Lessons Learned from the MSG-128 Study on Incremental Implementation of NATO Mission Training through Distributed Simulation Operations

Jean-Pierre FAYE (Behalf the MSG-128 TG)

AGENDA

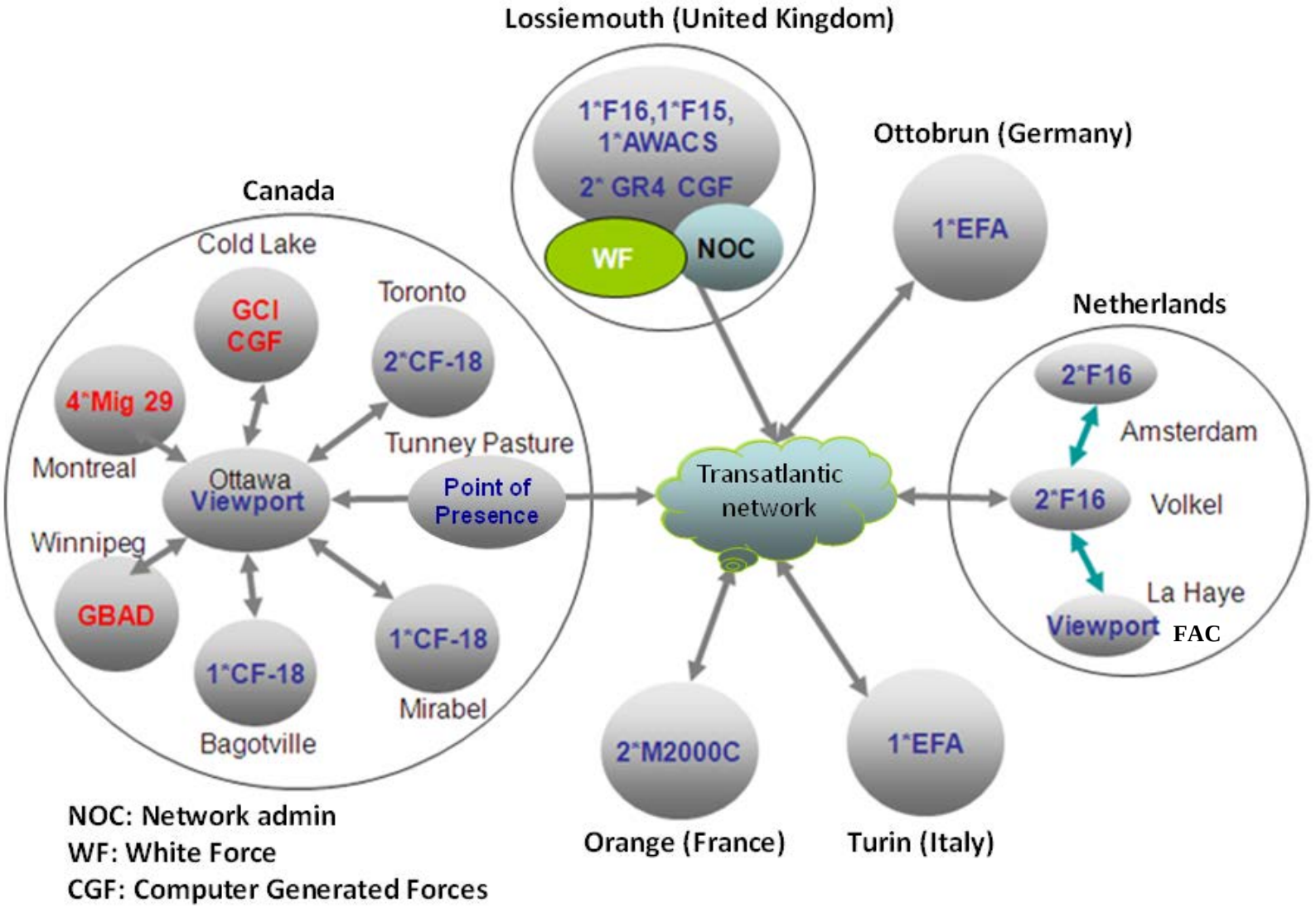
- MTDS BACKGROUND
  - SAS-034/MSG-001 First wave (2003-2005)
  - NIAG SG-162 study (2011-2012)
- MSG-128 (2013-2017)
- Follow-on

Dec 2004

MTDS value to NATO

- **First WAVE successfully demonstrated potential value in NATO of networked simulation**
  - to enhance NATO's readiness for coalition air operations
  - to prepare NATO Response Force
- **Operational community in Nations enthusiastic**

NATO First WAVE



NOC: Network admin
WF: White Force
CGF: Computer Generated Forces

1st Wave Lessons Learned

Strengths	Weaknesses
1. MTDS can provide relatively low cost training. 2. Time Saving due to use of national sim assets. 3. MTDS can be used as preparation for Live flying exercise. 4. Weapon employment (often not possible in live exercises).	1. Unavailability of a permanent NATO (MTDS) network. 2. Infrastructure required. 3. Limited resources available for MTDS.
Opportunities	**Threats**
1. Carry out mission rehearsal with MTDS. 2. Unlimited options for the development and execution of varying scenarios. 3. To have actual threat reactions.	1. Network security and site accreditation (caused withdrawal of the USAF assets in EFW and UK Tornado asset)

NIAG SG 162 – Distributed Simulation for Air and Joint Mission Training

Vision of Mission Training via Distributed Simulation (NIAG SG 162)

NATO MOC (Mission Operation Centre)

NATO MTDS Network

NAEW

Air C2

FAC

NATO MTDS Exercices

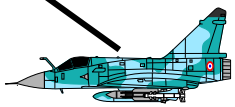
Daily training !

National MOC

Multinational MTDS Exercices

Nation A MTDS Network

Nation B MTDS Network

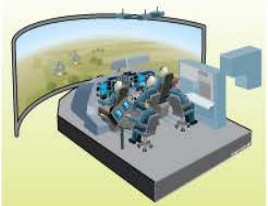


NIAG MTDS Study Vision

Mission Rehearsal

Technical → **Operational**

Individual Pilot Training (initial Conversion, Recurent Training)



Crew Training (CRM)

Team Training

Collective Training

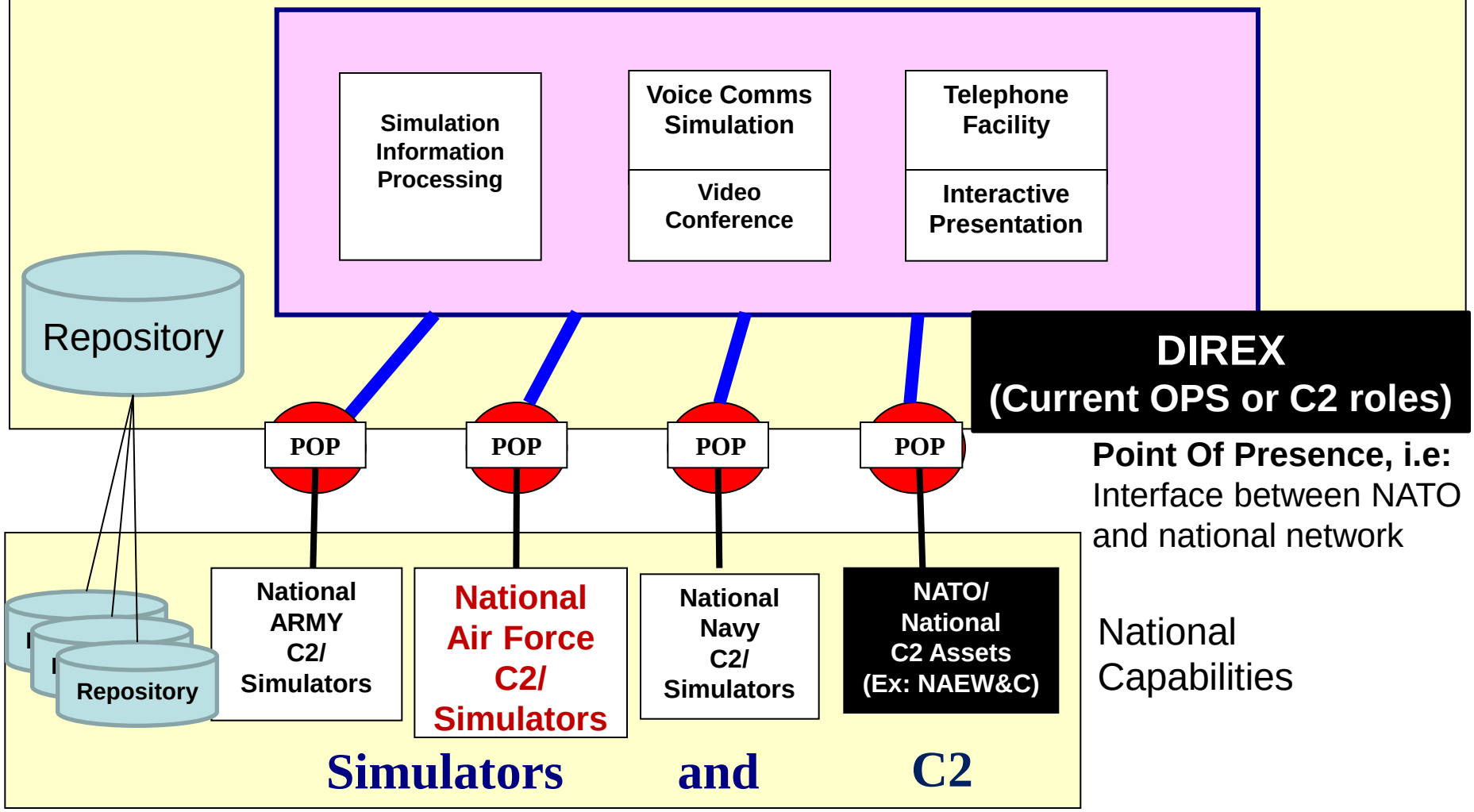
Multi-Team Training, Multi-Platform, One Service

Joint Training (Army/Air Force /Navy)

Combined / Coalition Training

National Capabilities → **Current GAP** ← **NATO responsibilities**

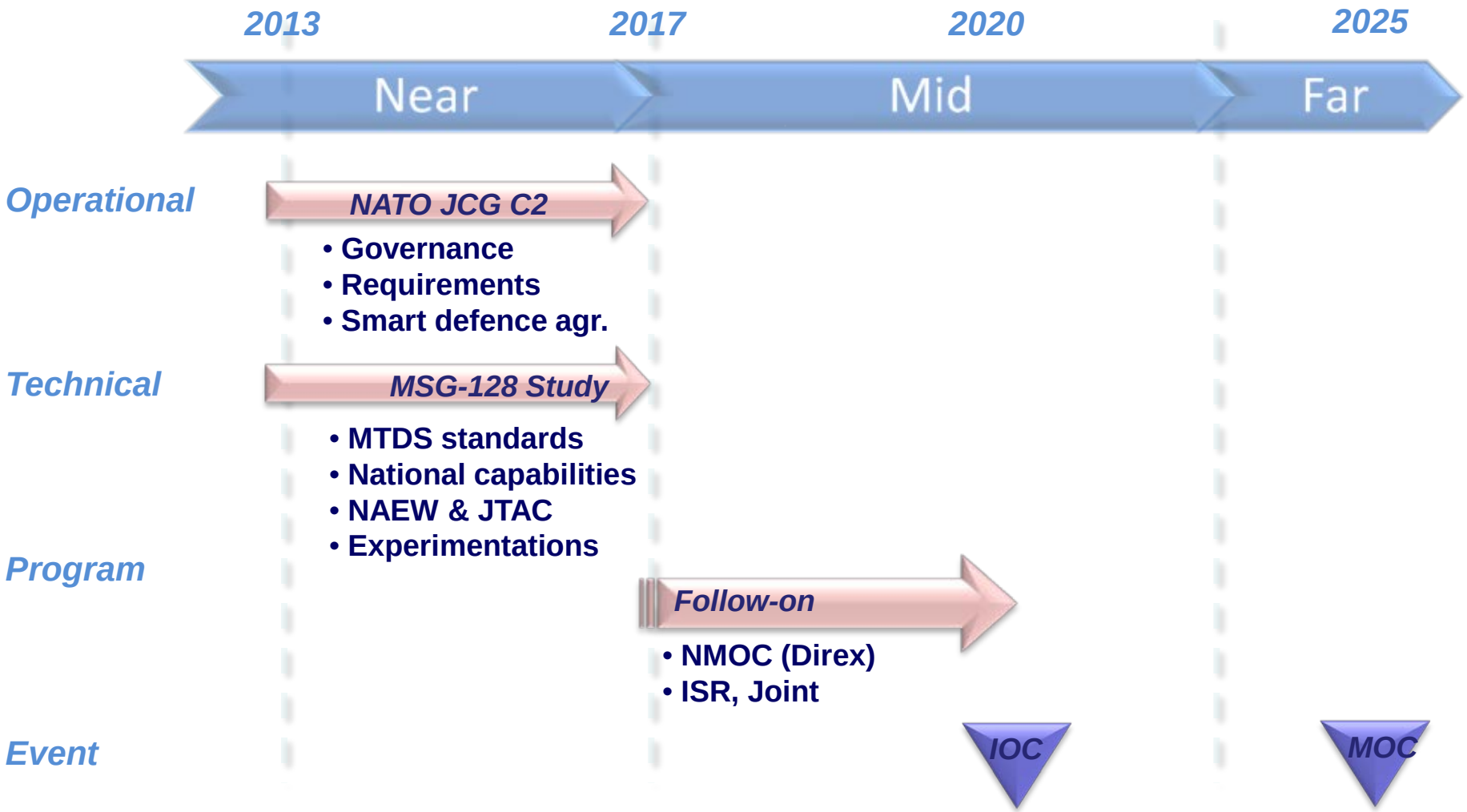
NATO Mission Operation Centre (NMOC) Concept



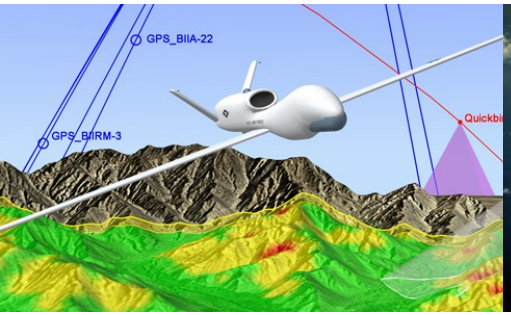
Point Of Presence, i.e:
Interface between NATO and national network

National Capabilities

NMTDS Roadmap (update)



MSG-128 RTG "Incremental Implementation of NATO Mission Training through Distributed Simulation (MTDS) Operations"



Team Leader: Dr Jean-Pierre FAYE (NIAG)

Contributing NATO Members: CAN, DEU, ESP, FRA GBR, ITA, NLD, NOR, SWE (as PfP), TUR, USA/WPC, CASPOA COE, M&S COE, NAEW, NIAG

Contributing Partners: not open to Partners
Start-End: Oct 2013 – Oct 2016
Classification: NATO SECRET

Related activity: MSG-001 / SAS-034 "First Wave"

Objective:

- establish essential elements for a NATO MTDS environment, including: Concept, Standards and agreements, Legal and Security framework, Services infrastructure, Standing operating procedures
- validate these elements through initial operational test and evaluation
- support a Smart Defence project on NATO MTDS

Themes/topics:

- Missions
- Assets
- Organisation
- Interfacing and Integration
- Performance

Output and Deliverables:

- Final Report;
- Initial implementation of a NATO MTDS environment;
- Report including MTDS Concept (Employment and Use) and draft standards ratification plan;
- Requirements document for NATO MTDS Initial Operational Capability.

Exploitation:

- Implementation of a persistent air combined and joint collective tactical training capability to support operational readiness of NATO collective and National air warfare capabilities.

MSG-128 Working Teams

OPS

- Define training objectives
- Define operational requirements
- Develop a CONOPS
- Identify and document MTDS assets
- Define MTDS missions and scenarios

TEK

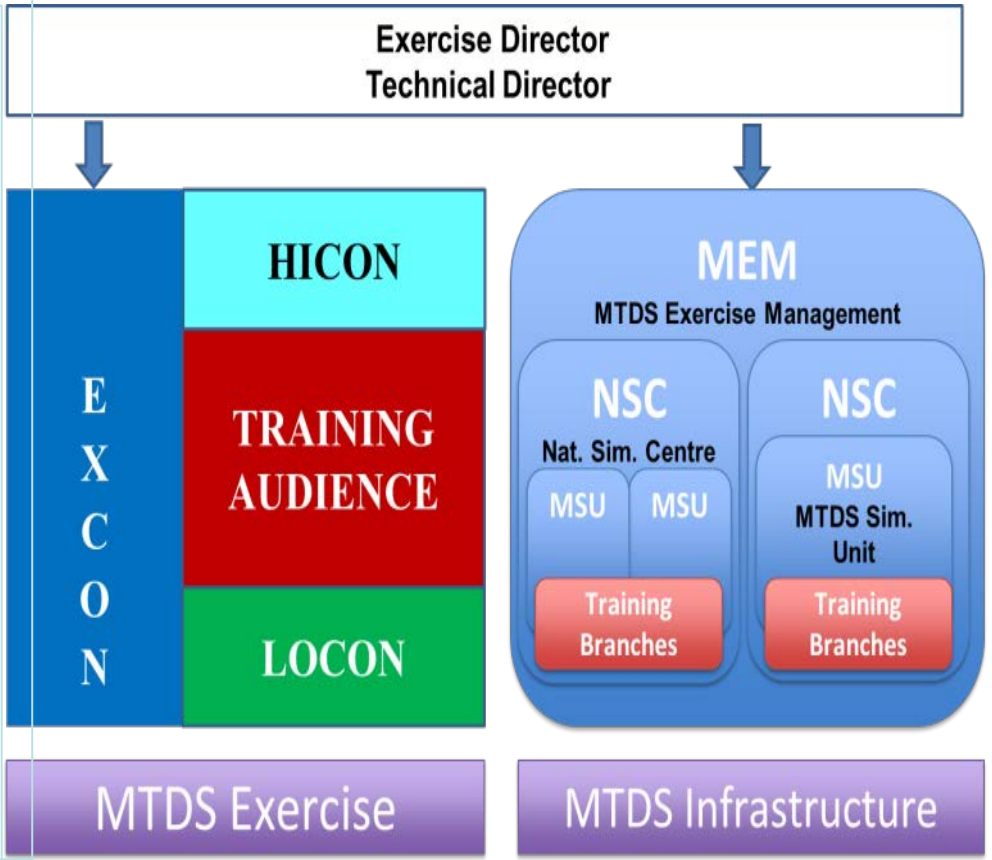
- Develop the recommended reference architecture (MRAD)
- Conduct unclassified technical evaluations
- Describe a transition path to the MRAD
- Recommend required standards for MTDS in liaison with SISO and MS3

IMPL

- Develop and implement the initial architecture using existing assets
- Conduct initial exercises (including integration testing)
- Define and implement security requirements and a secure NATO network
- Assess the initial exercises and document the lessons learned
- Contribute to the MTDS CONOPS

Concept of Operations for MTDS

1. **Same MTDS Exercise organization than CAX or Livex (ref Bi-SC 75-3)**
2. **Specific MTDS Exercise Mgt Infrastructure (MEM) for technical support of preparation, execution and debriefing**
3. **Subordinated centers to MEM and distributed responsibilities**
   - NSC: NATO/Nation Simulation Centre
   - MSU: MTDS Simulation Unit
4. **Human Resources by « Training Branche »**



Implementation activity: 2 DIS exercises, 1 HLA ex.

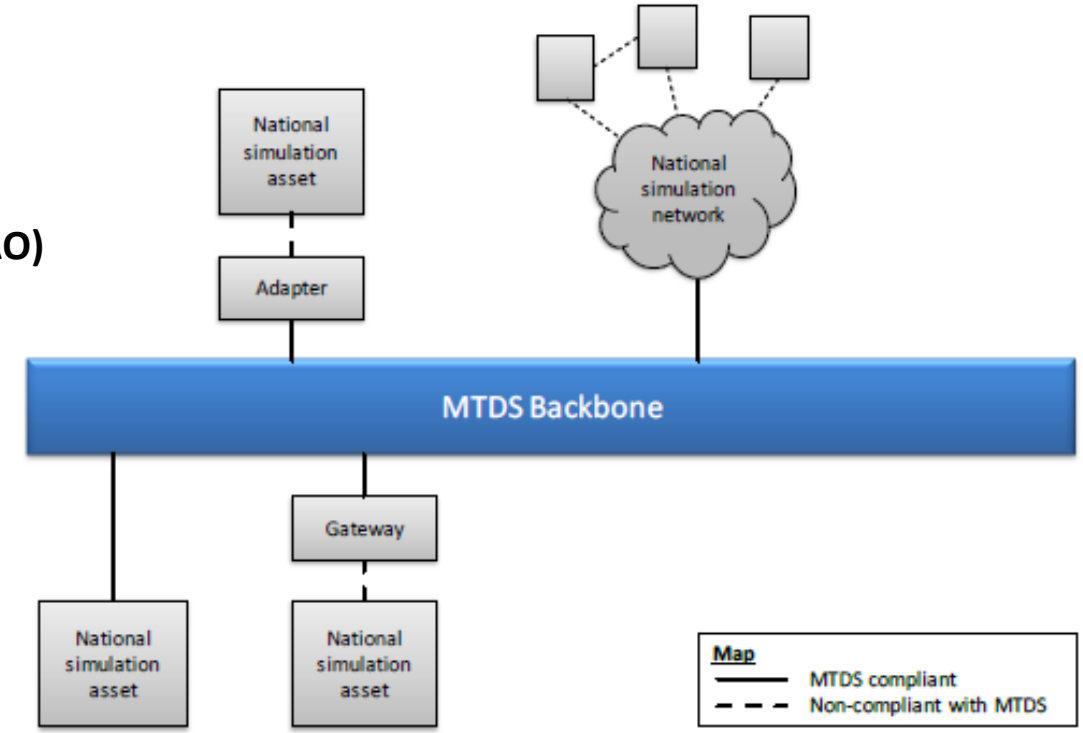
- **NAEW training Centre play NMOC role for the 3 exercises**
- **Network: CFBLNet (NCIA support) → NS accreditation**
- **Legacy simulators: NAEW, CAN, DEU, FRA, NLD, NOR**
  - Initially based on DIS → evolution towards HLA RPR-FOM (gateway)
  - SIMPLE L16 and Radio voice communication for coordination between E-3A and Fighters → HLA BOM L16, (Radio over HLA ?)
  - Air to Air mission → Air to Ground (correlated terrain objects)
- **Supporting Tools**
  - JCHAT, VoIP for instructors, DIS/HLA gateways, Encryption, …
- **Growing complexity of exercise and architecture**
- **Test Plan version for each exercise**

Technical & Standardization activities

❑ MRAD architecture

(MTDS Reference Architecture)

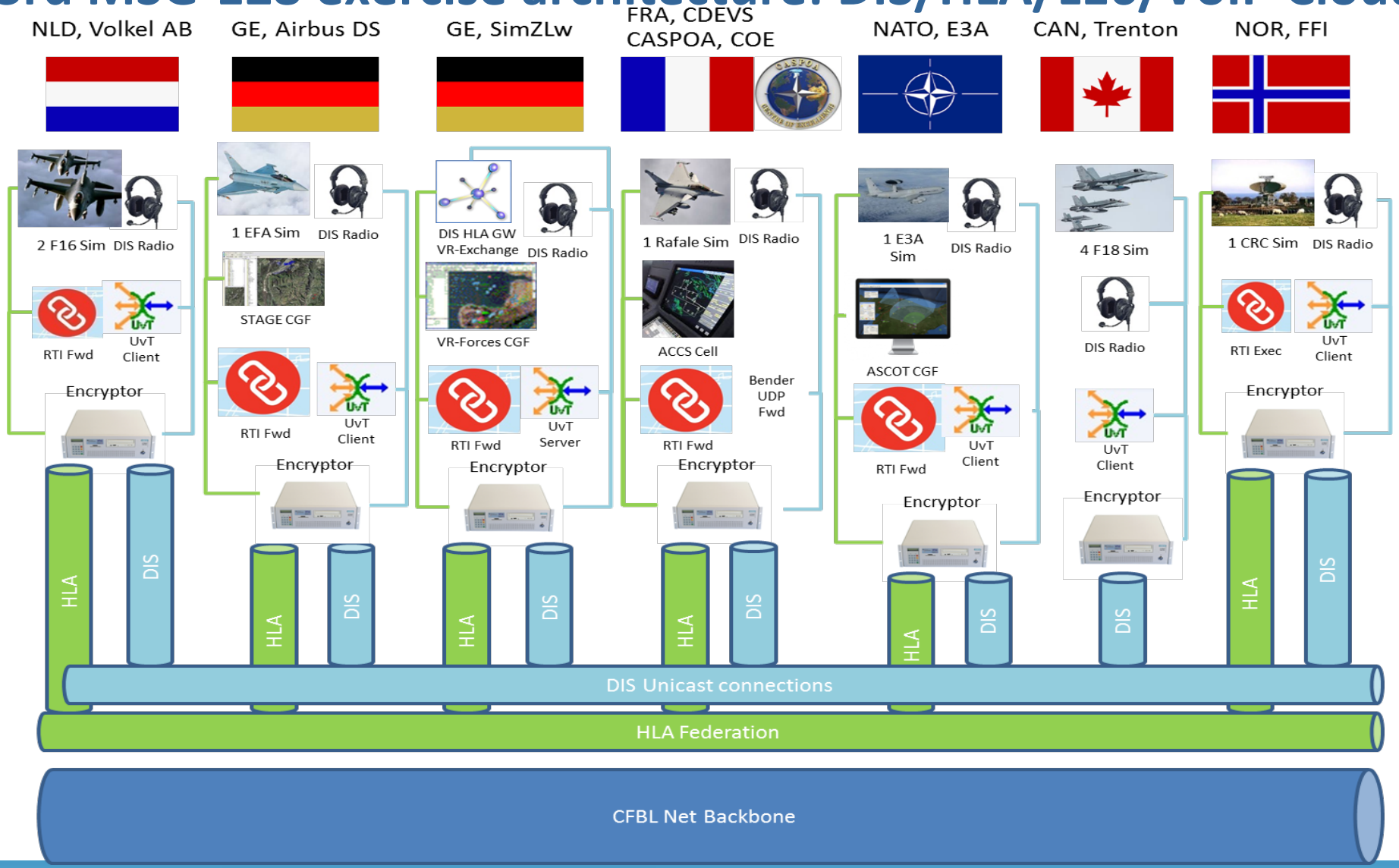
- **DSEEP Multi-Architecture Overlay (DMAO)**
  - DIS V7 & HLA 1516
  - Radio communication (DIS → HLA)
  - L16 messages



❑ Federation agreement

- **MTDS FOM based on RPR-FOM**
- **Tactical data link (TDL) for MTDS**
- **Enumerations for entities and emitters**
- **Time representation and dead reckoning**
- **Simulated radio communications**
- **Federation states including startup and shutdown procedures**
- **Modelling responsibility and Common damage models**
- **Synthetic Natural Environment agreements.**

3rd MSG-128 exercise architecture: DIS/HLA/L16/VoIP Cloud



MSG-128 Lessons Learned

Strengths

1. Availability of a permanent network: CFBLnet
2. Cost for training decreasing and technology deployment growing,
3. Realistic mission training with “real operators” and war fighting capability (often limited in live exercises).
4. Availability of test and research simulators

Weaknesses

1. DMOC Availability
2. Limited availability of national and NATO simulation assets and resources
3. Lack of ownership and governance from the NATO training community
4. NATO Secret Accreditation required
5. Requested effort for Tests before exercise
6. Availability of Common terrain data for nations and federation of simulators

Opportunities

1. Multi Level Security technology
2. Availability of COTS: Gateways, CGF
3. CFBLNET services: VoiP, JCHAT, …
4. Simulation for MTDS interoperability testing (DIS/HLA, L16, …)
5. NATO Operational exercise emerging (virtual magic, Spartan Warrior, …)

Threats

1. Site accreditation is a long process
2. Planning conflict between usual national training activities and multinational training
3. MTDS Level of maturity within MTDS community

Recommendations for MTDS Follow-on (1/2)

- **Governance of MTDS is essential**
- **Improve maturity level**
  - Stabilization of implementations
  - Continue yearly tests and exercises for faster execution of the test plan and integration of new comers.
  - Transition towards operational exercises: Spartan Warrior, Virtual Magic
- **Multi Level Security**
  - Accredited bidirectional Information Exchange Gateway supporting:
    1) Declassification of data for publication toward lowest network classification
    2) Data integrity checking for data coming from lowest network classification
- **Initiate MTDS Infrastructure developments:**
  - Identify COTS for Collaborative tools for preparation, execution and analysis of exercises and test implementation

Recommendations for MTDS Follow-on (2/2)

- **Toward Future combined / joint distributed tactical training, through simulation for joint and combined tasks and operations (NIAG study SG-215)**
  - Extension to Air and Joint operations
    - Scenario: Mission rehearsal and operational assessment of air and C2 systems (including data links) in all core air power roles and types of air operations (Counter-Air, Attack, Air Mobility, JISR, and Personnel Recovery) for aircrews, controllers (i.e. NAEW, Forward Air Controllers, Joint Air Terminal Controllers), and CAOC/JFAC staff.
    - Scope: C4ISTAR, UAVs, Fighters, Ships and Land assets
- **Ensure continuity of MSG-128 by addressing identified gaps**
  - Scenario preparation tool at MEM level interfaced with Air C2 databases and JISR database
  - Standardization of scenario distribution
  - Full Sim-C2 interoperability for Air and Joint operations

QUESTIONS ?