FMN for Coalition Operations

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The Afghanistan Challenge

“Coalition forces within Afghanistan cannot communicate effectively and share theatre related operational Commander’s guidance, information and intelligence. These communication gaps increase risks to life, resources, and efficiency”.

COMISAF, General McChrystal
NATO’s Mission Network Concepts

1949 - 1995

Cold War

1995 - 2010

Large national land warfighting formations (Corps) STANAG 5048

1995 - 2010

Smaller multinational joint formations conducting comprehensive missions (Brigade/Division)

2010 – 2017… ?

Afghanistan Mission Network

2015 - 2030

NATO's Mission Network Concepts

Federated Mission Networking

STANAG 5048
“[Allies] have doubled the size of the NRF, making it more ready and more capable, and established a high readiness Joint Task Force, able to move within a matter of days. ... and increased our exercises three-fold,...

First, we must modernize our deterrence,

• with better intelligence and early warning,

• a better integration for our land, sea and air forces, and

• significantly better cyber defence”
The FMN

Connecting forces in a federated mission environment at any time, in a short period of time and at an optimised level of interoperability.

Facilitated by:

A coordinated approach and the commitment of FMN Affiliates to create, maintain and evolve capabilities enabling federated mission networking.

Better command and control and decision-making with improved information-sharing.

Managed by:

Effective and efficient mission networking based on common management, processes, activities, technology, standards, education and training.

Affiliates
NATO Federated Mission Networking Implementation Plan (NFIP)

Vol I: Overview + Governance & Management: Nations‘ Triple Hatted Role in FMN

Vol II: Federation and the FMN Capability Process

Vol III: NATO Standing FMN Capabilities

The ‘Plan‘
The Concept of FMN

+ significantly shorter mission preparation with less IO issues
+ working together with all coalition partners on Mission SECRET networks

Mission-Ready
+ high level of IO prior to a mission through early consensus, validation & verification and training

Adapted from ACT presentation 20160202
Environments of the FMN Capability

1. Verification and Validation
2. Collective Training
4. Mission Execution

For longer missions, or if otherwise required:
   a. Mission specific Verification and Validation
   b. Mission specific Collective Training
FMN Environments

Verification & Validation Environment
- NATO
- V&VE
- Nation A
- Nation B

Collective Training Environment
- CTE
- NATO Command Structure

Operational Planning Environment
- OPE

Same infrastructures used for CTE/OPE and MEE

Mission Execution Environment
- NRF 2017 Preparation MEE
- Active Endeavour MEE
- Resolute Support MEE
- NRF 2016 Standby MEE

In Operations
A FMN Capability enables to connect forces in a federated mission environment at any time, in a short period of time and at an optimised level of interoperability. *NFIP Vol 1 Annex B*

The sum of all the capabilities offered by all FMN Affiliates that are required to manage and exploit Federated Mission Networking.
NATO’s FMN Perspectives

- **NATO as an Affiliate**: NATO acts as if it were an FMN Nation, similar to the other FMN Affiliates.
- **NATO as a Service Provider**: NATO provides services as a service provider.

NOTE: In these two roles NATO acts as if it were an FMN Nation, similar to the other FMN Affiliates.
The three FMN Perspectives

Within Federated Mission Networking responsibilities of each NATO body needs to be addressed individually for:

A. **FMN Framework** activities
   - e.g. support to collective FMN Capability Development or managing pre-agreed naming and addressing

B. **NATO as an Affiliate** activities
   - e.g. DCIS system upgrades and internal changes to ICT Service Management

C. **Mission Network management**
   - e.g. ICT Service Management across the entire life-cycle of the Mission Network, such as DCIS for NRF 17
FMN Capability Development

Source: NFIP Volume I, Para 113

Based on: NFIP Volume I, Para 116
FMN Spiral Roadmap (Service Scope)

**Spiral 1.x**
- **Human-to-Human Services**
  - Informal Messaging
  - Text-based Collaboration
  - Audio-based Collaboration
  - Video-based Collaboration
  - Web Hosting

- **Enabling Services**
  - Communications
  - Domain Naming
  - Distributed Time
  - Authentication
  - Directory Synchronization

**Spiral 2.x**
- **Functional Services**
  - Situational Awareness
  - JISR Information Sharing
  - MEDEVAC

- **Human-to-Human Services**
  - Unified Audio and Video

- **Enabling Services**
  - Security Markings

**Spiral 3.x**
- **Functional Services**
  - Air Tasking
  - Collection Management
  - Logistics
  - Medical

- **Human-to-Human Services**
  - Calendaring and Scheduling

- **Enabling Services**
  - Security Labelling
  - Distributed Search
  - App Store
  - Cloud (IaaS)

**Power Through Affiliation - Federate - Share - Win**
NRF Battle Rhythm within FMN

NCI Agency support activities and milestones

Service Change Management Directive 06.03.02
Release Management Directive 06.02.01
- Identification of Software Assets Tech Instr 06.03.01
Deployment Management Directive 06.03.01
Test, Verification and Validation Directive 06.03.04
Programmatic Approach for FMN

FMN Capability Delivery within NATO is driven by:

- the ‘**FMN Vision**’ and strategic action plan as set out in the NFIP;

- the need for ‘**compliance**’ of the NATO Enterprise with FMN Spiral Specifications;

- the need to ‘**manage change**’ and ‘**realise benefits**’ of FMN in-sync with the operational NRF Battle-Rhythm; and

- the requirement to bring together for ‘**cohesion**’ and/or ‘**management efficiency**’ a number of existing projects and activities.

- ‘**Maximize re-use**’ of existing structures and organisations.
NCI Agency’s Approach to FMN Support

Sponsoring Group

Coordination of FMN implementation within NATO Enterprise

C3CG

GM

COO

COS

Agency Executive for Capability Delivery

Senior Responsible Owner

FMN Coordinator

Programme Management

Business Change Management

FMN Support Office

NCIA FMN Capability Development Board

FMN Facilitation Team

SStrat

DIS

DAS

AirC2&BMD POs

DSO

O&E SL

Coordination Authority for Operations & Exercises

NCI Agency’s Executive for Capability Definition

Agency Executive for Capability Delivery

Coordination of FMN implementation within NATO Enterprise

FMN Coordinator

Programme Management

Business Change Management

FMN Support Office

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DIS

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Coordination Authority for Operations & Exercises
"The future combat system is not an aircraft, it is a C4ISR [system] with the cloud ID and platforms that are either piloted or unpiloted. We will have to be able to link on this. This is what we have to be able to build for the future, but we have to start it now."

Supreme Allied Commander Transformation, General Mercier
"Cloud computing" is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort.

requires the availability of high-capacity global interoperable networks

"Combat cloud" is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of sensors, navigation systems, weapon platforms and C2 functions that could act as a force multiplier for shrinking forces.

requires the availability of secure, federated mission networks
FMN Vision: Intra-cloud interoperability

- **Asset based**: End User Device
- **Infrastructure (as a Service)**: Applications > Data > Runtime > Middleware > O/S > Virtualization > Servers > Storage > Networking
- **Platform (as a Service)**: Internally managed or Managed by Service Provider
- **Software (as a Service)**: Internally managed or Managed by Service Provider

**vertical interoperability**
Objective: enable open Plug & Play Architectures

Horizontal interoperability:
- other participants’ User Applications
- NATO User Applications
- commercial User Applications
- Apps
- other participants’ COI services
- NATO Community of Interest Services
- commercial Community of Interest Services
- other participants’ CES
- NATO CES
- commercial Core Enterprise Services
- other participants’ CES
- other participants’ Comms services
- NATO Communications Services
- commercial Communications Services

Vertical interoperability:
- vertical service interoperability point
- horizontal service interoperability point
Confidentiality Labelling & Binding

- Standards Development
  - STANAG/ADatP 4774: Confidentiality
  - STANAG/ADatP 4778: Binding mechanism
Industry support to (FMN) Architecture Development?

• FMN is about interoperability, open architecture and alignment of capability development between FMN Affiliates

• Some nations as well as NATO itself will most likely use commercial partners for providing services in support of deployed operations.

► Industry involvement in defining FMN related architectures and building blocks (ABBs) to ensure that industry understands FMN requirements and can offer potential solution building blocks (SBBs).

► Need for a joint forum for federation/enterprise architecture collaboration
Industry support to Interoperability Verification?

• NATO and other FMN Affiliates are setting up a federated Coalition Verification and Validation Environment (CV2E). Prime focus: end-to-end operational interoperability validation of solution architectures

• NATO and Nations rely on industry and independent test labs to certify solutions to conform to respective FMN interoperability standards and profiles.

• Many solutions can already be certified by existing conformance testing and certification programs,

  there is a lack of these programs for special military and security standards.
Collaboration Opportunities with Industry (1/2)

- Use of hybrid cloud – use of commercial IaaS, PaaS and SaaS under the assumption that public cloud offerings are security hardened and accredited
- Common and reusable Interoperability Standards and Profiles (e.g. STANAG/ADatP 4774/4778)
- Definition of common, interoperable, reusable Architecture Building Blocks (ABB) in the area of C4ISR
- Common Solution Building Blocks (SBBs) towards the goal of exchangeable micro-services
Collaboration Opportunities with Industry (2/2)

• Improved collaboration in the area of interoperability verification resulting in e.g. standardized test processes, criteria and reusable sets of test cases
• Open Source and provision of related Managed Services
• Business Intelligence
• Use of Machine Learning and Cognitive Analytics
• E2E integration of SM&C and Cyber Defence services