

› **GETTING BATTLE LABS READY FOR MULTI DOMAIN OPERATIONS**

MAIN RESULTS AND DEVELOPMENTS WITHIN THE NLD MOD

LESLEY JACOBS (TNO), LCDR PASCAL ORDELMANS (RNLN) | LTCOL PETER VAN ONZENOORT (RNLAf), MAJ PETER GEURTS (GBADC) & LTCOL DESMOND LIBERG (JOINT IT COMMAND)

› PRESENTATION OUTLINE

GETTING BATTLE LABS READY FOR MULTI DOMAIN OPERATIONS

OVERVIEW OF BATTLE LABS IN THE NLD
THE MULTI DOMAIN OPERATIONS CHALLENGE
A NEW AND DIFFERENT ROLE FOR M&S
GETTING BATTLE LABS READY FOR MDO
MAIN TAKE AWAYS & WAY AHEAD

A Battle Lab is a combination of test capabilities brought together with operational end-users for the development or enhancement of operational concepts, procedures and/or operator training (NATO definition)

› OVERVIEW OF BATTLE LAB ACTIVITIES IN THE NLD



MARITIME BATTLE LAB

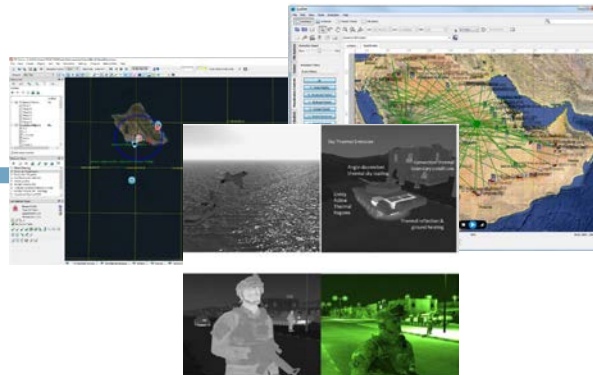


INTEGRATED AIR & MISSILE
DEFENCE BATTLE LAB



CLSK AEROSPACE
BATTLE LAB

JOINT BATTLE LAB
WORKING GROUP



SIMULATION BATTLE LAB

R&D FOR JOINT LITTORAL
OPERATIONS BATTLE LAB
COMPONENTS

MAIN OBJECTIVES FOR NLD BATTLE LABS

To support and enhance operational readiness of the Royal Netherlands Armed Forces

...with a flexible mission simulation environment that can be linked to other (inter)national LVC environments to explore, innovate, experiment, analyse, test, and train for all current and future operations.

KEY METHODS

CONCEPT DEVELOPMENT & EXPERIMENTATION

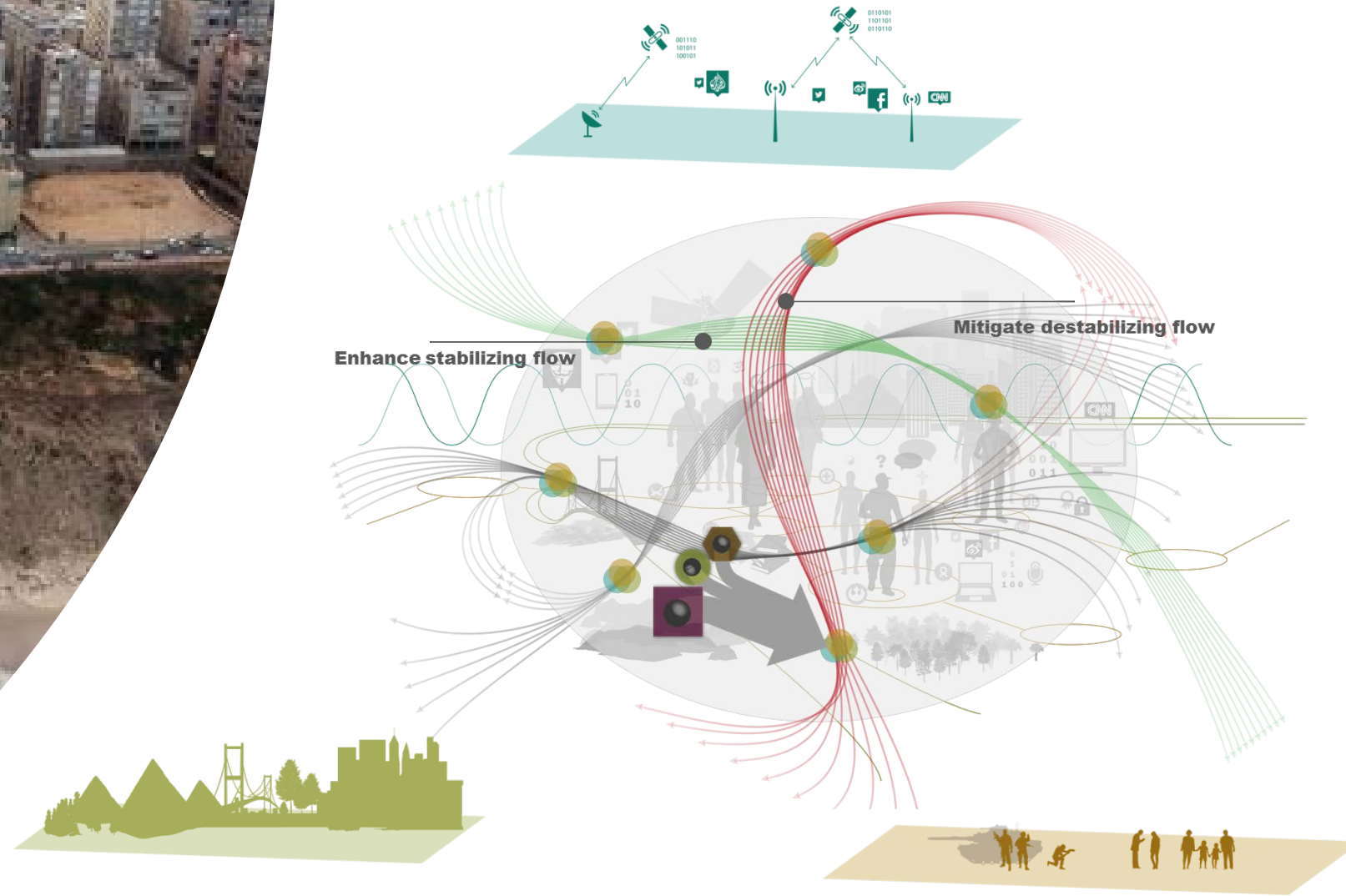
MODELLING & SIMULATION

OPERATIONS RESEARCH & ANALYSIS

MAIN DRIVER FOR CHANGE

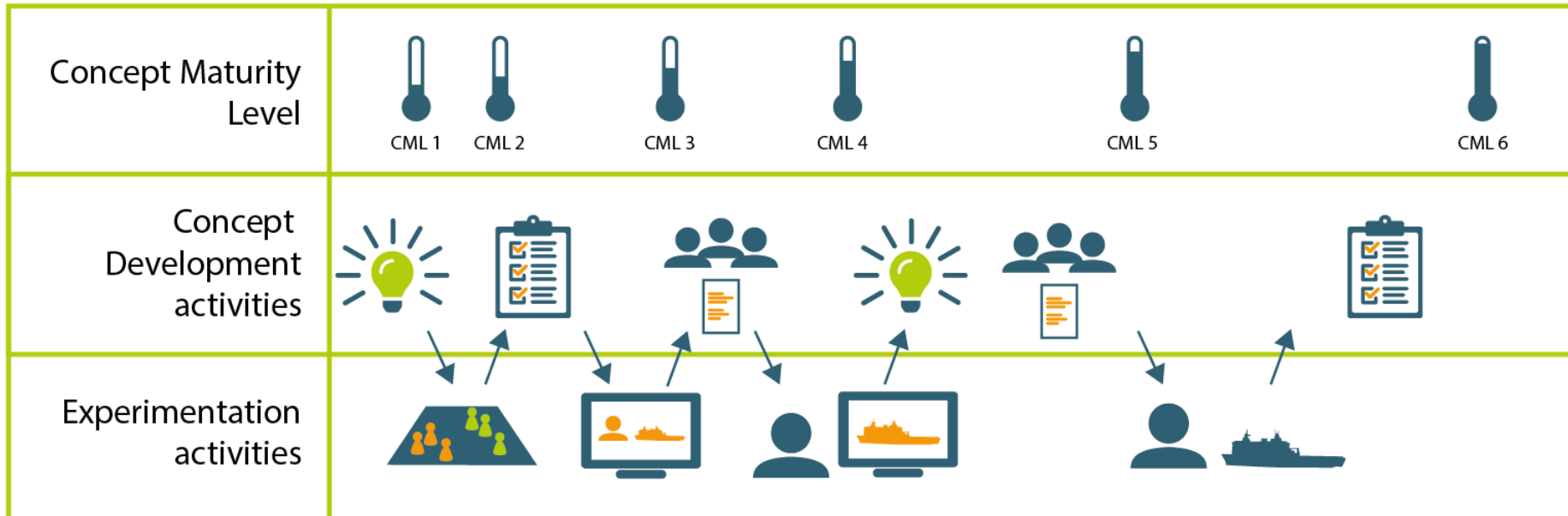


THE MULTI DOMAIN BATTLE SPACE



› CONCEPT DEVELOPMENT & EXPERIMENTATION FROM IDEA TO IMPLEMENTED CONCEPT




- › CD&E combines **Concept Development** with testing and validating these through **Experimentation** supported by Operational Analysis.
- › Concepts are iteratively developed via six **Concept Maturity Levels**.



Concept Development activities

-  Brainstorm
-  Evaluation
-  Expert panel

Experimentation activities

-  Virtual Analysis (table top/ war game)
-  Virtual Analysis (M&S)
-  Constructive Analyse
-  Live Analysis

› **GETTING BATTLE LABS READY**

WITH SYNTHETIC BATTLE SPACES THAT ARE FIT FOR VARYING PURPOSES

SOME APPROACHES:

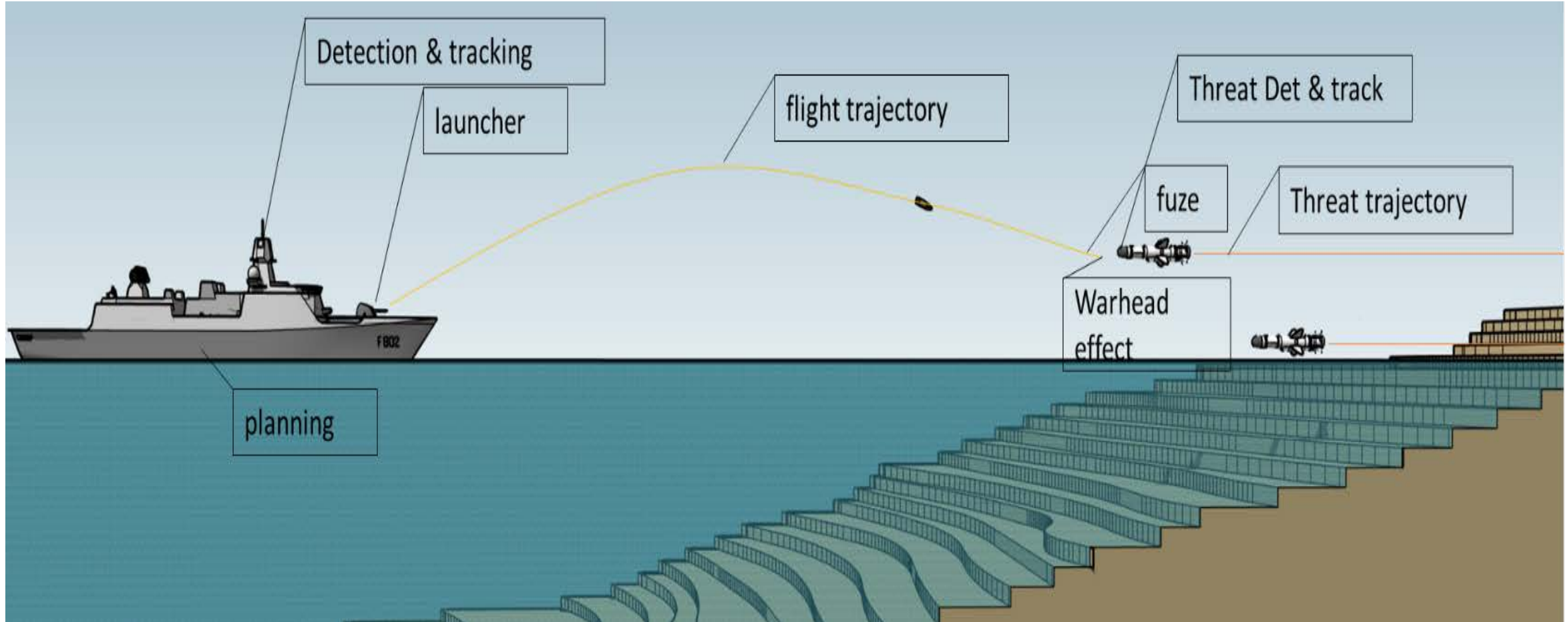
1. CHAIN ANALYSIS
2. FLOW ANALYSIS
3. MULTIPLE LAYERS ANALYSIS (INTEGRATION OF INFO OPS)
4. INTEGRATED WARFARE ANALYSIS (JLO BATTLE LAB R&D)

HOW TO:

- › USE or NOT TO USE AI SOLUTIONS ?
- › COME UP WITH WHITE BOX SOLUTIONS ?

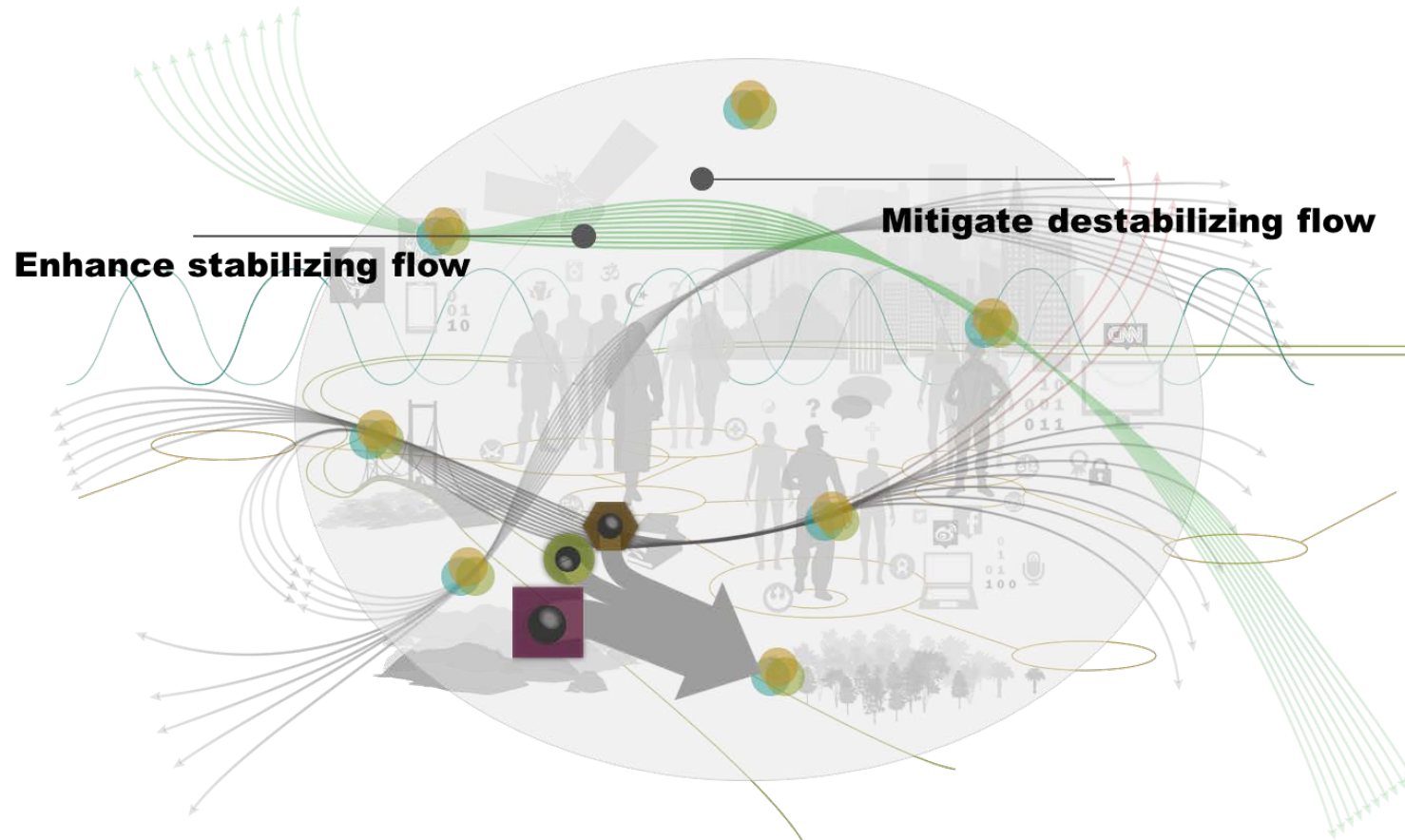
CHAIN ANALYSIS (EXAMPLE)

FROM SINGLE TO MULTIPLE SYSTEMS ANALYSIS



FLOW ANALYSIS (1)

Thinking in ecosystem, flows & resilience

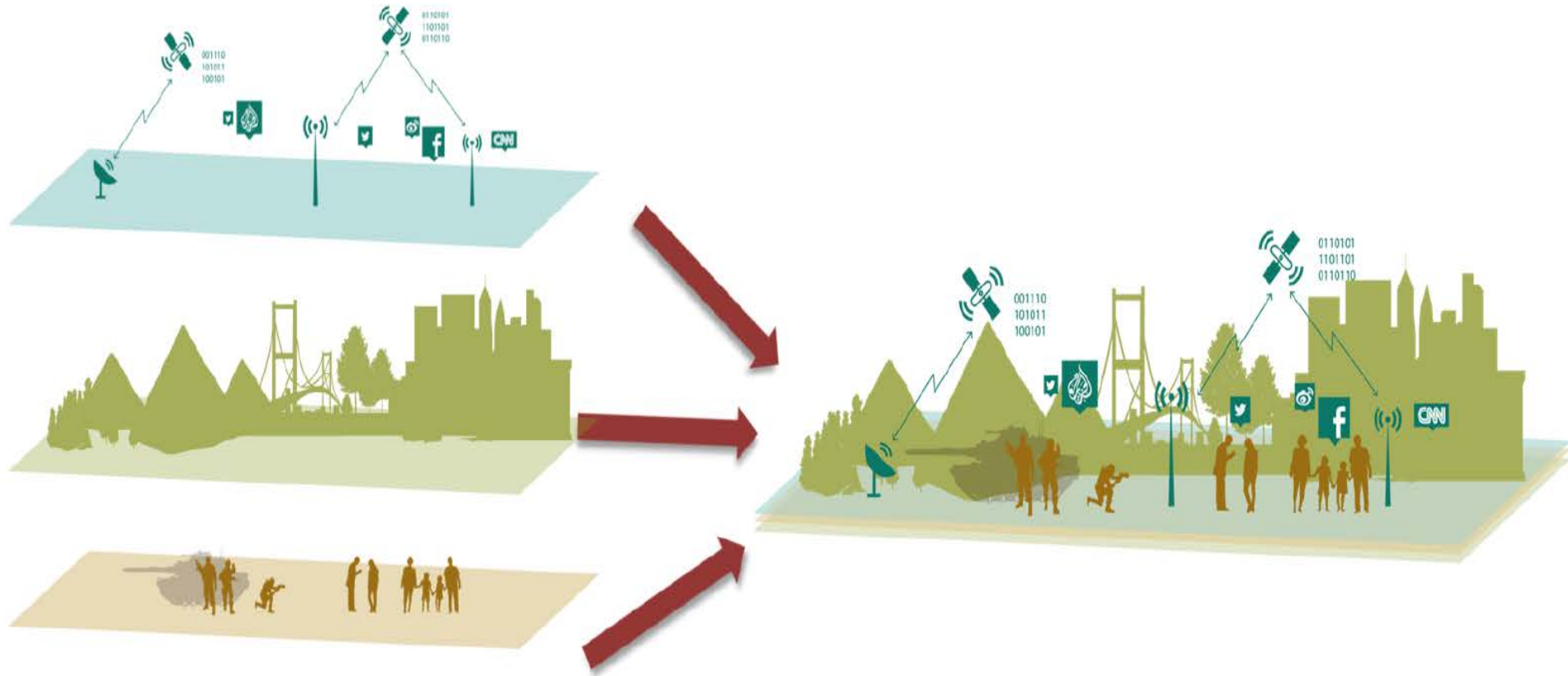


"Control by flow interdiction, not by occupation"

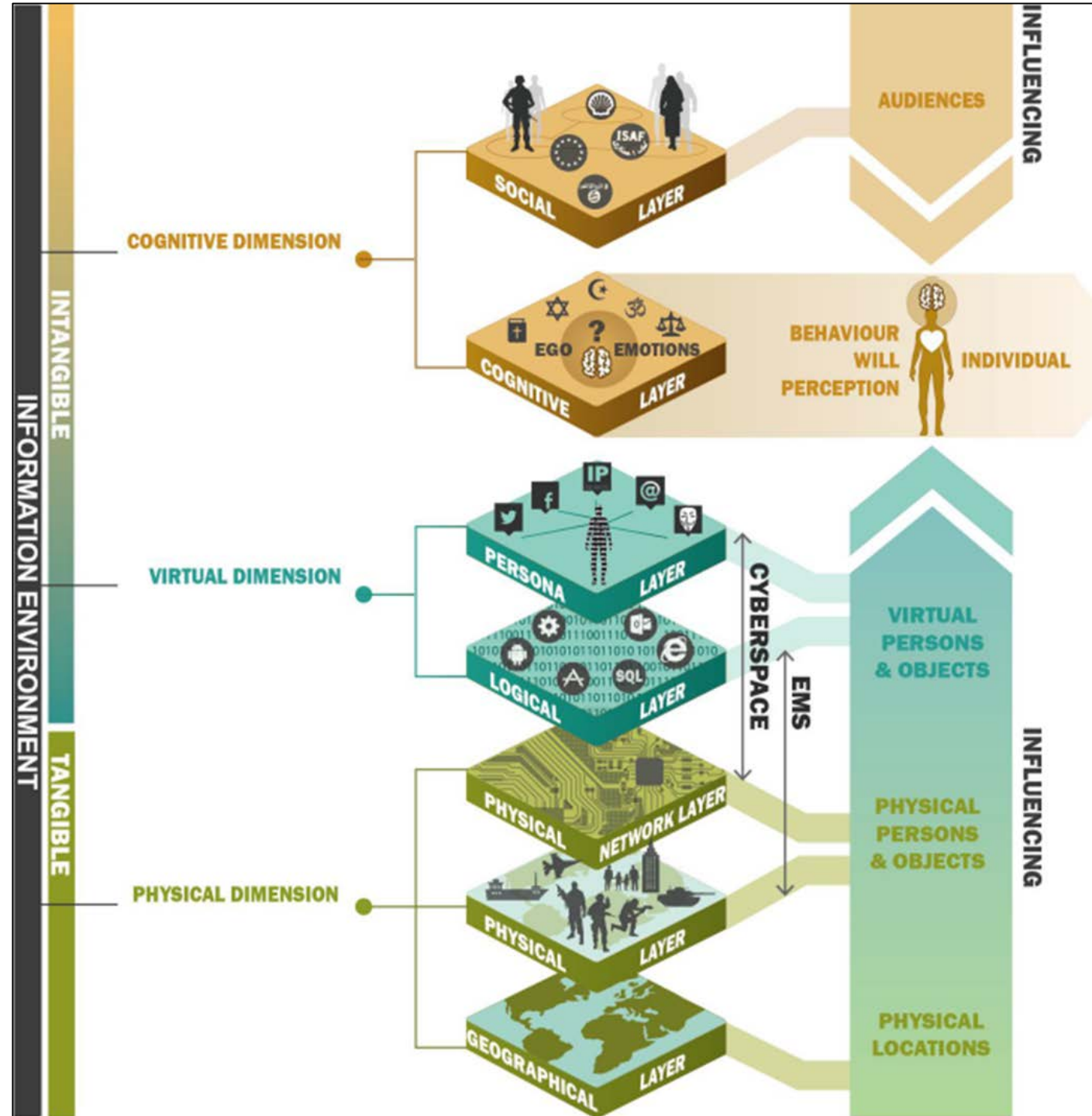
(RNLA, 2016, RNLN, 2019)

FLOW ANALYSIS (2)

HOW TO DELIVER MILITARY EFFECTS IN THREE DIMENSIONS ?



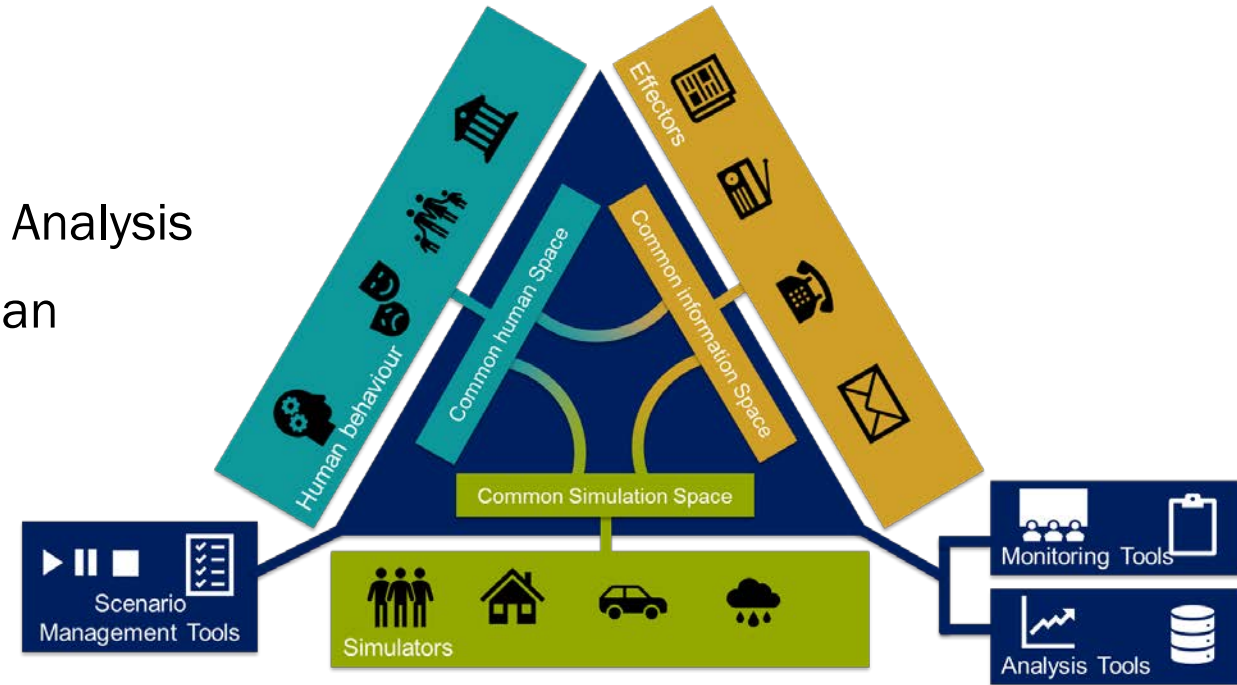
› MULTI LAYER ANALYSIS INTEGRATING INFO OPS



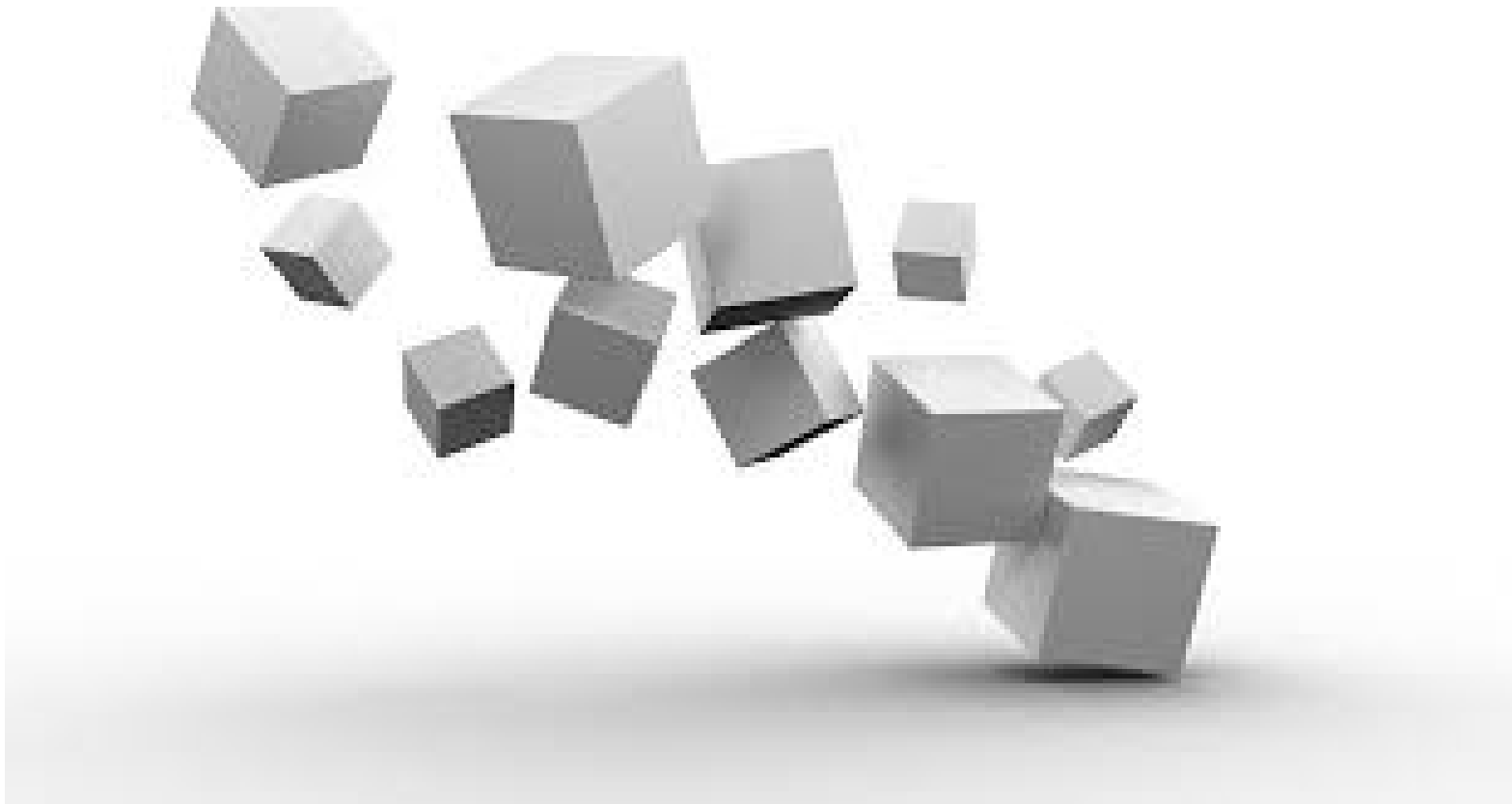
› R&D FOR INTEGRATED WARFARE ANALYSIS

JOINT LITTORAL OPERATIONS BATTLE LAB RESEARCH

- › Main objectives:
 - › Support Integrated Warfare Experimentation & Analysis
 - › In all dimensions: Physical, Information & Human
 - › Identify & Develop M&S components



› THE NEED FOR WHITE BOX SOLUTIONS TOWARDS FEDERATED CD&E AND BATTLE LABS



› CD&E

TAKE AWAYS

- › CD&E is an interdependent process. Meaning that close cooperation and mutual understanding between operational and research professionals is key.
- › CD&E is a difficult process to master. It takes time to gain sufficient knowledge, experience and skills to successfully prepare, execute, analyse and assess CD&E campaigns.
- › CD&E requires a significant amount of manpower, equipment and time. CD&E should be a dedicated activity in the annual planning in order to secure the aforementioned preconditions.
- › Above all, CD&E requires a mindset which requires a creative, risktaking (and accepting), open mindset. This applies to both participants in the experiments themselves as entities which are responsible for guidance and (pre)conditions.

› **OVERALL REFLECTION ON OUR RESEARCH**

TAKE AWAYS

› Multi Domain Operations require:

- › More extensive/integrated M&S, OR&A and CD&E efforts.
- › More joint MSG & SAS activities.

› Way ahead

- › From 'Chain Analysis' to 'Flow Analysis' and 'Integrated' Warfare Experimentation and Analysis.
- › Getting more 'White Box' solutions available.
- › Start working on Federated CD&E and Battle Labs.



› **THANK YOU FOR YOUR ATTENTION**

LESLEY.JACOBS@TNO.NL

TNO innovation
for life