-world situation;
- Identifying and analyzing opportunities, conflicts, gaps, interference, readiness, impacts, and available options for exploitation or resolution between planned operations and real-world situation;
- Creating and managing electronic warfare operational messages/reports, requests, allocations, assignments, intelligence requests for information, and tasking;
- Predicting and analyzing gaps and impacts between planned electronic warfare effects/estimates and real world situation/results.