



Unmanned Combat Air Vehicle

**UCAV: A Technology Assessment Project as a  
Complex Problem Case Study**

***Second International Symposium on  
Engineering Systems***

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# outline

## Unmanned Combat Air Vehicle

- To present a complex technological problem as a case study with:
  - Multidisciplinary concerns
  - Specifications undefined by customer
- To address project development issues such as:
  - “Transpecialization” teamwork and brainstorming
  - Innovation management

## the consortium

# Unmanned Combat Air Vehicle

- Participating Nations (5): Italy (lead), Norway, Portugal, Spain, The Netherlands.
- Participating companies (17):
  - two aircraft manufacturers (end users)
  - one aircraft maintainer
  - one engine manufacturer
  - three weapons, missiles and defence systems manufacturers covering the entire range of knowledge in the field
  - one avionic and sensors manufacturer
  - one university
  - one aeronautical research centre
  - one research and technological development institute
  - six system, hardware and software engineering Companies covering all the UCAV system specific aspects

## the stated objectives

## Unmanned Combat Air Vehicle

- To provide a guideline for technology development,
- the implications of both:
  - such required technologies
  - and the affordability issues,
- and the operational concepts related to UCAV use.

# the issues at stake

## Unmanned Combat Air Vehicle

- The MoDs expectations
- The partners' capabilities and strategies
- The driving technologies
- The concept for the future European UCAV:
  - Operational capabilities
  - Technological requirements

Unmanned Combat Air Vehicle

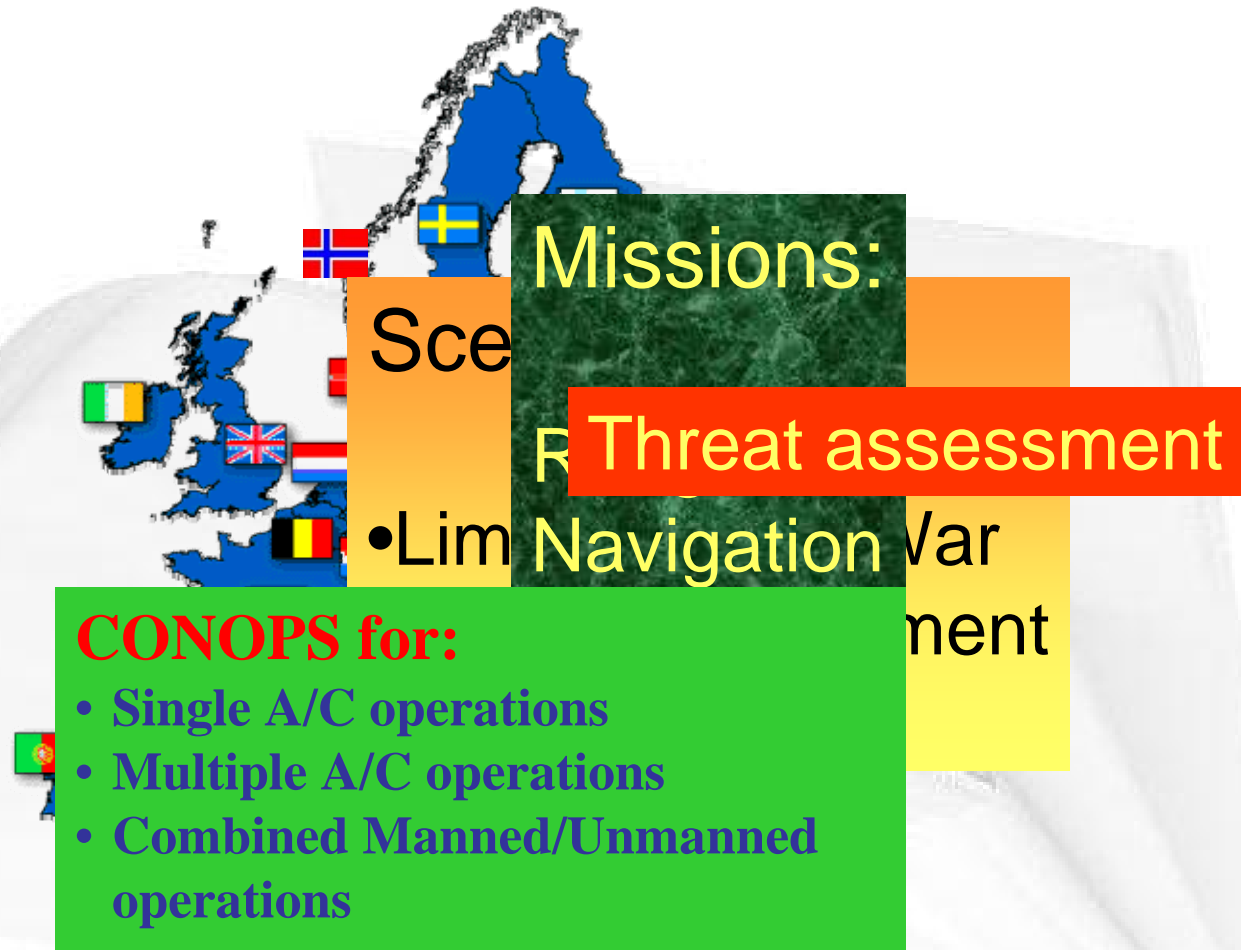
from the UCAV to the UCAS

the system

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# the function

## Unmanned Combat Air Vehicle



**Missions:**

- Threat assessment
- Navigation
- War
- ment

**Scenarios:**

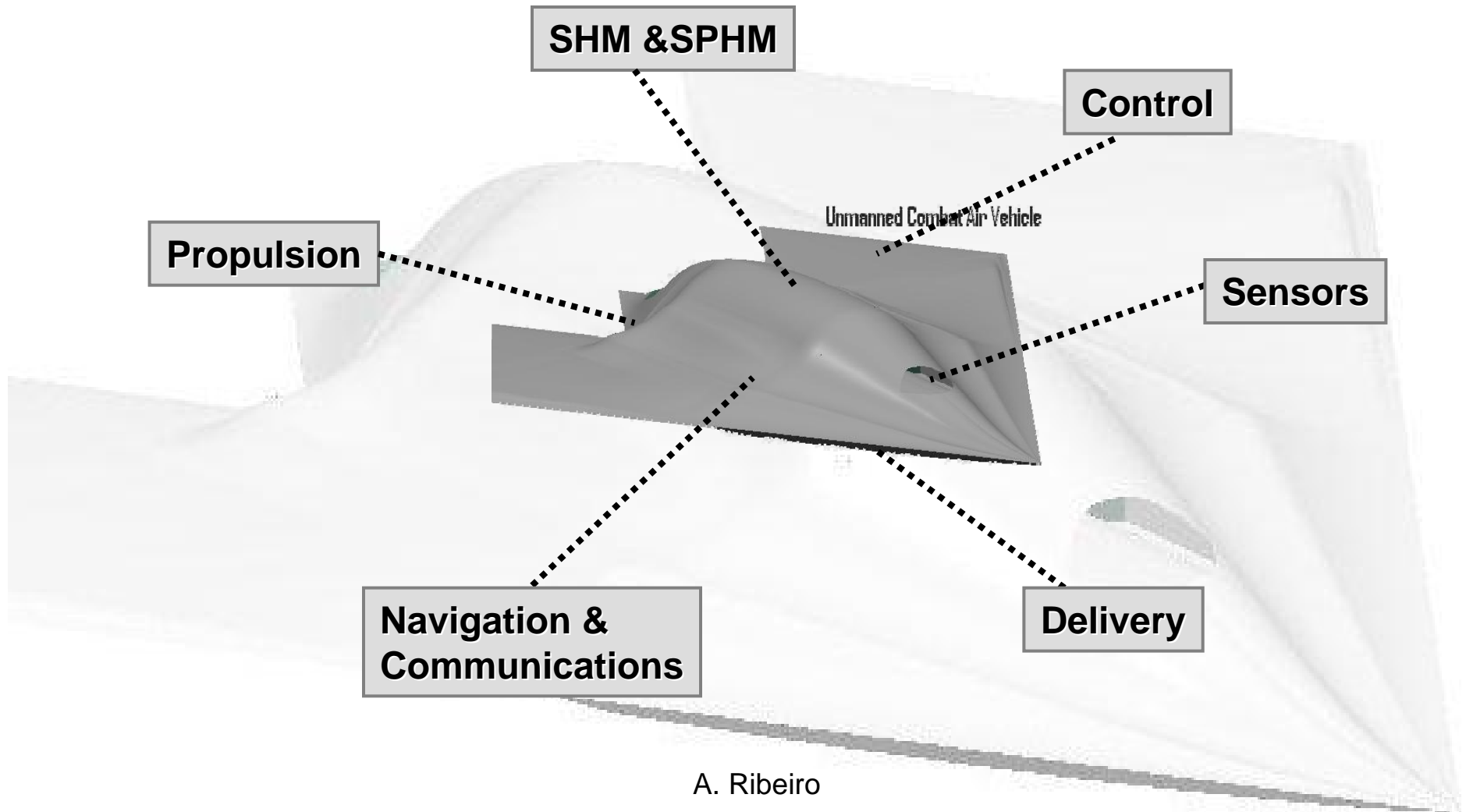
- Limited

**CONOPS for:**

- Single A/C operations
- Multiple A/C operations
- Combined Manned/Unmanned operations

# the structure

## Unmanned Combat Air Vehicle





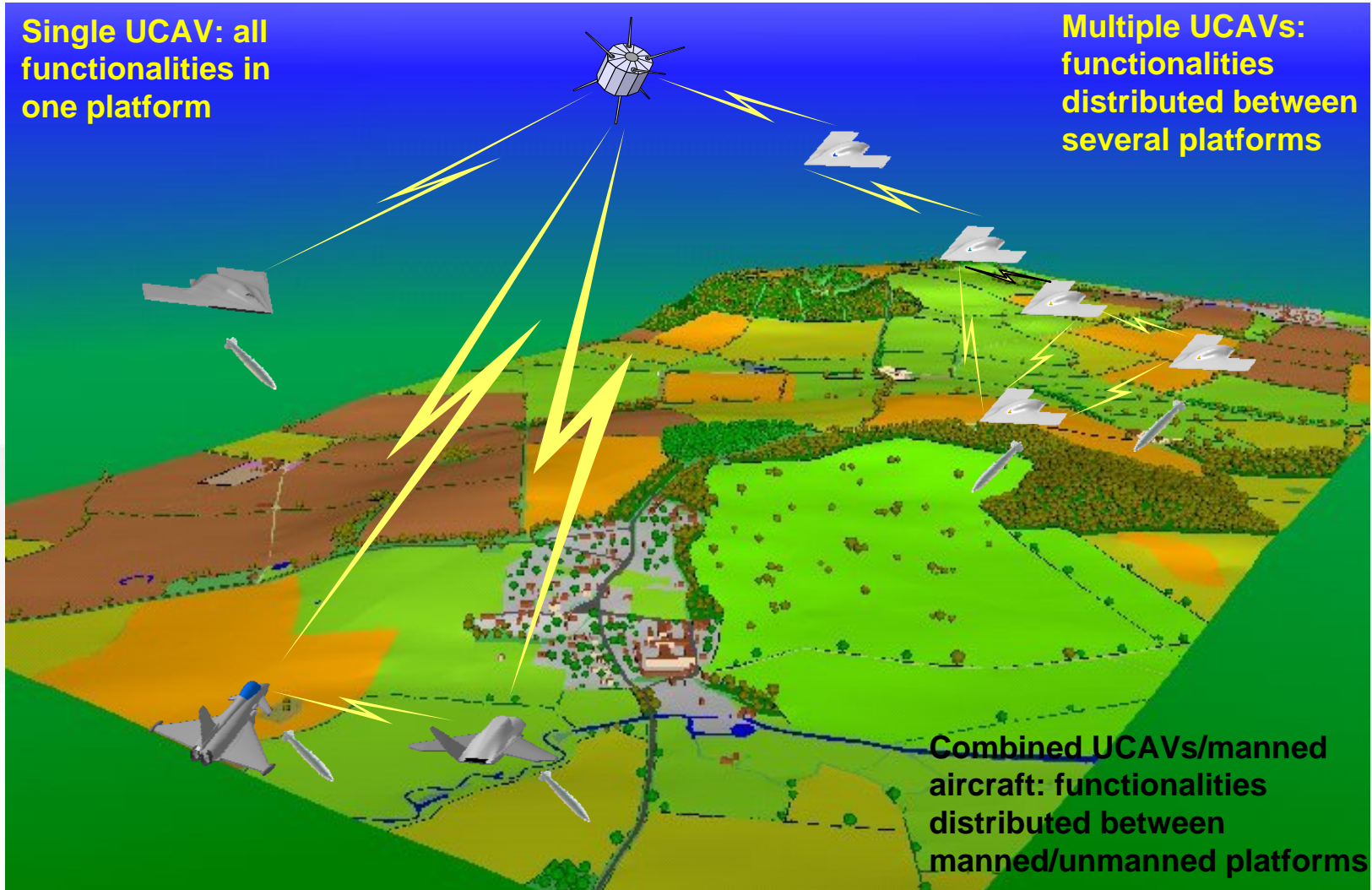
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# the concepts at stake

## Unmanned Combat Air Vehicle

**Single UCAV: all functionalities in one platform**

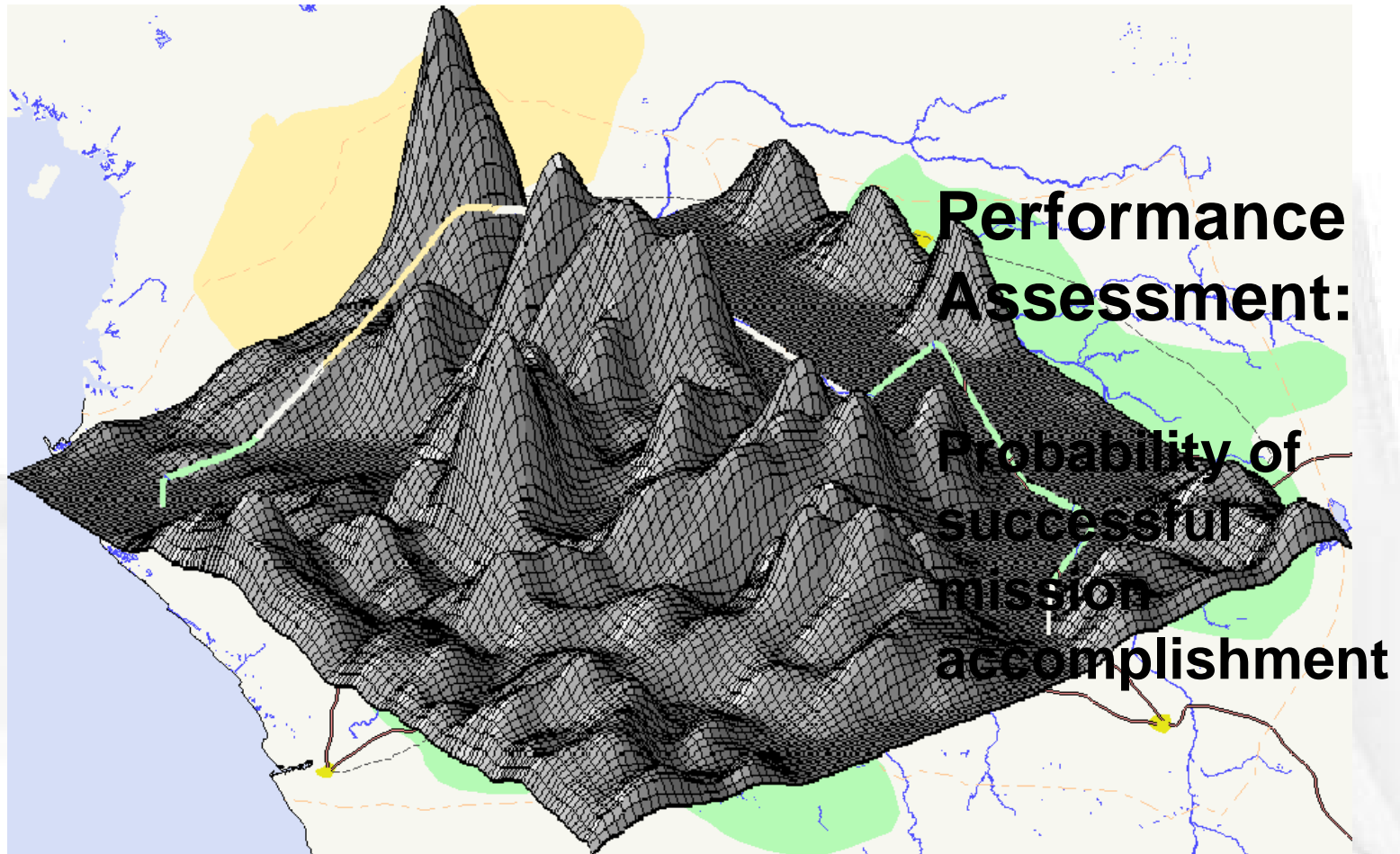
**Multiple UCAVs: functionalities distributed between several platforms**



**Combined UCAVs/manned aircraft: functionalities distributed between manned/unmanned platforms**

# simulation

# Unmanned Combat Air Vehicle



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the system

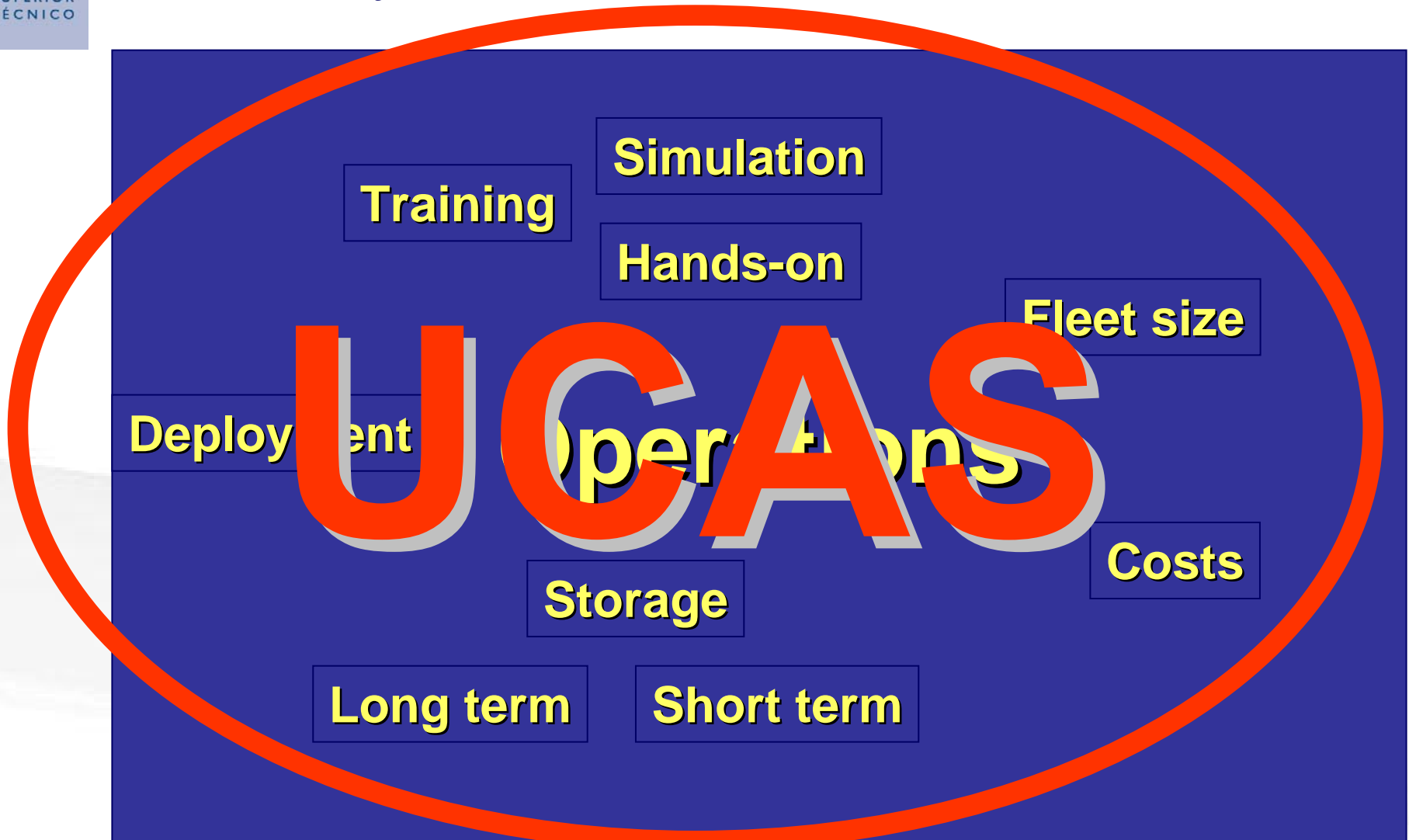
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# Operations

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the system

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# the critical technologies

## Unmanned Combat Air Vehicle

- UCAV system Autonomy
- Integration with C4ISR
- Communication technology
- Sensor technology
- Weapons guidance / autonomous weapons systems.
- Structures and Materials
- Low observability
- Self defence

# ILS subsystem

## Unmanned Combat Air Vehicle

- Integrated Logistic System:
  - Maintenance
  - Training
  - Transportability
  - Storage
    - Long term
    - Short-term
- New technologies needed
  - SHMS, remaining fatigue life assessment research
  - Structure, System and Powerplant HMS, capable of monitoring during storage.

**cost**

Unmanned Combat Air Vehicle

**Main LCC drivers:**

**Subsystems - requirements**

**Innovative solutions**

**Cost reduction opportunities**

**New cost model**



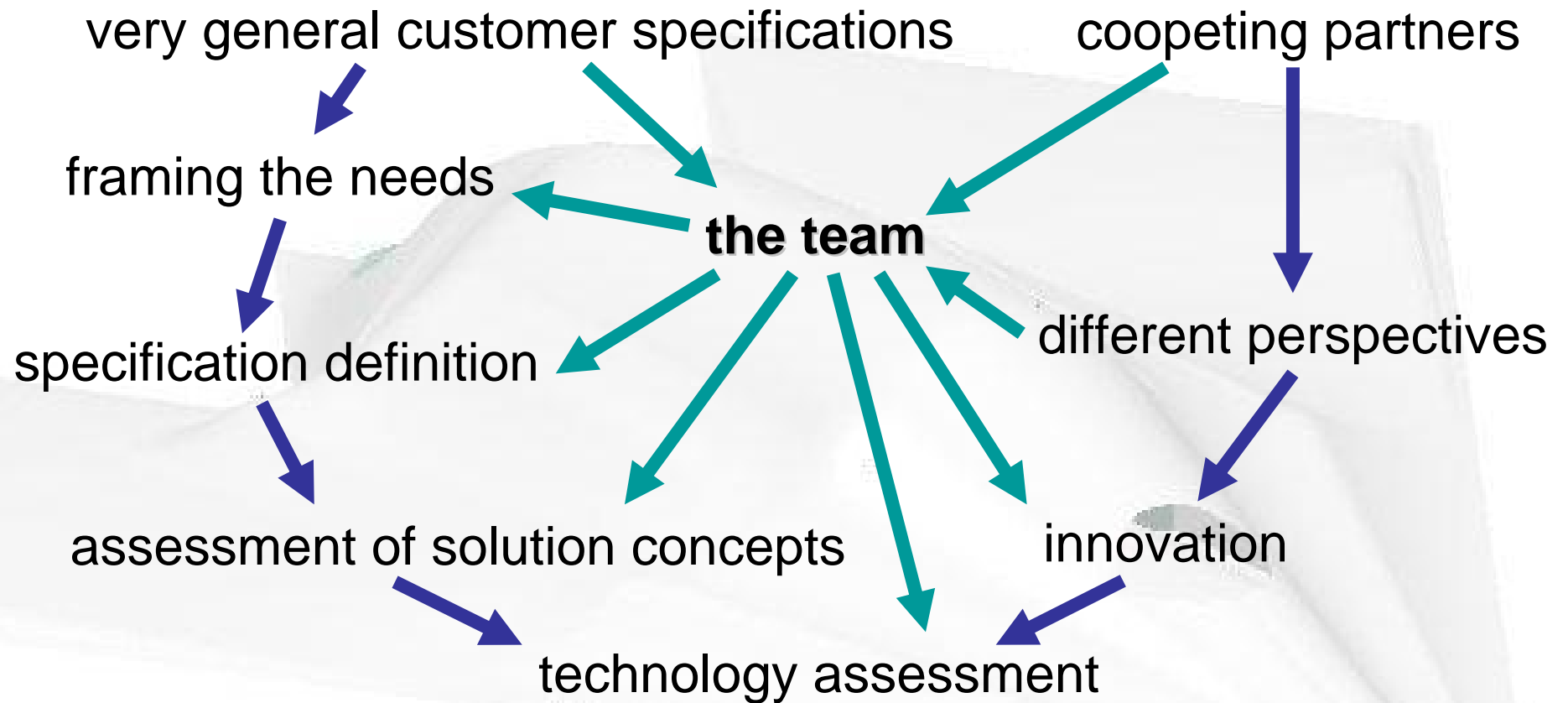
## teamwork

## Unmanned Combat Air Vehicle

- 17 partners
- 17 teams
- 17 understandings
- 17 micro-cultures
- 17 wills
- 17 goals
- 1 project
- 1 team
- 1 generalized concept
- 1 macro-culture
- 1 common effort
- 1 job done

# the dynamics

## Unmanned Combat Air Vehicle



# Unmanned Combat Air Vehicle

**Thank you**

**Questions?**

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