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101121330

EDF FEDERATES – Final Demo and Project Outcome

NATO CA2X2 Forum 2026 – Rome

Agatino Mursia (Leonardo), Robert Siegfried (Aditerna)

29th September 2026

FEDERATES

EDF-2022-DA-SIMTRAIN-MSSI



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FEDERATES – who we are

FEDERATED ECOSYSTEM OF EUROPEAN SIMULATION ASSETS FOR TRAINING & DECISION SUPPORT

Organizations

31

Countries

14

MidCaps

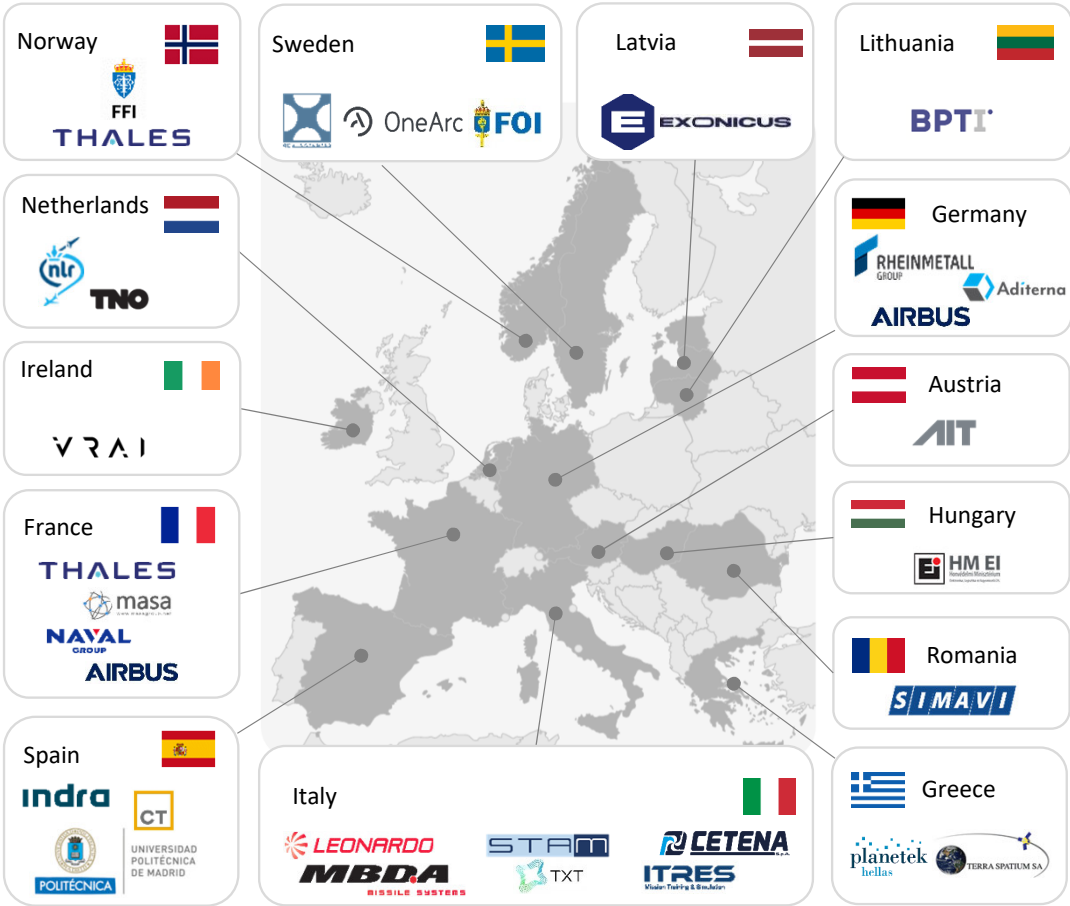
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RTO

5

SME/cb-SME

11/6



FEDERATES Final Demo Event – where it takes place



FEDERATES Operational – Functional – Business Views



- OPERATIONAL:

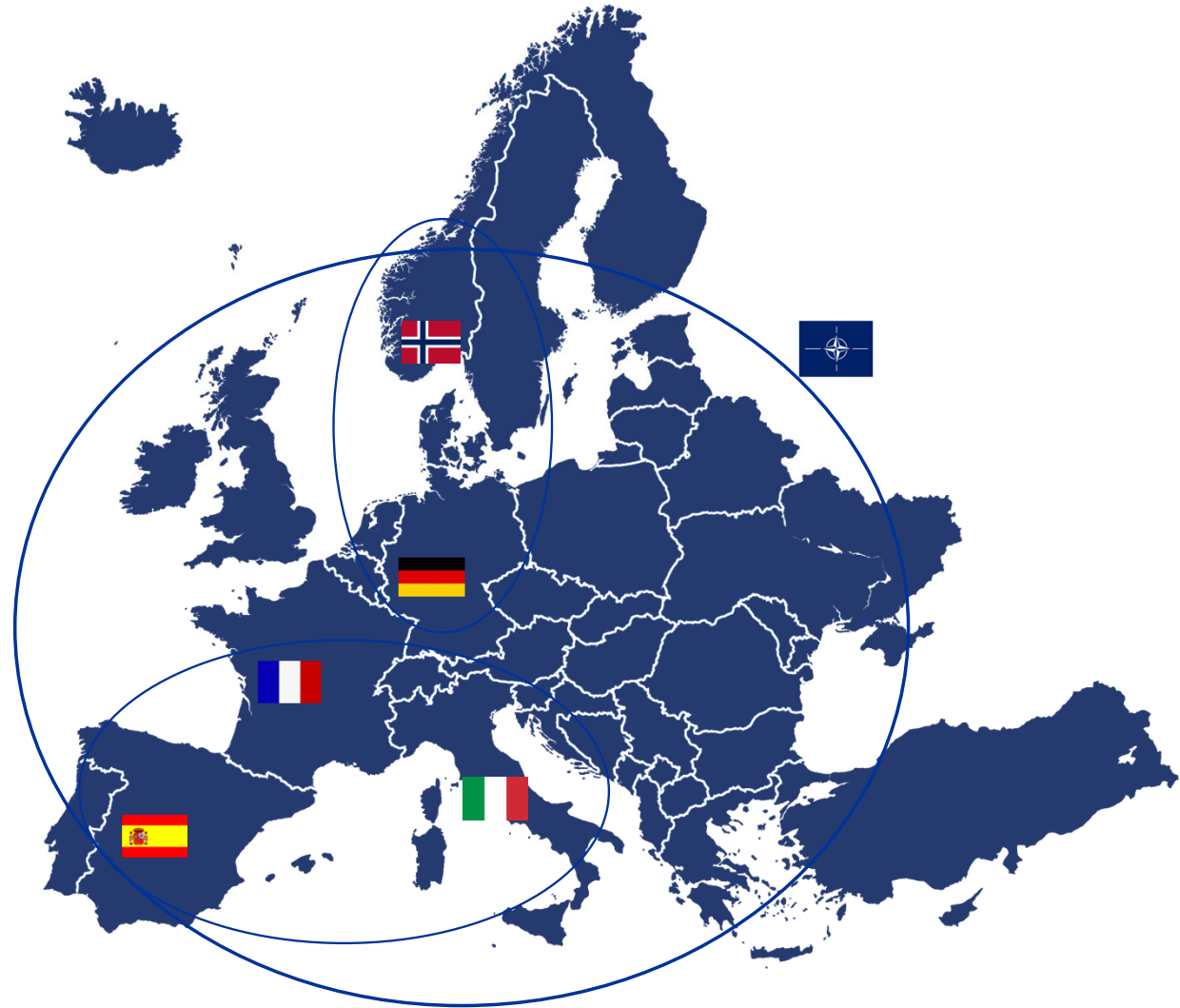
- Member States will speed up the planning, preparation and delivery of allied exercises (EU and NATO)
- Capable of simultaneous exercise planning, preparation and delivery of exercises and training support
- **Armed Forces engagement is key to define the operational use cases**

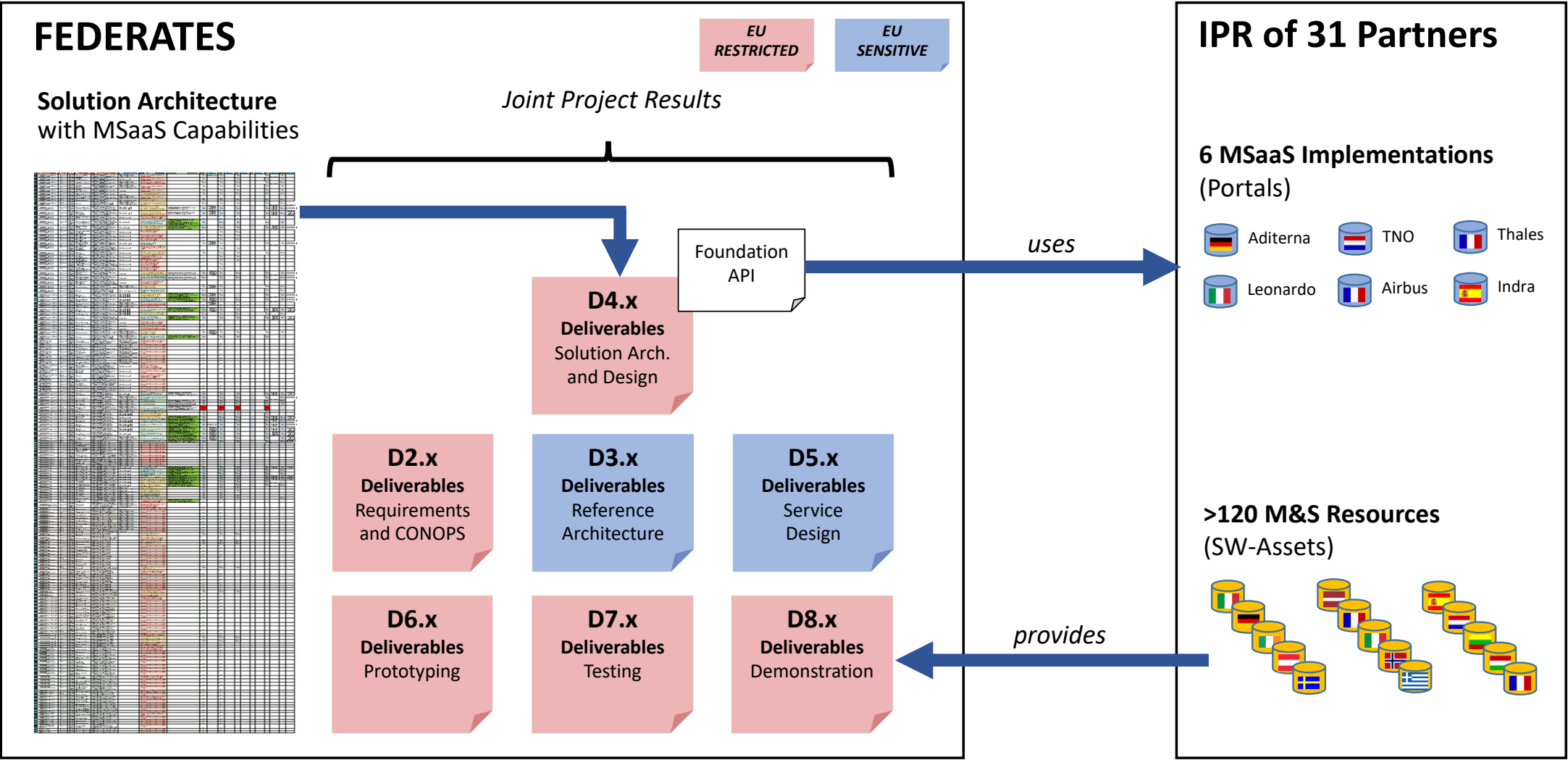
- FUNCTIONAL:

- Easy to use through collaborative portals
- Connectivity to existing simulation systems at different security classification levels
- **Native interoperability and MSaaS elaboration will mask complexity**

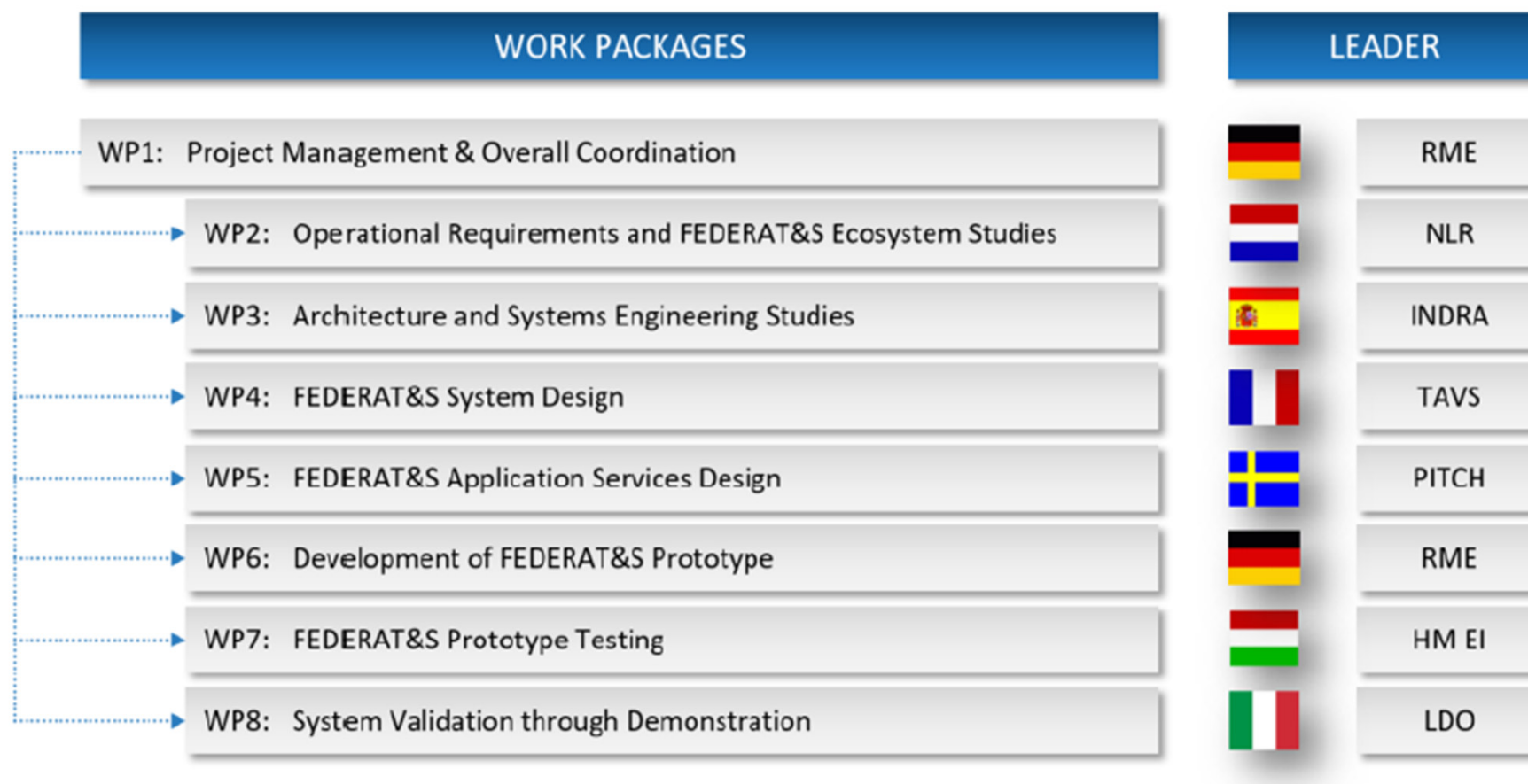
- BUSINESS:

- The solution will be scalable from the country level for National Specific use up to the EU level
- The consortium intends to reach a TRL 6-7 to allow next steps of commercialization and use by the Member States
- **Enabling a larger market for companies willing to develop such value proposition**





WORK BREAKDOWN STRUCTURE

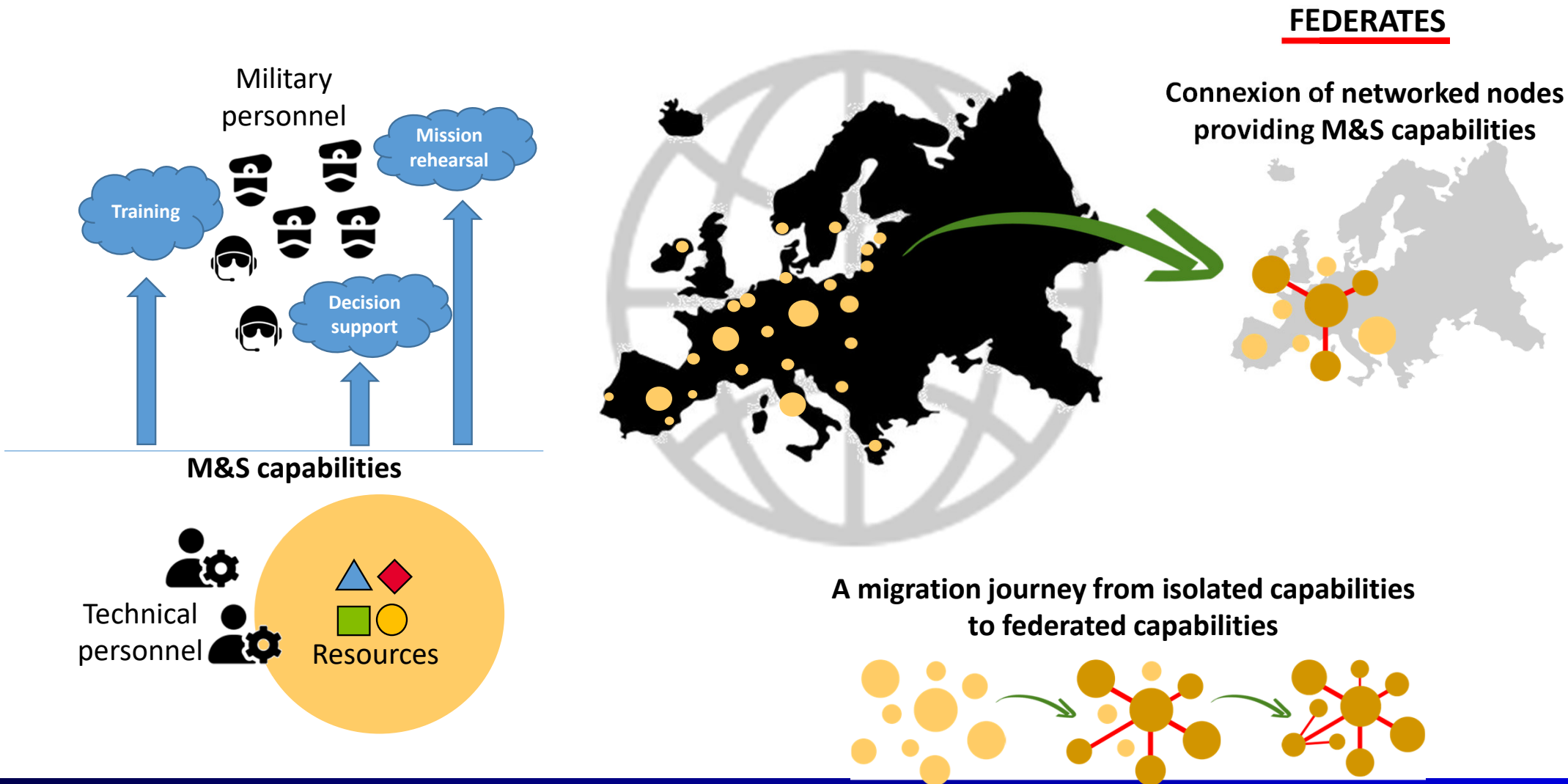




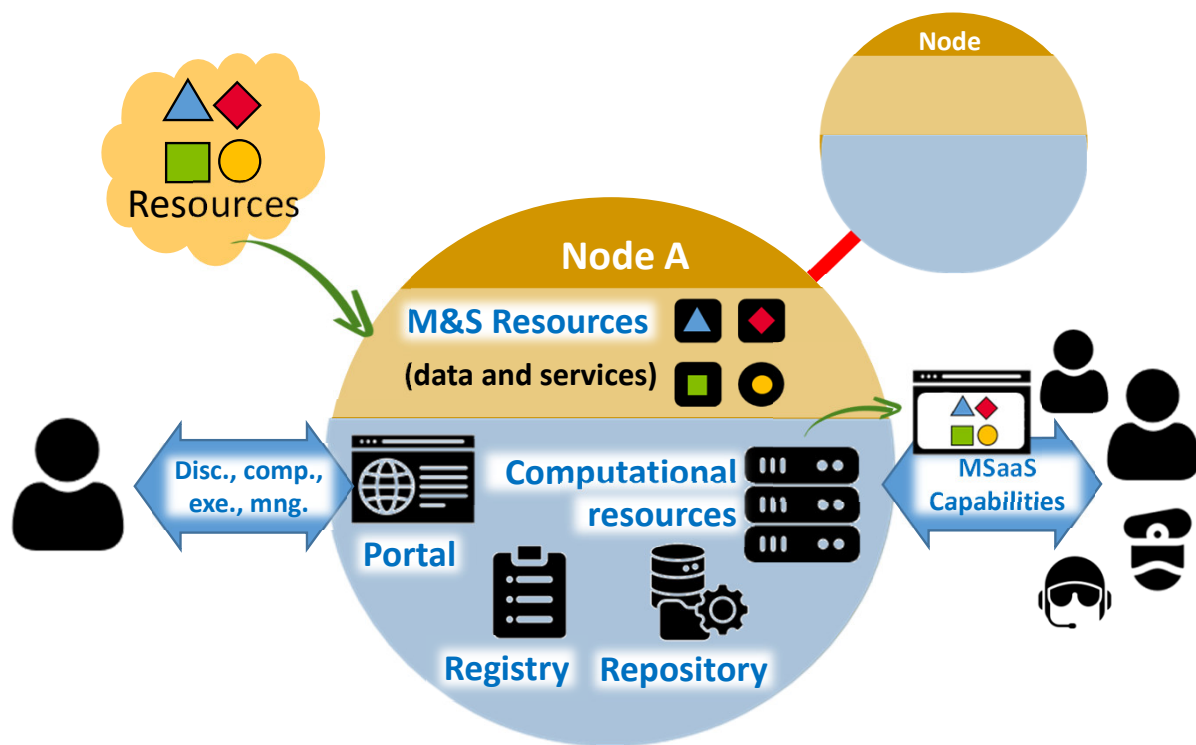
Concepts and Architectural View

Robert Siegfried – Aditerna

From isolated to federated / shared M&S capabilities



FEDERATES, a network of nodes, a federation of foundations



A Foundation refers to the ability, through a **Portal**, to discover, compose, execute, and manage **M&S resources** to provide **M&S capabilities**

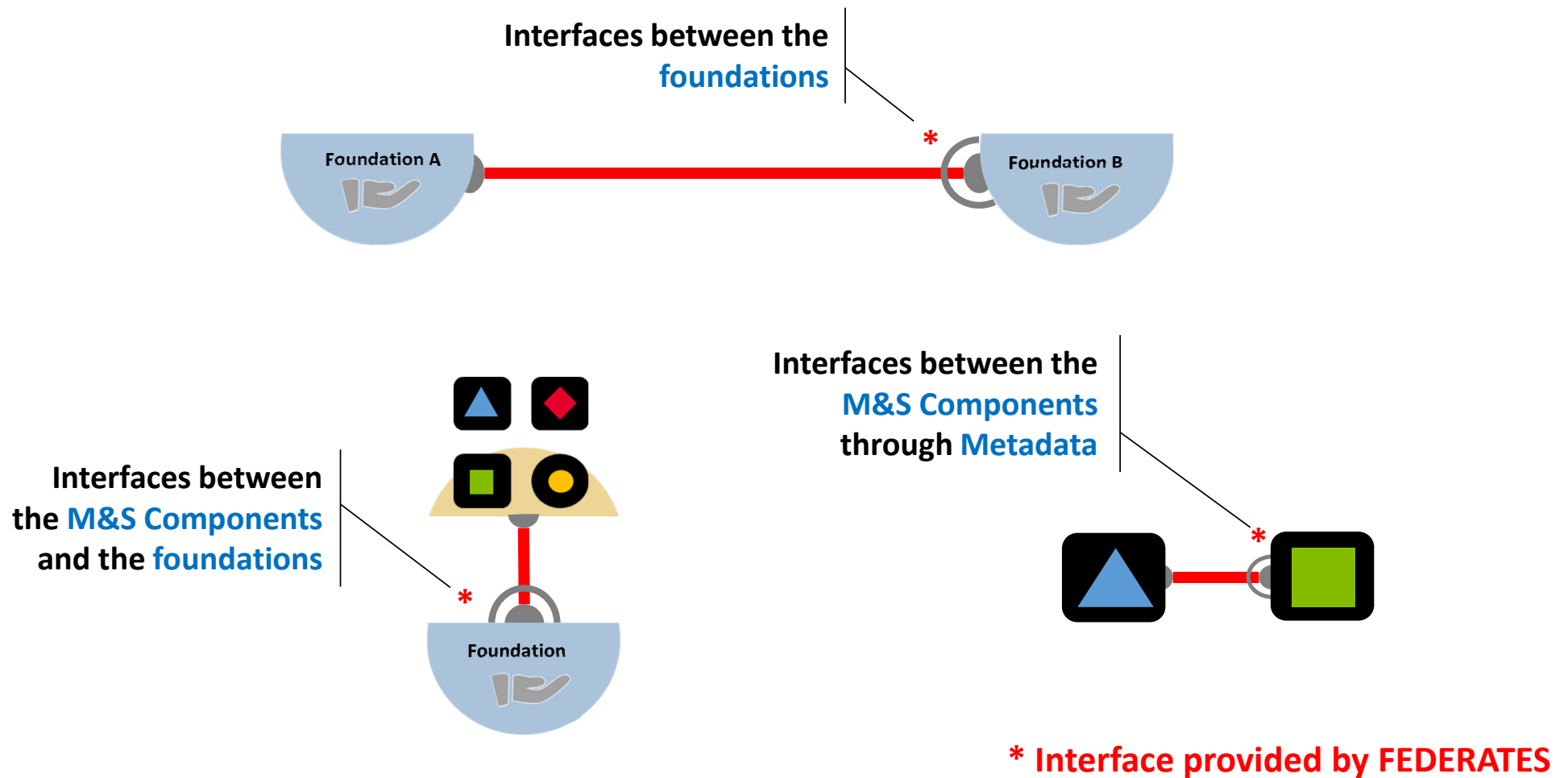
Portal: to provide access to the foundation by end-users through thin clients

Registry: to store, manage, search and retrieve data about components stored in the **repositories**

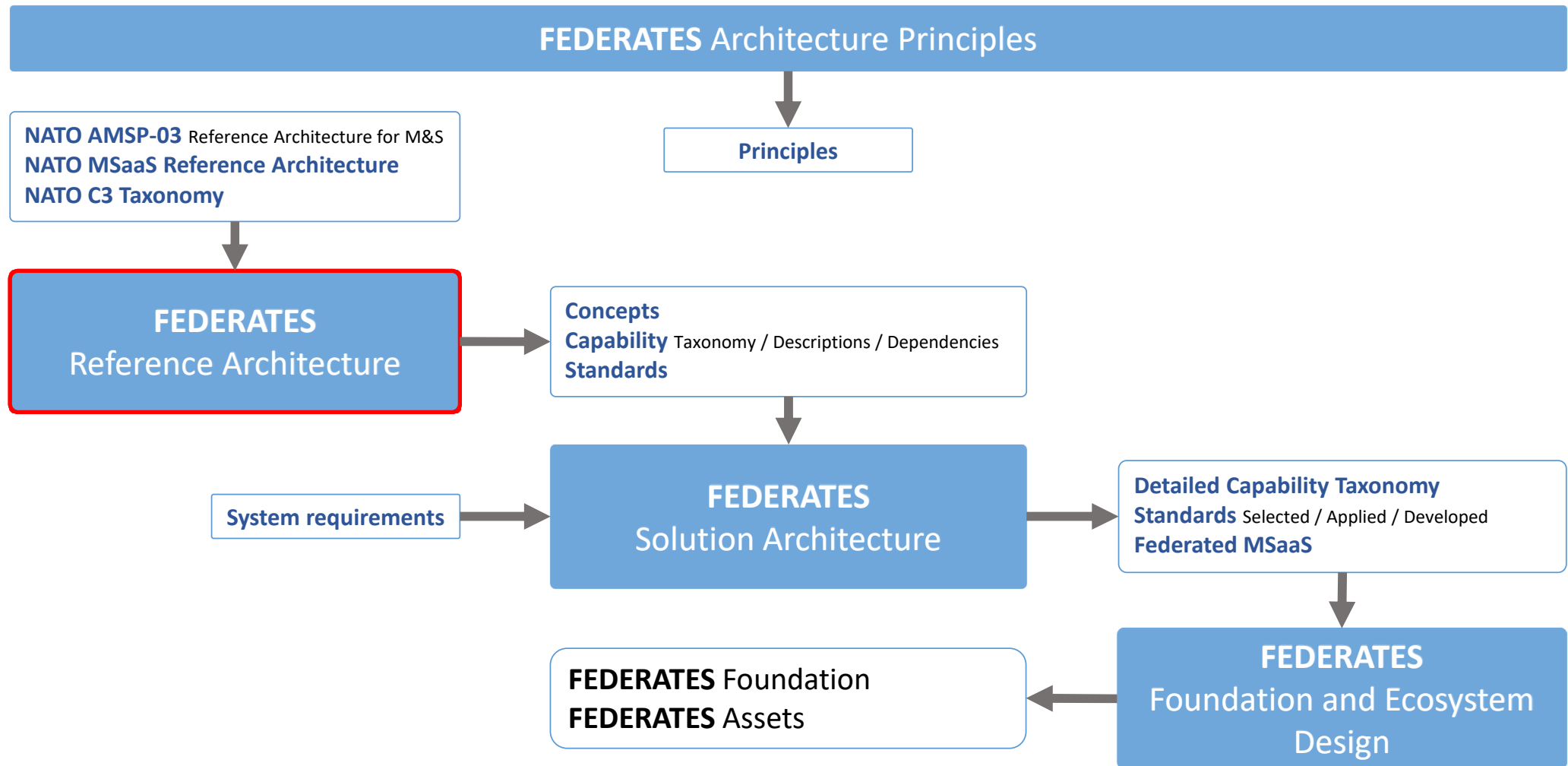
Repository: to store, retrieve and manage M&S components and associations with or references to metadata managed by the **registry**

Computational resources : the HW, networking, OS, virtualization, storage...

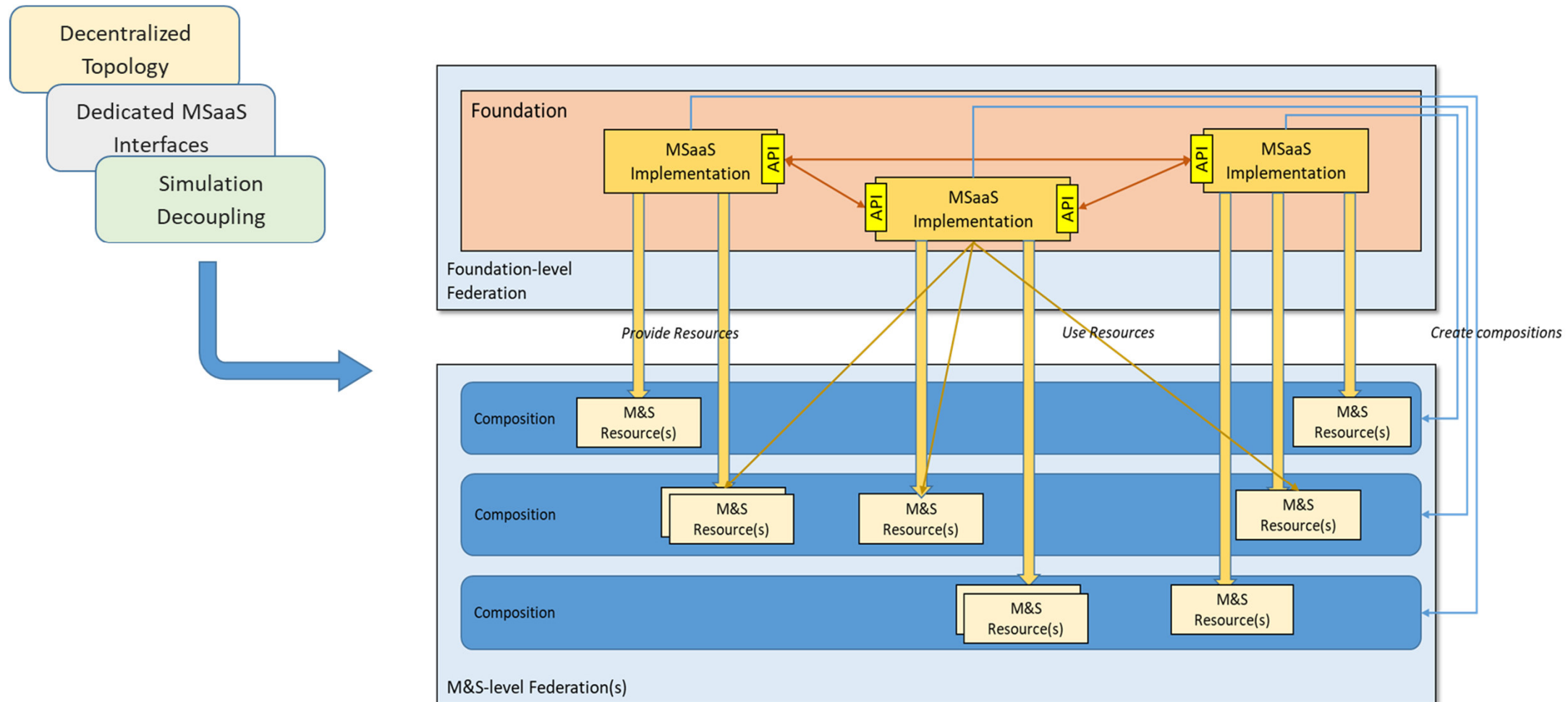
The interfaces



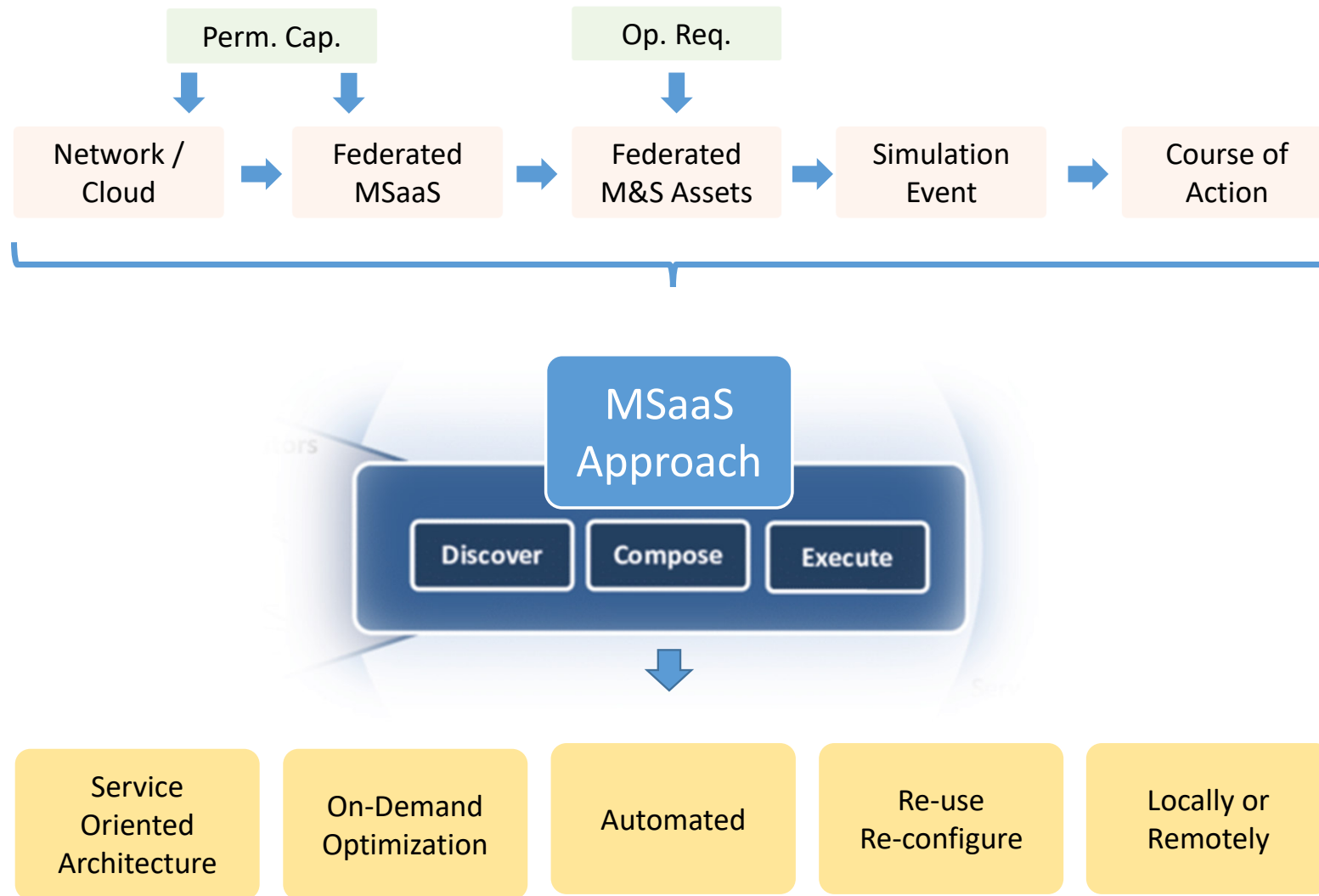
Role of the FEDERATES Reference Architecture



Key Considerations - Solution Architecture



Summary - MSaaS Approach





Demonstration Campaign

Agatino Mursia - Leonardo

Objectives of FEDERATES Demonstrations



- Initial technical integration
- Sharing & pooling of resources
- Verification of FEDERATES principles

Demonstration 1 ✓

- Integration of additional MSaaS concepts, such as Discovery, Composition and federated Service Management Control
- Higher compliance of M&S services with FEDERATES architecture
- Demonstration of key FEDERATES benefits

Demonstration 2 ✓

- Demonstration of fully developed FEDERATES ecosystem prototype and its benefits

Demo 3 and Final Demonstration

June
2025

Architecture evolution
M&S services development

Nov
2025

Dec
2025

Architecture evolution
M&S services development

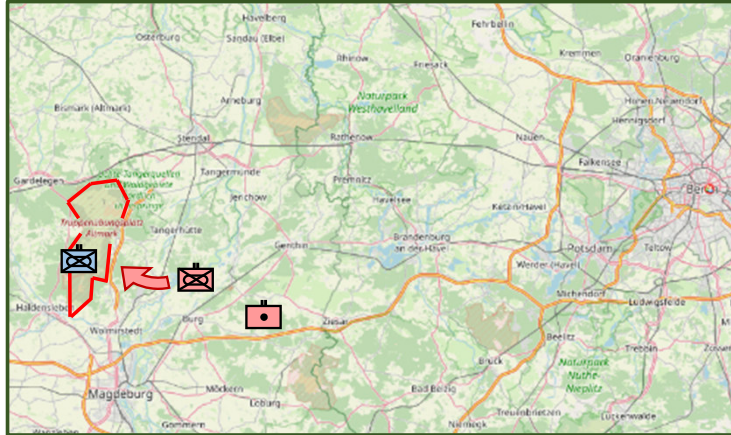
Jun
2026

Sep
2026

FEDERATES Demo Event – Use Cases focus

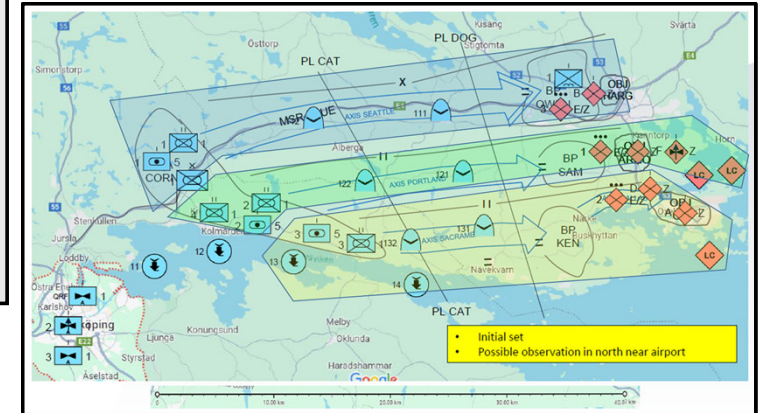
LVC with Decision Support and AAR

With assets from 15 partners



Collaborative Training with Allies at Brigade/Battalion Level

With assets from 8 partners



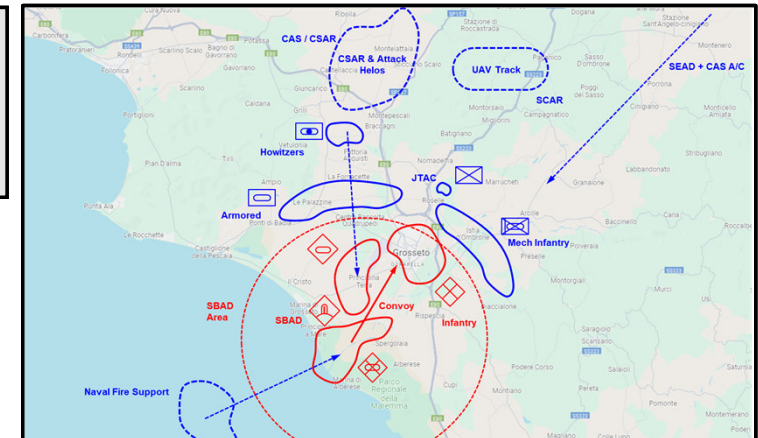
Naval – Antisubmarine Warfare

With assets from 12 partners

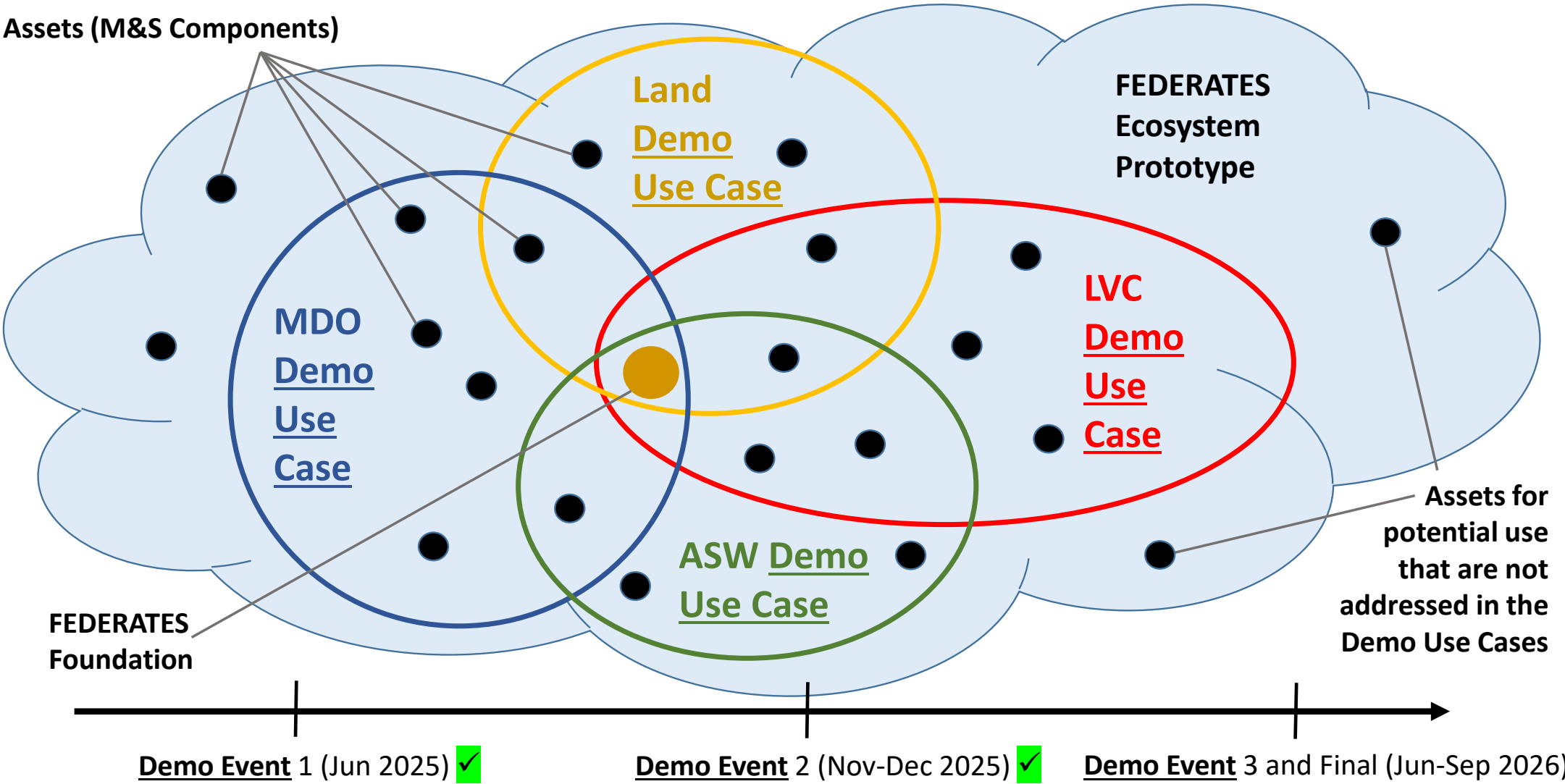


Multi Domain Operations

With assets from 12 partners



Clarification of the terms Demo Event vs. Demo Use Case



Demo Day 1		Demo Day 2	
LVC Live - Virtual - Constructive	MDO Multi-Domain Operations	LT Land Training	ASW Anti-Submarine Warfare
Scenario Init with Decision Support	Tactical Ballistic Missile Defence	Smart MSaaS Composition Design & Configuration using AI	MSaaS cross-portal Discovery and Composition
Drone Warfare with Live + Virtual UAVs	Offensive/ Defensive Counter Air	Exercise and Scenario preparation for national Training	MSaaS Distributed Execution
WES with Fighter Aircraft and GBAD	Ground Defence Planning	Scenario preparation for multinational Training	Naval Escort Simulation
Multi-portal with Live + Helicopter + Medical	Ground Defence Execution	Composition, initialization, and tasking & reporting for multinational Training	Cyberattack Simulation
Live + Virtual UAV Coupling		Cross Domain Solution	After-Action Analysis



LVC Use Case Live/Virtual/Constructive Leader Rheinmetall

LVC Use Case Overview

Partners involved in
the LVC Use Case:

Companies

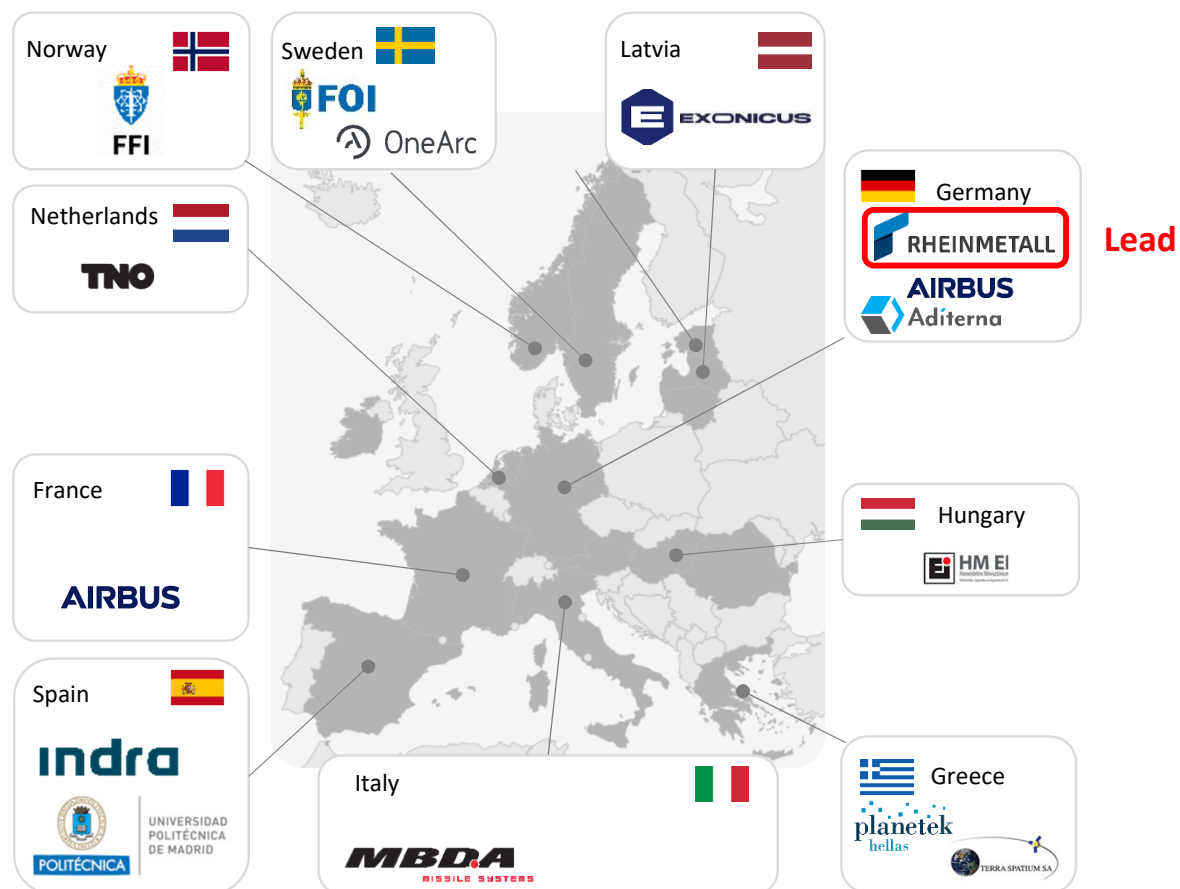
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Countries

10

Assets

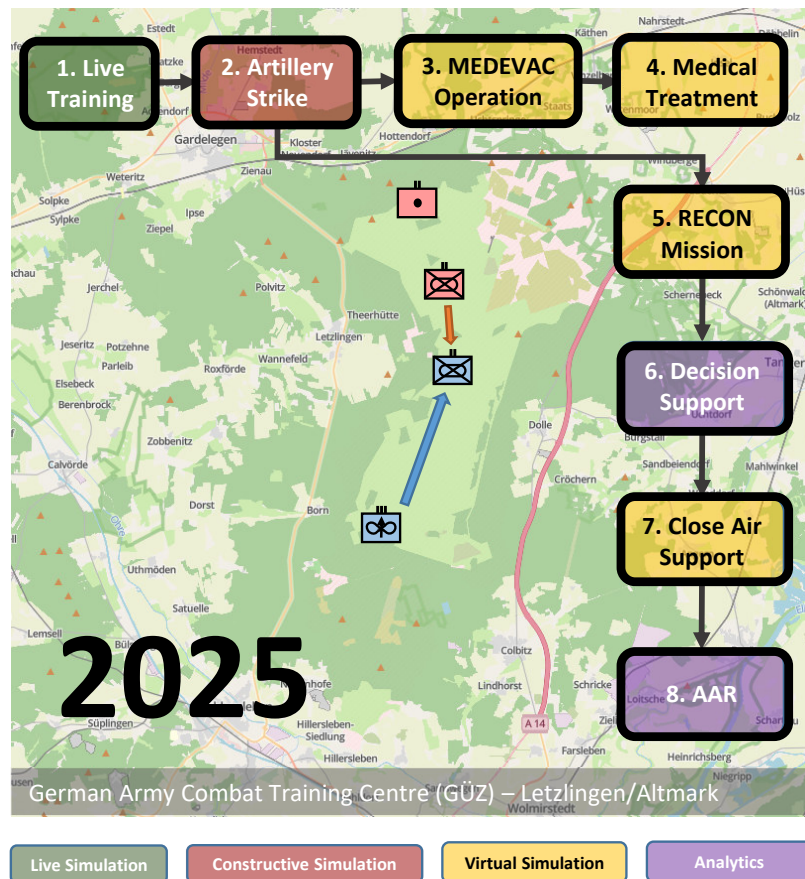
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LVC Use Case in a Nutshell



Evolution from a single Use Case in Demo 2 ...



2026



S1 Scenario Init

S2 Drone Warfare

S3 Weapon Effect

S4 Multi-Portal
Live + Medical

S5 Live + Virtual UAV

... to 5 snippets, showing more MSaaS capabilities than before

- All assets are operated simultaneously live from German CTC or remotely from partner premises.
- Locations in the scenarios are around the German CTC, whenever you see maps or satellite images.



MDO Use Case Multi Domains Operation Leader Leonardo

Multi-Domain Operation use case – Summary

MDO Use Case Involvement:

Companies

12

Countries

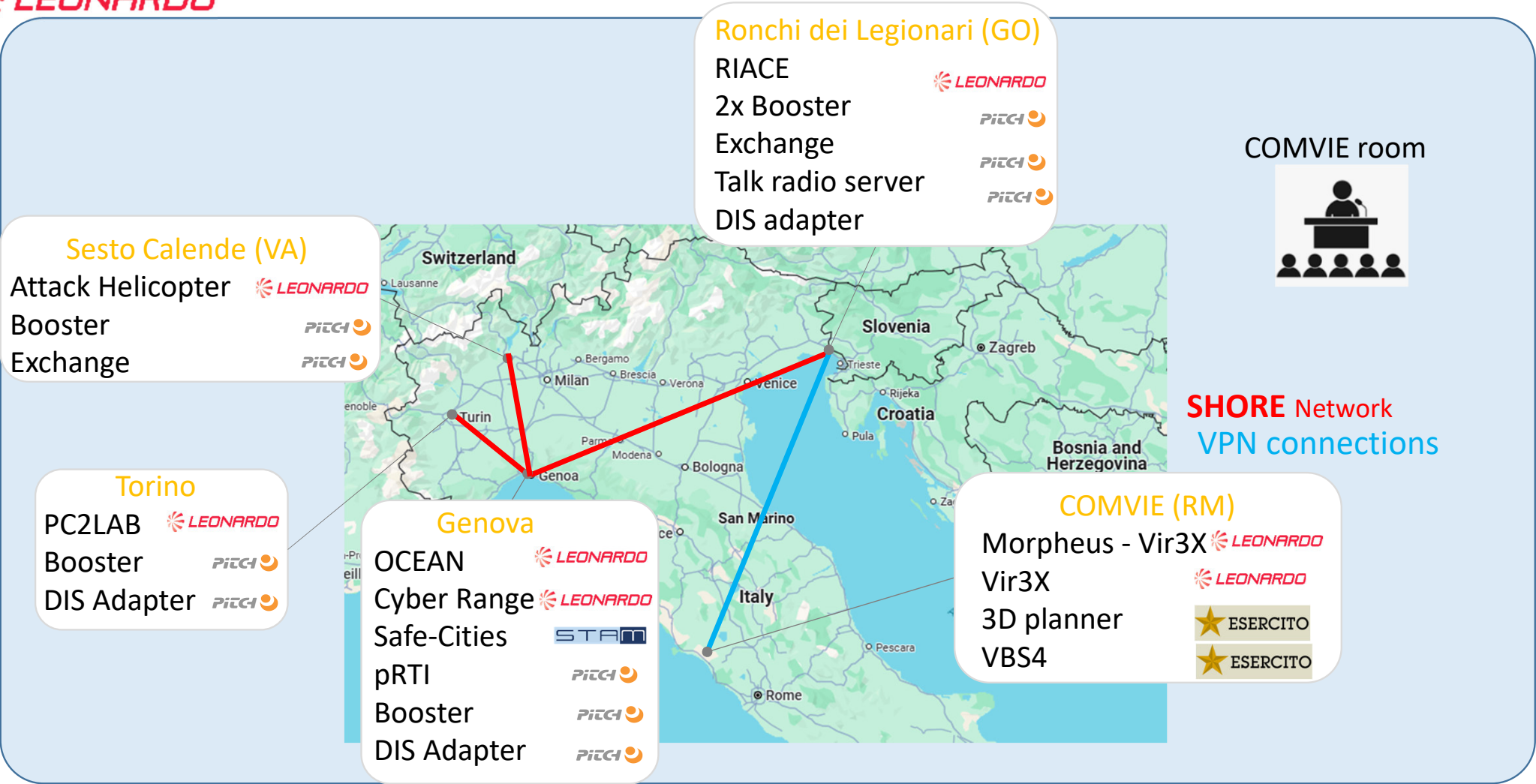
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Assets

20

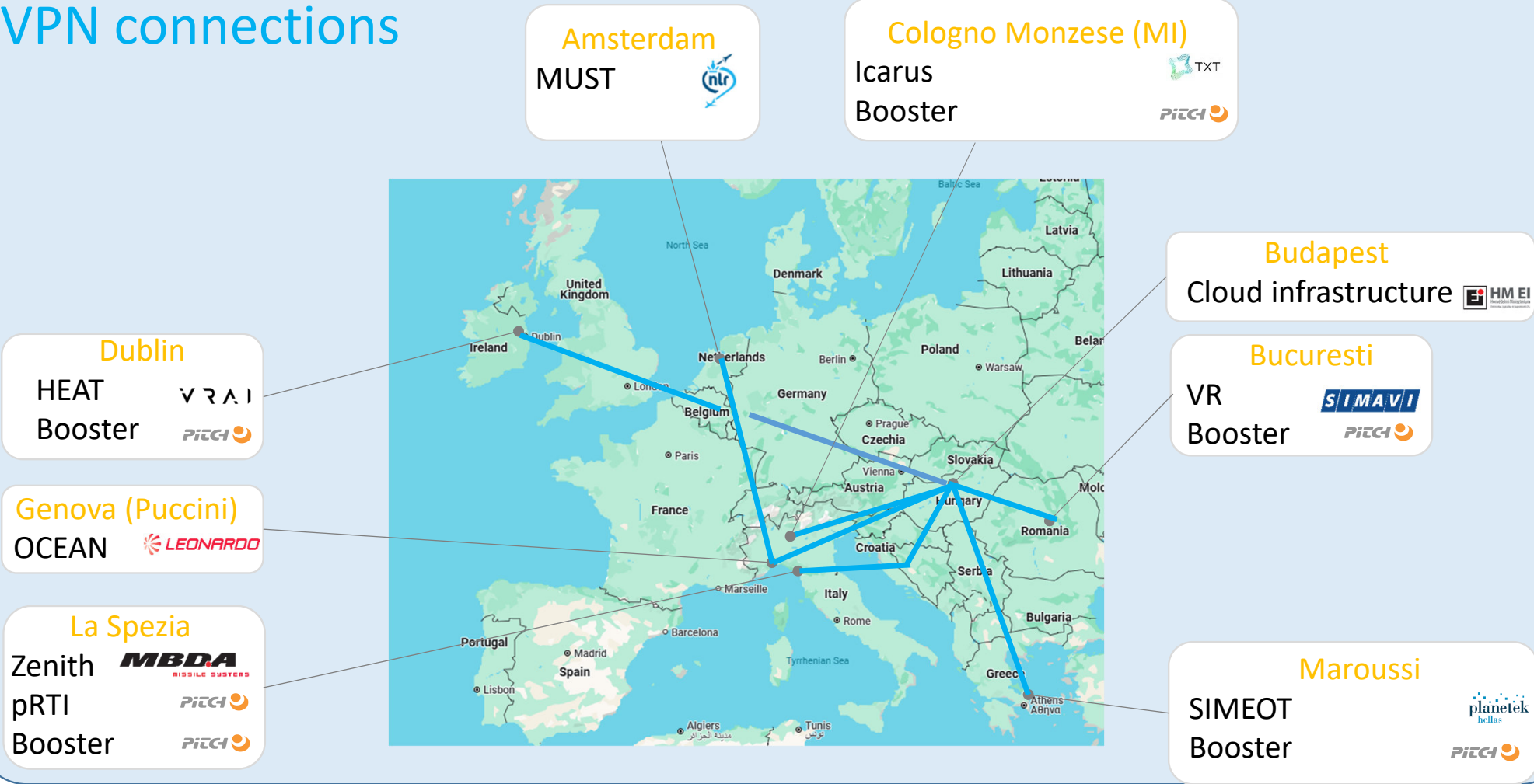


Multi-Domain Operation use case – Network (1)



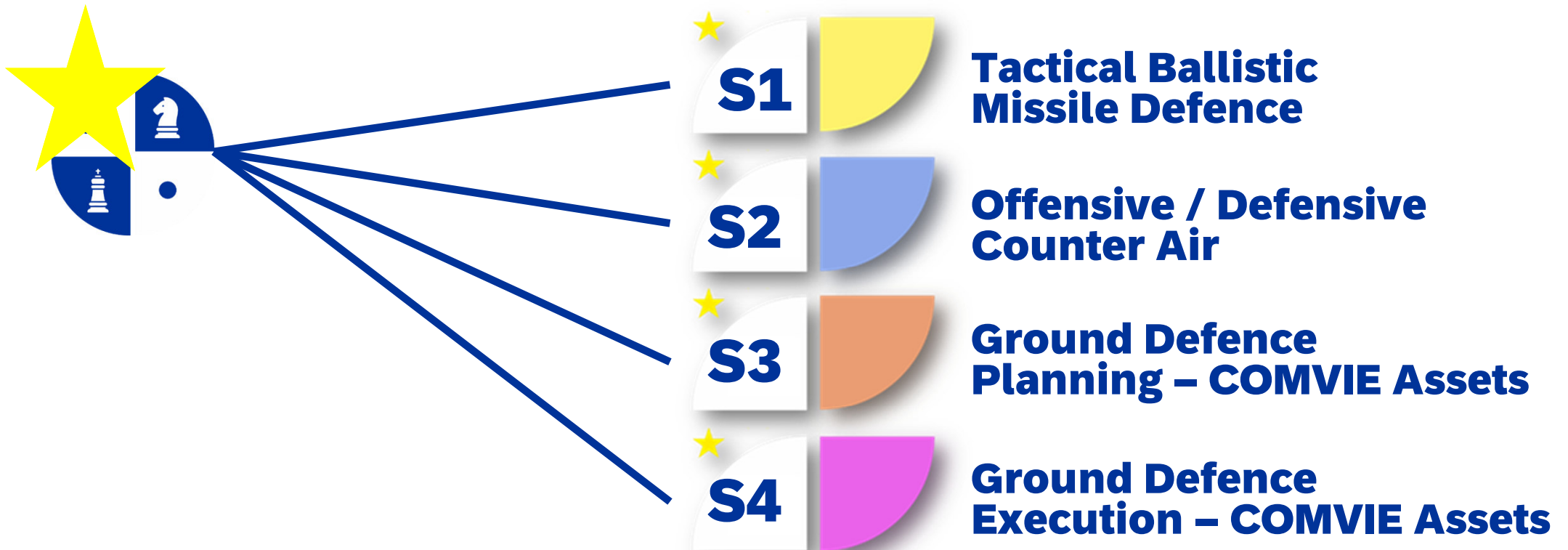
Multi-Domain Operation use case – Network (2)

VPN connections





MDO Use Case





LT Use Case Land Training Leader AIRBUS

LT Use Case Overview

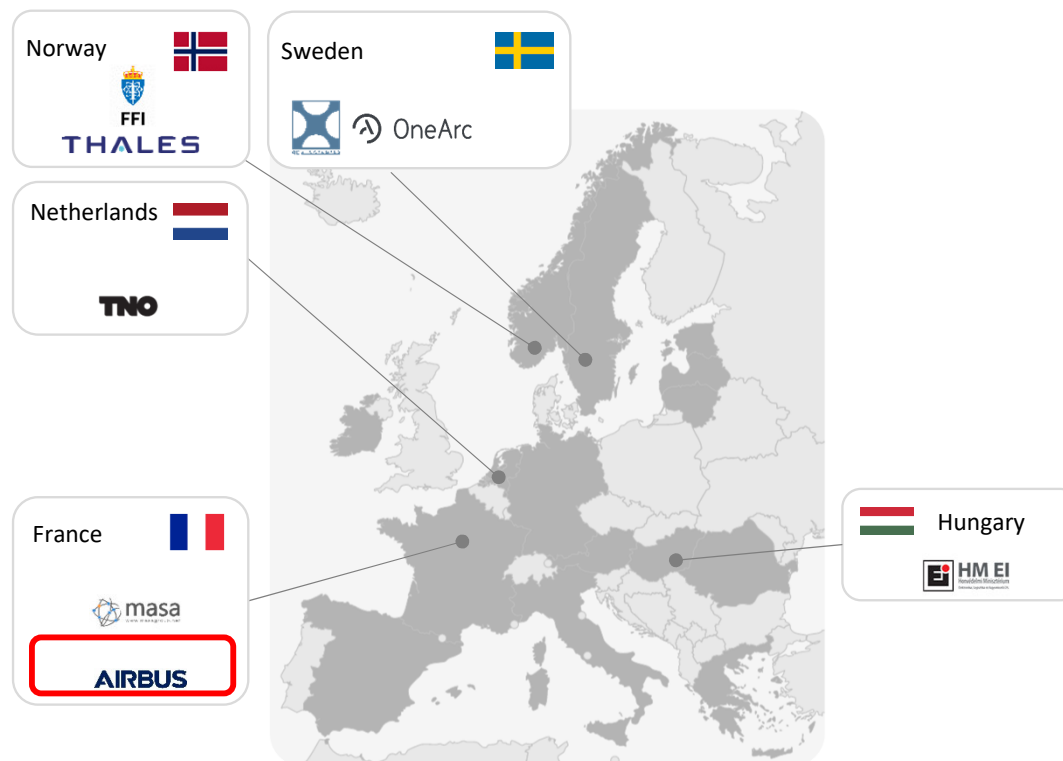


Organizations

8

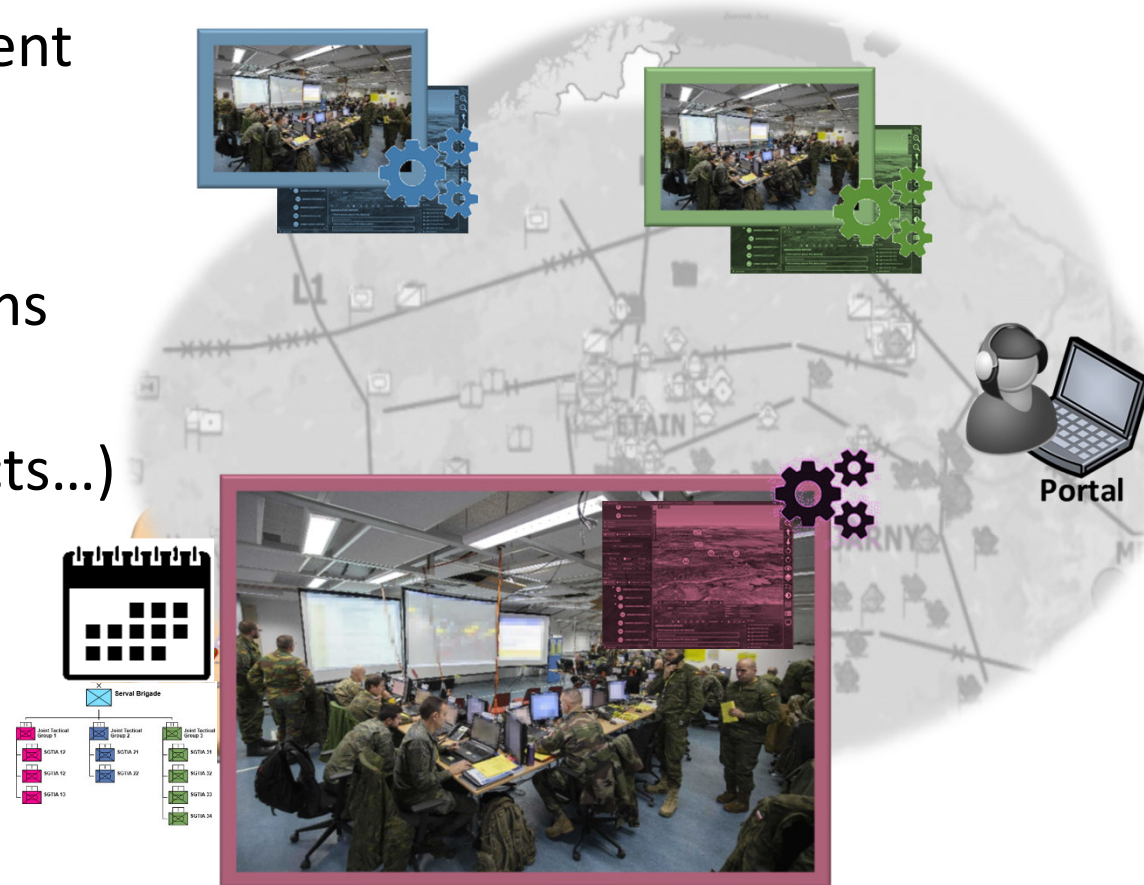
Countries

5



STAFF COMMAND EXERCISE - CHALLENGES

- Involve multiple nations from different sites, with potentially CDS
- Coordinate the participants
- Interconnect C2 & simulation systems
- Define exercise inputs (training objectives, scenario, timelines, injects...)
- Provide a synthetic environment
- Provide ways to interact with the environment



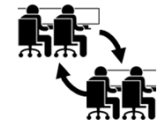
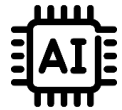
LAND TRAINING USE CASE – SNIPPETS OVERVIEW



Demo #02
Based on exercise phases
delivered in one continuous flow

- 1 SCENARIO PREPARATION (composition for the exercise/scenario preparation)
- 2 EXECUTION PREPARATION (composition for the exercise execution)
- 3 EXTERNAL SYSTEMS (example of an external system and its proxy / SWORD)
- 4 INITIALIZATION (initialization process of the simulations and C2)
- 5 EXECUTION (run of the exercise / execution of the simulation)

Demo #03 and Final
“Areas of interest based”
delivered in a set of “snippets”





ASW Use Case Anti Submarine Warfare Leader Thales

ASW Use Case Overview



ASW operational Use Case Scenario



Air Carrier escorted by Frigates, Helicopter Carrier...

**Submarine shadowing fishing boat
Detected by Frigate's sonar**

**Drones deployed
Send buoys to confirm and localize threat**

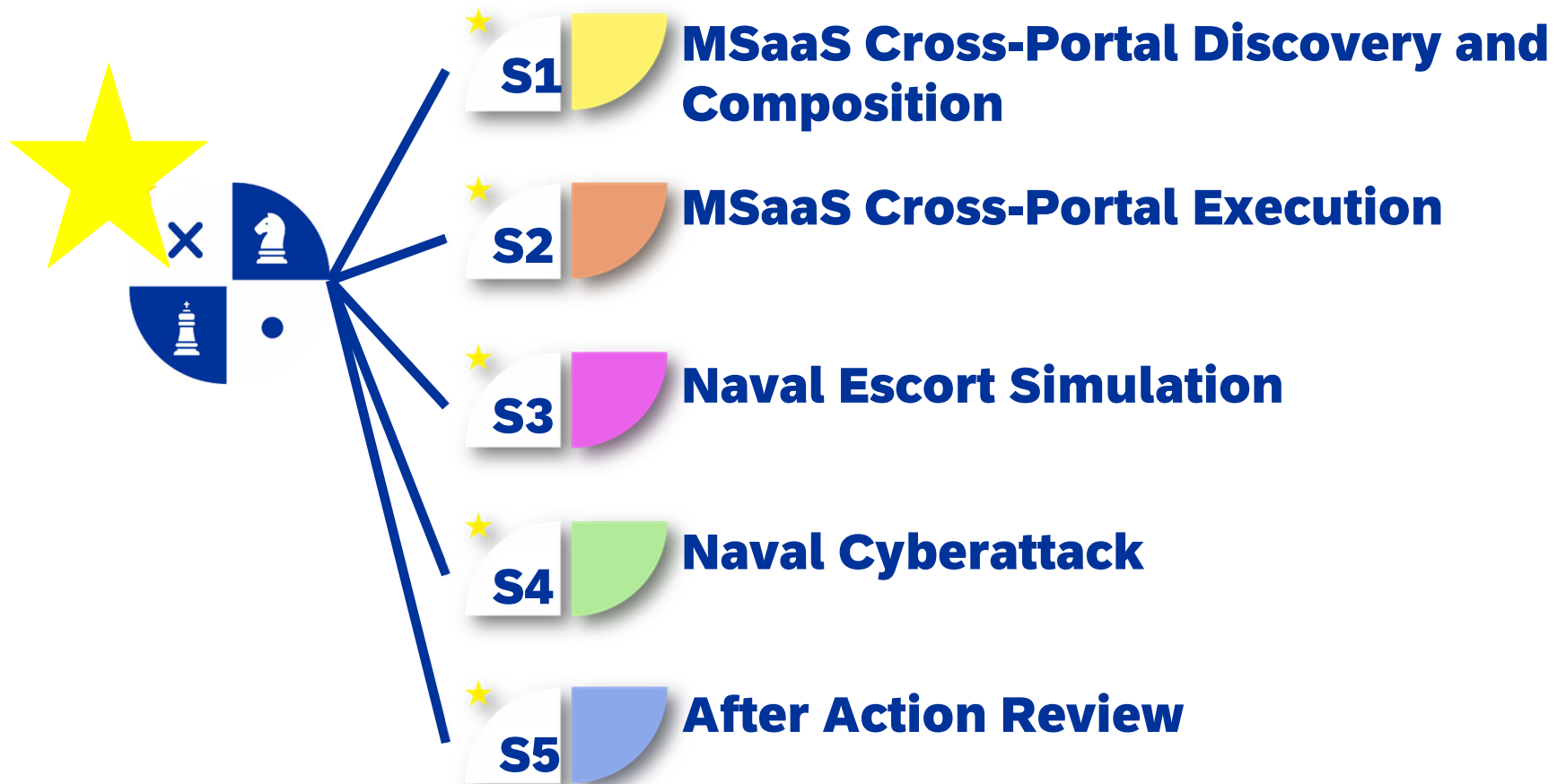
**Cyberattack launched by enemy
to disturb Frigate's CMS**

**Helicopter with dipping sonar
flies to wrong location to check threat**

**Threat not detected
Cyberattack identified, submarine localized**

After Action Review and debriefing







Projects Achievements

Agatino Mursia – Leonardo

What we have reached

FEDERATES was:

- ... with more than 30 partners much larger than originally planned.
- ... proof that collaboration between very different European partners can be successful.
- .. the birth of innovative products from many involved companies and institutions.
- ... an initial spark that has led to further projects and collaborations between partners.
- ... a success story in the end.
- ... a great pleasure for everybody to be part of it.

Taking Customer Requirements from the GA into account



R-1-1 Providing a modular system architecture

R-1-2 Considering cybersecurity aspects

R-1-3 Providing a distributed mission planning environment

R-1-4 Supporting During and After-Action Review

R-1-5 Reducing expense by using open standards

R-1-7 Supporting a multiple instance handling capability

R-1-6 Reducing preparation time for training and decision-making

R-3-1 Operating with different communication systems (WAN, SATCOM, etc)

R-3-4 Providing single platform for distributed simulation training

R-3-3 Providing SMC service with easy integration of actors and nodes

R-3-2 Interacting in domains with different security levels

R-5-1 Demonstrating interoperability with ≥ 5 training systems of all domains

R-5-2 Defining unified V&V process

R-6-9 Applying agile development methodology for continuous improvement

R-2-1 Proving a modern GUI with rapid operation and different screen sizes

R-2-3 Supporting quick access to resources with different performance levels

R-4-1 Supporting a wide variety of situations and scenarios

R-4-3 Supporting multi-domain operation, including C2 interfaces

R-6-1 Including LVC and C2 via C2SIM for training and decision-making

R-6-4 Collecting data about human factors

R-6-3 Implementing AI to generate behavioural models and content

R-6-7 Providing infrastructure and equipment for simulation centres

R-2-2 Supporting large-scale exercises in distributed infrastructure

R-2-4 Supporting open standards to work with NATO and national systems

R-4-2 Supporting conventional and hybrid warfare scenarios

R-4-4 Supporting all nations and joint forces at all levels, domains and LVC types

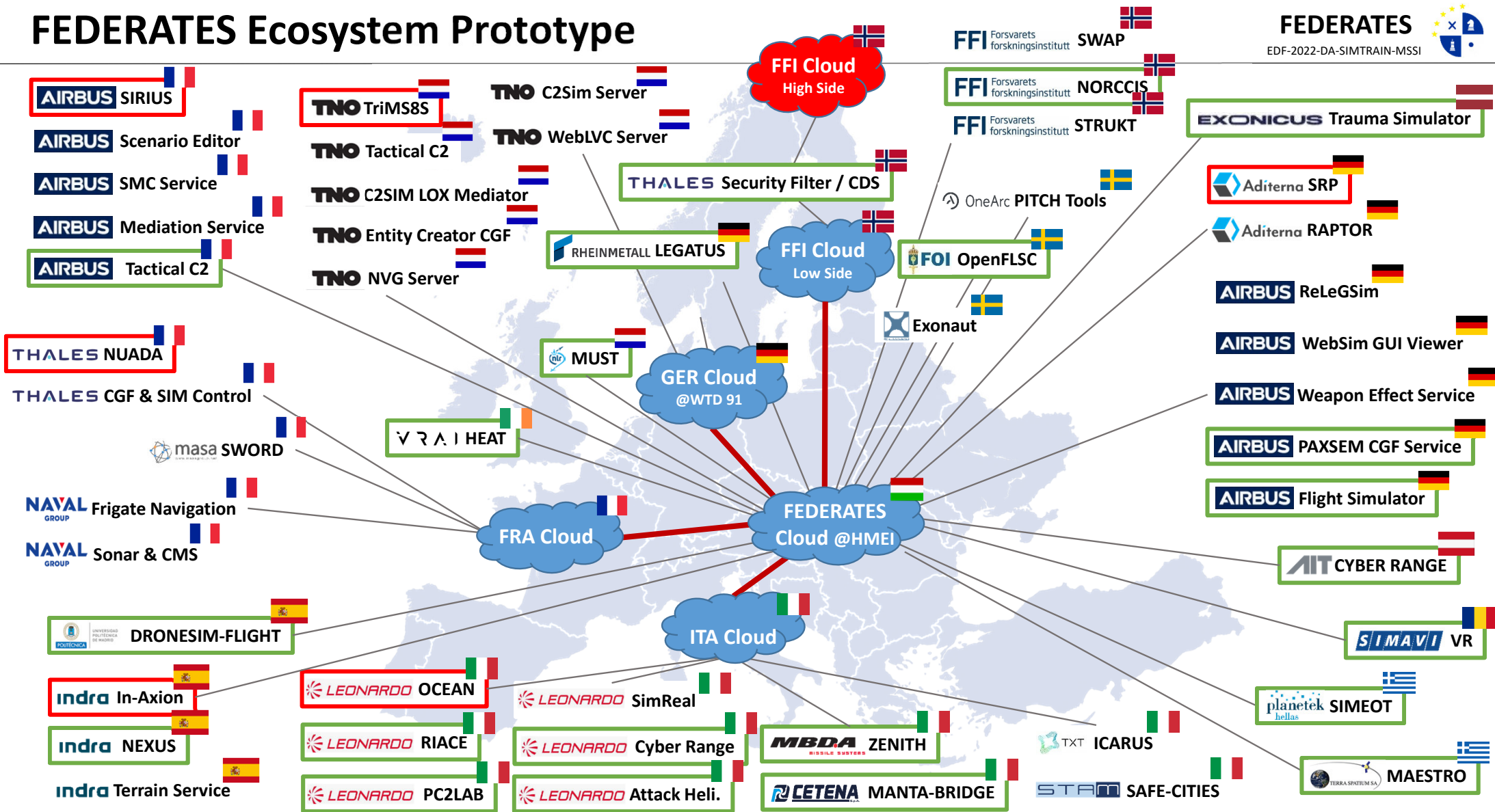
R-6-5 Providing an open, scalable, high availability architecture

R-6-2 Considering data analytics and related AI services

R-6-6 Considering technological improvements during the project

R-6-8 Providing templates for scenario planning and management

FEDERATES Ecosystem Prototype



Expected Impact requested in the GA

Expectations in the GA	How they are fulfilled
<i>Increase of interoperability and efficient use of simulation systems.</i>	The prototype and this event demonstrated how fundamentally different M&S resources can be brought together.
<i>Facilitating joint training and operations among armed forces of the EU MS and Norway.</i>	Multidomain operations for joint training, including space and cyber domains have been show in the demo use cases.
<i>Deliver a prototype of TRL 6 (at least) and integrate simulation means provided by EU MS and associated countries and reinforce interoperability between them.</i>	The six MSaaS implementations range from experimental new approaches to operational portals at TRL 9.
<i>Create common reference simulation building blocks.</i>	Fulfilled by D3.4: FEDERATES Reference Architecture document.
<i>Reduce the cost of military missions in particular in the training and preparation phase.</i>	When M&S resources have been adapted to the FEDERATES interfaces, they can be used in compositions on-the-fly which saves time and cost.
<i>Generate an operational decision-making (constructive) environment to test and train Joint and Command Structures.</i>	This is subject to the availability of suitable M&S resources. Nevertheless, the use of decision-making assets was demonstrated today.
<i>Foster innovation and cooperation for stakeholders in the defence M&S domain.</i>	FEDERATES has demonstrated how more than 30 companies can cooperate and innovate effectively.
<i>Create an ecosystem to develop EU autonomous industrial segments for further industrialisation phase.</i>	FEDERATES uses European technologies based on international standards which is the base to start the industrialisation as next phase.
<i>Promoting a collaboration network between EU MS and Norway including academies, research centres and industries looking for synergies with civil initiatives.</i>	See FEDERATES consortium comprising multinational corporations, SMEs, mid-caps and RTOs, all of which have agreed to participate in a follow-up project.

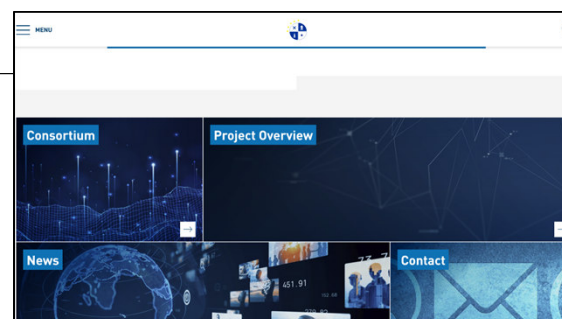
Major Achievements



Main Capability	Description	Results of FEDERATES
Foundation Portal Applications	User-facing capabilities to operate the Ecosystem.	6 MSaaS implementations , after starting with 3. They can manage the lifecycle of compositions and deployments , configure and start it and view component metadata.
Foundation Services	Backend capabilities for frontend Foundation Application.	Services for deployment of compositions, for management and exchange of component metadata and composition execution data using the Foundation API.
Scenario Development Applications	Development, storage and use of simulation scenarios for compositions.	Stand-alone applications for editing MSDL and C2SIM to provide initialisation data to scenarios.
Platform Management Services	Platform SMC Services to monitor and control M&S components.	Limited SMC capabilities (restricted to some degree of monitoring) for M&S components deployed within a Foundation.
Security Services	Authentication and security for Foundation service access, and Cross Domain Security integration.	Secure data exchange and token based authentication/authorization between Foundations.
COI M&S Capabilities	Bulk of simulation capabilities that can be discovered, composed and executed.	Provision of numerous M&S components from partners , as demonstrated in the demos, including component metadata to automatically describe and retrieve them.
External System Proxy Services	Seamless integration of external systems.	Basic capabilities in specific and general proxy services for the provided external system .
MSaaS Governance & Management	Service portfolio management, M&S information model management and standards compliance verification.	Not in scope.

Outreach activities (selected efforts)

- June 2024:
 - NATO Distributed Synthetic Training (DST) Workshop, Brussels, Belgium
 - Exonaut User Forum, London
- Sep 2024: NATO CA²X² Forum, Rome, ITA
- Oct 2024: EDA CapTech Simulation
- Jan 2025: DEU M&S Workshop, Munich, DEU
- May 2025:
 - 16th 3AF Integrated Air and Missile Defence Conference, Thessaloniki, Greece
 - 55th NMSG Business Meeting, Toulon, France
- Sep 2025: NATO CA²X² Forum, Rome, ITA
- Oct 2025: NATO MSG-232 "MSaaS Ecosystem" Working Group Meeting
- Dec 2025: Tutoriels de la Simulation, FRA
- Jan 2026: Leonardo (ITA), Polaris Journal
- **29 Sep – 01 Oct 2026: NATO CA²X² Forum, Rome, ITA**
- **30 Nov – 03 Dec 2026: I/ITSEC, Orlando, USA** ←



www.federates.eu

2026 Interservice/Industry Training, Simulation, and Education Conference (I/ITSEC)

FEDERATES: Europe's MSaaS Ecosystem for Distributed Synthetic Training and Decision Support

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ABSTRACT

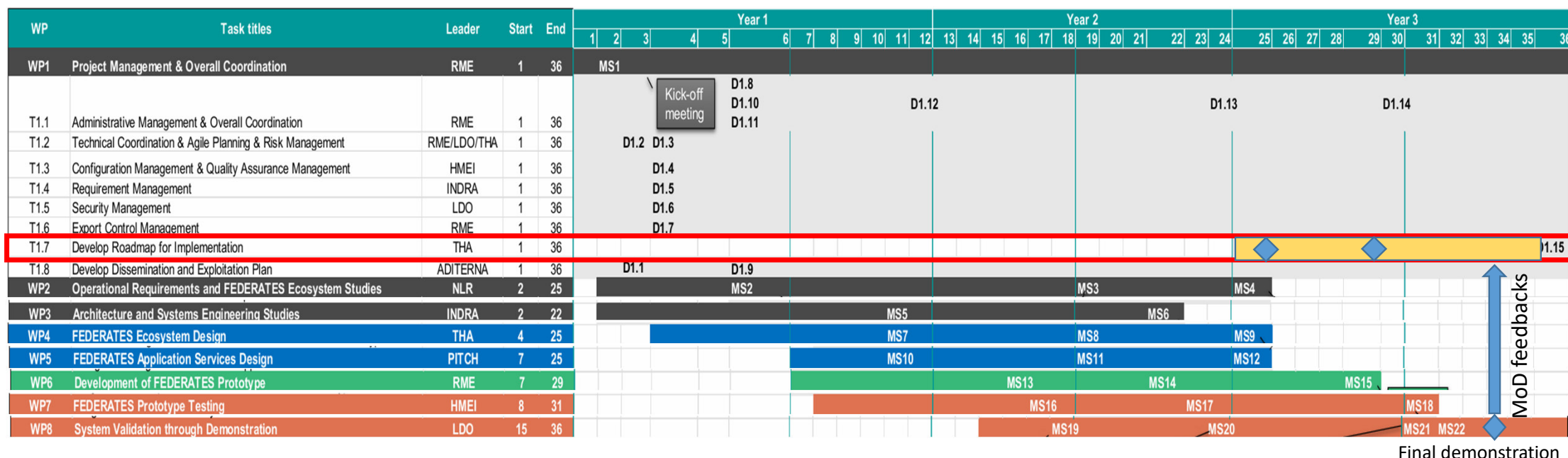
Under the European Defence Fund (EDF), the FEDERATES project (EDF-2022-DA-SIMTRAIN-MSSI) develops a European prototype of a Modelling & Simulation as a Service (MSaaS) ecosystem to enable seamless, secure interconnection of national simulation assets. National training centers have historically operated in isolation, resulting in lengthy exercise preparation (months to years), high costs, limited multi-domain coverage, and limited reuse of M&S resources. FEDERATES addresses these challenges by creating a federated, cloud-based service ecosystem



Roadmap

Robert Siegfried – Aditerna

Status of the Roadmap activity and mains objectives



- The roadmap is a major input to next FEDERATES step
- 3 main objectives are proposed:
 - A strategic objective : the transition from a prototype towards a permanent and more operational MSaaS federated system
 - A capability evolution : to improve scalability, performances and the integration with more national simulation systems
 - More involvement of MoDs during the implementation of the roadmap

Capabilities to be considered in the Roadmap

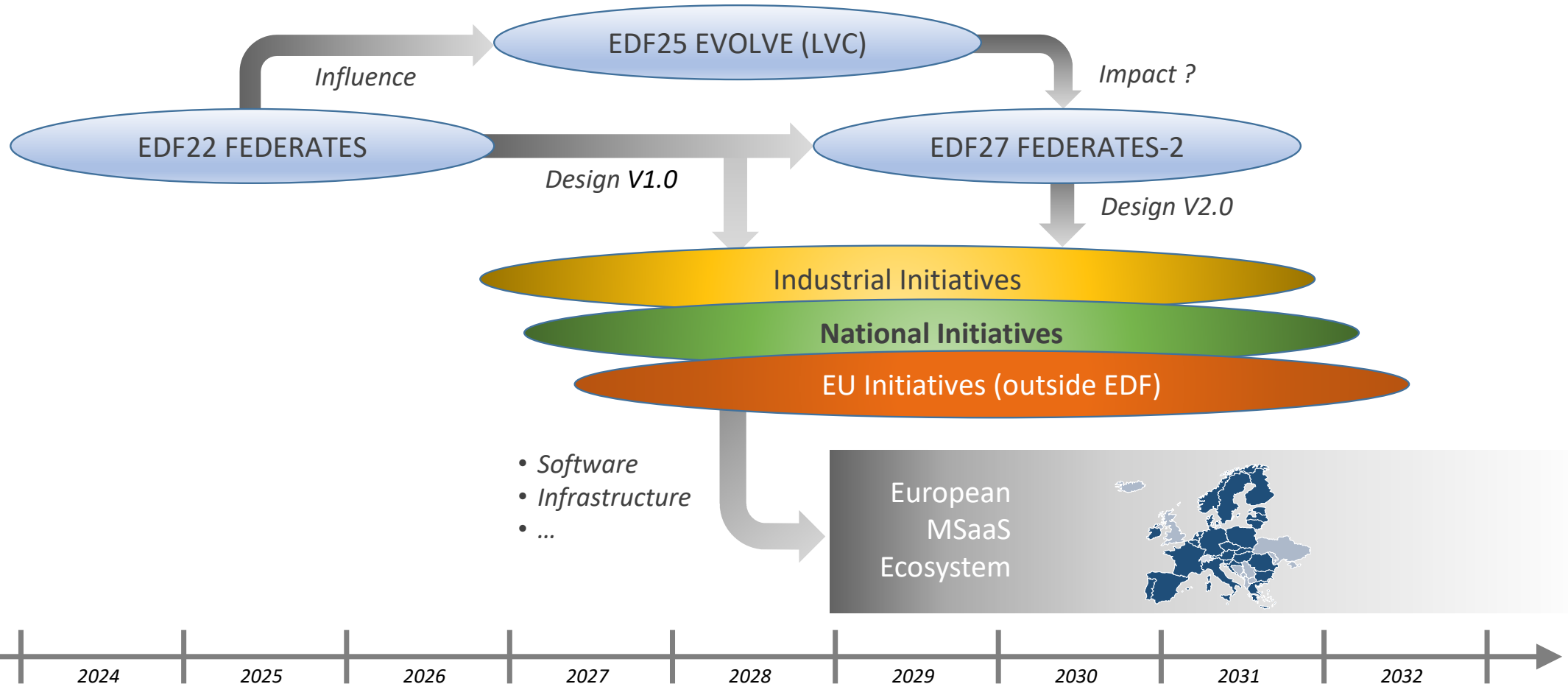


Conditions to implement the Roadmap



training
resources
infrastructure
guidelines
actors
timeline
governance
standards
key_milestones
budget
business_model
workstreams
dependencies
maintenance

Outlook of FEDERATES: Required Levels of Procurement for Operation



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Thank you.

FEDERATES Consortium

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