Tactical Edge
Command and Control On-The-Move
"A New Paradigm"

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Agenda

- *Define C2OTM*
- *Assumptions*
- *Organization and Stakeholder Engagement*
- *The C2OTM Challenge (Capability Gaps)*
- *Guidance*
- *Operational Context and Success'*
- *Capability Feasibility Examination / Assessment*
- *C2OTM Reference Architecture*
- *Desired Operational Outcome*

C2OTM Defined

Command and Control On-the-Move represents the capability to maintain SA and make timely and informed decisions while non-stationary (i.e., moving from place to place). It includes the capability to collaborate, communicate, and monitor joint/multinational/combined/interagency operations through an arrangement of personnel, equipment, communications, and procedures during decentralized operations over extended ranges and in complex operational environments. C2OTM provides leaders with the ability to plan, direct, coordinate, assess, and control forces and operations while moving anywhere within the operational environment.

C2OTM is a Joint requirement to coordinate existing PORs, emergent capabilities, and resources and not a new start.

Assumptions

- Complex operating environments will continue to challenge the joint force in the future
- Joint operations will be executed across the ROMO
- The future of warfare will be characterized by forces dispersed throughout an operational area in small units operating autonomously and beyond mutually supporting range, supported by non-organic capabilities
- GPF and SOF integration and interoperability activities will persist
- Joint forces will conduct operations in coordination with mission partners
- Joint forces will be functionally interdependent at increasingly lower echelons

Organization and Mission

Serves as DoD lead integrator for joint warfighter capability development and assessment in order to be the advocate for an interoperable and integrated joint force.

Sustained joint integration and interoperability requires direct, constant engagement across all DoD processes.

Supports DoD by providing…

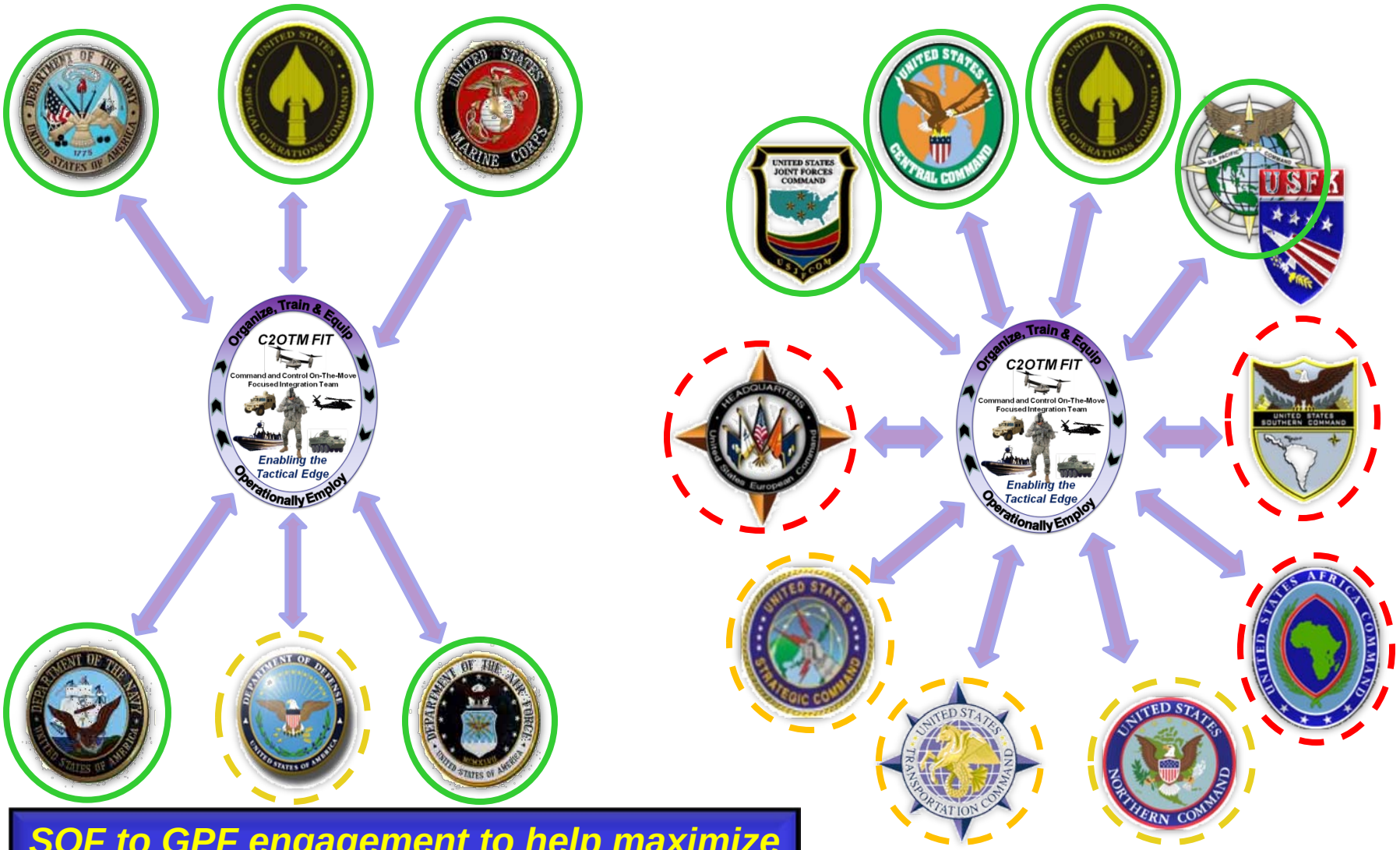
- **A collective COCOM voice and advocacy**
- **COCOM capability gaps**
- **Integrated and interoperable C2 capability solutions**
- **Capabilities-based oversight & management**
- **Informed strategic investment decisions**

We don't make the capabilities, we integrate the capabilities to make them joint!

C2OTM FIT Stakeholder Interaction

Organize, Train & Equip

Operationally Employ



SOF to GPF engagement to help maximize capability and development sharing

The C2OTM Challenge

Challenge: Integrate individual Service C2OTM capability enhancements at the tactical edge. Known shortfalls at the tactical edge:

- **U.S. general purpose tactical elements/units, special operations forces, and Provincial Reconstruction Teams do not have sufficient C2 capabilities to stay connected to their higher, adjacent and supporting units while conducting distributed/on the move operations.**

- **Beyond Line of Sight (BLOS) communications, position location information (PLI), chat and Situational Awareness (SA) constitute a minimum capability set.**

Coordinated C2OTM capability delivery supporting the execution of warfighter functions

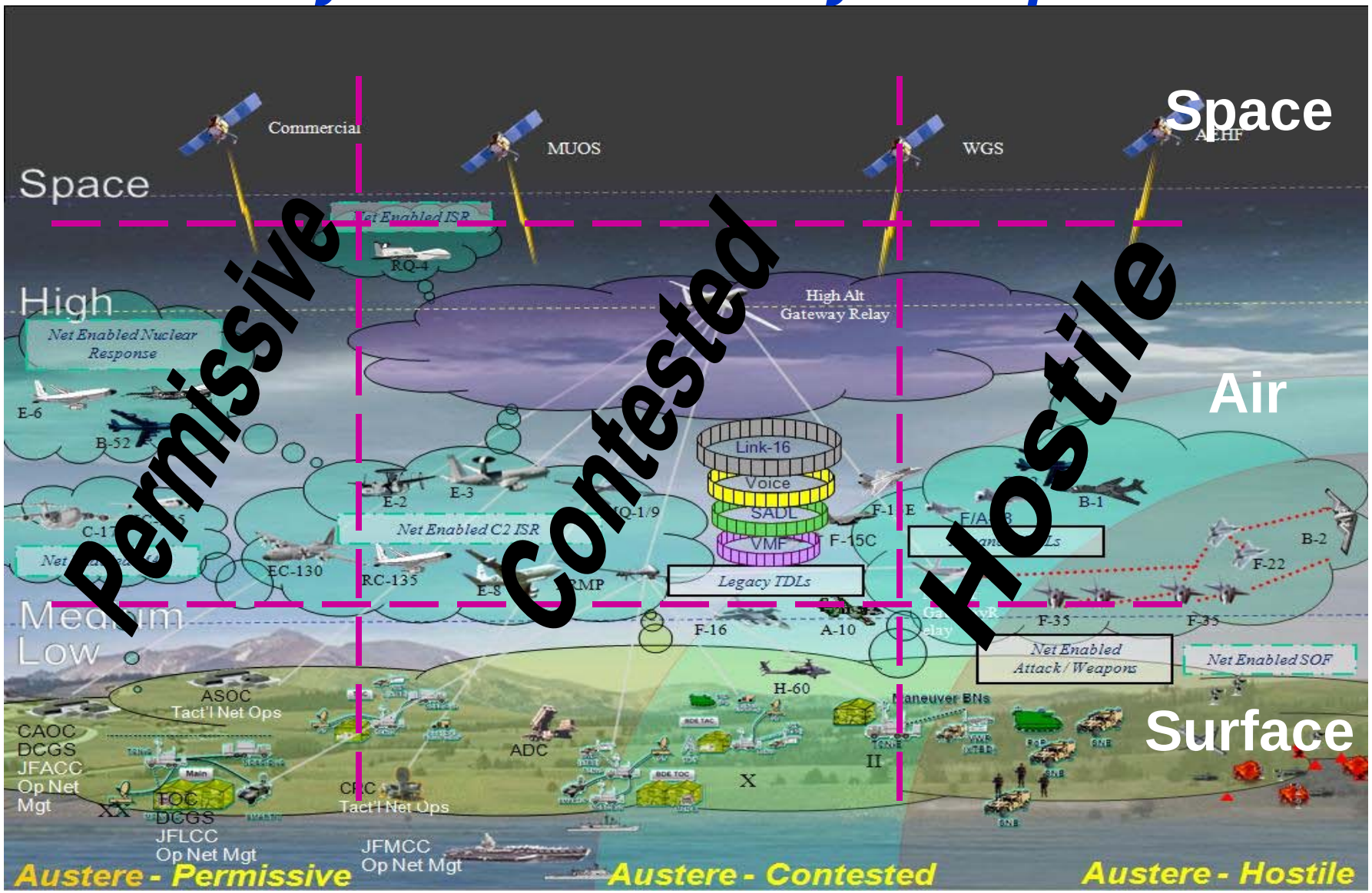
Gap and Required Capability Analysis

Capability to Gap Relationship for C2OTM	**GAP 1:** Nonexistent or Limited use of C2 Services in a DIL Environment while OTM	**GAP 2:** Limited ability to maintain and share SA while OTM	**GAP 3:** Lack of ability for leaders to provide accurate and timely intent to subordinate units and mission partners while OTM	**GAP 4:** Inability to plan collaboratively while OTM	**GAP 5:** Limited ability to share info with Mission Partners while OTM	**GAP 6:** Lack of common interoperability standards for C2OTM
RC-1: Exercise Leadership		X	X	X	X	X
RC-2: Develop and Maintain shared SA and Understanding	X	X		X	X	X
RC-3: Communicate Intent and Guidance	X	X	X		X	X
RC-4: Plan Collaboratively	X	X	X	X	X	X
RC-5: Synchronize Execution across all Domains	X	X	X	X	X	X
RC-6: Monitor Execution, assess Effects, Adapt Ops	X	X			X	X
RC-7: Leverage Partners		X	X	X	X	X
Derived Priorities	Medium	High	Medium	Medium	High	High

Higher Guidance

- **Intent:**
  - **Improve small unit leaders' capability to conduct C2 in joint distributed operations**
  - **Decrease the support “tail”**
  - **Do not increase operational risk**
- **Constraints and Restraints:**
  - **Provide capabilities that improve ability to provide effective, timely C2 for maneuver, fires, sustainment, intelligence and protection**
  - **Do no harm while improving capability**
  - **Do not increase the soldier’s load and/or logistics tail**

Leader Centric C2 ↔ Tactical Edge
Very Technical / Very Complex



Success Stories

Distributed Tactical Communications System (DTCS)

- Iridium radio provides a 911 like voice capability
- DTCS use easier (size/weight/connection time) and more reliable than current TACSAT radios
- DTCS little to no additional infrastructure support
- Leverages Iridium satellite constellation to enable push-to-talk tactical networks effective for users in remote areas

Broadband Cellular

- Utility of commercially developed and widely available cellular communications capabilities to support warfighters at the tactical edge
- Mobile broadband cellular technologies are evolving rapidly with emerging capabilities supporting the network triad (space, aerial and surface layers)

JCSE Airborne Communications System Version 3 (JACSv3)

- Military utility of a C2 radio relay platform on a UAS while providing assured and reliable data and voice tactical communications to a variety of organizations
- Adds flexibility of lower operational costs and higher threat acceptance during engagements over current JACSv2 aerial radio relay communications capabilities

Evolution of Tactical Radios

- A man packed tactical radio that can provide voice, PLI, chat, a common tactical picture, and data with wideband data performance and interoperability with other fielded waveforms
- As a single channel radio it covers frequencies from megahertz (MHz) to gigahertz (GHz) and possesses Type 1 encryption

Capability Feasibility Examination / Assessment

This will assist by identifying a more cohesive process, by which requirements are managed, new technologies to meet these requirements are exposed and evaluated for use & interoperability, and finally capabilities that are mature enough are then brought into theater to meet warfighters' requirements.

Combination of

- Operational/Interoperability Assessment
- Tech demos
- Desktop Analysis
- Modeling & Simulation
- Experimentation (Lab & Field)
- Call to C/S/As, Academia and National Labs

Questions to resolve

- Maturity of Technology or Capabilities
- Risks
- Expandability
- Interoperability
- Relationships
- Fast Track Options for Critical Capabilities

Coordinated C2OTM capability delivery supporting the execution of warfighter functions

C2OTM Reference Architecture

- 45 DoDAF 1.5 and 2.0 Views
- DOD IEA for Net-Centric Context
- Follows NR-KPP Products Guidance contained in CJCSI 6212.01E

- Will the C2OTM capability interoperate with existing systems and services to accomplish assigned missions?
- Are the data and information exchanges for C2OTM meeting standards for the GIG and IA?

C2OTM Reference Architecture Provides these Products

How Can Federation Support the C2OTM Development Process?

CJCSI 6212.01E

Document	Supportability Compliance	DOD Enterprise Architecture Products (IAW DODAF) (see Note 5)															Data/Service Exposure Sheets	IA Compliance	GTG Compliance
		AV-1 /AV-2	OV-1	OV-2	OV-3	OV-4	OV-5	OV-6C	OV-7	SV-1	SV-2	SV-4	SV-5	SV-6	SV-11	TV-1	TV-2			
ICD			X																	
CDD	X	3	X	X	X	X	X	X			X	X	X	X		2	2	1	X	X
CPD	X	3	X	X	X	X	X	X	1		X	X	X	X	1	2	2	1	X	X
ISP	X	3	X	X	X	X	X	X	4		X	X	X	X	4	2	2	1	X	X
TISP	X	3	X		X		X	X		X			X	X		2	2	1	X	X
ISP Annex (Svcs/ Apps)	X	3	X				X				X	X	X	X		2	2	1	X	X
X		Required (PM needs to check with their Component for any additional architectural/regulatory requirements for CDDs, CPDs, ISPs/TISPs. (e.g., HQDA requires the SV-10c)																		
Note 1		Required only when IT and NSS collects, processes, or uses any shared data or when IT and NSS exposes, consumes or implements shared services,																		
Note 2		The TV-1 and TV-2 are built using the DISRonline and must be posted for compliance.																		
Note 3		The AV-1 must be uploaded onto DARS and must be registered in DARS for compliance																		
Note 4		Only required for Milestone C, if applicable (see Note 1)																		
Note 5		The naming of the architecture views is expected to change with the release of DODAF v2.0 (e.g., StdV, SvcV, StdV, DIV). The requirements of this matrix will not change.																		

Table E-1. NR-KPP Products Matrix

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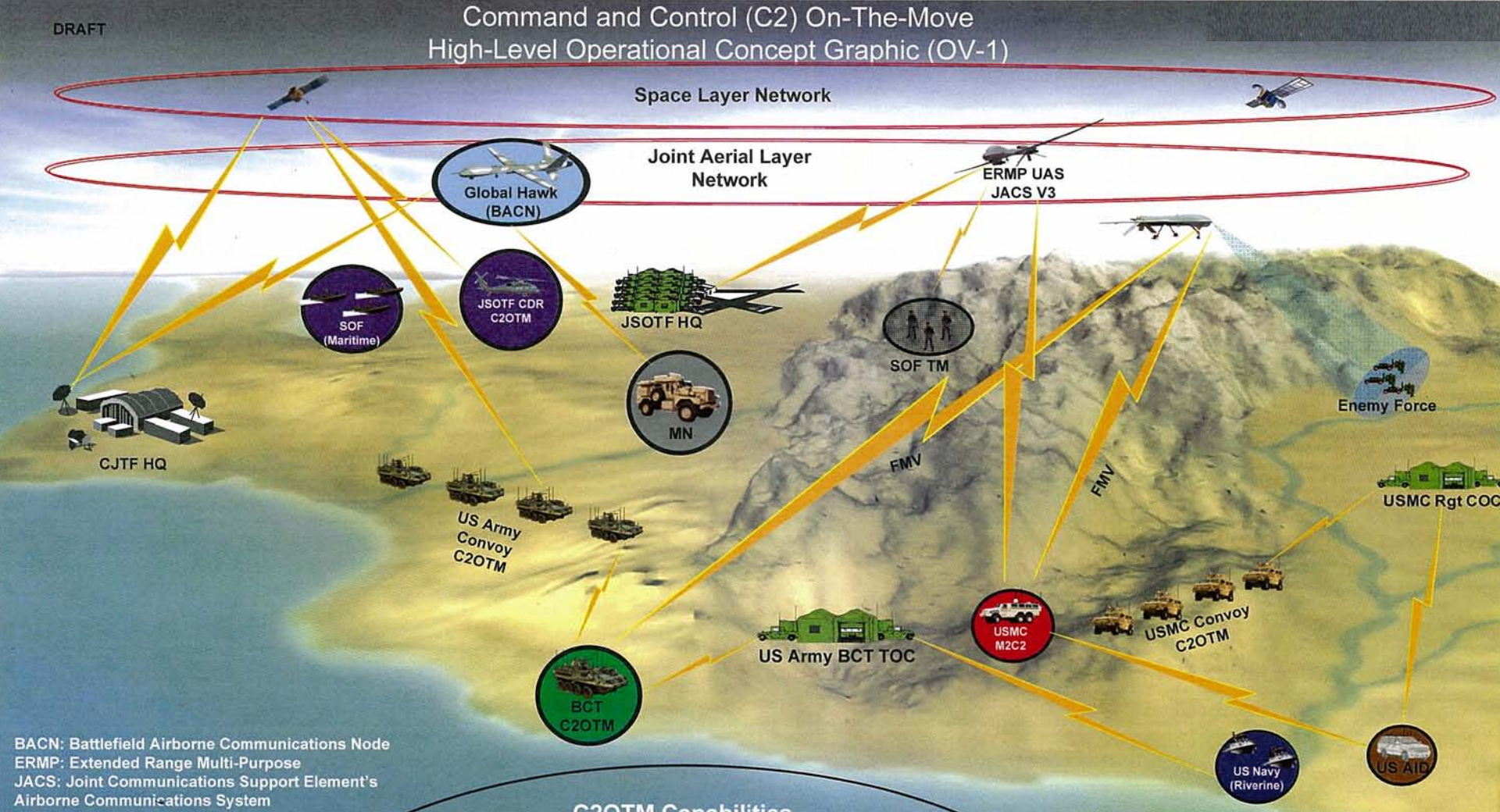
Command and Control (C2) On-The-Move
High-Level Operational Concept Graphic (OV-1)



BACN: Battlefield Airborne Communications Node
ERMP: Extended Range Multi-Purpose
JACS: Joint Communications Support Element's Airborne Communications System

- Joint
- USMC
- SOF
- USA
- USN
- USAF
- MultiNational
- Inter-Agency

C2OTM Capabilities

- Exercise Leadership
- Develop and Maintain Shared Situational Awareness and Understanding
- Communicate Intent and Guidance
- Plan Collaboratively
- Synchronize Execution Across All Domains
- Monitor Execution, Assess Effects, and Adapt Operations
- Leverage Mission Partners

J891F	J891F	J891D	C2OTM High Level Operational View

References:

1. Initial Capabilities Document for Command and Control on the Move (C2OTM) V2.1,20 Nov 2009
2. Concept of Operations for C2OTM, v2.2, 20 Nov 2009

Architecture value added to the Warfighter

- **Architecture products provide a means to address compatibility issues as an opportunity to guide Services as to their "to be“ solutions as well as addressing Combatant Commands Integrated Priorities Lists (IPLs)**

- **As the services develop and update C2OTM capabilities CDD, CPDs, and ISPs they can access and take into consideration authoritative architectural data to help them meet the interoperability challenges that face the Warfighter**

- **Exposure and access to authoritative architectural data that allows the Service Capability Developers the ability to rapidly analyze other capabilities and to make operational decisions based on that analysis**

Desired Operational Outcome

- **Enable information sharing and operational interoperability among all four Services, COCOMs, Special Operations Forces (SOF), agencies and mission partners.**

- **Enable on-the-move users to perform C2 functions within flexible command arrangements and in complex terrain across the full Range of Military Operations (ROMO).**

- **Support modular, dispersed forces operating over extended ranges, in austere and urban environments or maritime and littoral operations at multiple security levels.**

- **Reduce the user's need to be reliant on operations centers and fixed/static infrastructures to conduct effective C2.**

- **Support various Operations Plans (OPLAN) and Operations Orders (OPORD).**

C2OTM depends upon the presence of a multi-layered (space, aerial, and surface) network at mission dependent security levels that allows user to transfer and receive actionable information in a timely fashion while on-the-move.

Questions

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