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

Understanding

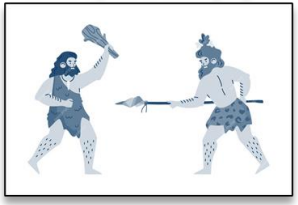
Applying

Exploring

Orienting

Adapted Organisation

Once upon a time […]



until suddenly […]

Improved Arsenal

until suddenly […]

thus […]

thus […]

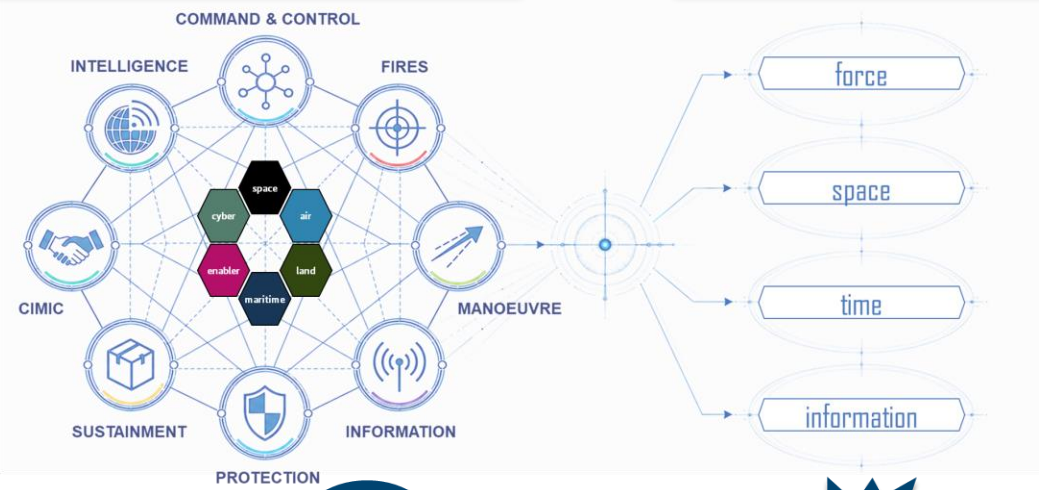
until suddenly […]

warfare evolves

Orienting

Operational Level

Tactical Level

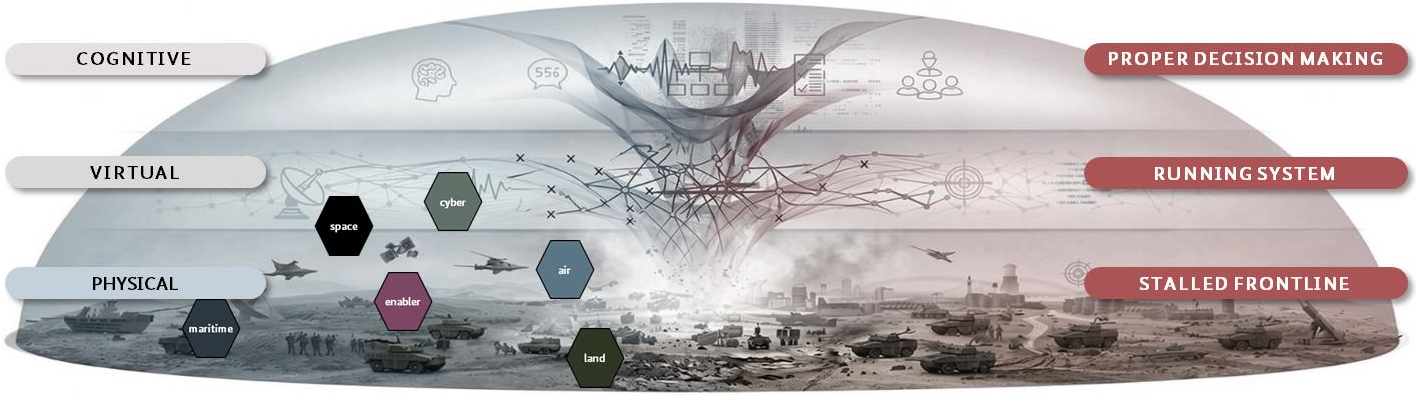


EFFECT → ACTION → IMPACT

perspective matters

Orienting

Effect Dimension	Main Tenet
COGNITIVE	PROPER DECISION MAKING
VIRTUAL	RUNNING SYSTEM
PHYSICAL	STALLED FRONTLINE

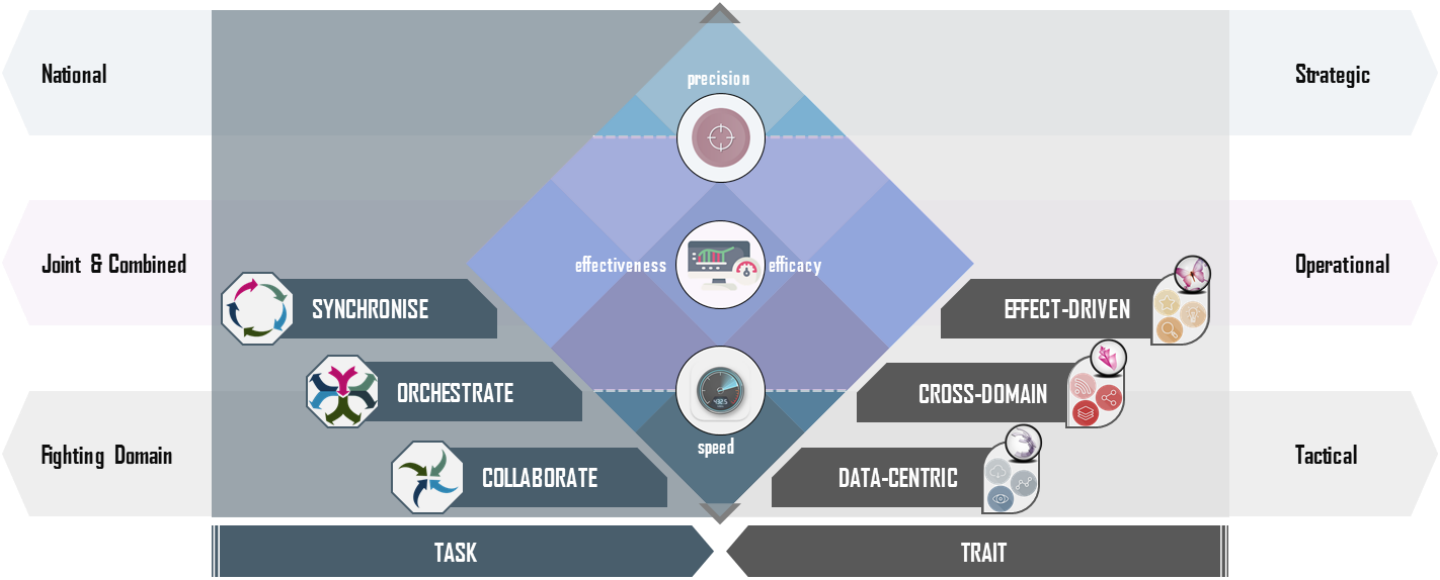


BLUE DOMINATING | RED DOMINATING

all Domains have a physical manifestation (on the ground)

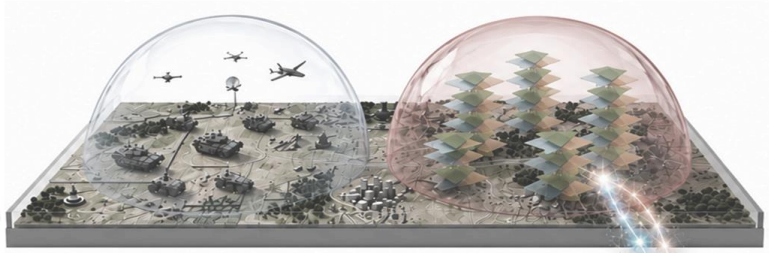
transparent battlefield

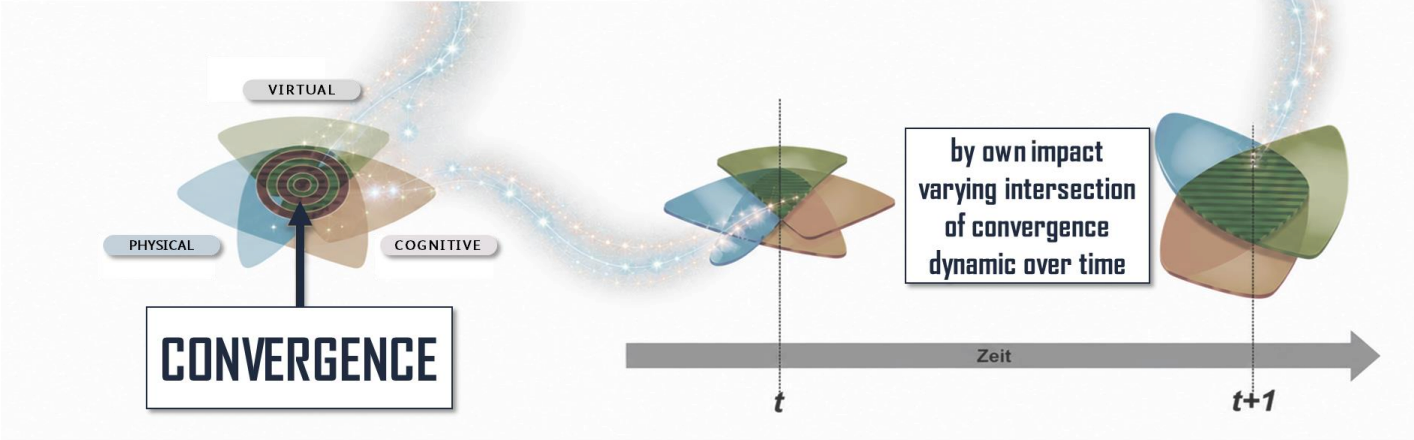
Understanding



arranging for a new paradigm

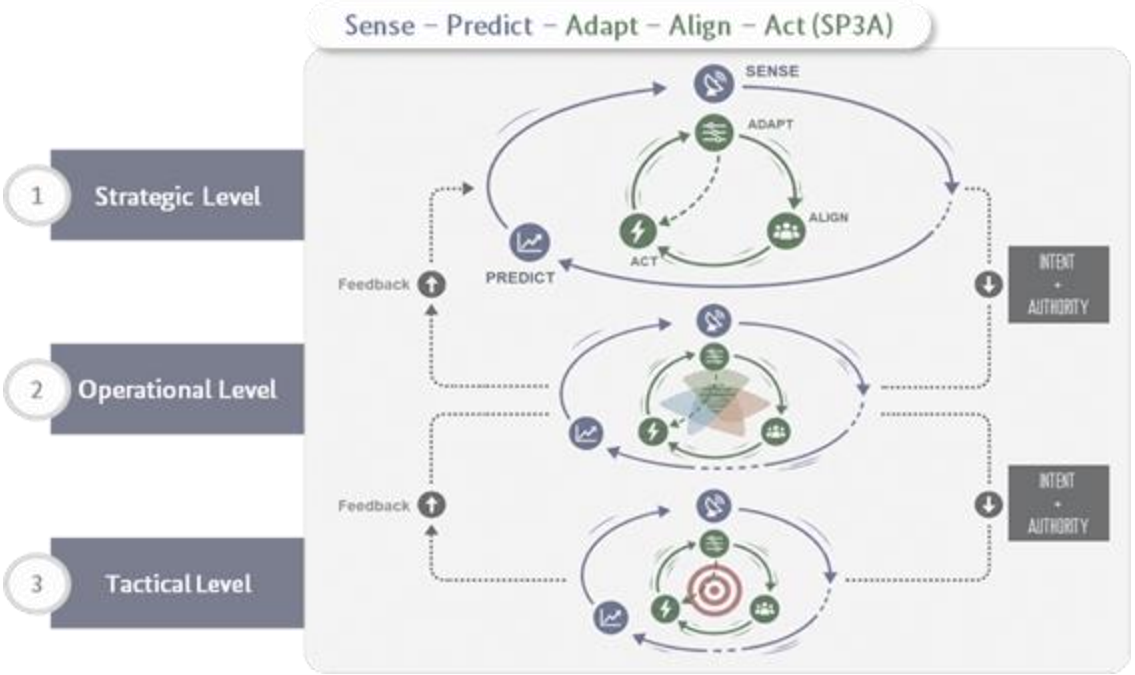
Understanding





tangible end for planning purpose

Understanding



RHYTHM

VIBES

FREQUENCY

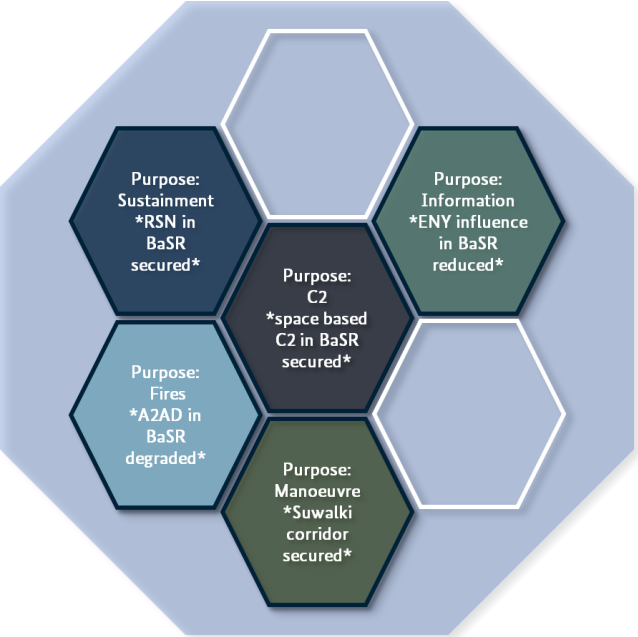
beyond sequencing in human machine teams

Applying

Same Language	Domain Excellence	Level Specific	Purpose Focussed	Aligned Roadmap
common understanding with cohesive **terms and definitions**	dominating domains and collaborating via **Joint Functions**	mission command with trust to empower for **SP3A - C2 rhythm**	X-domain planning derived from purpose of **orchestration**	adapt Force Design based on **agile exploration**

Terms + Meaning	Joint Functions	C2 rhythm	Solving Purpose	Force Design
↓	↗ ➢ # collaborate ➢ # organise	∞	⌇ ➢ # domain ➢ # joint function	∞
formalised representation				
↓	↓	/ plan **AI** ♫ - act \ eval	↓	/ linking **cloud** - data \ energy

Applying



*** MDTF: Multi-Domain Task Force**

modelling with focus on

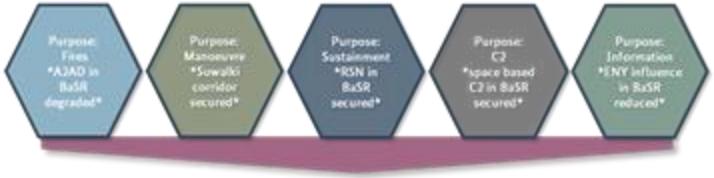
rationale for #solving purpose + #joint function
→
set up interdependent MDTFs* based on resources

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

Class`24 Result JUN 26



CA2X2 FORUM 2026

profiling MDTF

based on modelling of engagement spaces

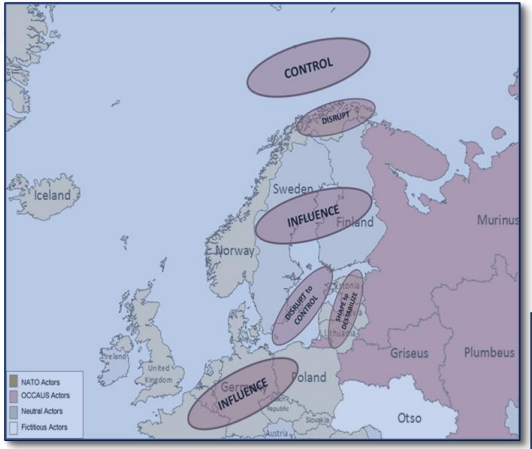
with FKIE to use AI

following step

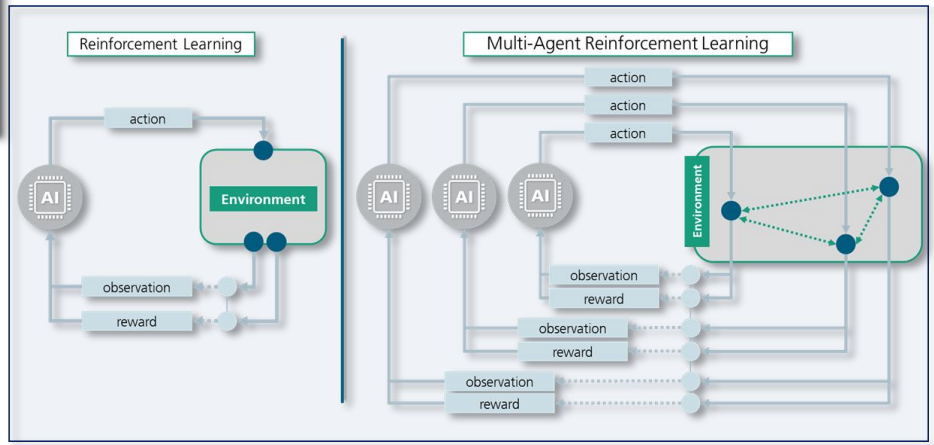
with FKIE is to use AI to design

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.



Fraunhofer
FKIE

solving + creating decision problems w/MDPs

Outlook

SHINE
The Continuum
2026

5 – 9 OCT
COVE
HALIFAX, CAN

NATO ACT Innovation Continuum

[...]

ADC
2027

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