International Cooperation as a Multiplier for M&S Innovation: Example of DEU-NLD Partnerships

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Workshop-Reihe
Perspektiven der Modellbildung und Simulation

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M&S is a Critical Technology

Defensie

M&S

Investment
1 BEuro !

Battle Lab Overview

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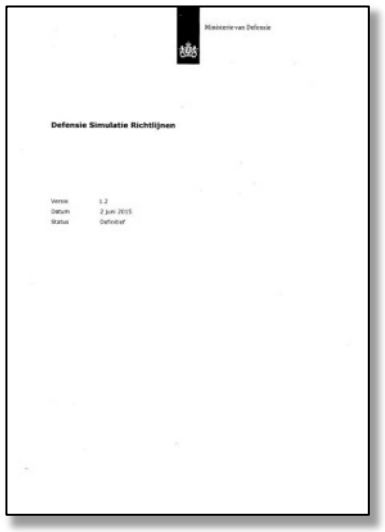
Masterplan Royal Netherlands Air Force

- *In 2019 25% of the training shall be exercised at simulators. In 2024 the portion of simulation shall be 50% of the training*
- *Acquisition of high-fidelity training simulators and advanced simulation technology is part of introduction of new highly advanced weapon systems (like F-35). That pushes forward a growing role of simulation in the training curriculum*
- *This opens up opportunities to train operators for complex tactical scenarios in a joint and combined virtual environment*

Defence Simulation Policy

- **NLD ratified ‘’Defensie Simulatie Richtlijn (DSR)’’ in 2015.**
- **DSR identified the need for a common simulation architecture and common deployment and usage processes.**
- **The national infrastructure and approach should be aligned with our partners.**
  Implementation plan will adopt
  NATO AMSP-01 (M&S Standards Profile).


Defensie Simulatie Richtlijnen

NATO M&S Vision and Guiding Principles

- **Exploit M&S to its full potential across NATO and the Nations to enhance both operational effectiveness and cost effectiveness.**

- **Guiding Principles as Reflected in the NATO M&S Masterplan (NMSMP):**
  - **Synergy**
  - **Interoperability**
  - **Reuse and Affordability**


NATO M&S Strategic Plan Version 2.0

NATO OTAN

NORTH ATLANTIC COUNCIL
CONSEIL DE L'ATLANTIQUE NORD

14 September 2012

DOCUMENT

AC/323/NMSG(2012)-015

NATO MODELLING AND SIMULATION
MASTER PLAN

NATO MODELLING AND SIMULATION
STRATEGIC PLAN

VERSION 2.0

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Collective Mission Simulation

Growing need

- More out-of-area operations
- Missions in complex environments (eg littoral, hybrid, UxV)
- Decreasing availability of operational systems
- Increasing limitations for Live mission training

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Mission Training through Distributed Simulation for NATO and Nations

NETN - NATO Education and Training Network

MTDS Ambition

A validated, reusable and interoperable mission simulation environment that supports distributed mission preparation and execution at various levels of security classification simultaneously:

- *Joint*
- *Combined*
- *Interagency*

Mission Simulation Environment (Common Technical Framework)

- LVC capable
- Flexible, extendable, reusable
- Fair-fight / fair-play
- Distr. planning, briefing & debriefing
- Multi Level Security

Develop the Next Generation Virtual Battlespace

Model the world
efficiently and valid

- World data
- Models
- Scenario

Model challenge

Simulate the world
any place, any time, any device

Transform results
actionable knowledge

- Data
- Information
- Knowledge

Data challenge

Simulation workflow
modelling and simulation done effectively and efficiently

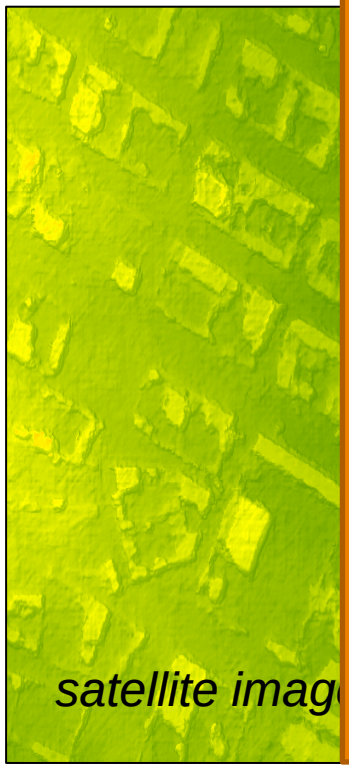
Time is of the essence

Innovations Needed : Mission Areas

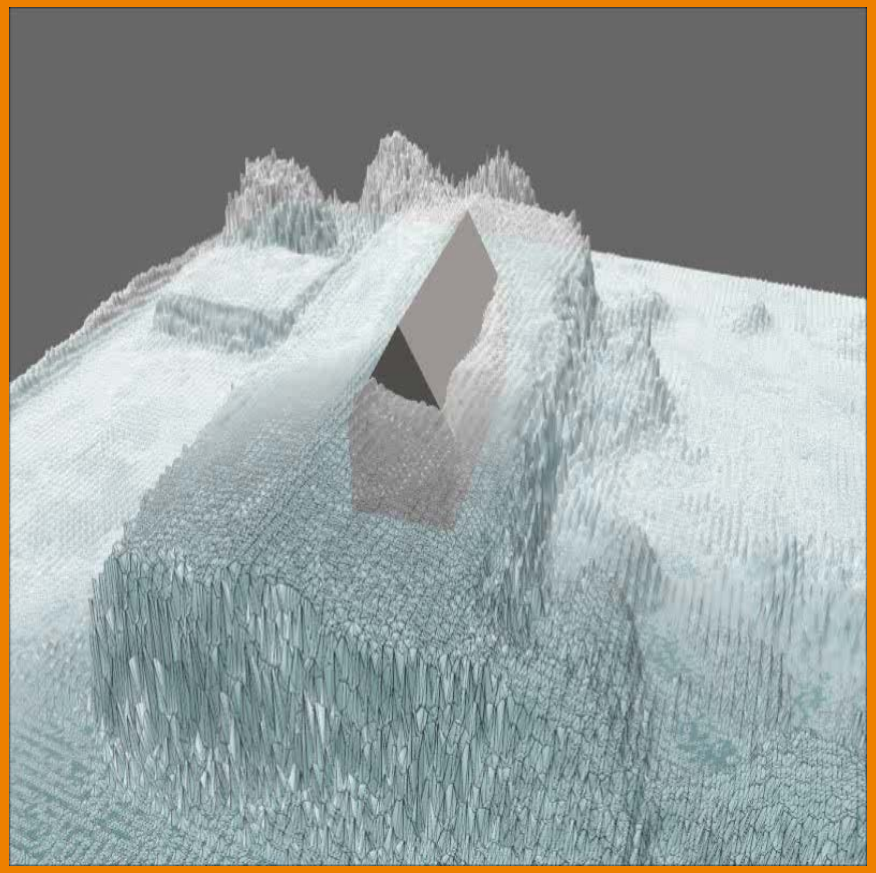
automated analysis

and reconstruction

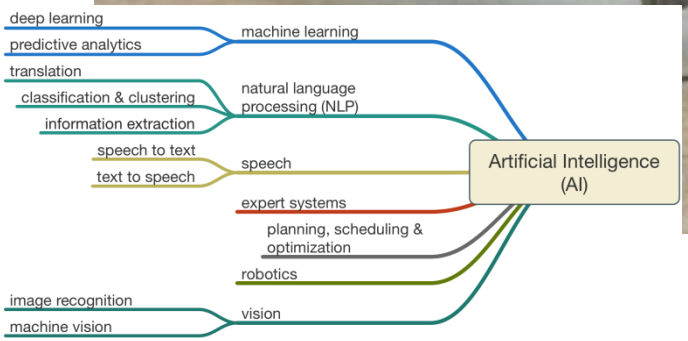
not good enough



semantic
feature
extraction



Innovations Needed : Human Behaviour Modelling



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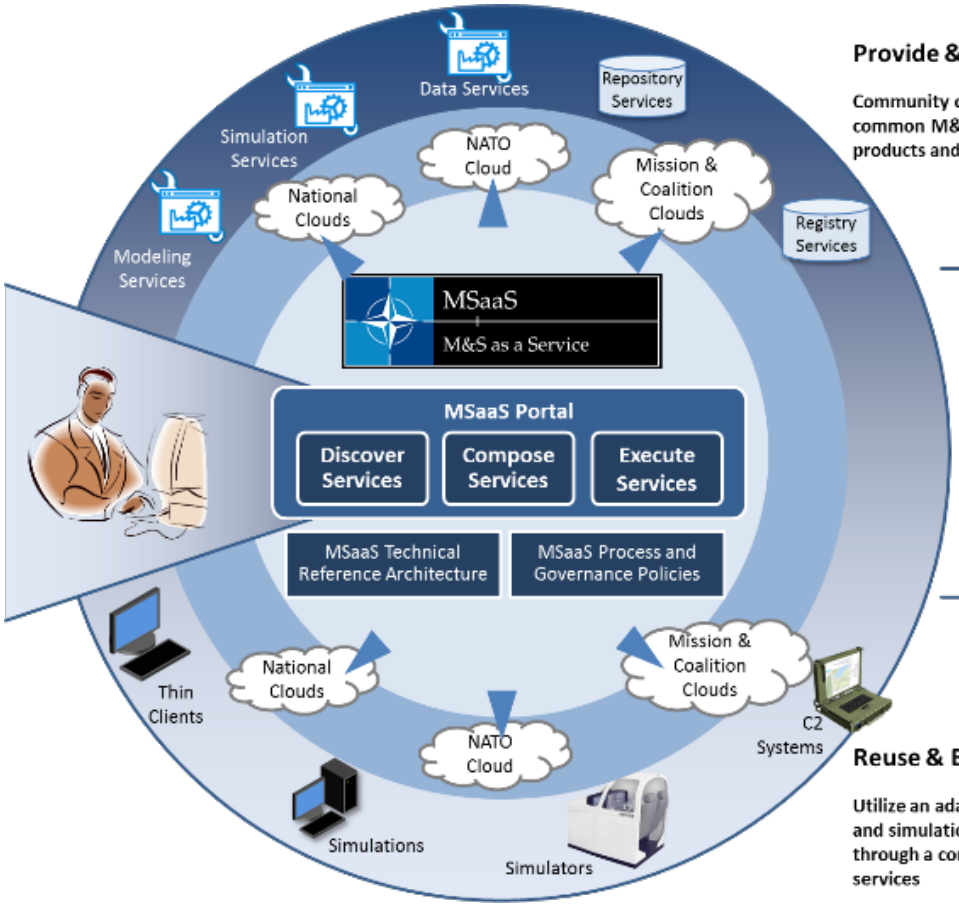
Innovations Needed : Composable Simulations



Provide & Share

Community of Interest to share common M&S processes, products and datasets

Allied Framework for M&S as a Service

The linking element between providers and users

Reuse & Benefit

Utilize an adaptive modelling and simulation capability through a combined set of M&S services

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Innovations Needed :
(Outdoor) Augmented Reality

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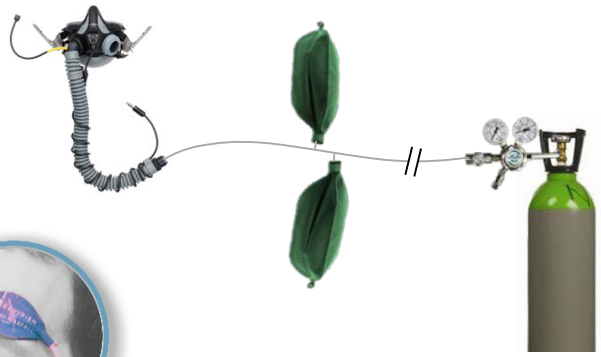
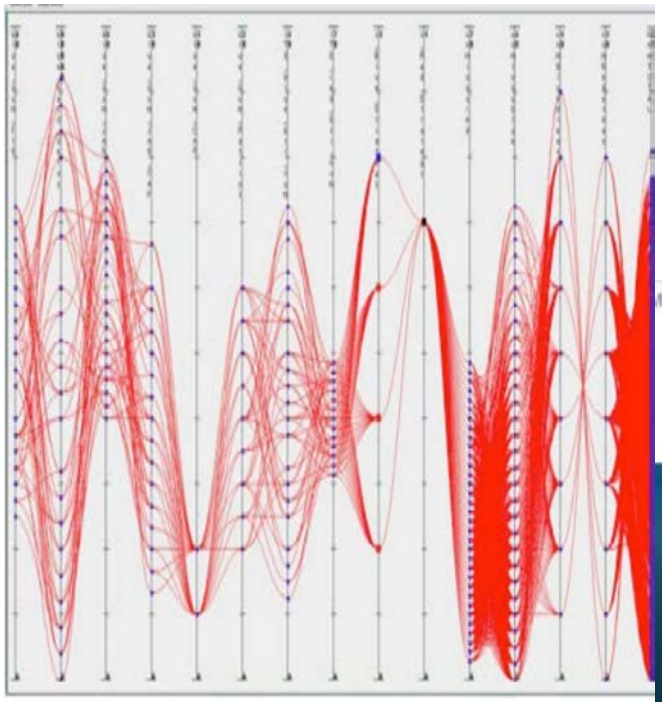
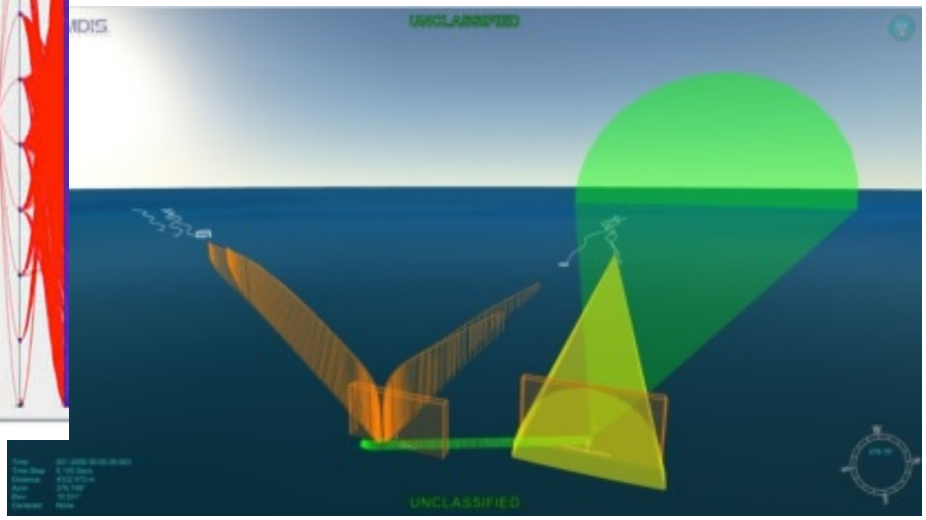
Innovations Needed: Extreme Conditions Simulation

Combi motion, nightvision & hypoxy



Innovations Needed : Analyse Results





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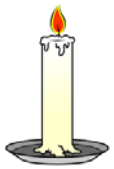
Innovation > Technological Edge



- ✓ **Innovation will only succeed when customers get <u>more capabilities</u> or <u>save cost</u> (and preferably both)**

- ✓ **Innovation will only succeed when <u>all stakeholders</u> are involved**

- ✓ **Innovation is <u>multi-disciplinary</u> and often an <u>incremental</u> process**

International Cooperation DEU-NLD

NATO OTAN

COMMUNITATE VALEMUS

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“Vereinbarung über die Zusammenarbeit auf dem Gebiet der Forschung und Technologie“ (1993)

- Verbesserung der Zusammenarbeit im europäischen Rahmen allgemein; wechselseitige Unterrichtung über die F&T-Planung, Koordinierung der F&T Planungen, Investitionen und Erprobungen; Bündelung der beiderseitigen wissenschaftlichen, technologischen und finanzielle Ressourcen und gemeinsame/wechsel-seitige Nutzung der erzielten Ergebnisse; […]

- Die Zusammenarbeit hat zum Gegenstand: […] das Entwickeln wehrtechnisch nutzbarer Ideen, Methoden und Gegenstände einschliesslich der Planung und Ausführung von Simulationen, Demonstratoren und Prozessen (Zukunftstechnolgie).

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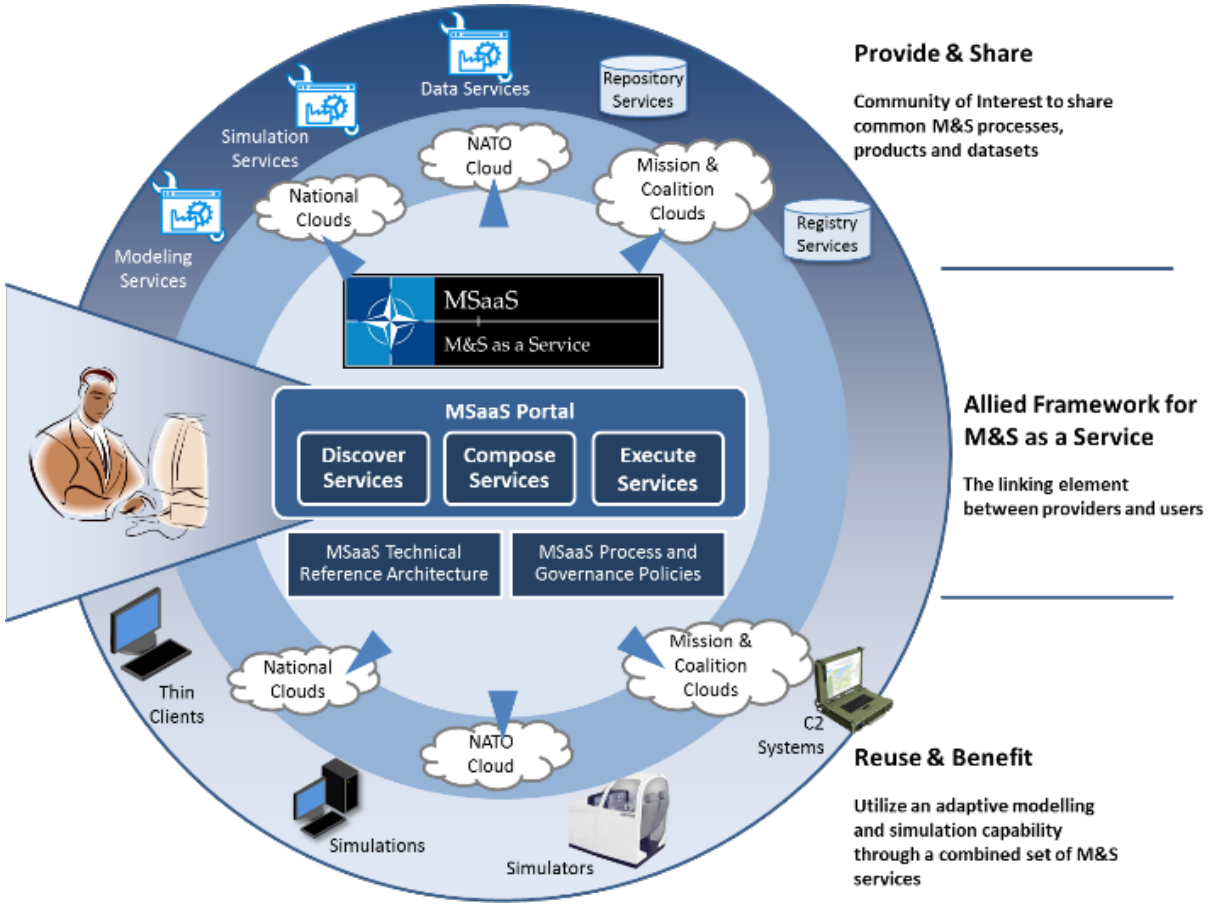
International Cooperation - Challenges

- Political Challenges:
  - Lack of political commitment to follow through with concrete initiatives
  - Lack of strategic coordination
- Administrative Challenges:
  - Bureaucracy instead of common sense and flexibility…
  - Legal issues
  - Compliance with reporting requirements
  - Funding cycles not synchronized

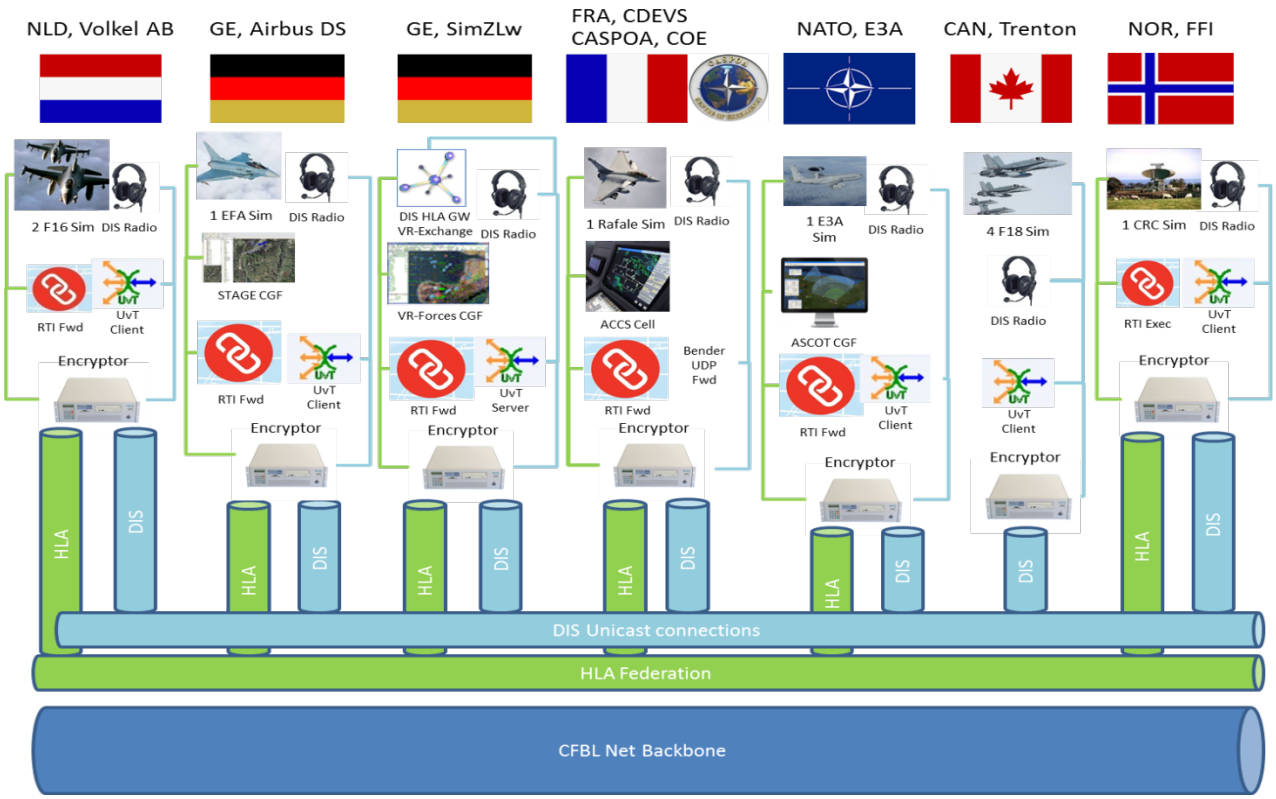
International Cooperation - Challenges

- Cultural Challenges:
  - Language
  - Hierarchy
  - Trust, Myths and Legends..

Example: MSG-136, MSG-164 MSaaS

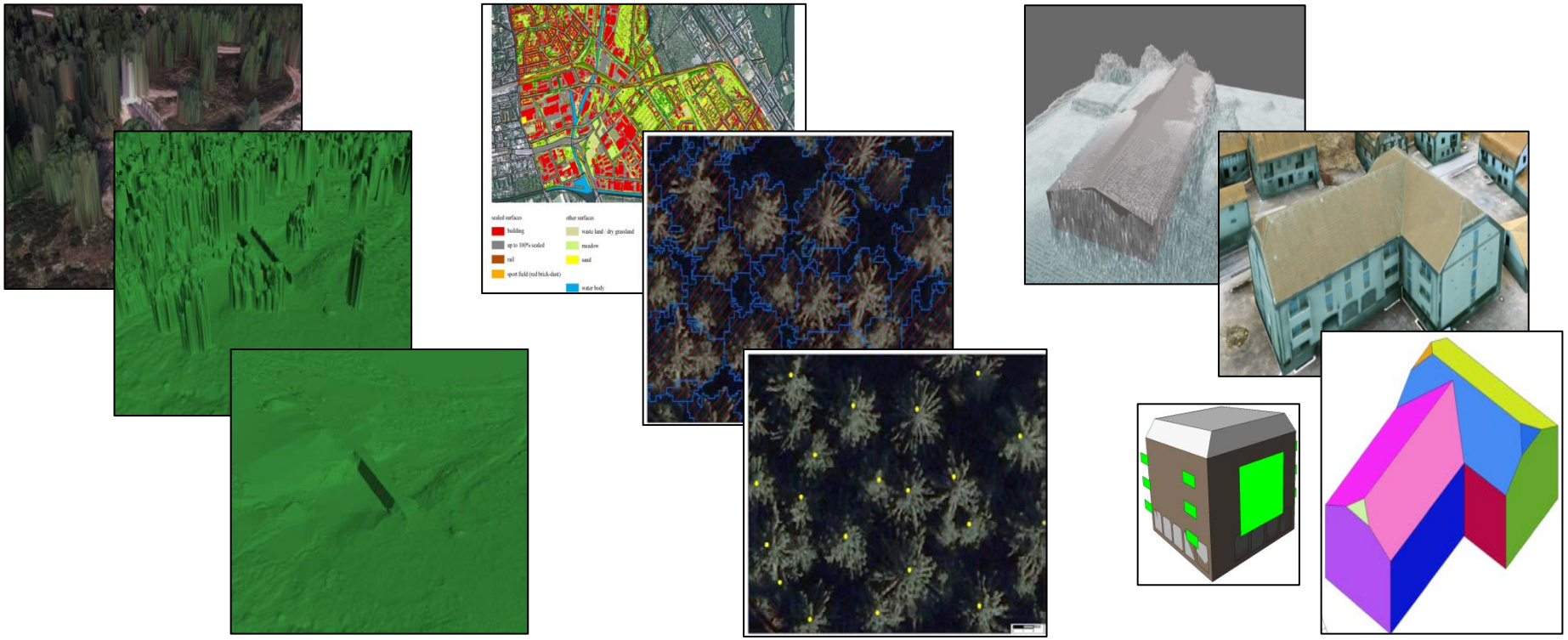


Example: MSG-128 MTDS Solution Architecture



Example: Virtual Mission Area modelling (1)

- TNO modelling expertise
- DLR expertise on sensor and photogrammetry technology



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Defensie

Bundeswehr
Wir. Dienen. Deutschland.

DLR

Fraunhofer

nlr

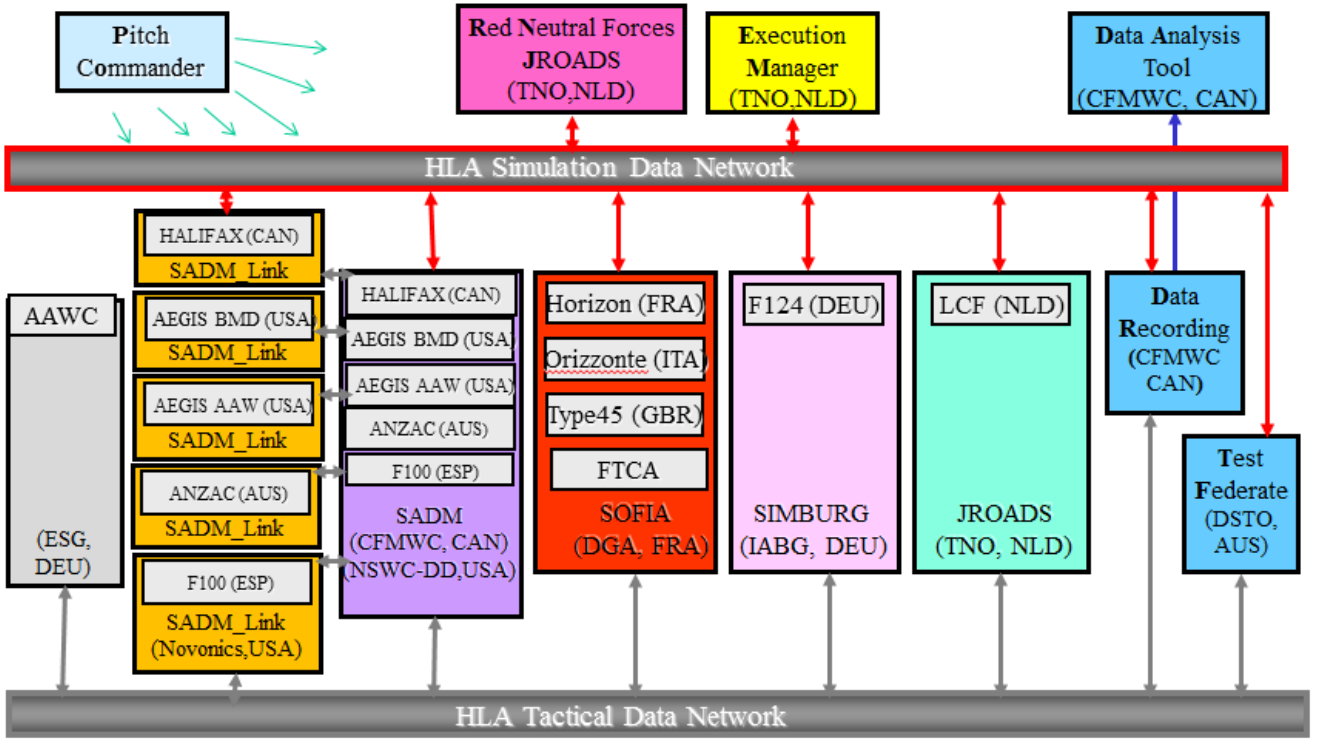
Example: Virtual Mission Area modelling (2)

- Past projects
  - NTP-VMG study (2013): DLR performed photogrammetry on aerial imagery
  - Mali mission support (2015): DLR performed photogrammetry on satellite imagery
  - Virtual Training Areas Germany (2017): DLR performed photogrammetry on aerial imagery
- Planned projects (2018-2020)
  - "Geospecific Terrain Databases for Military Simulation Environments" Co-operative research by DLR, FhG, TNO, NLR
  - "Geo-referencing and 3D Reconstruction from Arbitrary Airborne and Satellite Based Optical Sensors“. Co-operative research by DLR, FhG, TNO, NLR

Example: Maritime Theatre Missile Defence (1)

…protection against the proliferation of short, medium and long-range Ballistic Missiles, Advanced Anti-Ship Cruise Missiles threats through the creation of an Interoperable Seabased Defense Capability among coalition nations.

Example: Maritime Theatre Missile Defence (2)



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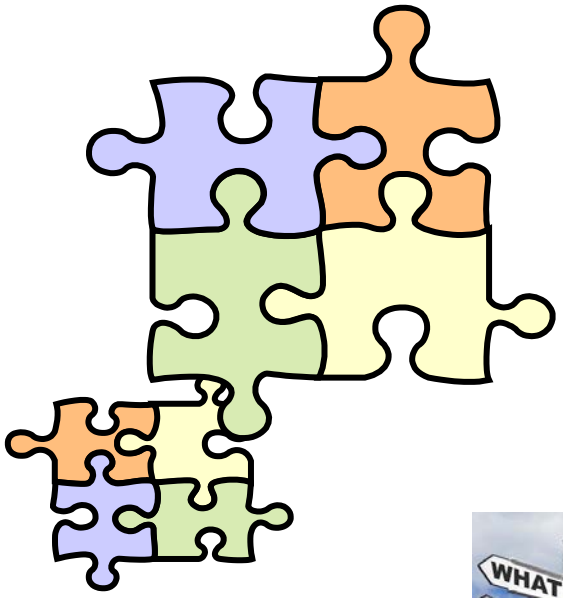
International Cooperation Approach

R&D results should be puzzle pieces to incrementally achieve your medium/longterm objectives. Stakeholders should:

- Define a common technology roadmap
- Define and Review R&D project proposals
- Review and Integrate Results
  (and help end-users to deploy)
- Perform M&S Technology watch



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International Cooperation Success Factors

- The objective of research cooperation must be to achieve results for concrete problems – not cooperate for the sake of cooperation!
- Find suitable partners, understand where they excel and where they complement each other. Align agenda's in specific research domains.
- Develop a workable and realistic proposal with a clear common goal.
- Informal, open atmosphere. Enjoy the ride!
- Celebrate success and Learn from the results!

NMSG Success and Impact

Share Efforts and Multiply Results

BRIEFER

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