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Our Difference, Your Success

2018 TDL Interoperability Summit

Live Virtual Constructive TDL Training

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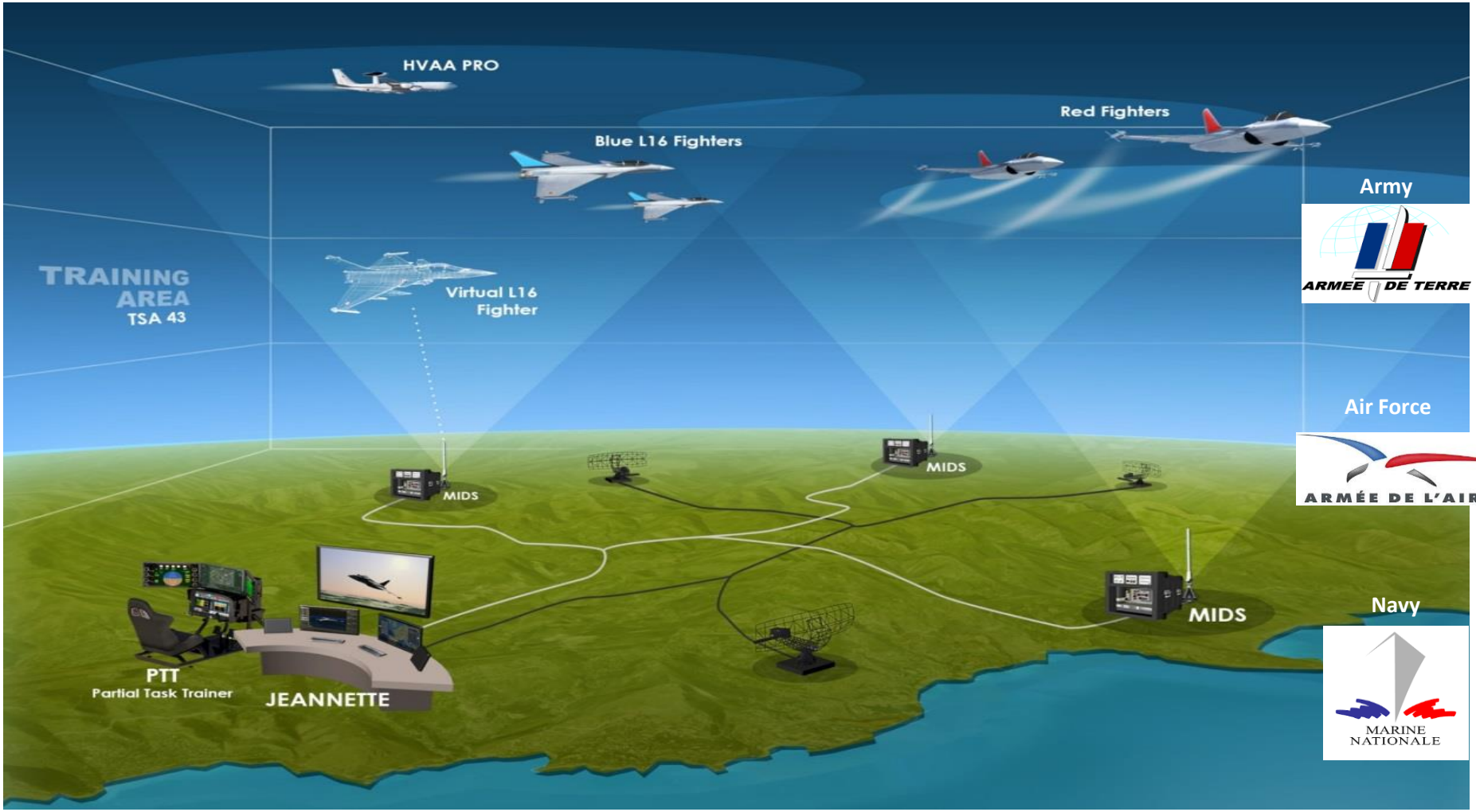
French Forces main issues

- **Link16, a must have, is mandatory for modern warfare operations**

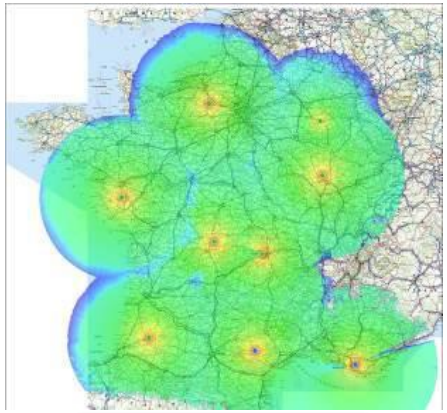
- **Constant growth of TADIL J fitted weapons systems. A need to:**
  - Enhance the Link16 knowledge for operators (pilots and controllers)
  - Enhance the SOP within Forces and in joint operations

- **A Joint request to train daily using a dedicated training system**
  - Train Pilots and fighter controllers in A/A and S/A scenarios
  - 5 systems are delivered (3 Air, 1 Army (deployable) & 1 Navy)
  - Single Force or Joint Force training or exercise support
  - Scalable scenarios to reach according to educational purposes

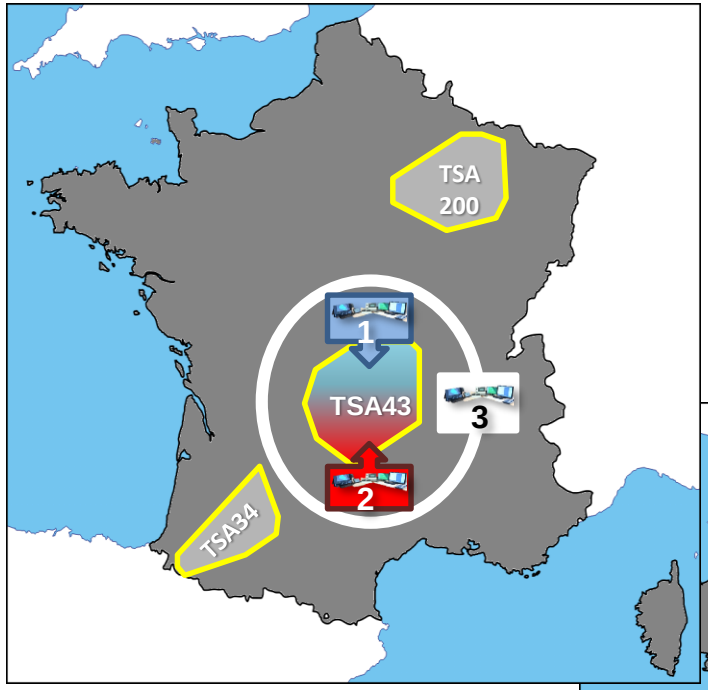
LVC training for French Forces

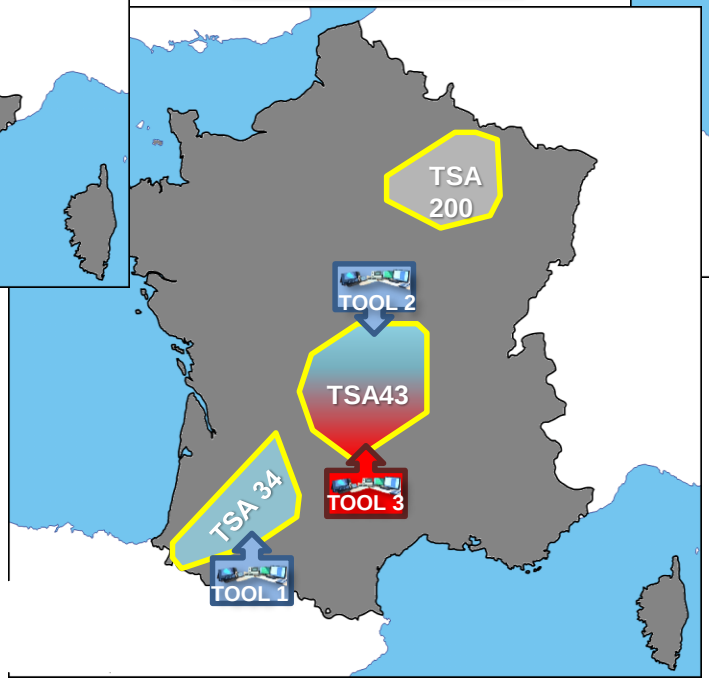


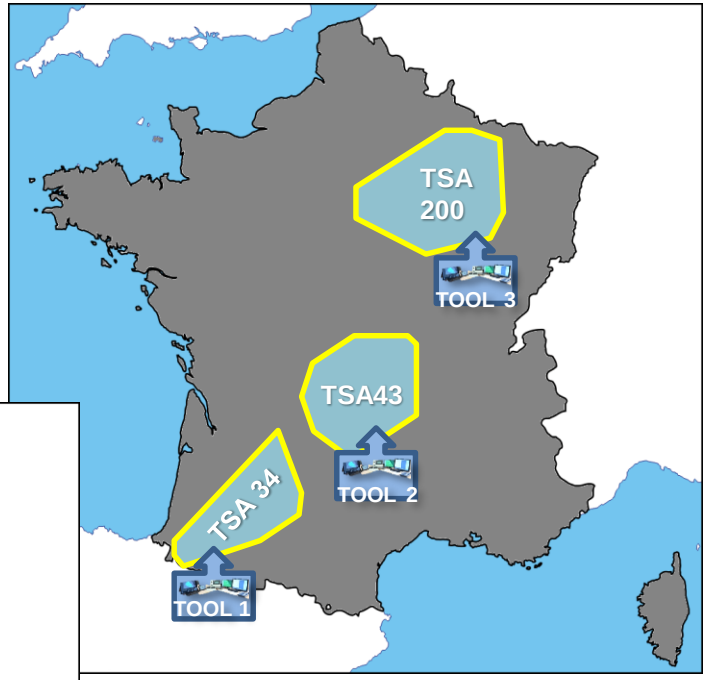
French Forces main issues



3 different areas







3 communities
BLUE
RED
WHITE

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French Forces main issues

A need for a tool

- User-friendly and evolving GUIs, during system lifecycle
- Able to Support Forces transformation and Warm-Up
- Able to provide Scalable scenarios to reach defined educational objectives
- With a capability of multi-site debriefing system to highlight lessons learned

French Forces main requirements

- Real and simulated activity in 1, 2 or 3 combat areas
- Link16 radiation covering large training ranges
- Missions Command & Control for red, blue and white forces
- Real time kill assessment
- Exercise record and replay
- Distant site situation display and debriefing
- Connection to external simulators, systems and TDL training systems
- MIDS digital voice

A mature build-up process to reach LVC16

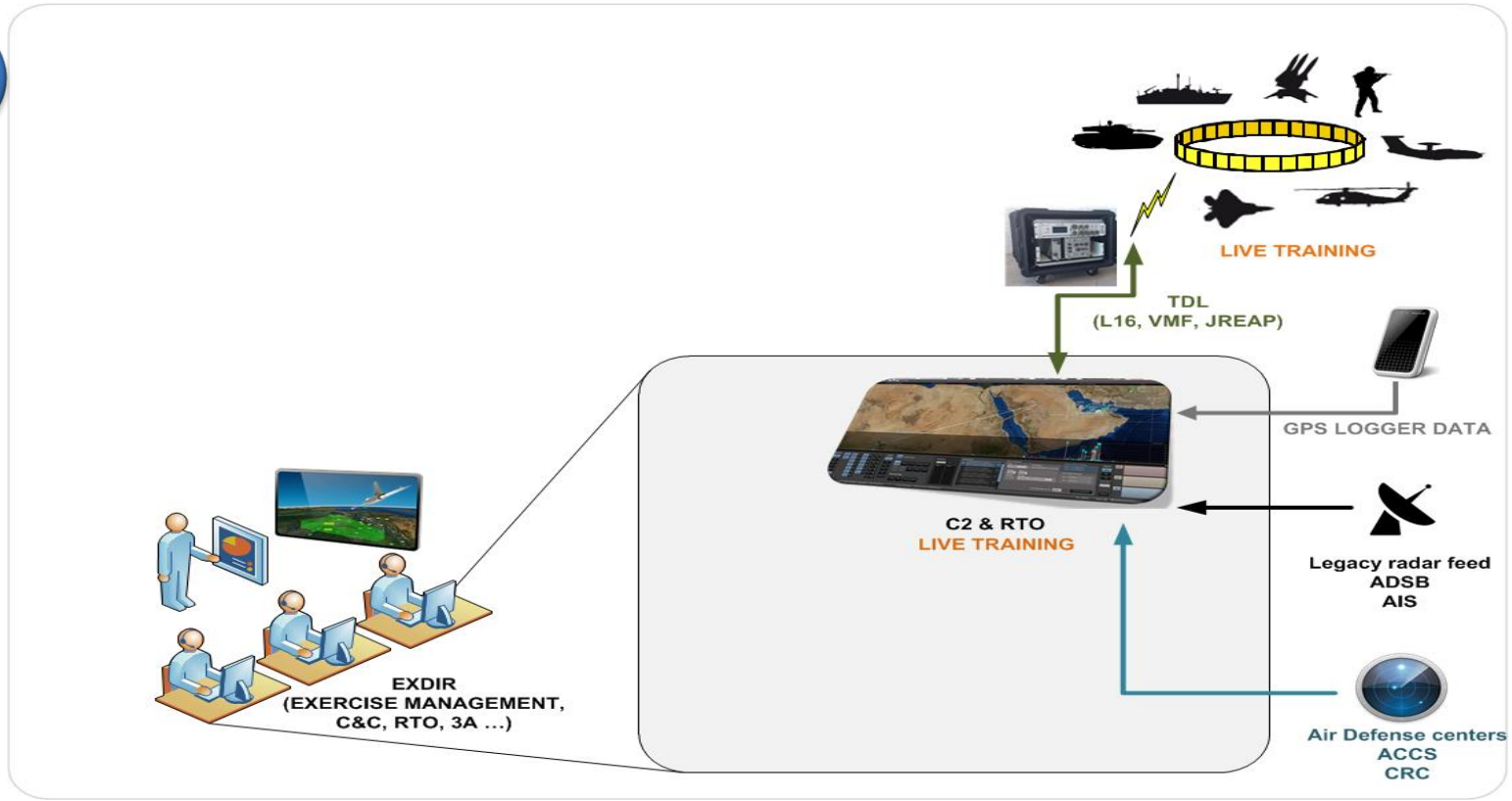
- **2010: First Live FAF Link16 exercise management**
  - Radar feed module development (multi-radar tracker)
  - Multi-MIDS management system (to radiate within a wide training range)
  - Constructive simulation sent to Jet fighters via Link16 channel

- **2011: LVC16 support NATO Tiger Meet exercise**
  - C2 functions enhancement (GUI working group with operational users)
  - Range Training Officer & Full Debriefing modules

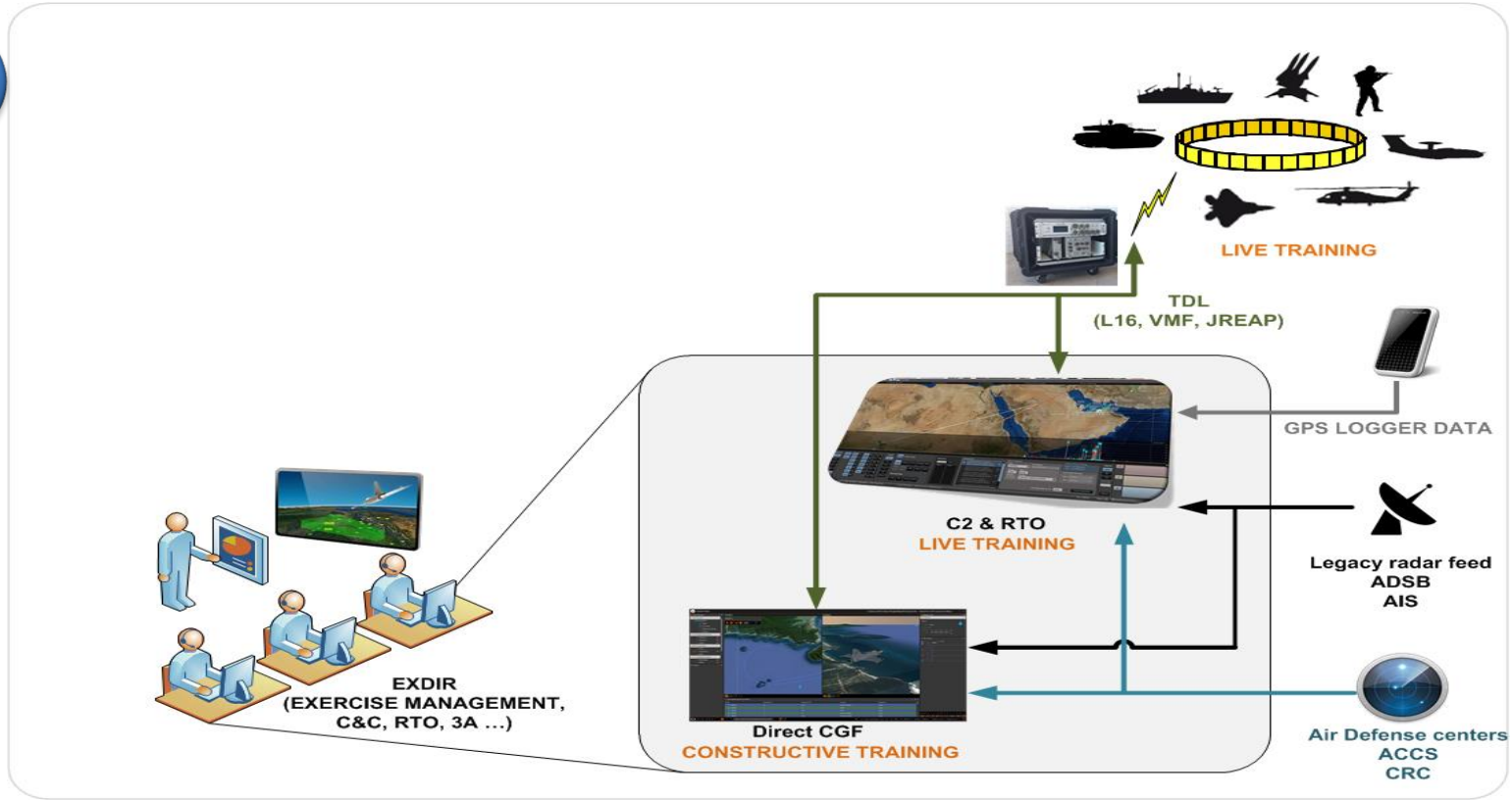
- **2012 to 2016: Major exercises or courses support:**
  - COMOA type: TLP (NATO), VOLFA (FR), POKER (FR)
  - CAS type: SERPENTEX (FR + International guests), BOLD QUEST (US)

- **2017: 5 LVC16 delivered to Forces (3 Air, 1 Navy and 1 Army)**
  - Mont de Marsan AB, Landivisiau Naval AB & Hyères Army ADA regiment

From Live to LVC

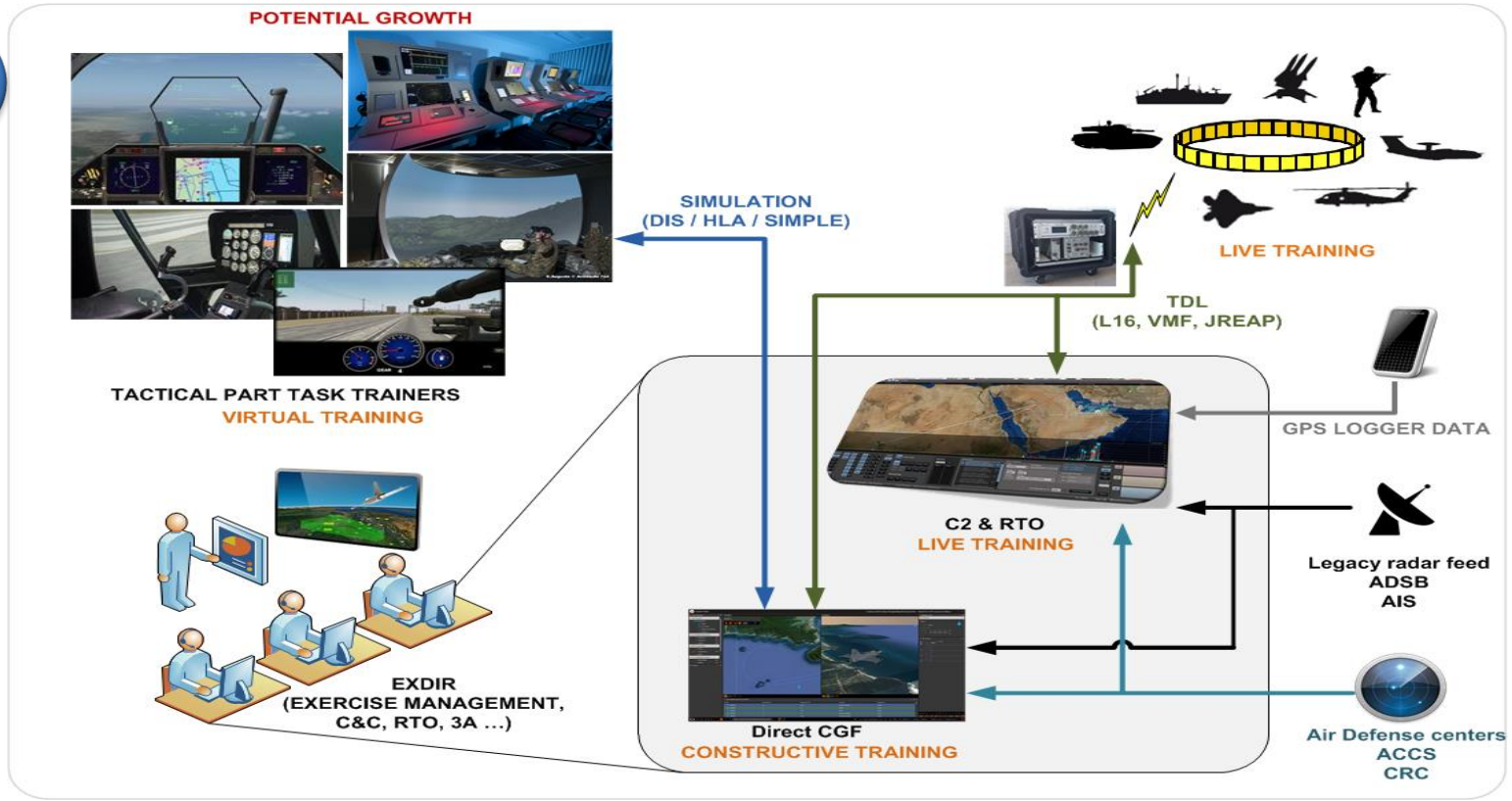


From Live & Virtual to LVC

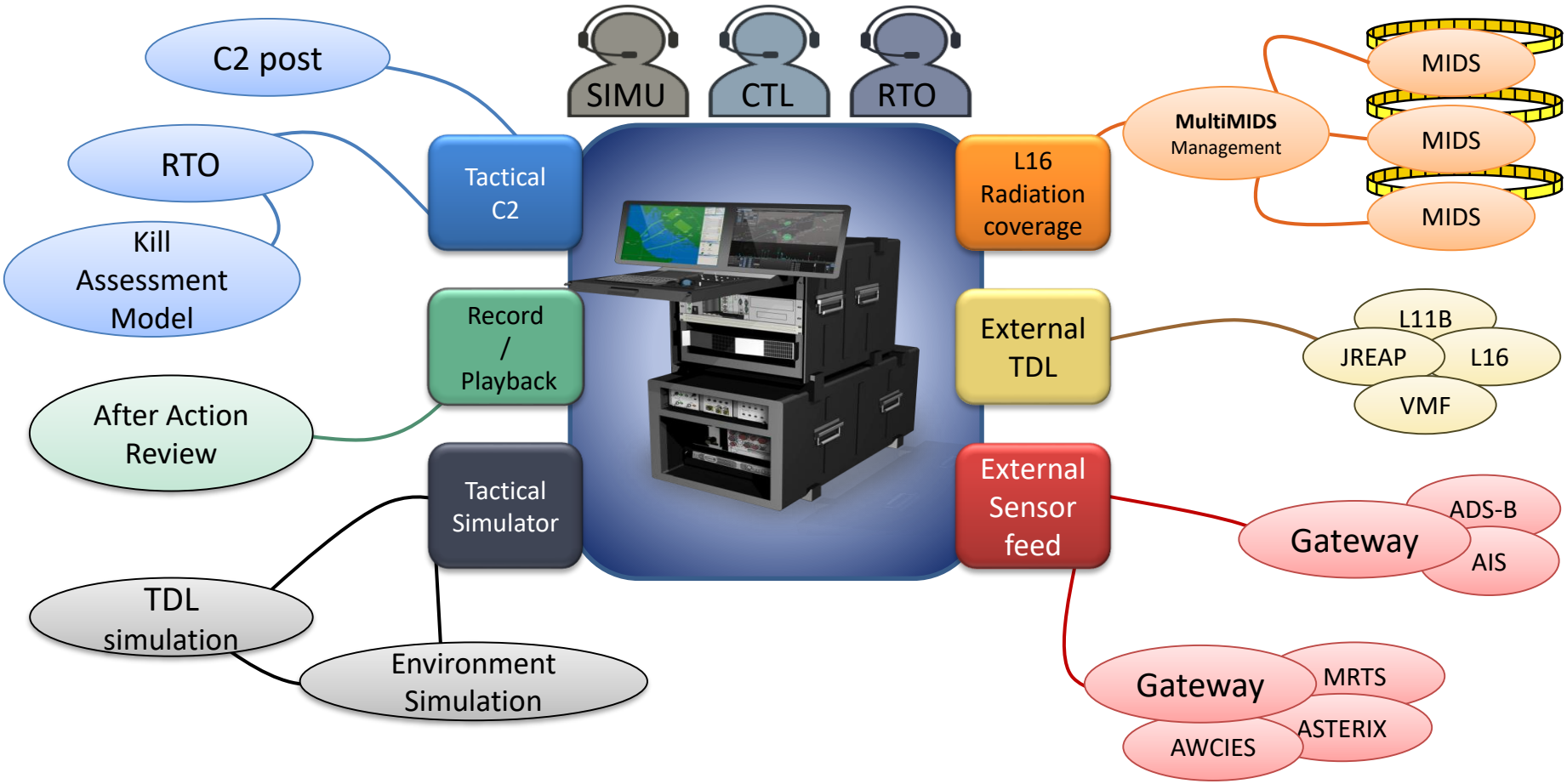


JEANNETTE Configuration

L V C

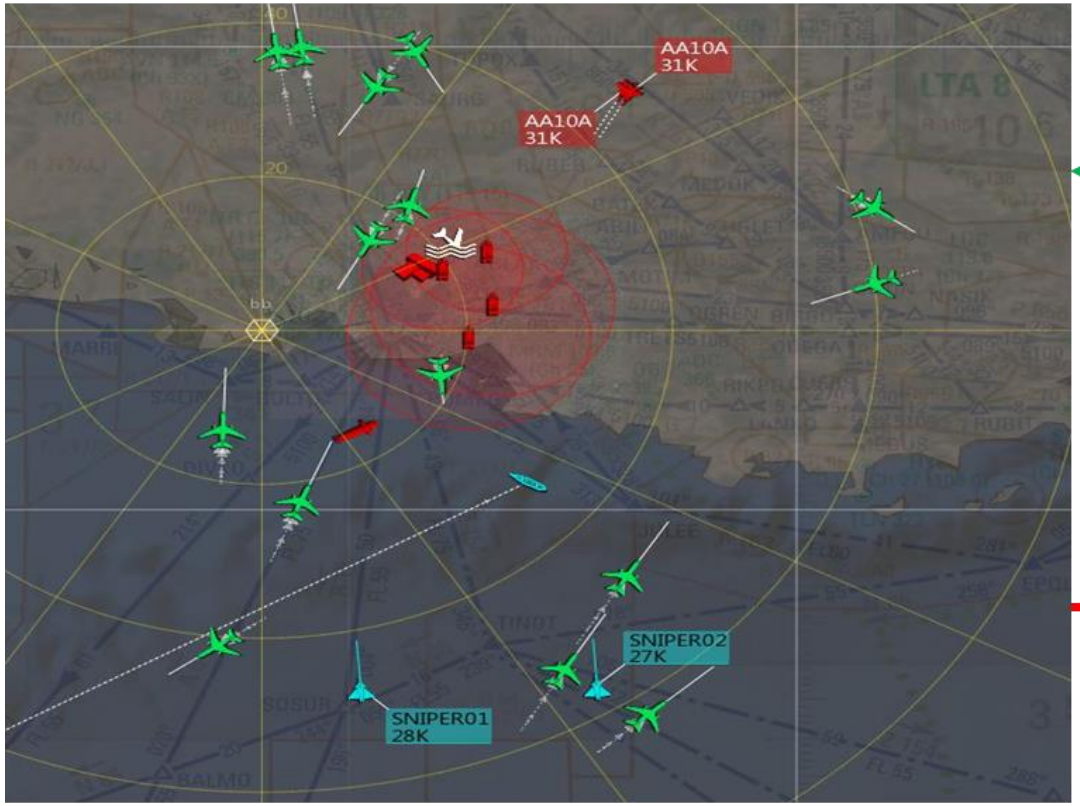


JEANNETTE Characteristics



System Components

Command and Control (C²)



Incoming Data

- Radar tracks
- ADS-B, AIS
- DIS/HLA entities
- SIMPLE
- Link16

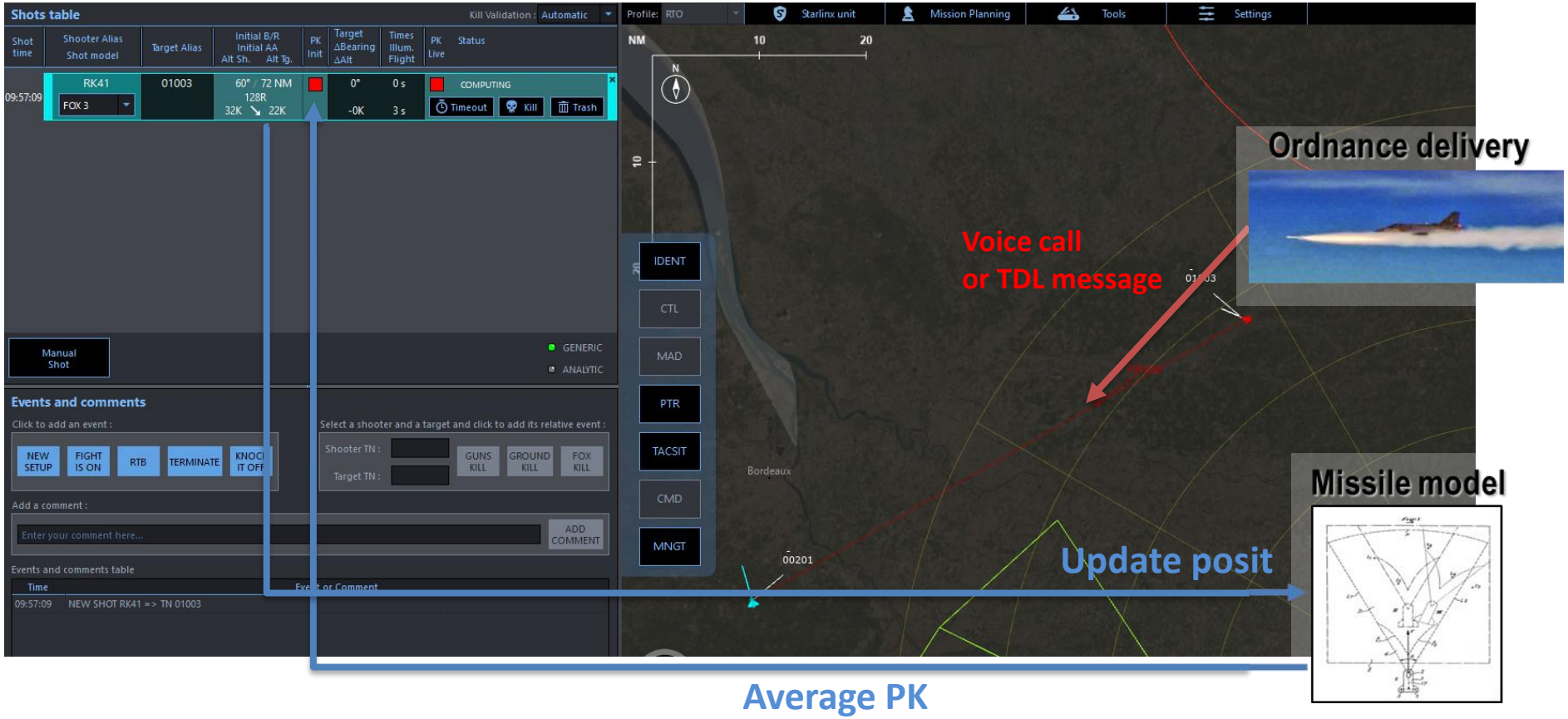
Outgoing Data

- Link16 tracks
- Own PPLI
- Platform Status
- Command order
- Mission Assignment
- Text & Pointer
- Engagement status

System Components

RTO

Live assessment process based on missile probability kill model



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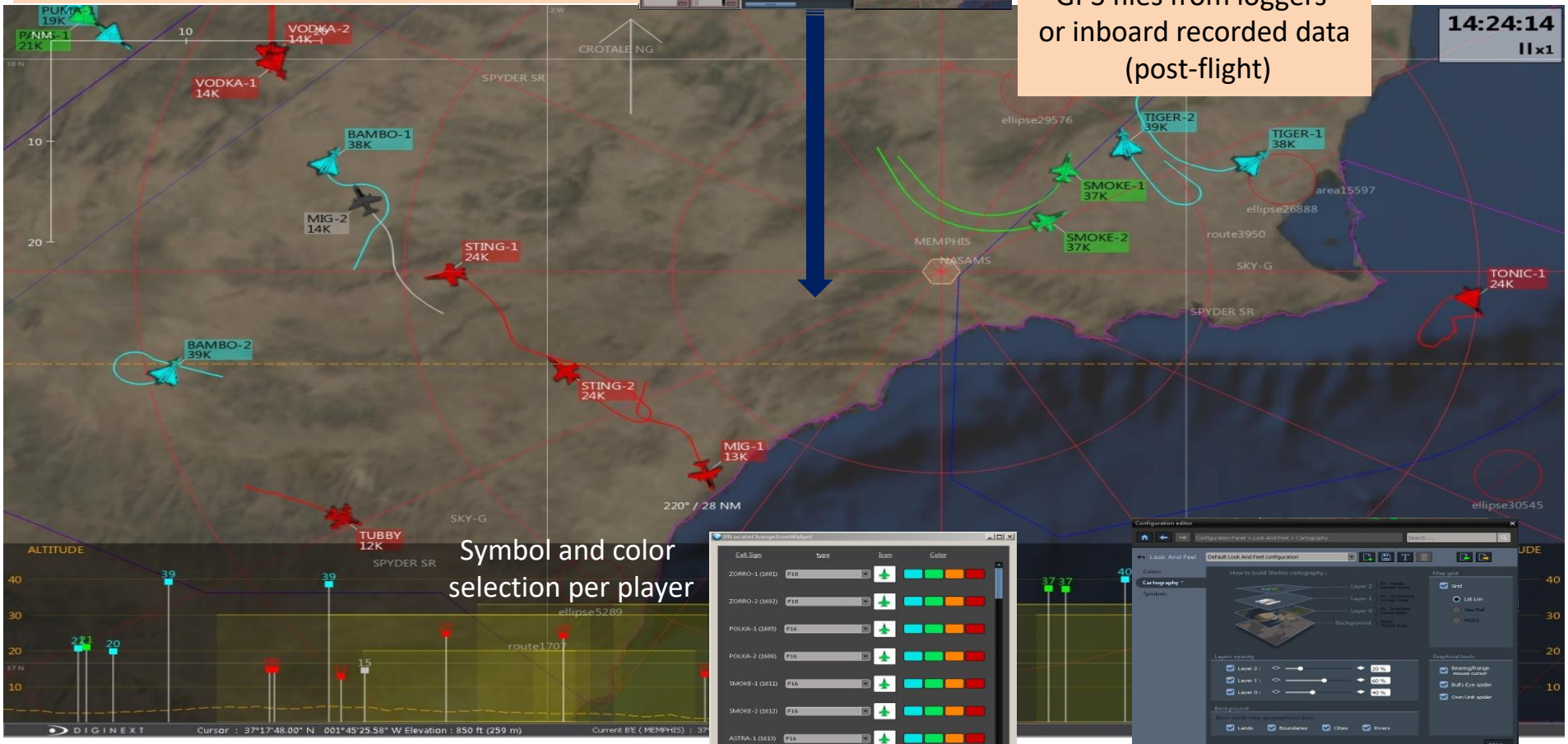
System Components

Debriefing

Merging and processing Link16/GPS comparison - matching

GPS files from loggers or inboard recorded data (post-flight)



Symbol and color selection per player

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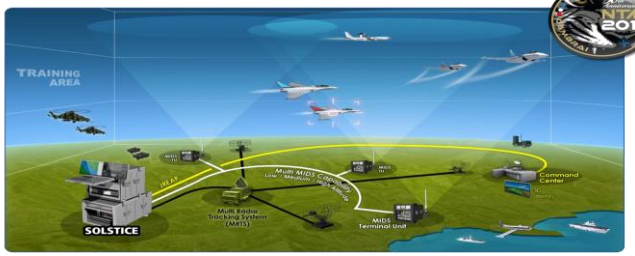
System Components

Sensor Feed



- A live sensor feed extension
  - **Multi-Radar Tracker:**
    - Multi-connection to radars
    - Merging and computing bias to deliver a common and unique radar picture
    - Use of CSI CSTS module
  - **AWCIES , Asterix, ADS-B, AIS gateway**
    - A gateways to convert AWCIES, Asterix, ADS-B, AIS feeds into DIS as standardized input format

System Components

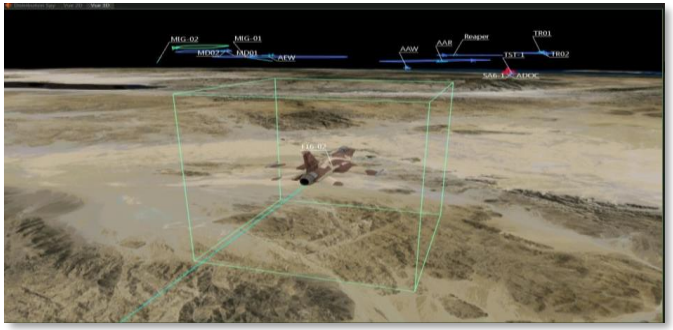
Multi-MIDS

- A Link16 radiated training range extension
  - **Multi-MIDS management**:
    - Managing and adapting Link16 load-files
    - Monitoring MIDS discretes
    - Computing and monitoring Time Slot Duty Factor (TSDF)
  - **Distant MIDS Interface (IMX)**
    - Enables to connect, to the Multi-MIDS management, a Link16 C^2
    - Manage the routing tables to adress a link16 unit using MIDS with the best connectivity
    - Using a secondary track number table → live radiating unit and simulated TDL units can interact on the live network
    - Supervision of the overall system
  - Distant crypto-keys injection

System Components

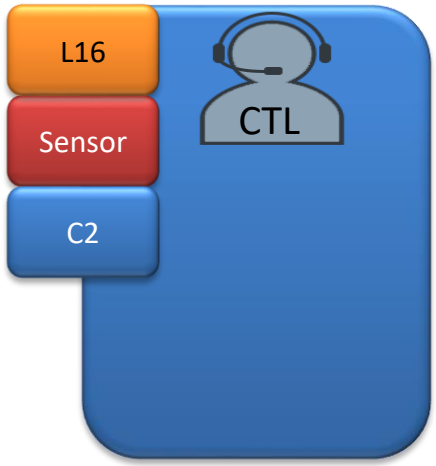
Simulation overview

- Virtual, Constructive and distribution
  - **Constructive simulation**
    - Tactical environment and TDL simulator
      - All kind of model generation (Air, land, maritime, space)
      - Multi-link and multi-edition(STANAG and MilSTD)
      - Enhanced the Tactical context (CSAR, EOB, COMAO, ...)
      - Dynamic and realistic animation of entities
      - Scenario can be modified during execution
  - **Virtual simulation (potential growth)**
    - Part Task Trainer (Jet Fighters, UAV Ground Station, GBAD, Helicopter)
  - **Simulation interfaces**
    - SIMPLE Gateways (STANAG 5602)
    - Native DIS & HLA



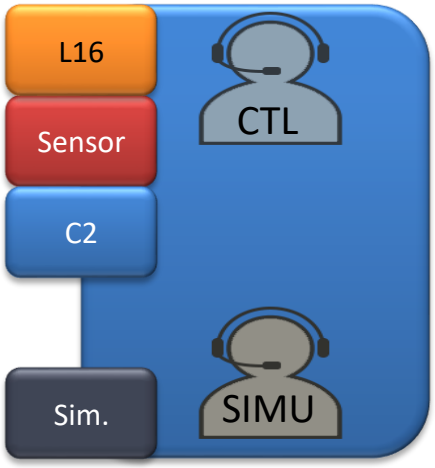
5 levels of training

- **LEVEL 1:**
  - Surveillance picture based on real sensor feed (collaboration with C²s unit in the net)
  - Command exchange, Tactical Control and Weapon engagement



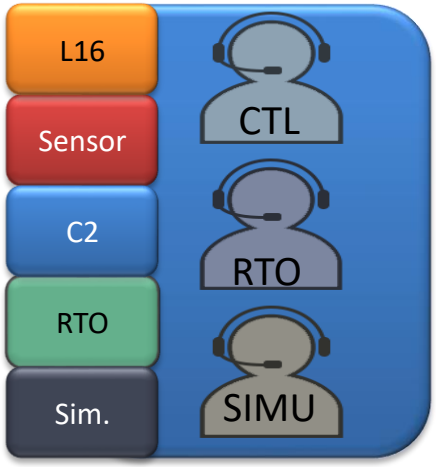
5 levels of training

- **LEVEL 2:**
  - LEVEL 1 + use of simulation to enhance and populate the Tactical Situation



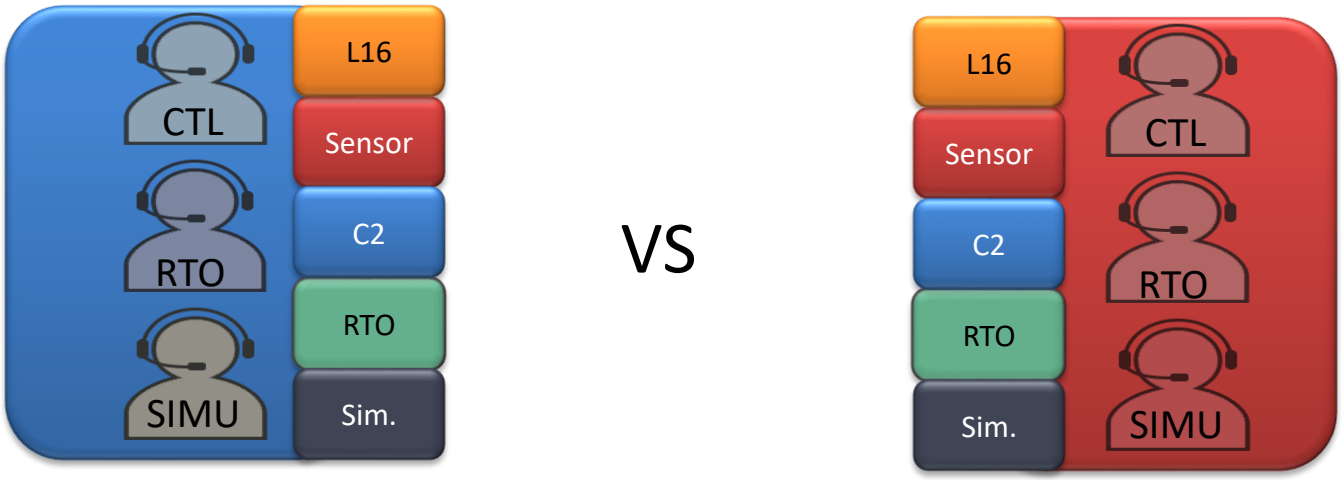
5 levels of training

- **LEVEL 3:**
  - LEVEL 2 + Range Training Officer working position (EXCON)
  - Interfaced with a (GFE) missile model to support Kill Assessment



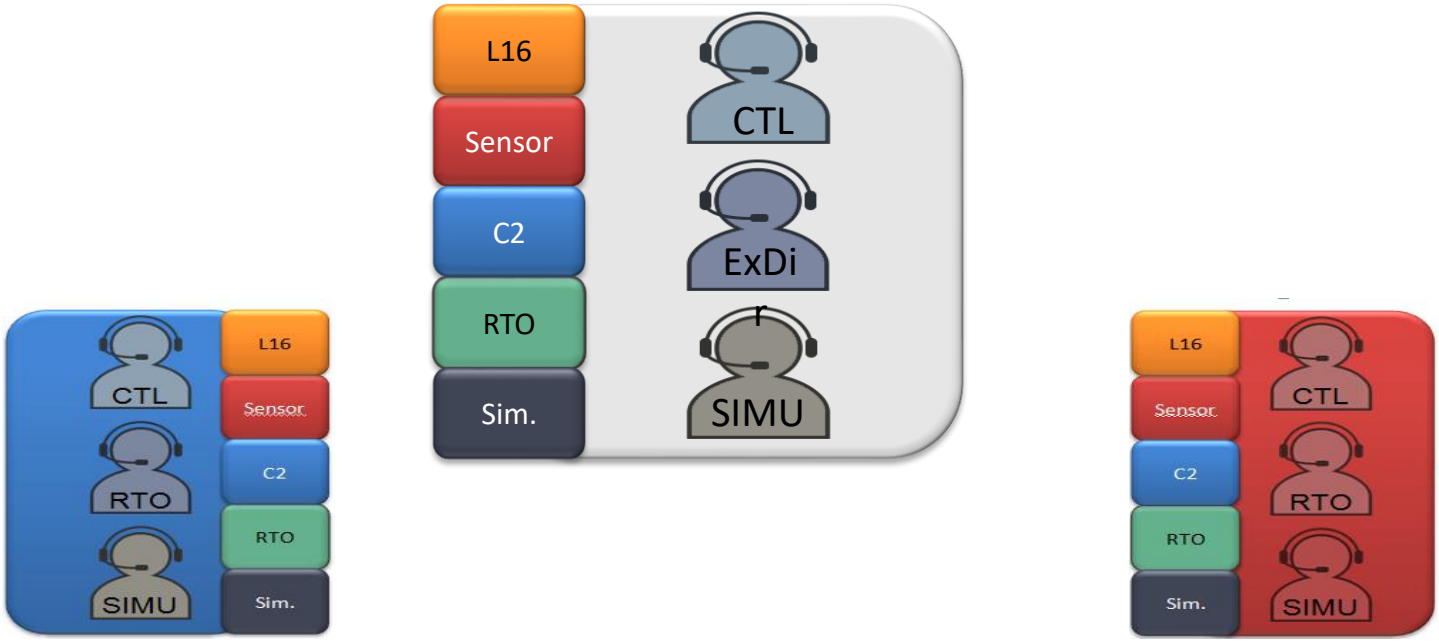
5 levels of training

- **LEVEL 4:**
  - 2 training systems fitted LEVEL 3 to perform “Blue” VS “Red” in the L16 network

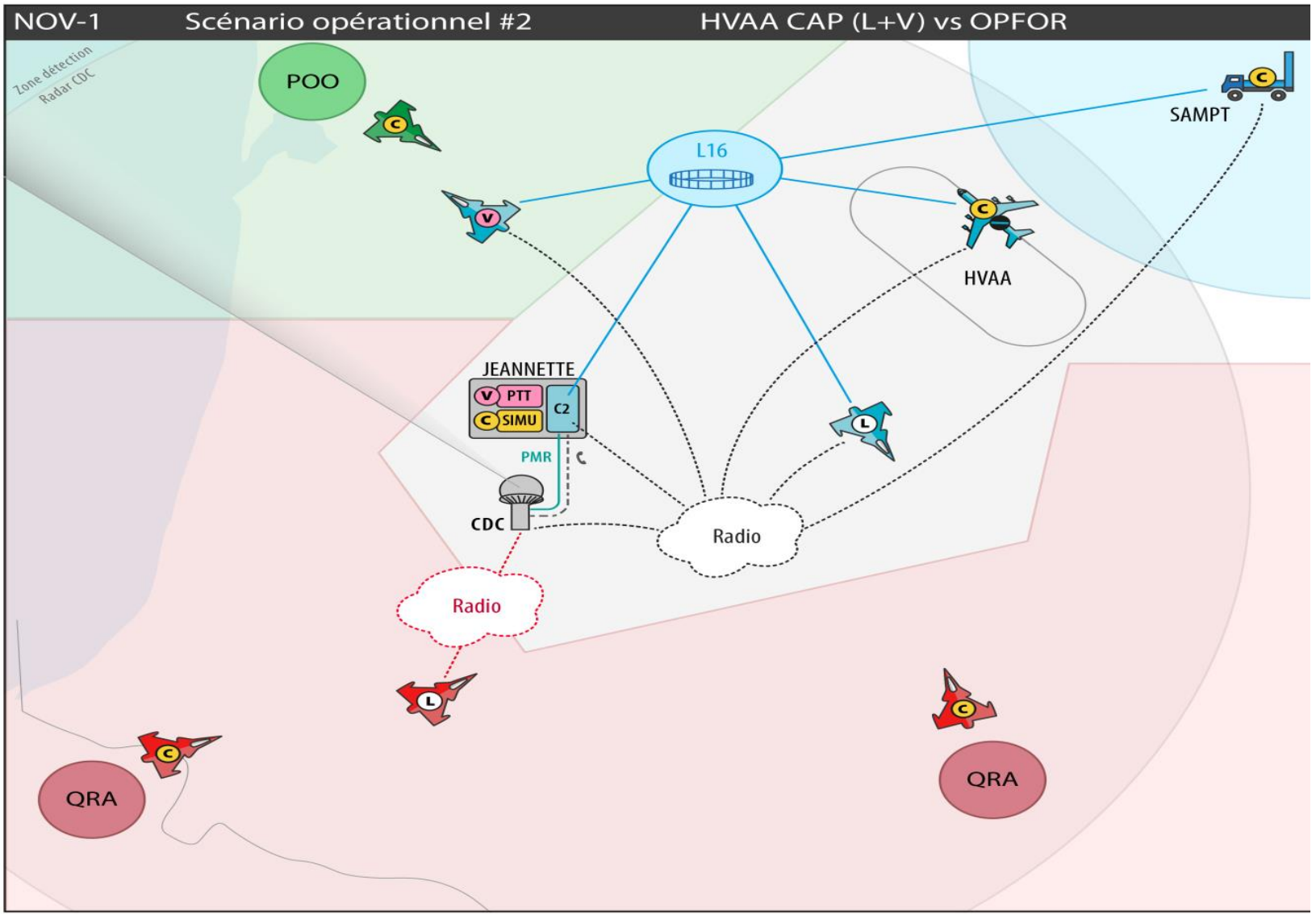


5 levels of training

- **LEVEL 5:**
  - 2 training systems as in LEVEL 4 configuration (RTO Blue VS RTO Red)
  - 1 training system “White Cell” acting as Exercise Director (Global monitoring)



Scenario example




Questions ?

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