



Designing Dynamic Distributed Cooperative Human-Machine Systems

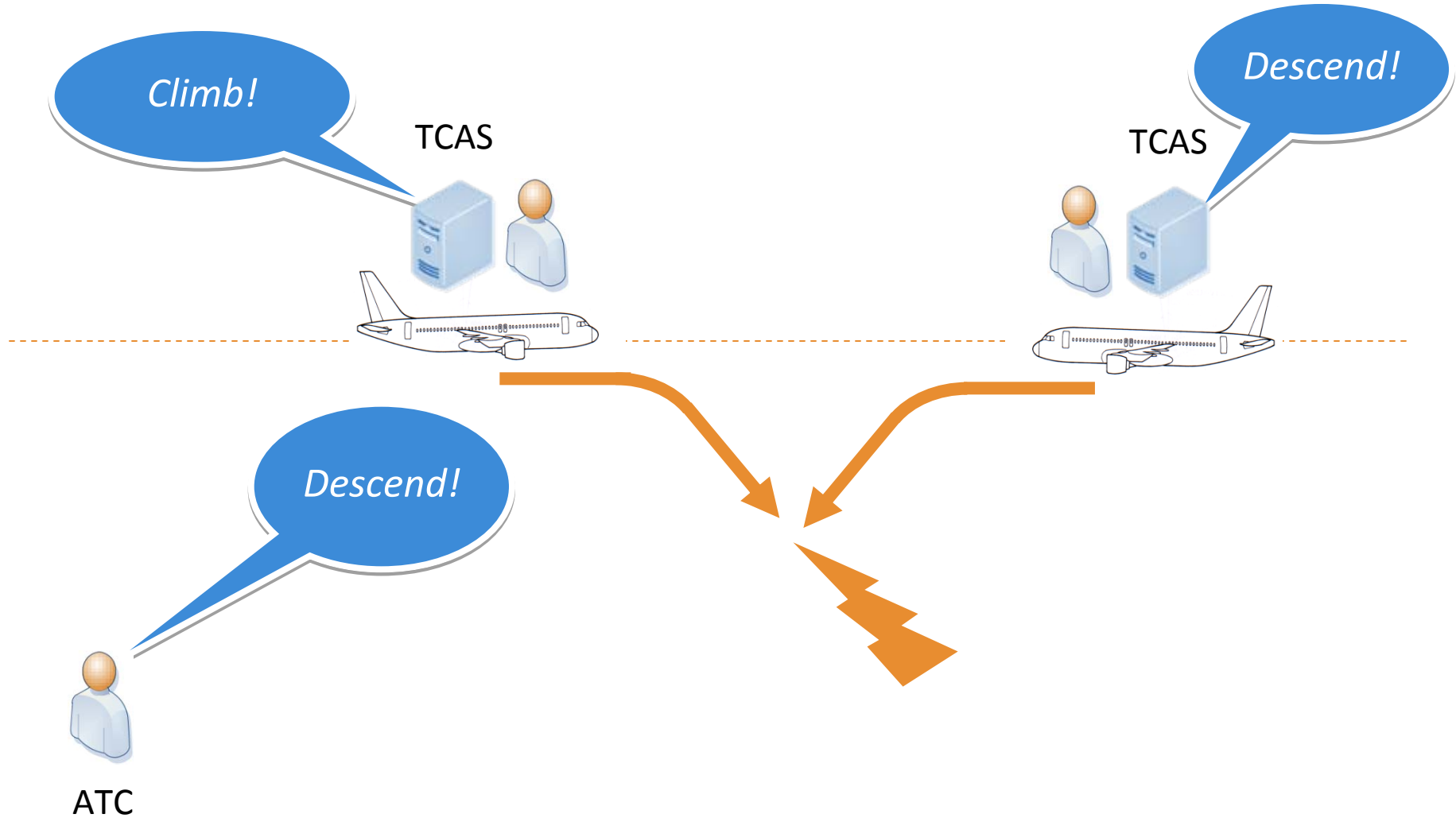
Artemis Summer Camp June 2012
Catherine Ronfle-Nadaud



1. Motivation
2. Methods, Techniques and Tools for Cooperative Systems
3. Demonstrators
4. Conclusion

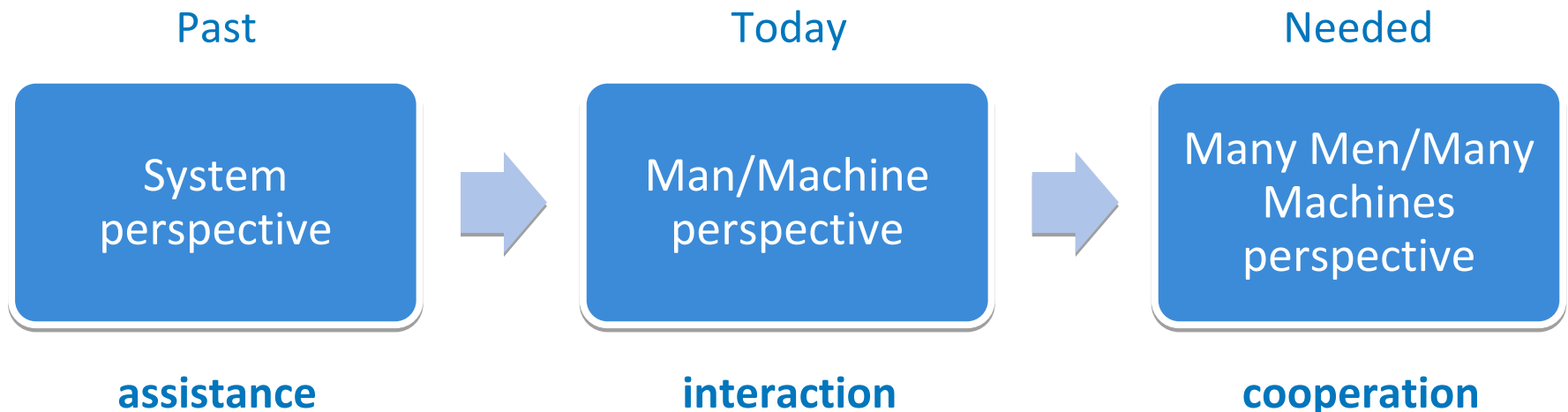
- Transportation as Key Factor for Human Societies
- Density of Traffic : Rising.
- Human-Machine Interaction: Error-Prone.





Automation design for such **complex situations** needs to involve **all actors: machines and humans!**

They have to be designed as **teams** with mutual **understanding of the situation** and their plans, capabilities and limitations.





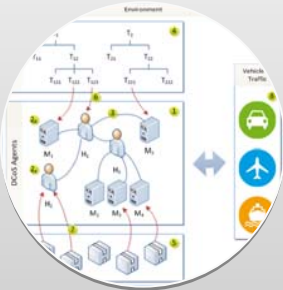
2. METHODS, TECHNIQUES & TOOLS



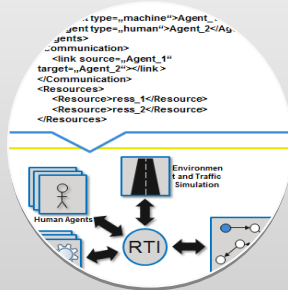
Definitions :

- **Methods** are rules, procedures, steps to be followed to solve problems or to design a system;
- **Technique** is an instantiation of one method;
- **Tools** are concrete implementations in terms of software or hardware.

Objective: To support DCoS development in the four industrial steps: **requirements capturing, specification, development, evaluation.**



Framework



Modeling & Simulation



State Inference & Adaption

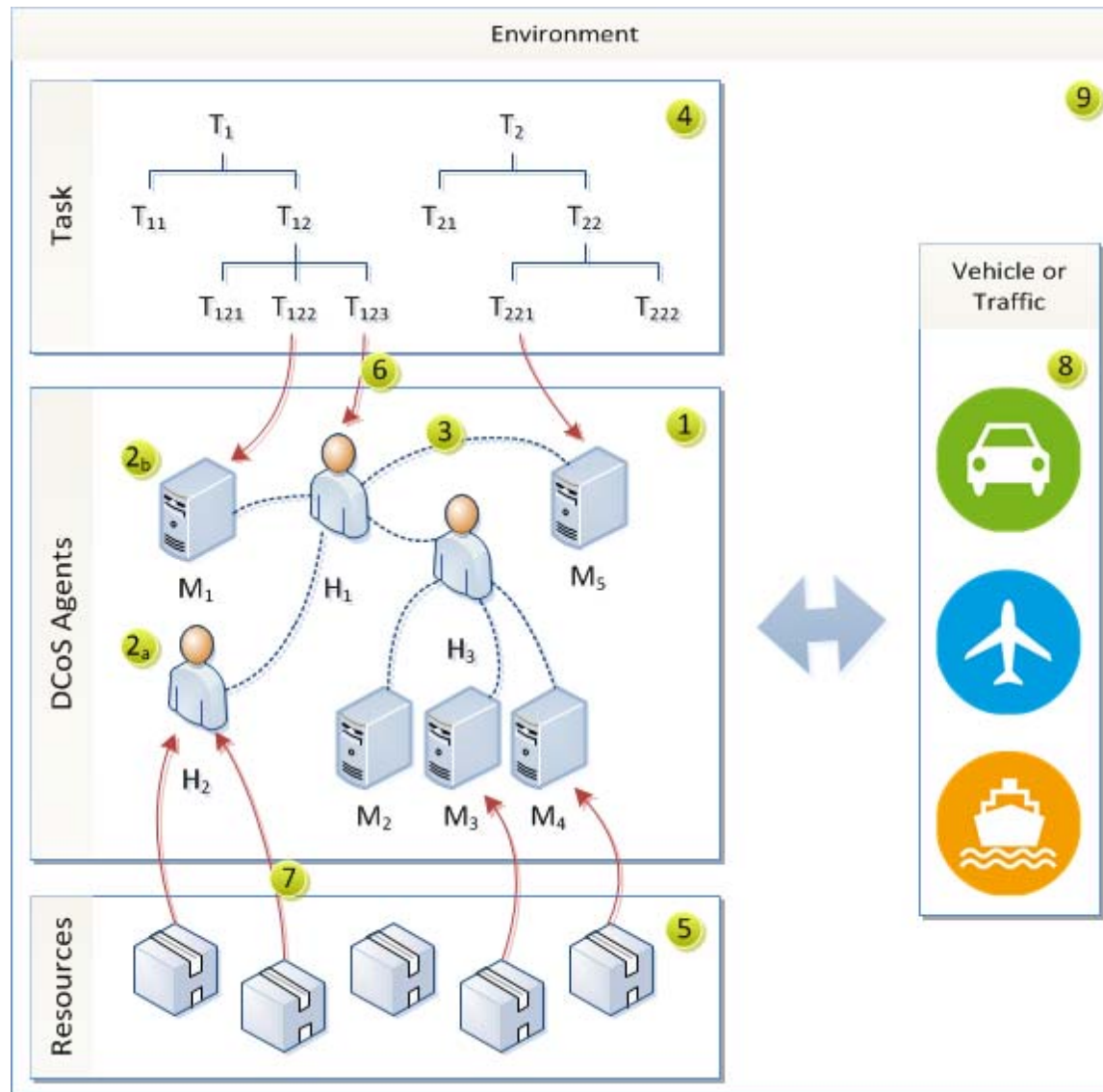


Interfaces

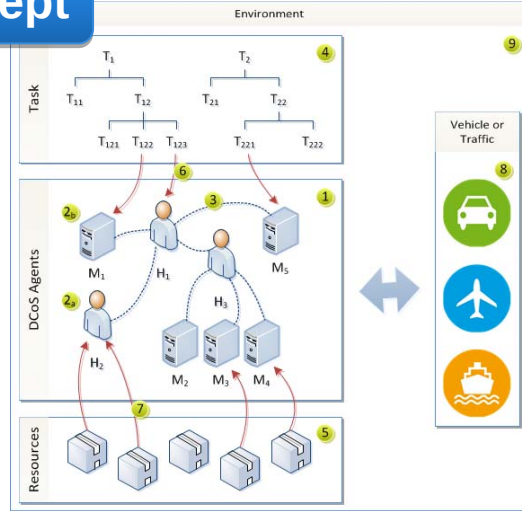


Architecture

**Metho-
dology &
Tool Chain**



Concept



Environment

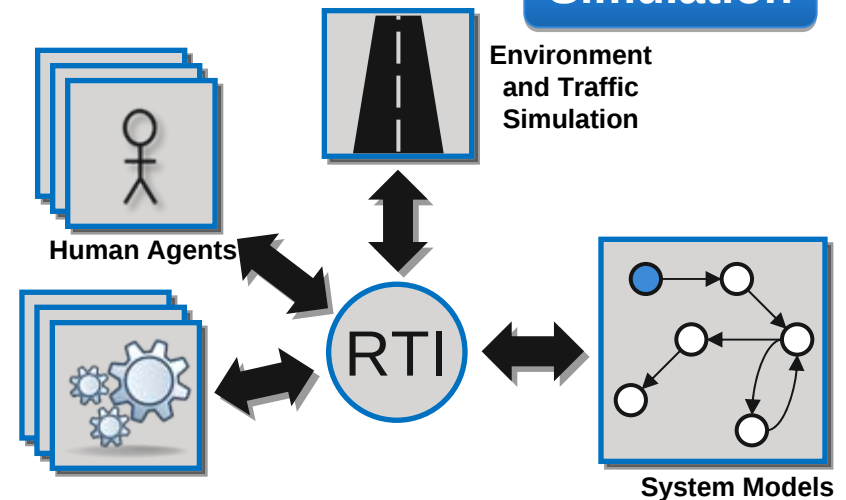
Formal Description

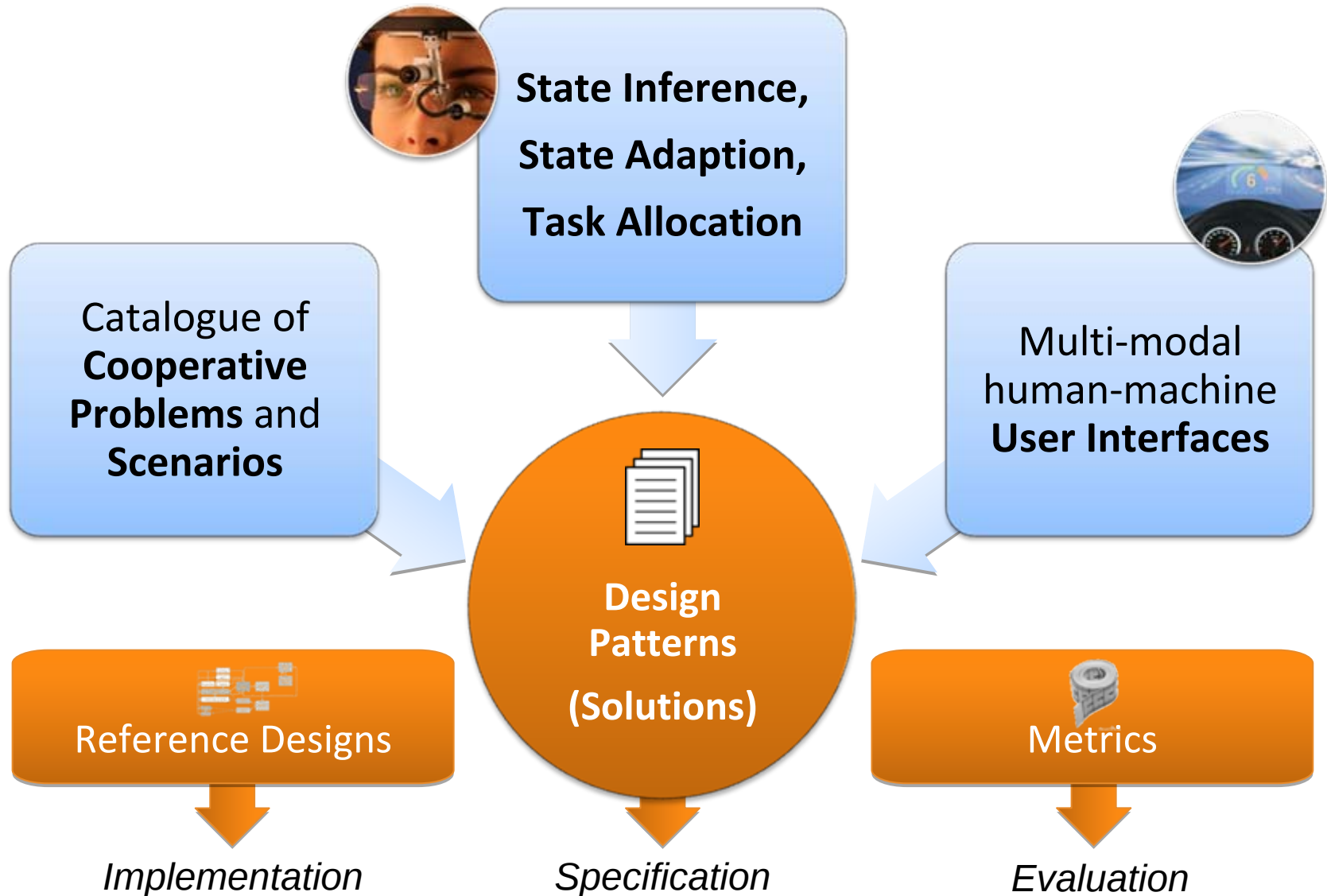
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Evaluation



Simulation





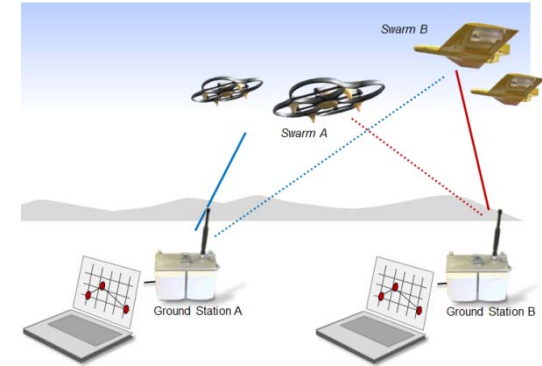


- Cross-domain reusable **architectures** for real-time interaction
- **Extend** existing approaches in the four domains
- Software and hardware **interfaces** for communication between DCoS components

3. DEMONSTRATORS



workload & safety
improved cockpit systems



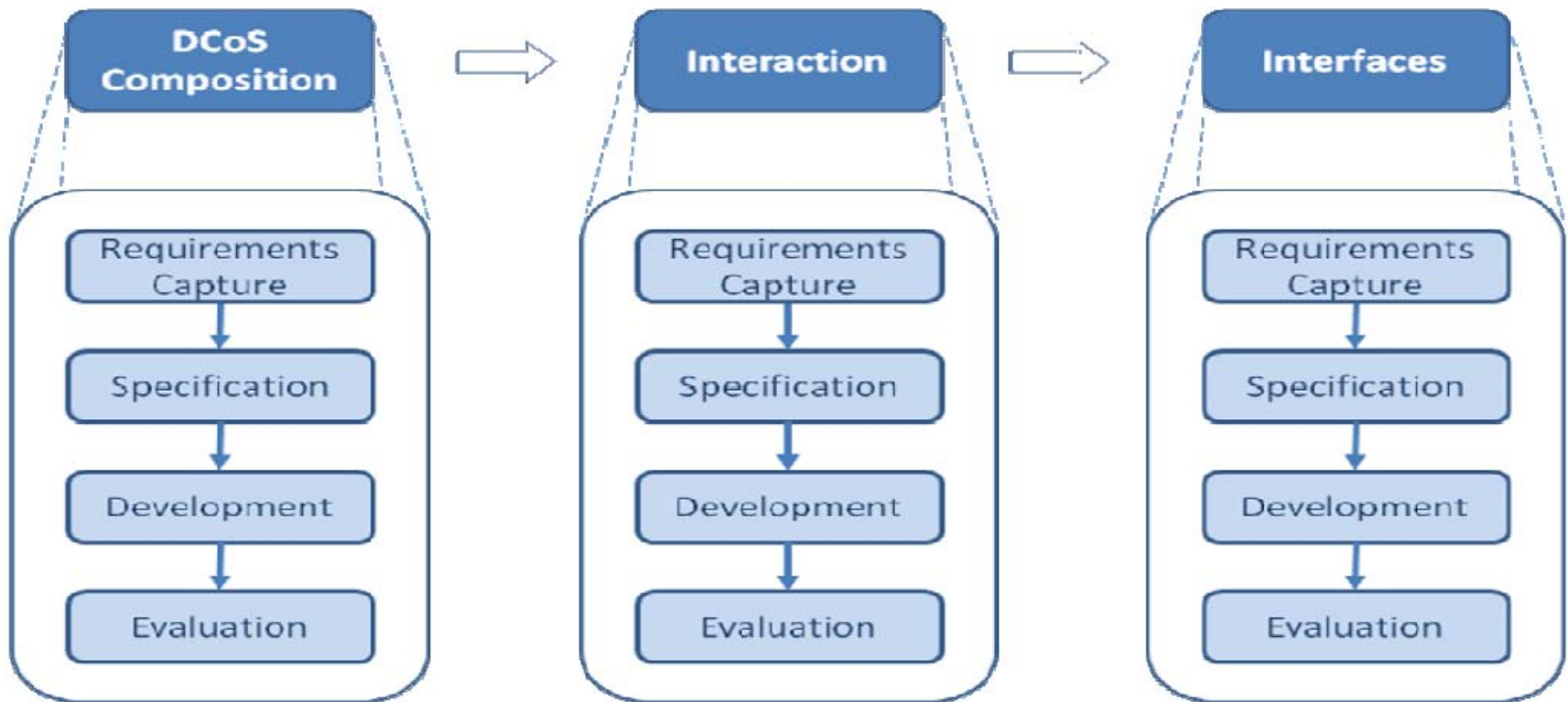
swarms of multiple
interconnected low-cost UAVs



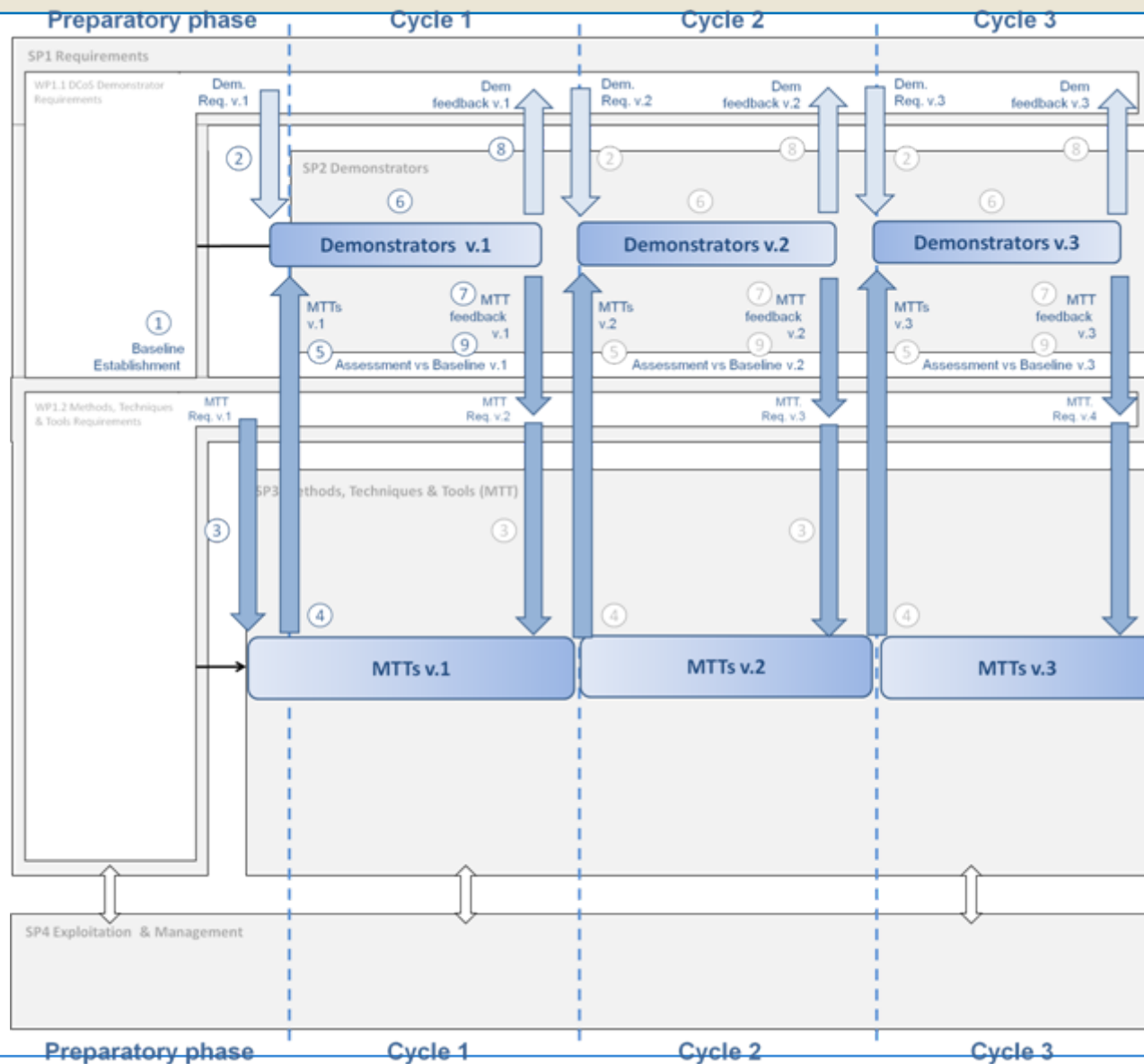
highway merging involving
car-to-car communication



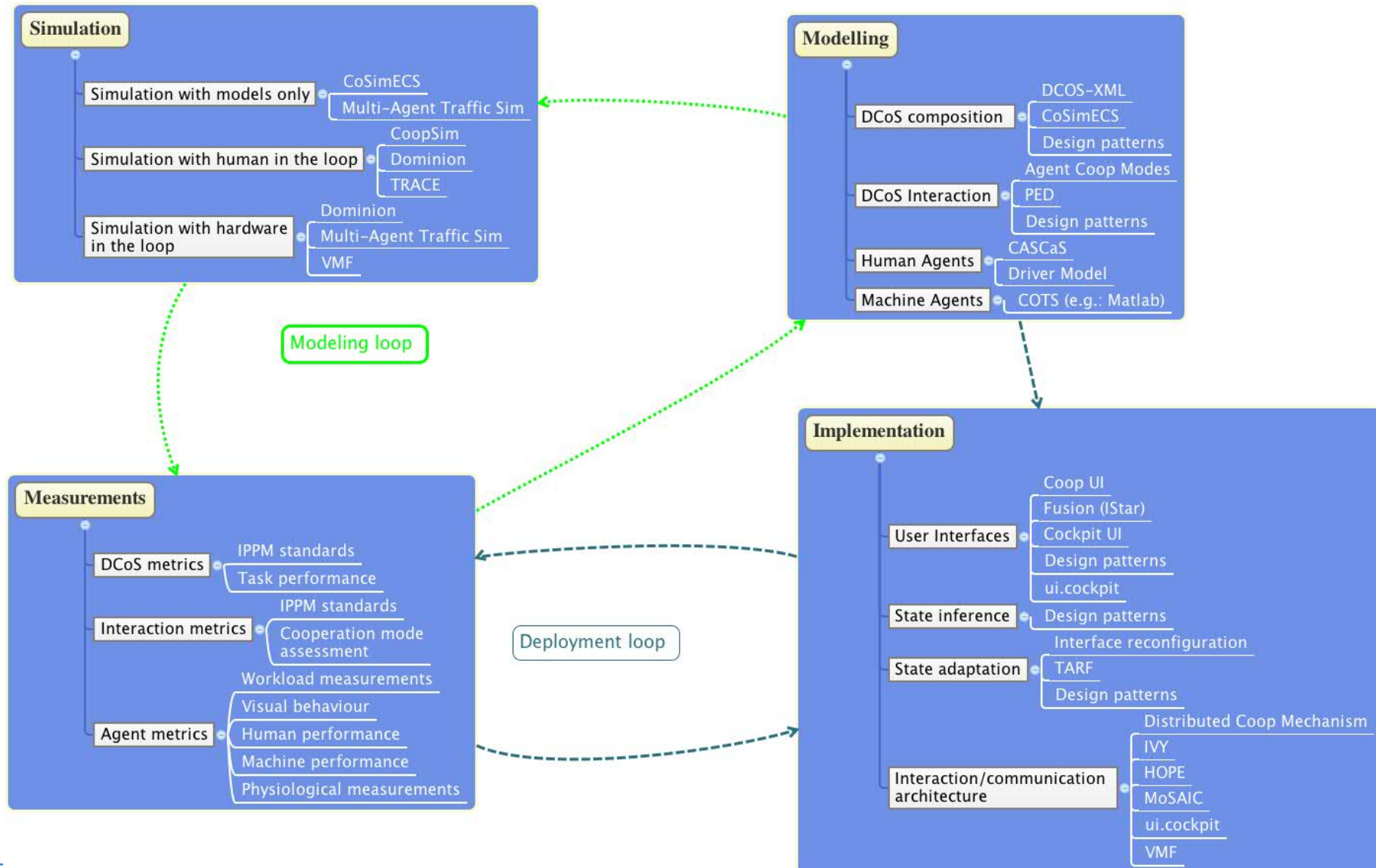
cooperative path planning
for safe berthing



CYCLES



4. Conclusion





→ www.d3cos.eu