Coalition C2/Multinational Information Sharing: Current Capabilities and Challenges

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Overview

• **DoD C2 Background**
• **Coalition C2 and Multinational Information Sharing (MNIS) Capabilities**
• **C2 Challenges**
• **Key Initiatives**
• **Summary**

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Command and Control (C2)
The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. C2 functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.

Command and Control System
The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned and attached forces pursuant to the missions assigned.
C2 Joint Capability Area (C2 JCA)
(Tier 1 and Tier 2)

C2: The ability to exercise authority and direction by a properly designated commander or decision maker over assigned and attached forces and resources in the accomplishment of the mission.

Organize: The ability to align or synchronize interdependent and disparate entities, including their associated processes and capabilities to achieve unity of effort.

Understand: The ability to individually and collectively comprehend the implications of the character, nature, or subtleties of information about the environment and situation to aid decision-making.

Planning: The ability to establish a framework to employ resources to achieve a desired outcome or effect.

Decide: The ability to select a course of action informed and influenced by the understanding of the environment or a given situation.

Direct: The ability to employ resources to achieve an objective.

Monitor: The ability to adequately observe and assess events/effects of a decision.
C2 Information Sharing Space

SIPRNet

Enabling Services Infrastructure

C2 Apps

REL DMZ

Multinational Information Sharing (MNIS)

CENTRIXS

Classified Network

AMN

ISAF

NIPRNet

Federated DMZ

Law Enforcement

Internet

APAN

Legend

• Cross Domain Guards • Associated Efforts • AMN – Afghan Mission Network • CDS – Cross Domain Solutions • DMZ – Demilitarized Zone • ISAF – International Security Assistance Force • UIISC – Unclass Information Sharing Capability

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Major Coalition Information Sharing
MNIS and Other Mission Partners

Legend
- GIRoQ – Government of the Islamic Republic of Afghanistan
- NGO – Non-Governmental Organizations
- PVO – Private Volunteer Organization
- USAID – US Agency for International Development

United Nations
- USAID
- GIRoA
- NGO
- PVO

GCTF (90)
- List of names classified

ISAF (48)
- Armenia
- Australia
- Austria
- Azerbaijan
- Bosnia-Herzegovina
- Finland
- Georgia
- Ireland
- Jordan
- Macedonia
- Malaysia
- Mongolia
- Montenegro
- New Zealand
- Singapore
- S. Korea
- Sweden
- Tonga
- Ukraine

NATO (28)
- Albania
- Belgium
- Bulgaria
- Canada
- Croatia
- Czech Republic
- Denmark
- Estonia
- France
- Germany
- Greece
- Hungary
- Iceland
- Italy
- Latvia
- Lithuania
- Luxembourg
- Netherlands
- Norway
- Poland
- Portugal
- Romania
- Slovakia
- Slovenia
- Spain
- Turkey
- United Kingdom
- United States
- NATO

Other Mission Partners – Federal, State, Local, Tribal, Industry, NGOs
Current MNIS C2 Information Sharing Systems

• Under MNIS, DoD develops, fields, and sustains capabilities for US and coalition operational information sharing at the Secret Releasable through Unclassified Public Domain levels
  – Combined Enterprise Regional Information Exchange System (CENTRIXS)
  – Combined Federated Battle Laboratory Network (CFBLNet)
  – Unclassified Information Sharing Capability (UISC)
CENTRIXS Today

- A combination of separate multilateral & bilateral networks
- Allows U.S. and mission partner nations & their forces to securely share mission-specific information
- Supports local, regional, and global combined operations including OEF, OIF, GWOT & counter-narcotics
- Regionally focused, COCOM centric

- 50+ CENTRIXS/coalition networks
- 150+ sites/locations worldwide
- Each network is cryptographically isolated (Type 1 or VPN over GCTF)
- Larger networks have full range of services with cross-domain solutions
- Many smaller bilateral networks have limited services (e.g., FTP, email)
What CENTRIXS Is
Global Operations (GCTF View)

Each CENTRIXS network follows this same global architecture; some commands may not support all the networks

CENTRIXs is global reaching – supported by multiple COCOMs
Afghanistan Mission Network

LEGEND
Cross Domain Guards
Fully Connected

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A controlled Trials and Assessment capability for U.S. and coalition forces to assess secret level C2 technologies in a simulated operational environment.
Information exchange and collaboration between the US DoD and any external country, organization, agency or individual that does not have access to traditional DoD systems and networks
**MNIS Challenges**

**Current State/Challenges**

- Multiple organizations within a COI host their own applications and services
- Limited coalition application / service interoperability
- Limited service scalability based on class and quality of service
- Regional data management with organization unique governance
- No metadata / IA attribute tagging
- COI unique data semantics require ambiguity resolution
- Each COI manages its own independent network and physical infrastructure
- Locally managed username / password access control
- Unique network architecture and devices for each organization

**Objective State**

- Enterprise provisioned applications / services (i.e. Situational Awareness, Planning, Chat, etc.)
- Widgets (i.e. visualization of data, etc.)
- Globally managed trusted metadata tags enable policy based COI data sharing
- Data warehouses for COI data
- Visible, accessible, understandable data conformance with Net Centric Data Strategy
- Attribute based policy enforcement
- Converge physical infrastructure at Enterprise Computing Nodes
- Enterprise Identity Management for coalition environment

**Applications / Services**

**Data**

**Infrastructure**

Leverage enterprise services and incrementally deliver capabilities
Coalition C2 Challenges

- **Governance** – common adjudication authority
- **Policy** – common set of rules/guidelines
- **Agreement/Commonality**
  - Purpose/Application
  - Security – Information Assurance, Identity Management, Cross Domain Solutions
  - Technology
  - Resources and Commitment – uniting resources in common direction, long term continuity
- **Dynamic policy/agreement/rules application**
  - Key Initiatives
    - Data Strategy
    - Services Strategy
    - Objective and Transition Architectures

Not all elements are technical in nature
Way Forward - Key Initiatives

• **Achieving the Net-Centric Vision** – Creating net-centric capabilities

• **DoD Net-Centric Data Strategy**
  – Identify and expose Authoritative Data Sources (ADS)
  – Publish in a common format to support flexible implementation
  – Develop a common data exchange standard (C2 Core) as an extension from Universal Core (non-proprietary, open source)

• **DoD Net-Centric Services Strategy**
  – Maximize Use of Mandated Core and Shared Enterprise Services
  – Identify and provision C2 Common Services

• **Joint Mission Threads** – An essential element to understand the context of how we C2

• **C2 Functional Capability Services**
  – Intent is to sustain and synchronize current C2 capabilities
  – Incremental vice evolutionary delivery of capability

• **Joint C2 Objective Architecture** – Software View, Data View, Standards Profile
Creating net-centric capabilities involves combining the specialized information production, consumption and display features of functional mission areas with the ability to publish, subscribe, aggregate and manage at the Enterprise Level.

**C2 Focus is in this area**

- Enterprise Systems Management
- Collaboration
- Content Staging

- Discovery
- User Assist
- Application

- Mediation
- IA/Security
- Messaging

Provided by Programs in various functional mission areas

Provided by NCES and other infrastructure programs

Provided by Comms programs

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**Core Enterprise Services**

- IP-based Transport
  - Defense Information Systems Network (DISN)
  - Secret Internet Protocol Router Network (SIPRNet)
  - Joint Tactical Radio System (JTRS)
  - Warfighter Information Network – Tactical (WIN-T)
  - Etc.
DoD Net-Centric Data Strategy

Current Information Sharing Challenges

- **User UNAWARE**
  - Information exists
  - **Visible**

- **User knows it exists But CANNOT ACCESS IT**
  - **Accessible**

- **User can access Information, but cannot exploit it due to a LACK OF UNDERSTANDING**
  - **Understandable**

- **User can access date, but can it be TRUSTED?**
  - **Trustable**

Implementation Approaches

- **Advertise Information Holdings (“Tag” Data)**

- **Web Enable Sources**
  - Provide assured access
  - Remove Impediments — “Need to Share”

- **Vocabularies shared between Communities of Interest**

- **Assess data sources, Associate trust discovery metadata (secure tagging)**

* ADS: Authoritative Data Source

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C2 Core simplifies C2 information exchanges through agreement on:

- Data element definitions common to many Communities of Interest (COIs)
- Technical structure of Information Exchange Specifications (IES) supporting C2 information needs
- Leverages Universal Core (UCore) through extension of its Who, What, When and Where (4W) elements
Agility
Improved Information Sharing

NCSS Key Actions

✓ Enable producers and consumers to use, share, discover and access services:
  - Register services for discovery and use
  - Use consistent methods for describing services
  - Promote trust through service level guarantees and access control mechanisms

✓ Operationalize the SOE: (Web-based services and SOAs)
  - Extend infrastructure through federation
  - Implement service monitoring, including user feedback at all levels
  - Establish appropriate roles, responsibilities across the services lifecycle and for portfolio management
Joint Mission Threads

• **Joint Mission Thread (JMT):** an operational and technical description of the end-to-end set of activities and systems that accomplish the execution of a joint mission

• **Provides the Context of C2 activities and needs**
  – Tier 1 comprises overall systems, information exchanges, activities performed, nodes, need-lines, and actors
  – Tier 2 “strands” represent detailed breakdowns, with supporting reusable data
  – Tier 3 is a conceptual and organizational construct to address specific testing and certification requirements as they emerge
Joint Mission Threads

1. **Joint Mission Threads (JMTs) help us to understand:**
   - Interoperability issues
   - Capability gaps

2. **JMTs can be used for:**
   - Interoperability Testing and Evaluation (T&E)
   - Training Exercises and mission rehearsals

3. **Analysis of Joint Close Air Support JMT identified:**
   - Gaps in procedures – Services had different joint request procedures
   - Joint Terminal Attack Controllers had very different digital implementations (message formats, wave forms)
Joint C2 Objective Architecture: Software View

Acronyms:
CDCIE = Cross Domain Collaborative Information Environment
CDES = Cross-Domain Enterprise Services
DIA = Defense Intelligence Agency
DIL = Disconnected Operations, Intermittent Connectivity, Limited Communications
DMDC = Defense Manpower Data Center
DoDiss = Department of Defense Intelligence Information System
GCCS-J = Global Command and Control System - Joint
GCDS = GIG Content Delivery Service
GES = GIG Enterprise Services
GIG = Global Information Grid
GTN = Global Transportation Network
GV-ES = Geospatial Visualization - Enterprise Service
ICES = Intelligence Community Enterprise Services
ICG = IDE/GTN (Integrated Development Environment/Global Transportation Network) Convergence
MNIS = Multi-National Information Sharing
MSC = Multi-Service SOA Consortium
NCES = Net-Centric Enterprise Services
NGA = National Geospatial-Intelligence Agency
PDP = Policy Decision Point
PEP = Policy Enforcement Point
PKI = Public Key Infrastructure
RACE = Rapid Access Computing Environment (DISA)
RCVS = Robust Certificate Validation Service
SaaS = Software as a Service
The Bottom Line

• **Ultimately a Human Endeavor**
  – Technology enables the human interface and supports “command” and the decision maker, rather than forcing the decision maker to operate within the constraints of the “control” technology

• **Information Age Makes it…**
  – More Important and More Challenging….with Great Opportunity

• **Must Support the Way We Fight**
  – Joint, Allies and Coalition
  – Requires Trust

• **Must Work Enterprise Solutions**
  – Processes for Collaboration and Consensus Building
  – Promote Improved Information Sharing Among Mission Partners
Questions and Discussion