MODELLING & SIMULATION CENTRE OF EXCELLENCE

MODELLING AND SIMULATION AS A SERVICE (MSAAS) TOWARDS A GOVERNMENT SOLUTION

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"The views and opinions expressed in this presentation are those of the M&S COE and do not necessarily reflect the official policy of NATO or the MSGs position"

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Agenda

- **M&S as a Service (MSaaS)**

- **OCEAN (M&S CoE MSaaS core environment)**

  - **CAX Forum 2017 Demonstration**

  - **Participation results from CWIX 2018**

  - **Participation results from MSG164 October '18 Test**

- **NATO M&S COE MSaaS Initiatives**

- **M&S CoE APPROACH TO MSaaS EXPERIMENTATION**
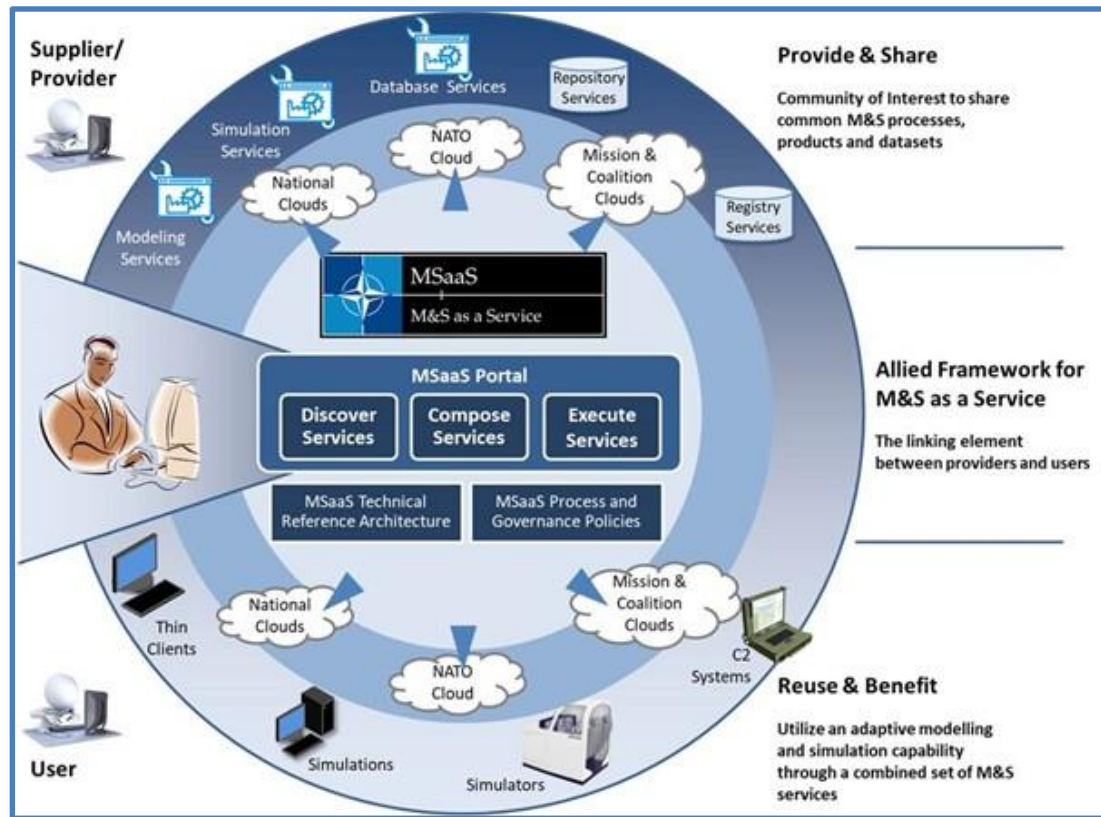
- **Conclusions towards a "MSaaS Government Solution"**

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MSaaS in NATO STO MSG 164 'MSaaS - Phase 2'

# Open Cloud Environment ApplicatioN (OCEAN)

The NATO Modelling & Simulation Centre of Excellence in collaboration with Leonardo, who has developed one of the first cloud-based M&S as a service solution, aims to implement and to continue to develop a government solution. The proposed infrastructure as a Service (MS-IAAS) aims to offer a unique point of access MS Services through a web portal.

The availability of services is managed by a system providing the user with the main functions

- **Discovery,**
- **Compose,**
- **Execute,**

who facilitate the delivery, versioning, testing, consumption, termination and disposal of services.
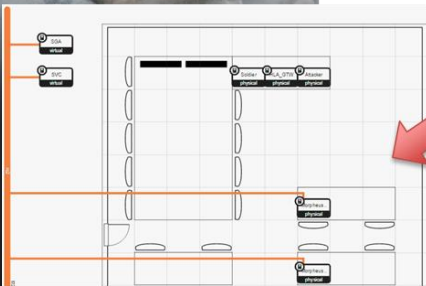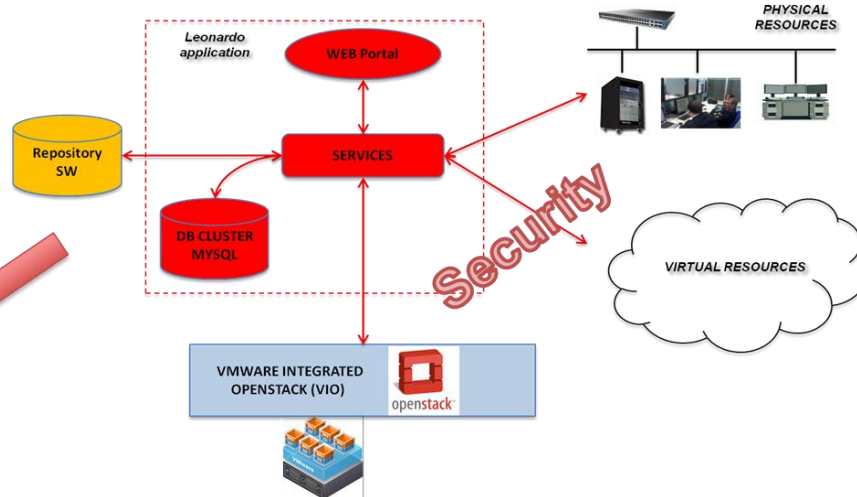
OCEAN (Main Capabilities)

OCEAN can provide services bonding the traditional cloud infrastructures with Modeling & Simulation As A Service (MSaaS) capabilities in terms of:

Extend traditional virtual environments for experimentation, test and training activities with a dynamic (cloud-based) environment able to instanciate:

- Virtual machines
- Containers
- Virtual networks

in isolated or joined concurred sessions or to connect them and with:

- Physical machines
- Physical networks
- to create thematic rooms into which monitoring and logging services can be executed together with the other assets.

Extend physical and virtual networks for activities involving simulation of non-cabled communications such as simulation of **wireless, radio or satellite networks**.

Manage rooms and labs (virtual and real, local and remote) and their training sessions or experiments.

CAX Forum 2017 MSaaS Demonstration

CAX Forum Florence

Scenario Generator Amnimator

Naval C2 Simulator

Sensors Weapons Simulators

Network Comms Simulator
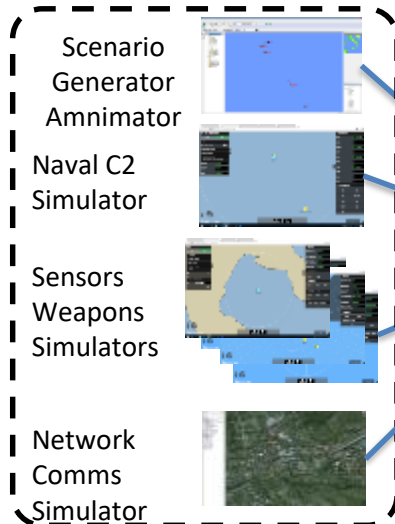
NATO M&S COE Rome

Key Results from CWIX 2018

M&S FOCUS AREA

- Provision of services to the M&S Area.

- Stimulation of real C2 systems (Joint Vignettes)

- MSaaS services towards Federated Mission Networking Spiral 3 Specifications (Virtual Machines exchange tests)

CYBER FOCUS AREA

- Provision of services to the Cyber Focus Area.

- Cyber-range-capable infrastructure federation, with the Estonian NATO Cyber Range.

- Federation and resilience test between MISP systems for Cyber Situation Awareness

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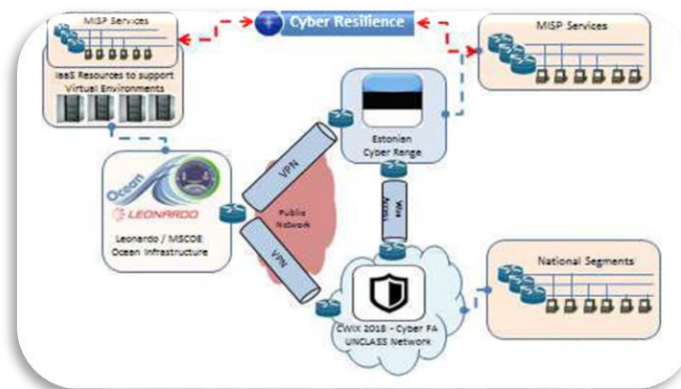
Key Results from MSG164 October 2018 Test

The MSaaS solution provided by the M&S COE passed all the tests and was the only one to reproduce the full MSG164 Demo and to expose a Common Operational Picture service, through EPIC container, in the cloud environment, accessible from remote CUE sites.
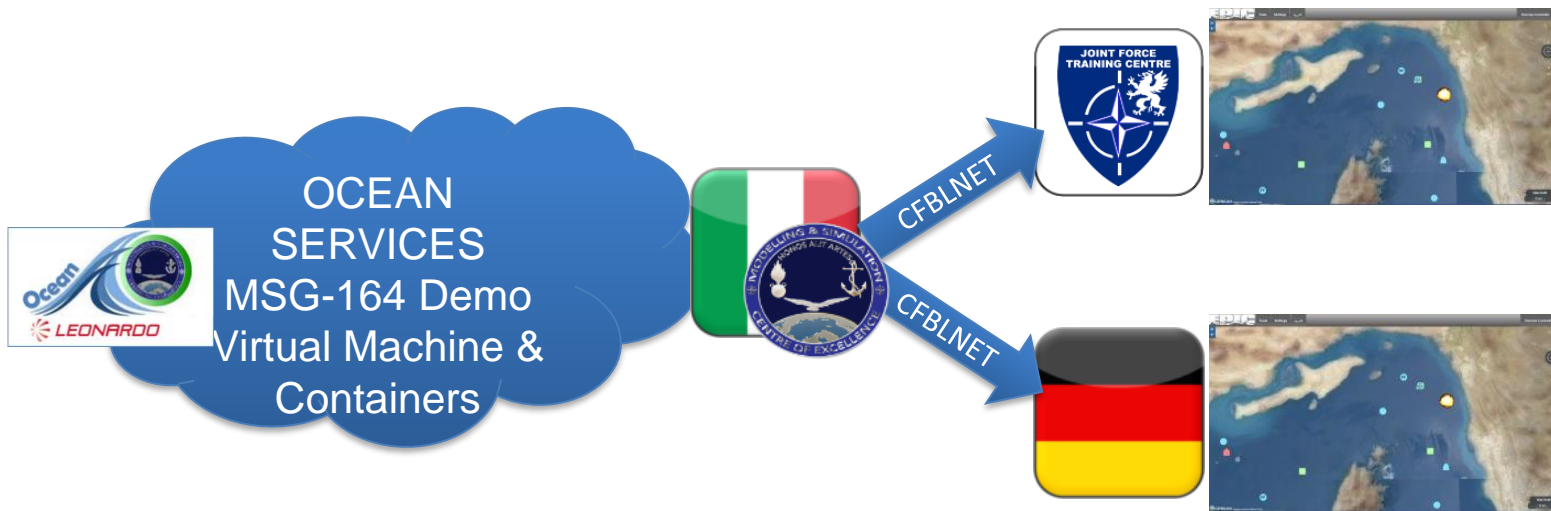
NATO M&S CoE site is a suitable hub for the provision of M&S services, to support NATO MSG-164 activities and future experimentations both on the CUE network and public internet.

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M&S CoE Initiatives within Open SimLab 2.0

CONCEPT: Development the capability to federate M&S CoE's contributing nations battle labs and simulation centres to improve experimentation, demonstrations, evaluation and test capabilities supporting the development and exploitation of innovative M&S technology, with priority to **MSaaS**.
Supporting nations in proof of concepts activities, acting as an Innovation Hub to better share among nations M&S innovation and knowledge and to stimulate multinational project and investments under the NATO SMART DEFENCE Framework.

Open Sim Lab 2.0 is based on OCEAN environment

BUSINESS MODEL: Ad-Hoc Cooperation Agreements or MOU to develop projects, evaluations and exchange of information regarding M&S technology, applications and tools, and participation to common CWIX experiments in class and unclass enclaves (M&S or other FA's) with particular efforts funding **MSaaS** related projects.

**WAY AHEAD:** OPEN SIMLAB 3.0 Accreditation as Research Centre

M&S CoE CD&E Projects - MSaaS Approach

Cyber HQ Effects Simulation Services

The CHESS (Cyber HQ Effects Simulation Services) project focuses on the development of an M&S solution to provide cyber effects injections versus a military command post (HQ).

The aim is to support training and exercises of non-cyber experts/operators (war-fighters) at Commander and Staff level during CPX-CAX. The Command Post training audience could be at multinational Brigade and above level, even if the solution is also suitable to be used at Battalion/Regiment HQ level

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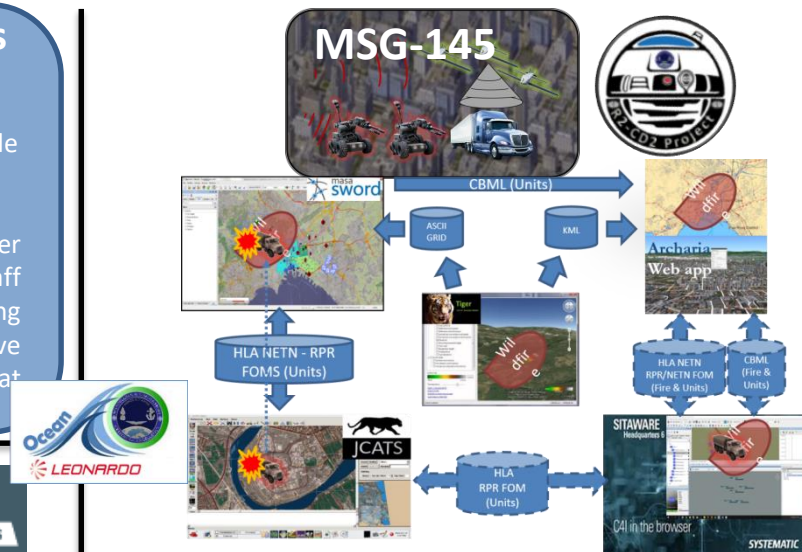
Playing a premiere role in the NATO MSaaS Community of interest (CoI) regarding the Experimentation Activities and the Development of a MSaaS Business Model, then implementing a M&S CoE's MSaaS governative solution

MSG-164

Contribution to MSaaS TRL (Experimentation Roadmap)
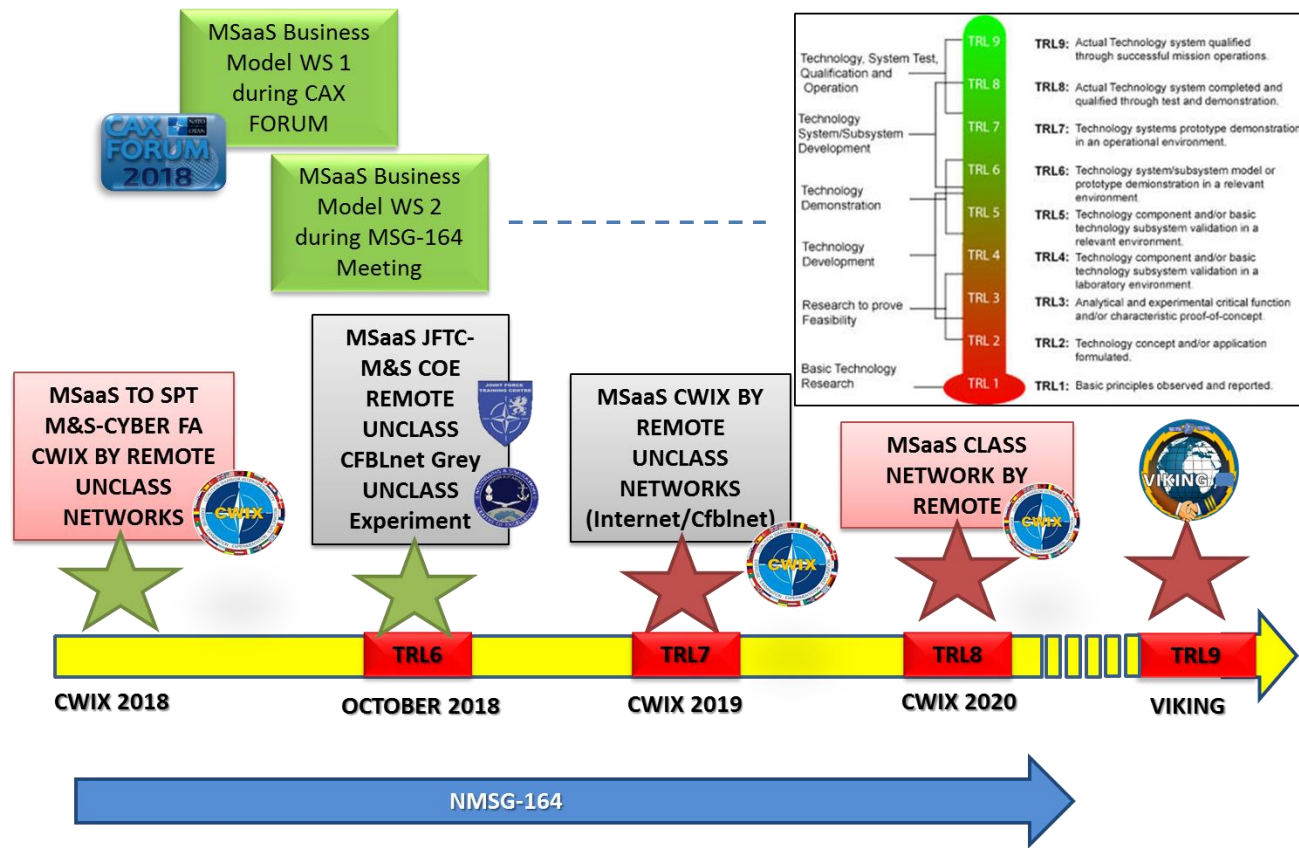
Conclusions

The NATO M&S CoE will further develop a government solution for:

- Supporting the participation to **International experimentations**, demonstrations and events (CWIX, Trident Series, VIKING, ITEC, IITSEC, etc...);

- Contributing to maintain and enlarge the **MSaaS Community of Interest**;

- Supporting the collection and sharing of **MSaaS governance** experiences, in establishing MSaaS capabilities and providing M&S services;

- Conducting **research** on M&S-specific service discovery and service composition, development activities on M&S-specific federated cloud environments, federated identity management and cyber secure communications;

- Collaborating with **international standards** bodies (like SISO, IEEE, etc.), informing and engaging stakeholders in NATO, Academia, and Industry about MSaaS;

- Supporting the development of a credible and robust **MSaaS Business Model**

QUESTIONS?