

# Observations on the use of Modelling and Simulation for Advanced Planning in NATO

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# Centre for Maritime Research and Experimentation

CMRE is an established, world-class scientific research and experimentation facility located in La Spezia (ITA).

NATO facility

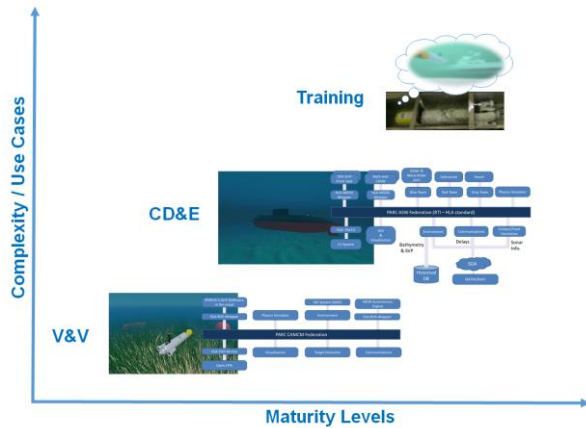


# Modelling and Simulation (M&S) at CMRE

Support the different Programmes of Work at the Centre and investigate innovative M&S approaches and solutions.

## Research & Technology (mainly maritime)

Adoption of M&S in the different phases of the life cycle of manned and autonomous systems at sea.



## Consultancy & Analysis (multi-domain)

Identification and definition of future trends and requirements for M&S in NATO and in the Member States.

### Evaluation of NATO M&S use for Training



### M&S for Analysis of scenarios



**Enabling Technologies**

- Standards & Interoperability**: ROS, SOCS, Popen, STANAG, NEB, XML, AUS, YARP, JCSOIN, TDL, NRP, DSS, ORCOS, SOA, SMPLE, C-SML, TENA, DS, CTA, HLA
- Live, Virtual and Constructive Simulation**: [Image of simulation environment]
- Augmented Reality**: [Image of AR application]
- Serious Gaming**: [Image of gaming interface]

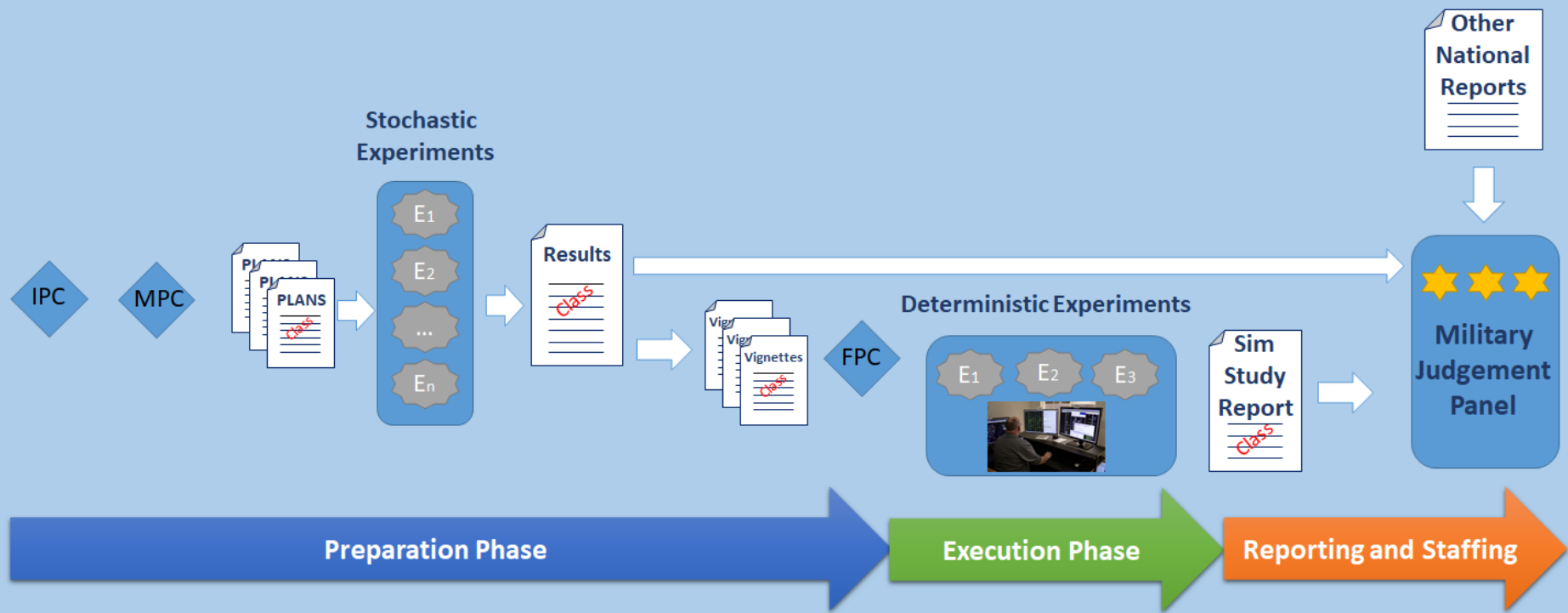
## Introduction and Background

- New (Old ?) Challenges
- New NATO planning capability

Question: “Are we able to tackle the new challenges?”

Answer: “Use Simulation to better inform the decision makers”

# Observed Process

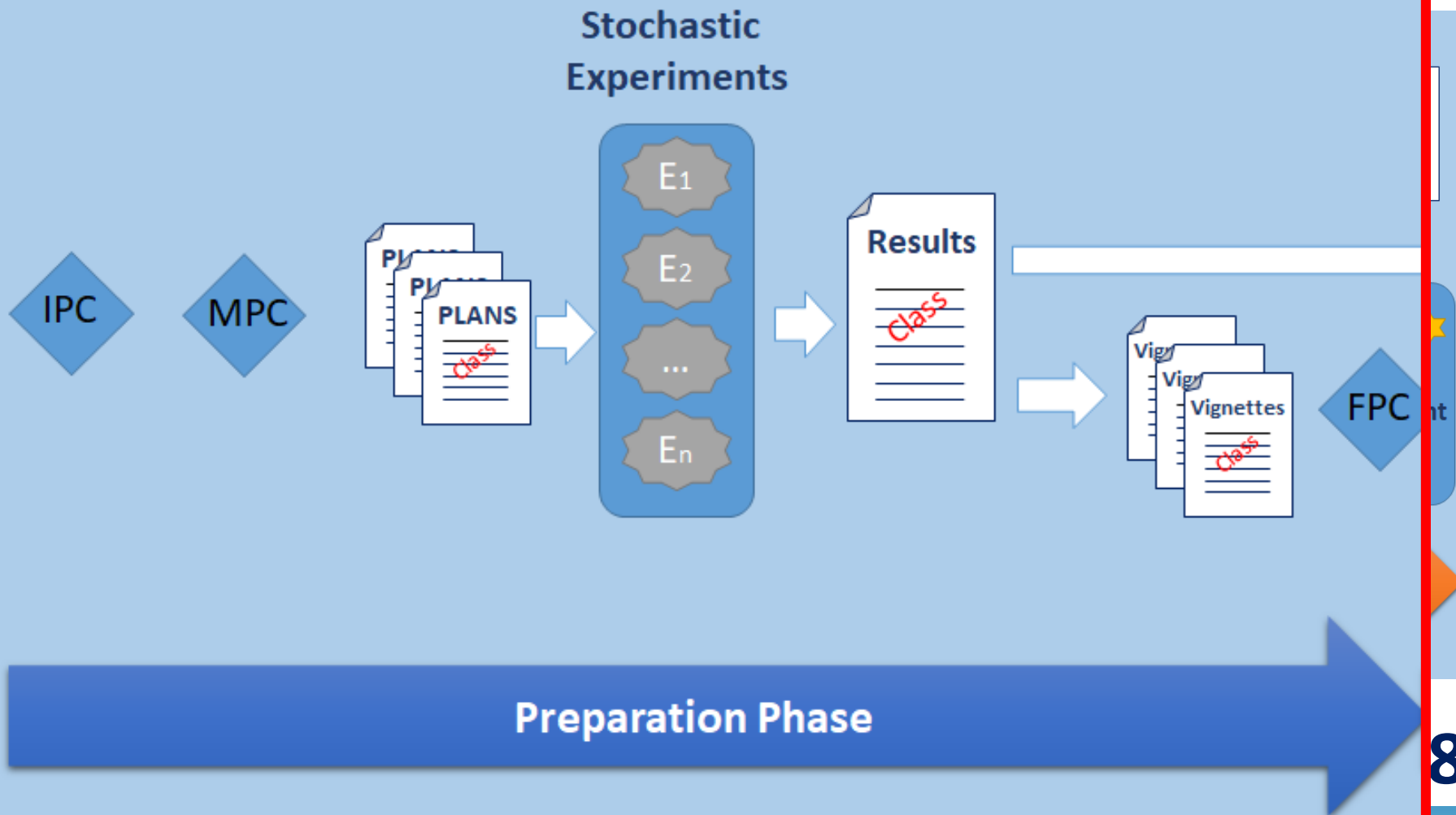


2017

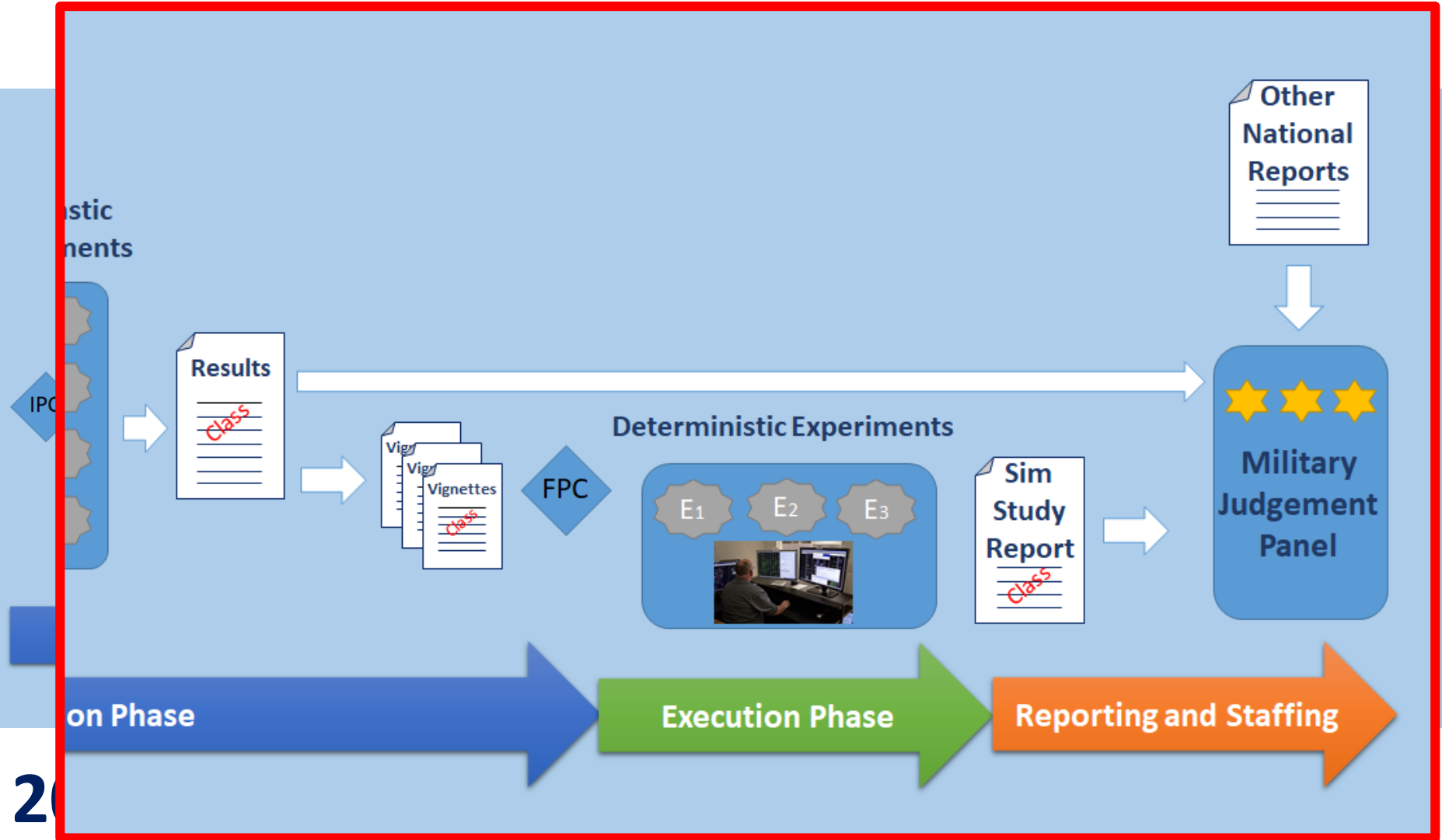
observe, collect notes, propose best practices

2018

# Observed Process (2)



# Observed Process (3)



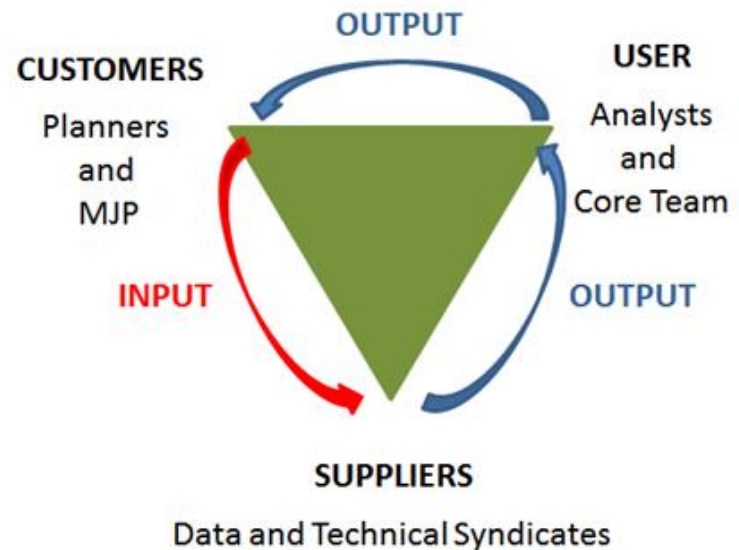
## 5 Areas of Best Practices

- **Stakeholders**            the human in the loop
- **Culture**                    what we know and think
  
- **Material**                    simulators and other tools
- **Data**                         feed of the process
  
- **Process**                     how we work



# Stakeholders

- Identify and support the customer
- Encourage the multi-cultural approach
- Facilitate the human interaction
- Information flow

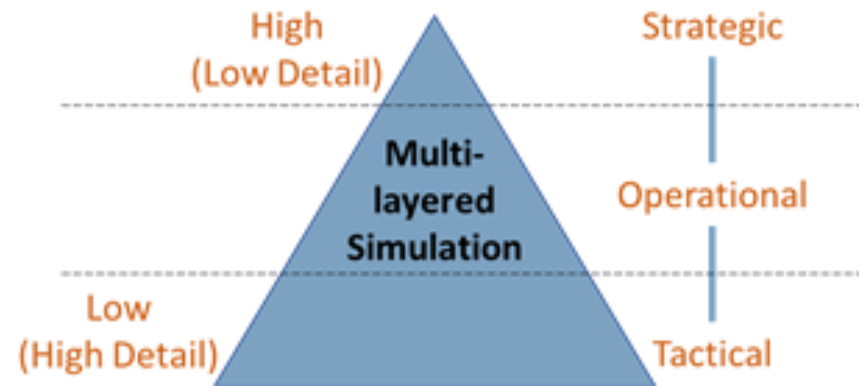


# Culture

- **Education on M&S**
- **Setting the expectations**
- **Planning to test and not necessarily to win**

# Materiel

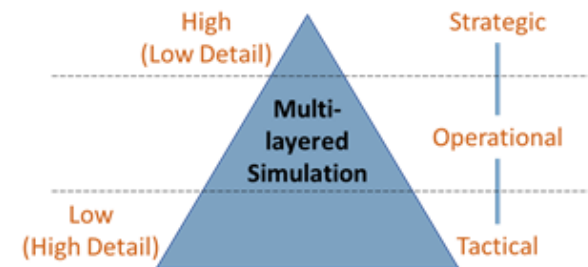
- Improvements on the usage of existing tools and acquisition of new ones
- Capability to run multi-level simulations



- Event Management

# Data

- **Maintenance, improvement and availability of the database**
- **Manage the level of detail of data**
- **Manage aggregated data**



# Process

- **Develop specific doctrine for M&S based decision making process**
- **Planning the resource allocation**
- **Organization of the experiment**

# Conclusions

- **1<sup>st</sup> Time in NATO!**
- **Focus on Human and Culture**
- **Which Simulation? How to use it?**
- **Better use Data**
- **New processes and doctrines**

# Questions?

"I know that I know nothing"

Socrates

(Σωκράτης)

(470 – 399 BC)