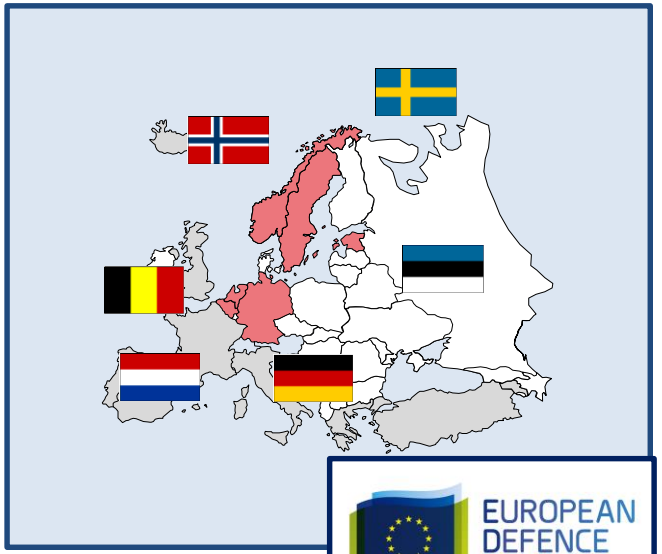
A BUSINESS CASE APPROACH FOR MARITIME MINE COUNTERMEASURES CAPABILITY REPLACEMENT

Dr. R. van Vossen

TNO innovation for life

OBJECTIVES AND SCOPE



OBJECTIVES

- Prepare the development and subsequent procurement of the future Maritime Mine Counter Measures capabilities
- Investigate cost-effective solutions for future MMCM and explore potential for common way ahead

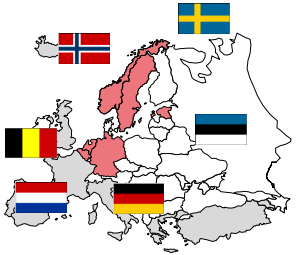
SCOPE

- The solution scope is limited to the **M**ateriel component of the future capability

EDA MMCM-NG PROCESS

- **WORKSHOPS**

- **MIXED EXPERTISE TEAM**
  - Scientific and technical across different domains
  - Operational
  - Financial
  - Government/private
  - Multi-national



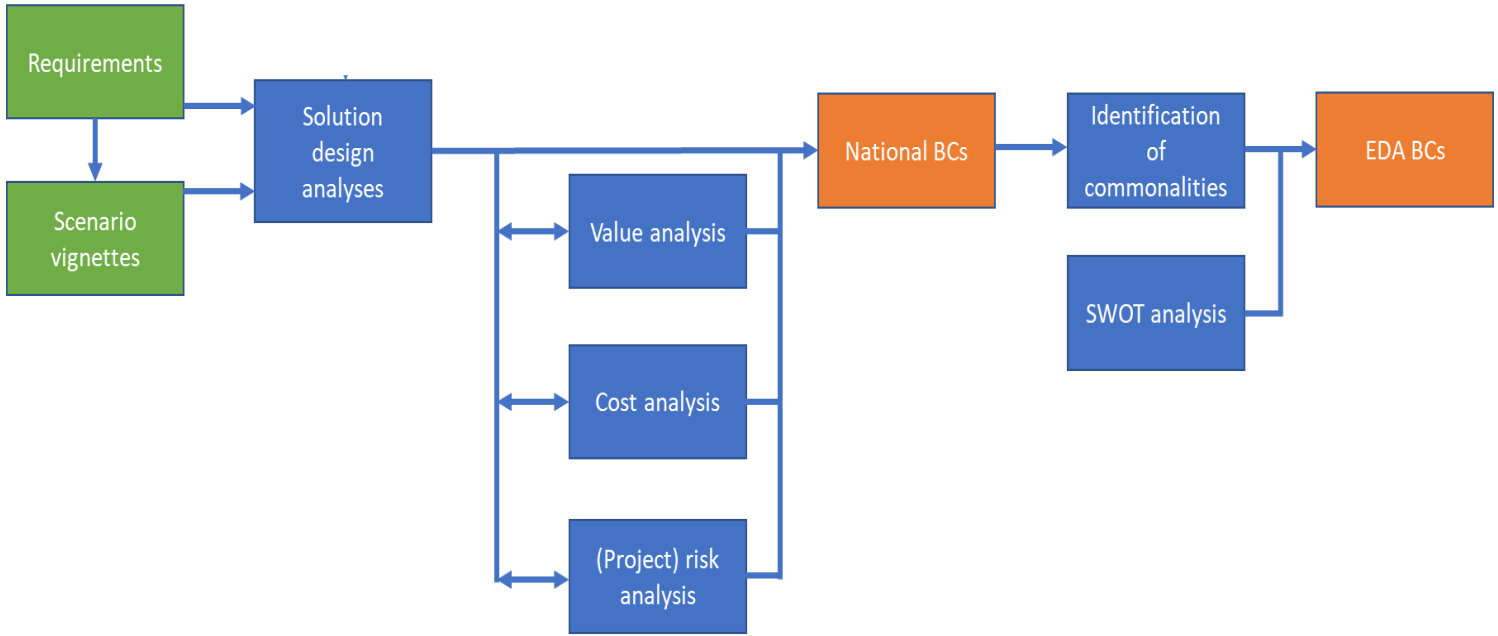
FFI Forsvarets forskningsinstitutt
Norwegian Defence Research Establishment

FOI

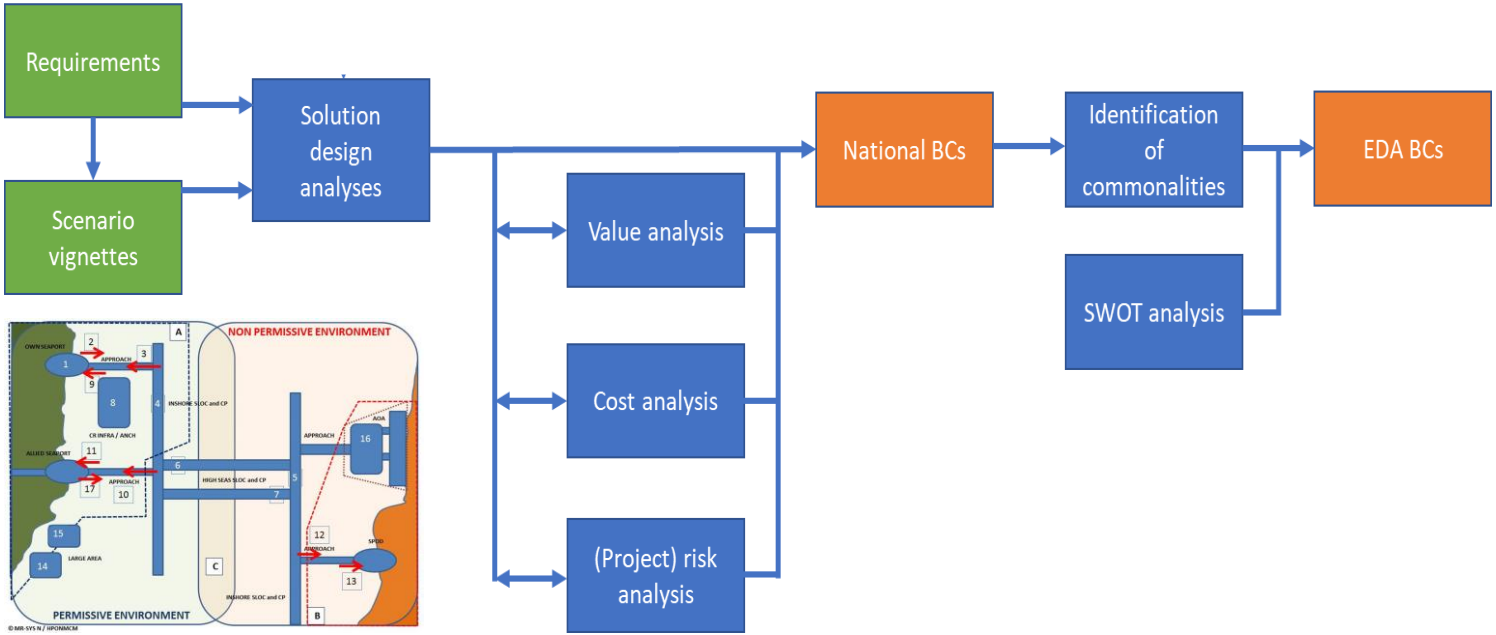
MTG MARINETECHNIK INDEPENDENT NAVAL CONSULTANTS

TNO innovation for life

EDA MMCM-NG APPROACH



EDA MMCM-NG APPROACH



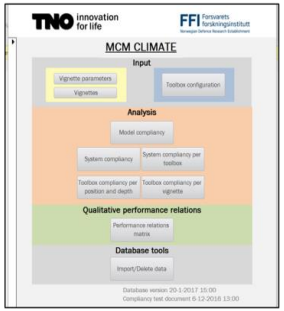
EDA MMCM-NG APPROACH

Requirements

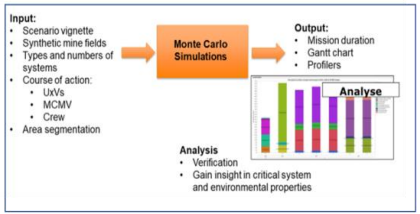
Scenario vignettes

Solution design analyses

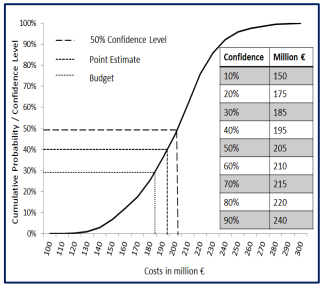
CLIMATE-I



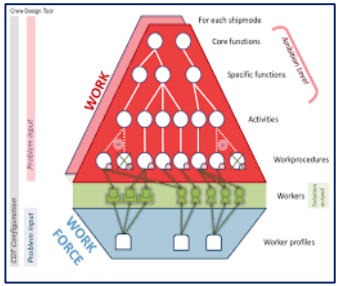
CLIMATE-II



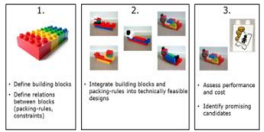
Cost Analysis



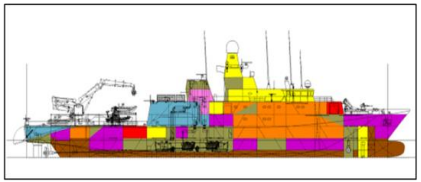
Crew design



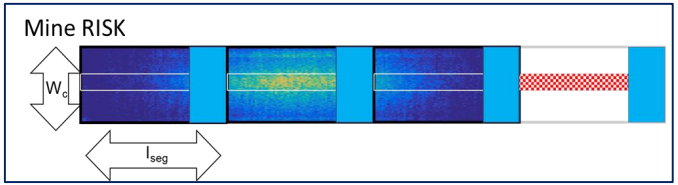
PLATFORM Statistical design models



PLATFORM Numerical & specific design models



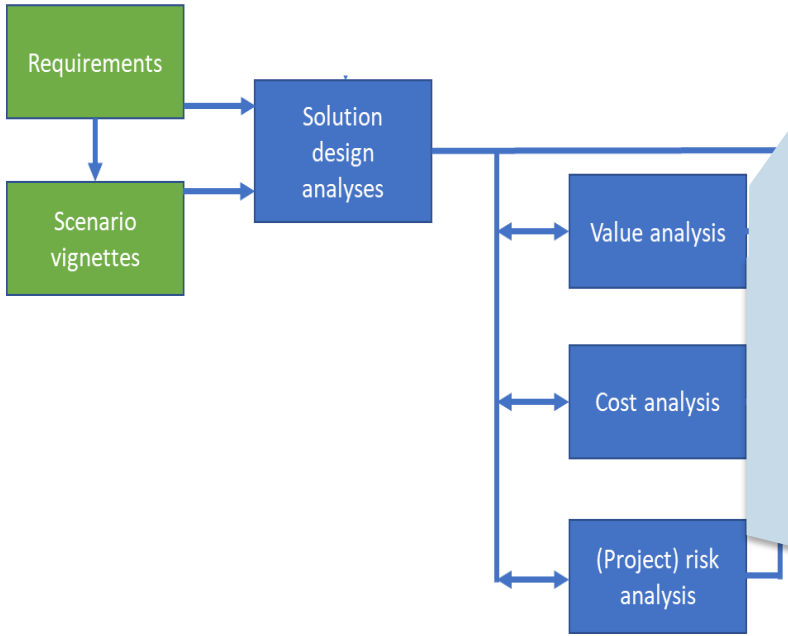
Mine RISK



C

(Project) risk analysis

EDA MMCM-NG APPROACH

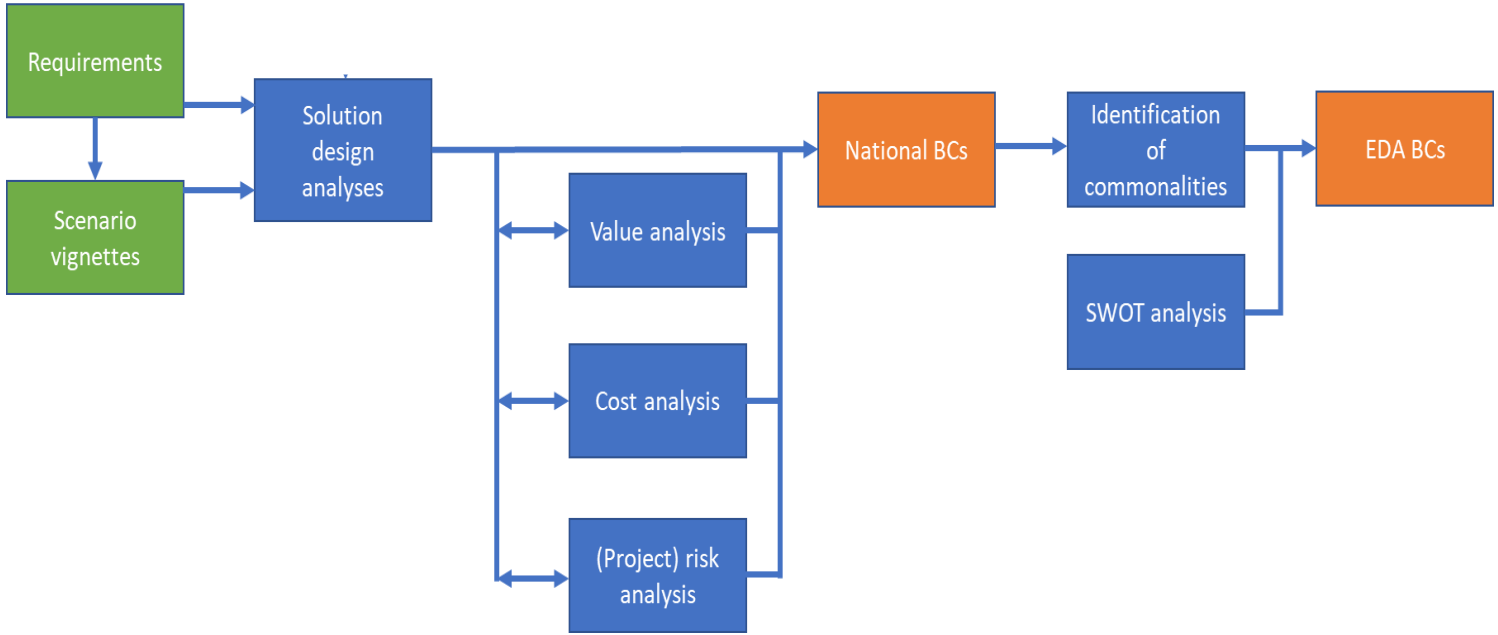


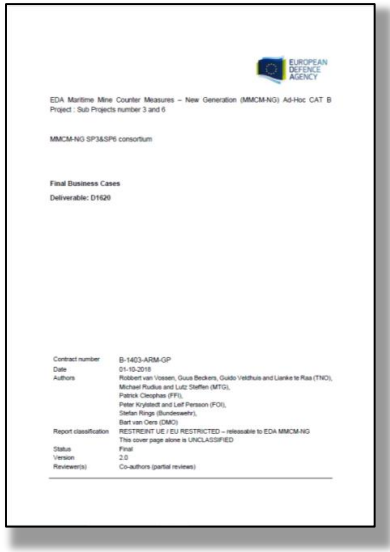
VALUE
- Effectiveness
- Efficiency
- Survivability
- Operability in different environments (waves)
- Resilience

COST
- Platform
- Toolbox

PROJECT RISK
- Technical
- Programmatic
- Integration

EDA MMCM-NG APPROACH




EDA Maritime Mine Counter Measures – New Generation (MMCM-NG) Ad-Hoc CAT B Project : Sub Projects number 3 and 6

MMCM-NG SP3&SP6 consortium

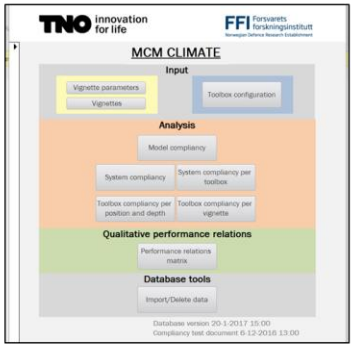
Final Business Cases

Deliverable: D1620

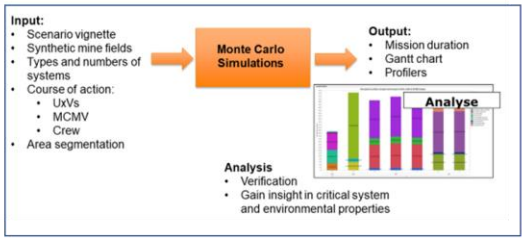
Contract number B-1403-ARM-GP
Date 01-10-2018
Authors Robbert van Vossen, Guus Beckers, Guido Veldhuis and Lianke te Raa (TNO), Michael Rudius and Lutz Steffen (MTG), Patrick Cleophas (FFI), Peter Krystedt and Leif Persson (FOI), Stefan Ringe (Bundeswehr), Bart van Oers (DMO)
Report classification RESTREINT UE / EU RESTRICTED – releasable to EDA MMCM-NG This cover page alone is UNCLASSIFIED
Status Final
Version 2.0
Reviewer(s) Co-authors (partial reviews)

EDA MMCM-NG TOOLING

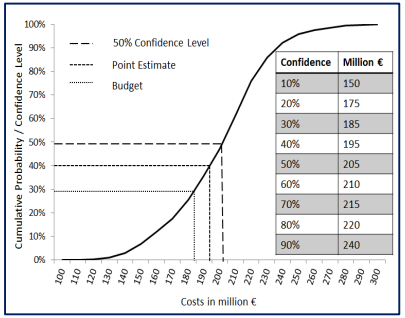
CLIMATE-I



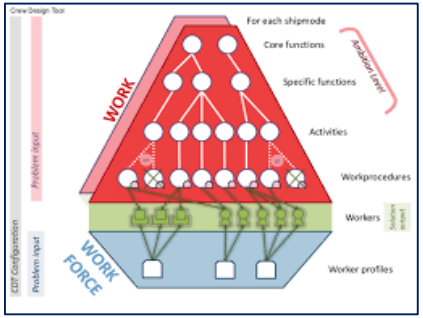
CLIMATE-II



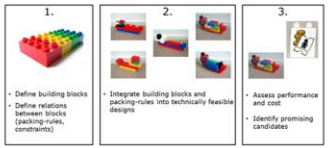
Cost Analysis



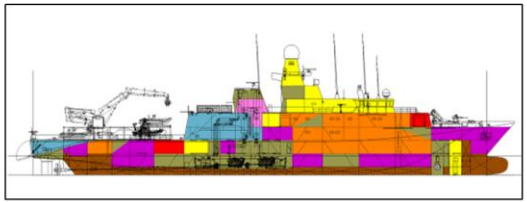
Crew design



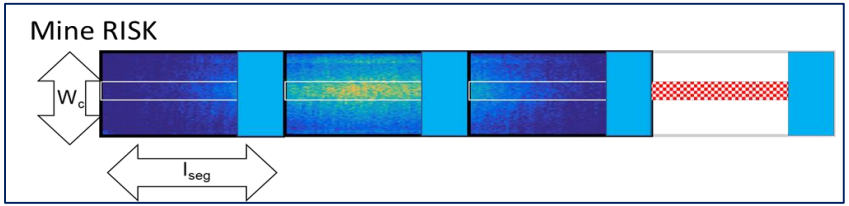
PLATFORM Statistical design models



PLATFORM Numerical & specific design models

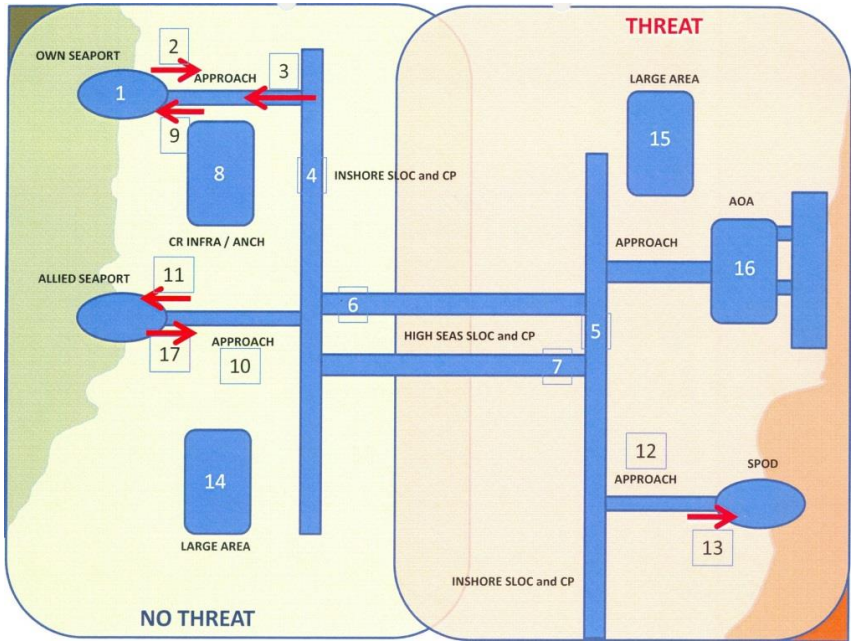


Mine RISK

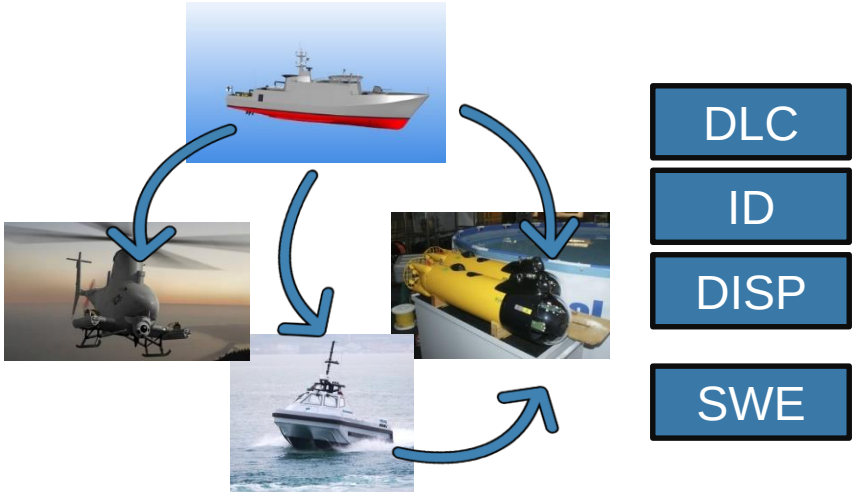


CLIMATE-I: CAPABILITIES, LIMITATIONS AND MATURITY OF TECHNOLOGY

Diversity of scenario vignettes



1) Which types of systems are suitable
2) Which combinations deliver an MCM capability ?



R. Van Vossen et al., UDT 2017

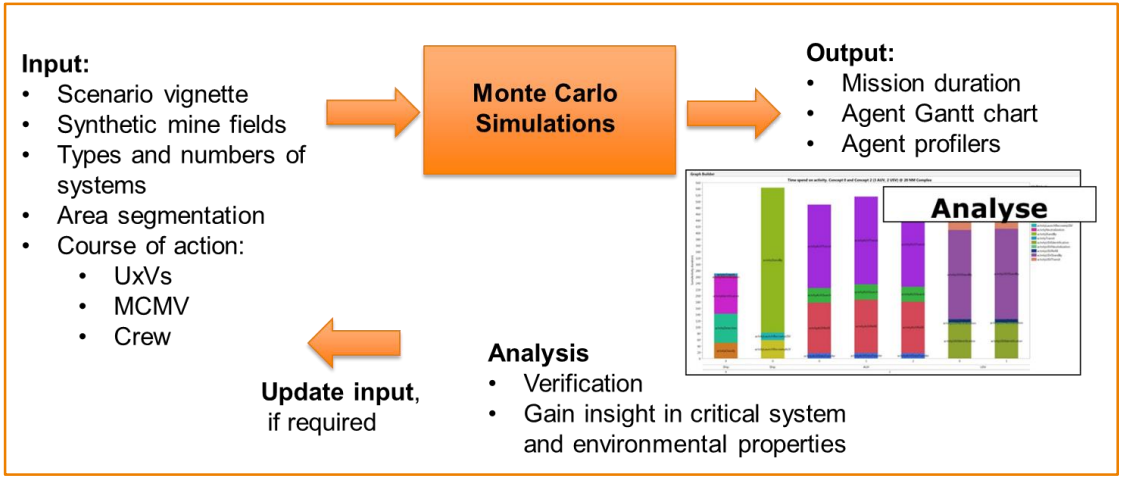
CLIMATE-II: EFFECTIVENESS AND EFFICIENCY

Objective:

- Gain insight in types and numbers of MMCM systems that are needed to meet requirements in terms of effectiveness and efficiency

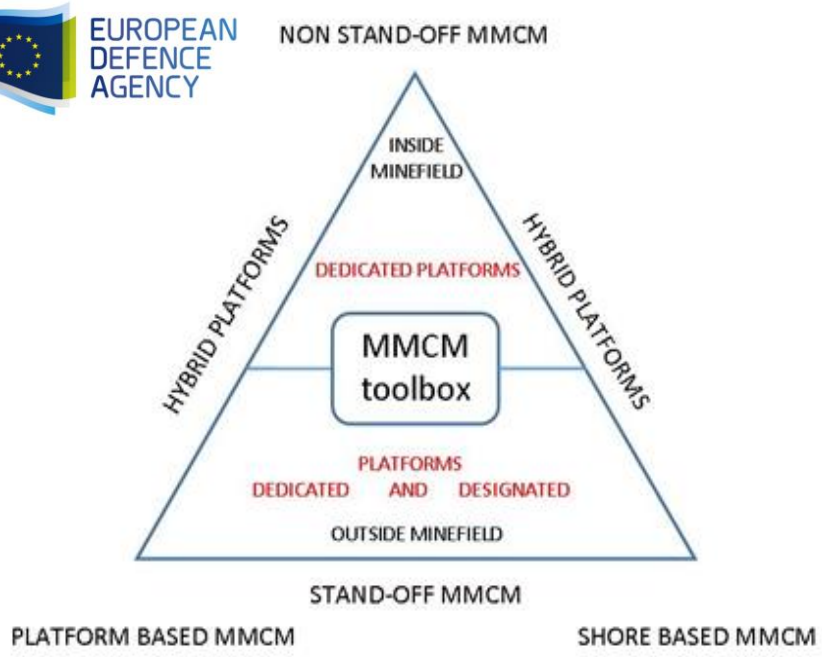
Context:

- Types and numbers of systems determine:
  - Design for MCMV
  - Cost
  - Crew design
  - Operational effect



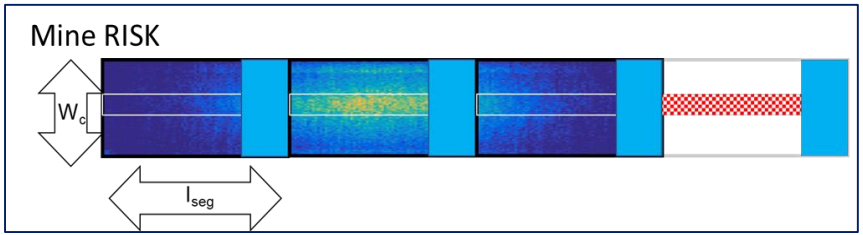
R. Van Vossen et al., UDT 2018

MINE RISK ASSESSMENT



- **New MCM concepts are being introduced:**
  - What is the risk for a stand-off MCMV?
  - What is the risk to unmanned systems?
  - What is the risk for follow-on traffic?

- **Activities:**
  - Signature measurements for UxVs
  - Statistical risk assessment studies



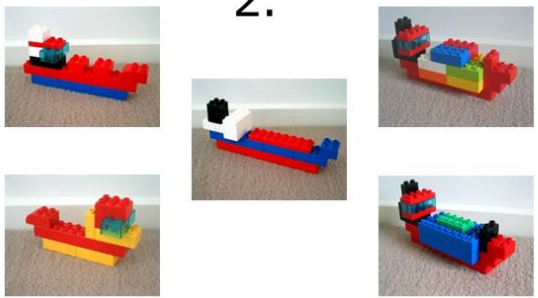
PLATFORM DESIGN

- **Provide insight**, **for a range of mothership alternatives** of interest, how different requirements, e.g. impact the design of the mothership and its (relative) cost, with respect to: UxV's, platform requirements, crew size survivability, SEWACO-suite

1.

- Define building blocks
- Define relations between blocks (packing-rules, constraints)

2.



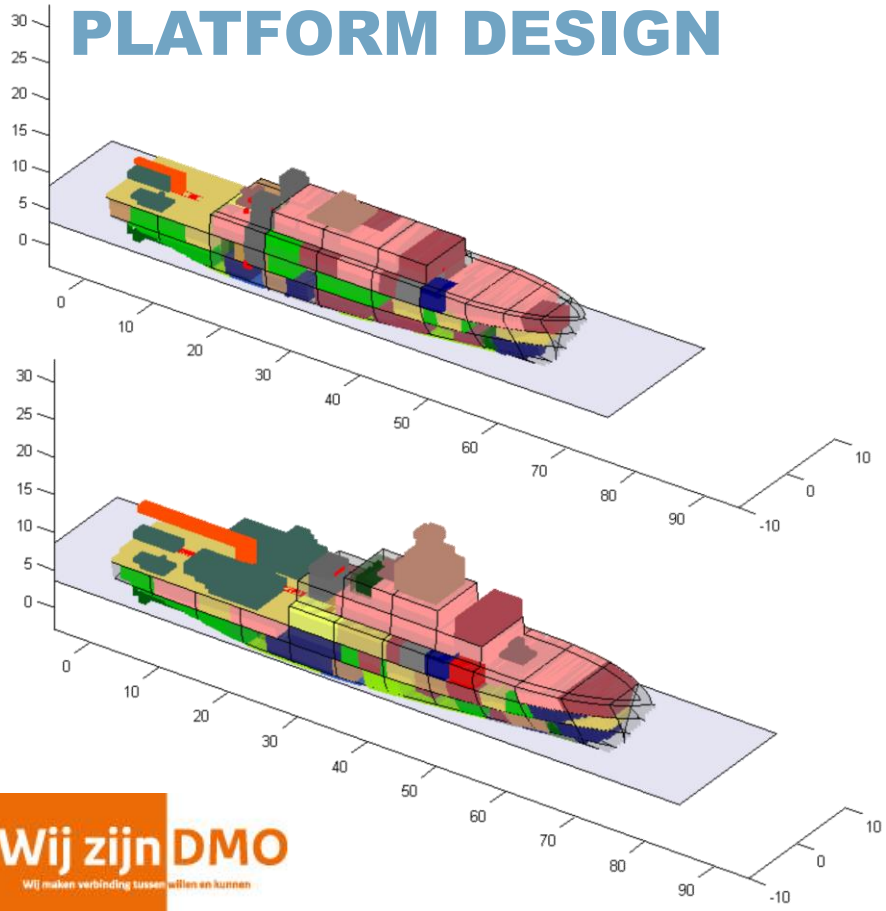
- Integrate building blocks and packing-rules into technically feasible designs

3.

- Assess performance and cost
- Identify promising candidates

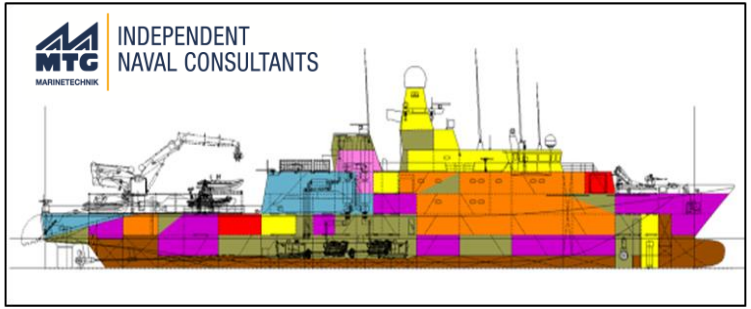
Wij zijn DMO
Wij maken verbinding tussen willen en kunnen

PLATFORM DESIGN



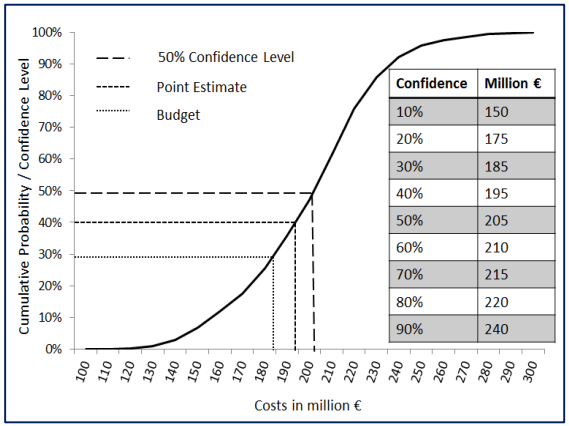
- **Approach:**
  - Conceptual designs
  - Numerical designs & specific design models

PLATFORM Numerical & specific design models



COST STUDIES AND ANALYSIS

- **Platform costs:**
  - MTG and DMO cost estimates
- **Toolbox costs**



Confidence	Million €
10%	150
20%	175
30%	185
40%	195
50%	205
60%	210
70%	215
80%	220
90%	240

1. Platform:

+ 2. SeWaCo/Payloads:

+ 3. Non-recurring costs

- Design and Engineering
- Management
- Software
- Logistics
- Tests
- Documentation
- ...

= 4. Total system price

CREW DESIGN

Objectives:

- Gain insight in crew size and composition
- Gain insight into the tasks that make up the basic MCM function and its modules (AUV/USV)
- Gain insight into the necessary competencies the crew
- Gain insight in consequences of automation

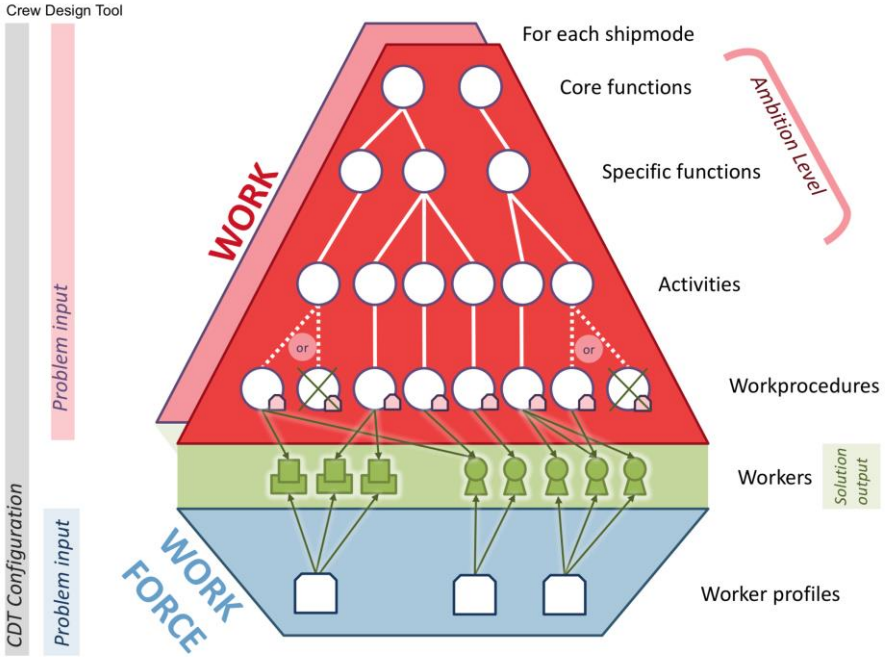
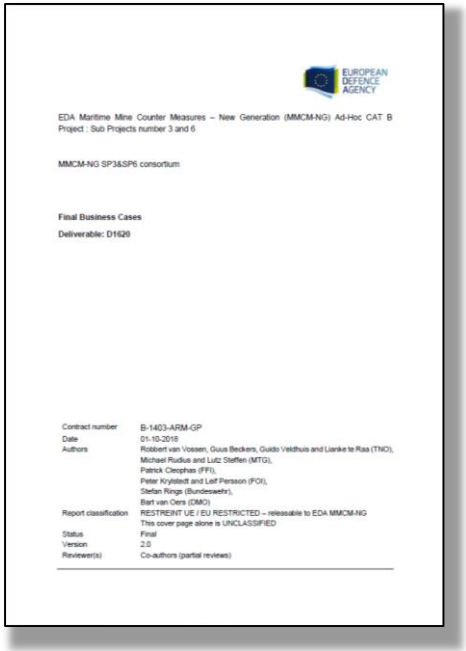


Figure 1 Datamodel of Crew Design Tool

SUMMARY

- This briefing provided an overview of tooling and some results of EDA MMCM-NG studies
- Tooling has been used for EDA MMCM-NG Business Case development
- Business cases are generated for:
  - GER,
  - NOR,
  - SWE
  - NLD



EUROPEAN DEFENCE AGENCY

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Project : Sub Projects number 3 and 6

MMCM-NG SP3&SP6 consortium

Final Business Cases

Deliverable: D1620

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Report classification	RESTREINT UE / EU RESTRICTED – releasable to EDA MMCM-NG This cover page alone is UNCLASSIFIED
Status	Final
Version	2.0
Reviewer(s)	Co-authors (partial reviews)

BUSINESS CASES

- **Business case:** key decision support document in which the substantiated benefit of taking a decision on the way ahead is outlined

- Leads to national choices of platform + toolboxes, based on multi(national) needs, requirements and budgets (and collaboration ambitions):
  - Joint procurement
  - Further Defence cooperation
  - Joint research

VALUE
- Effectiveness
- Efficiency
- Survivability
- Operability in different environments (waves)
- Resilience

COST
- Platform
- Toolbox

PROJECT RISK
- Technical
- Programmatic
- Integration