



Command and Staff College of the German Armed Forces

MDO - In Pursuit of a New C2 Rationale

> > heading for a formalised representation < <

Lieutenant Colonel (GS) Ronald Pietrowsky

Rome, 29 September 2026

Outset



Orienting



Adapted Organisation

Once upon a time [...]



until suddenly [...]



Improved Arsenal

until suddenly [...]



thus [...]



thus [...]



until suddenly [...]



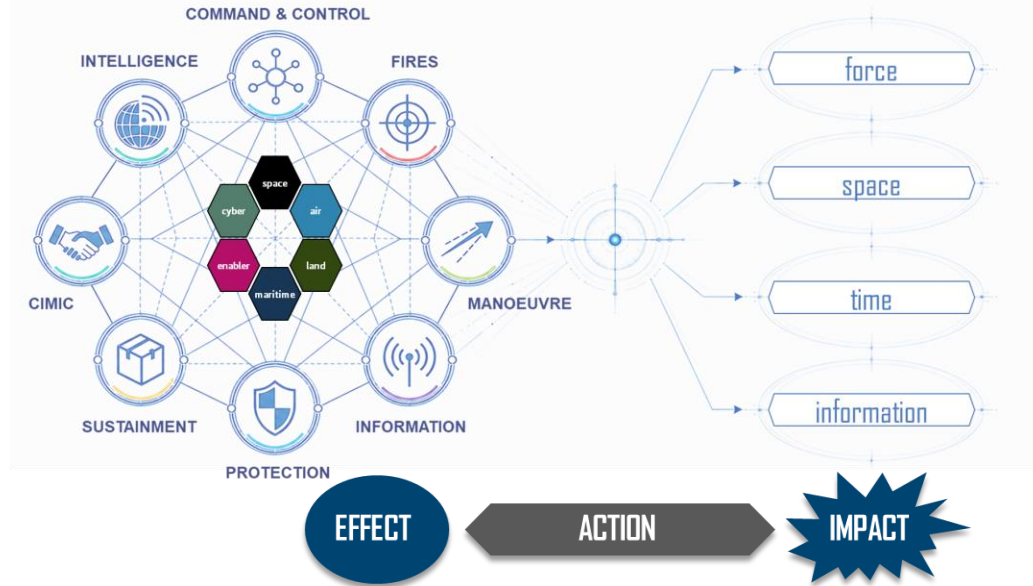
warfare evolves

Orienting



Operational Level

Tactical Level



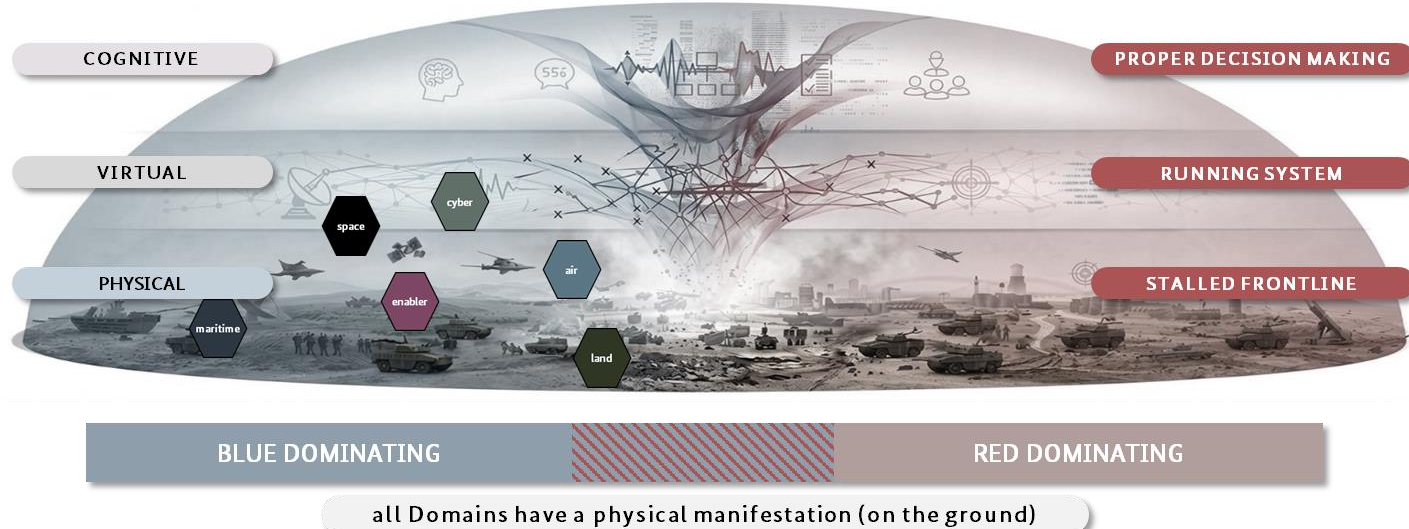
perspective matters

Orienting



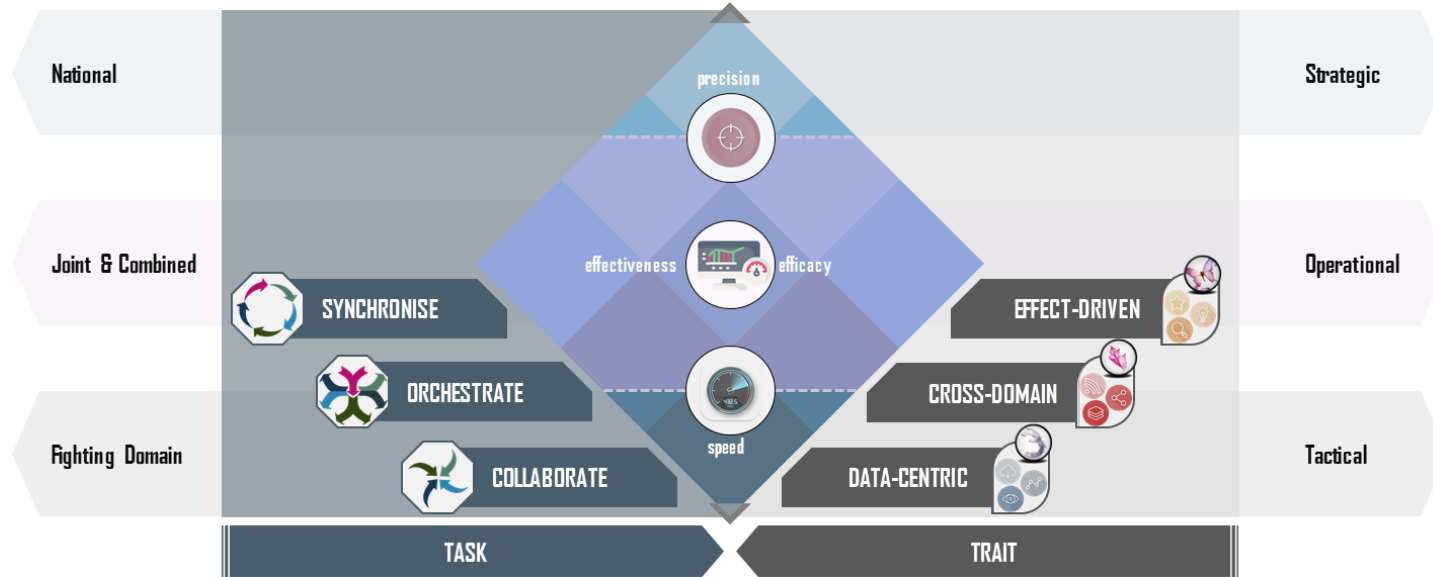
Effect Dimension

Main Tenet



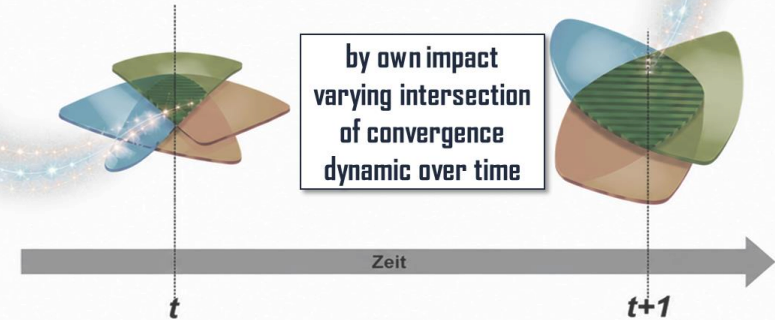
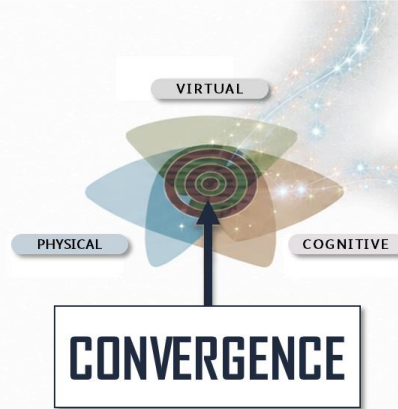
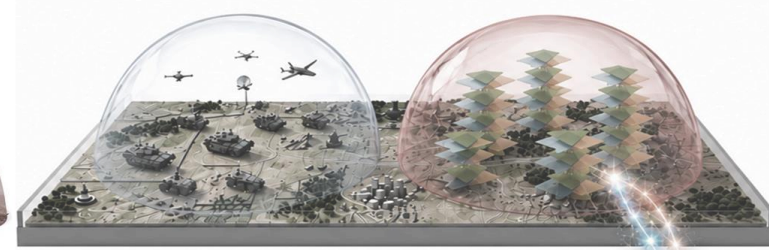
transparent battlefield

Understanding



arranging for a new paradigm

Understanding

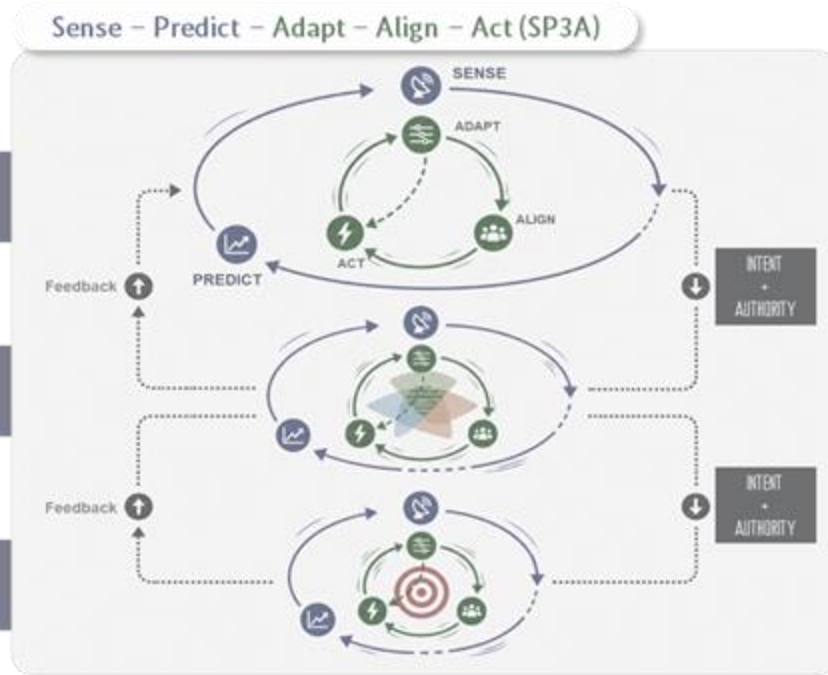


tangible end for planning purpose

Understanding



- 1 Strategic Level
- 2 Operational Level
- 3 Tactical Level



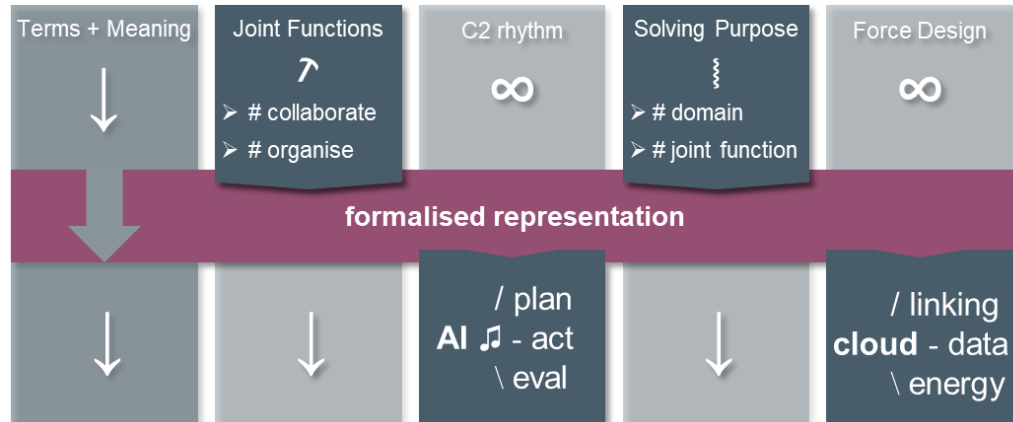
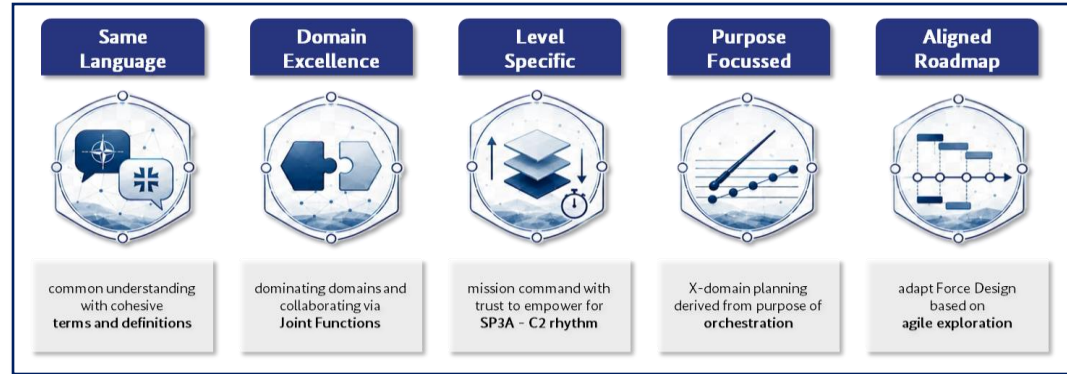
RHYTHM

VIBES

FREQUENCY

beyond sequencing in human machine teams

Applying



Applying



* MDTF: Multi-Domain Task Force

modelling with focus on

rationale for #solving purpose + #joint function



set up interdependent MDTFs* based on resources

need for describing engagement spaces and convergence windows in vignettes for distinct dominance (temporary / specific / domain-agnostic)



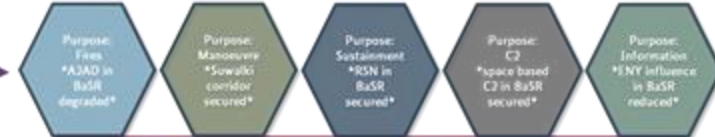
operational challenge based on problem set

generating interdependent vignettes



tool for analysing, planning, and assessing

Exploring

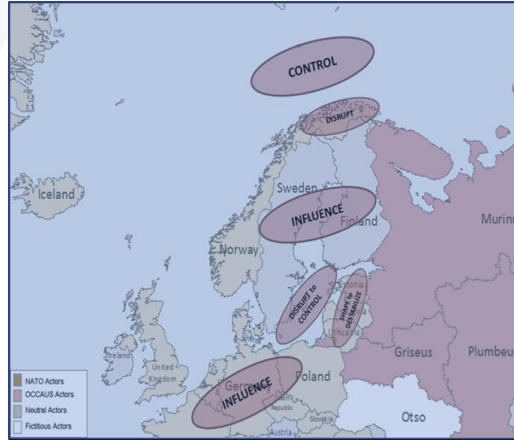


profiling MDTF
based on modelling of
engagement spaces
with  FKIE to use AI

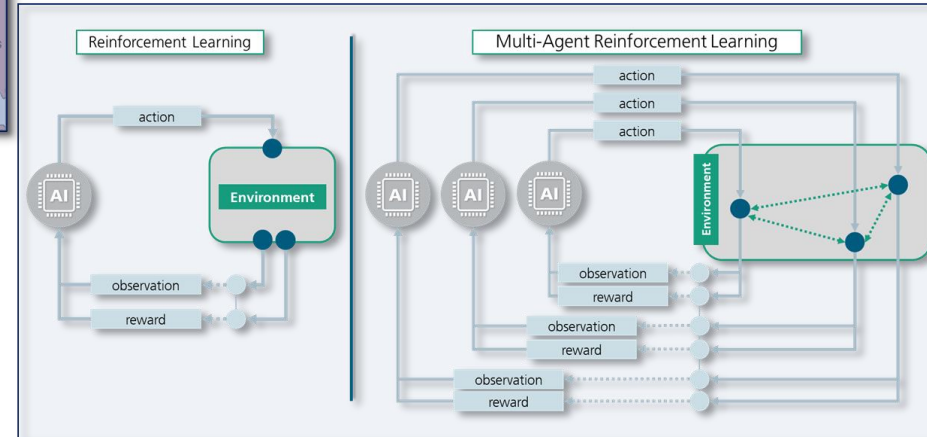


following step
with  FKIE is to use AI to design
SENSE + PREDICT

Exploring



- **Graph-based modelling of the engagement space** with (potential) facts as vertices and their interdependencies as edges.
- Definition of problems concerning the detection of convergence zones and windows, as well as potential dilemmas for the enemy as **Markov Decision Processes (MDPs)**.
- Applying **Graph Reinforcement Learning (GRL)** for training agents to solve MDPs.
- Usage of **vignettes** for both training and inference.



solving + creating decision problems w/MDPs

Outlook



5 – 9 OCT
COVE
HALIFAX, CAN

**NATOACT
Innovation
Continuum**

[...]



27 – 29 APR
FüAkBw
HAMBURG

**NATO CoE
Shallow Waters
ADC**





Command and Staff College of the German Armed Forces

MDO - In Pursuit of a New C2 Rationale

> > heading for a formalised representation < <

Lieutenant Colonel (GS) Ronald Pietrowsky

Rome, 29 September 2026