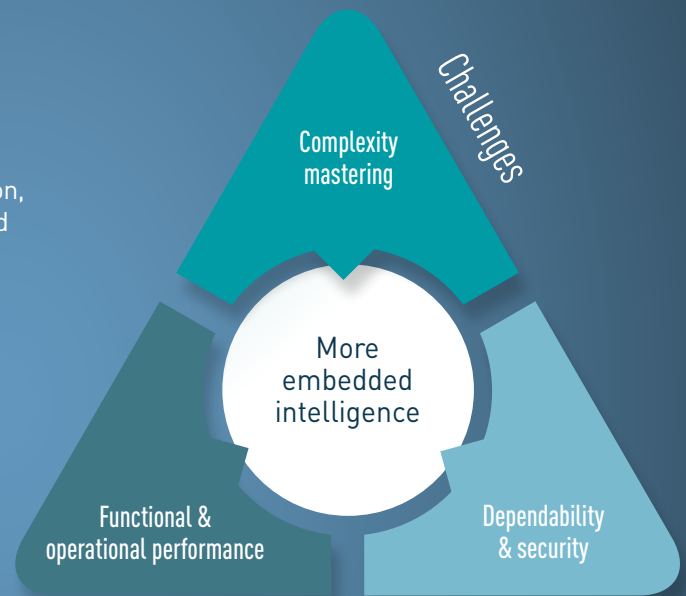


# Key technological domain

## Embedded Systems

### ★ ★ Market and needs

Embedded systems are at the heart of products innovation, enabling new functions and new usages. The desired increase of systems autonomy, performance, dependability, communication capability leads to more and more embedded intelligence and complexity. All these innovations require advanced hardware and software technologies. Mastering their development, utilization and maintenance in a stringent regulatory context constitutes one of the major stakes of the domain.



### ★ ★ Technological Axes

#### COLLABORATIVE SYSTEM ENGINEERING

- Requirement Engineering
- Modeling and (co)simulation
- Co-design
- Formal methods
- Extended Enterprise
- Multidisciplinary Simulation and Optimisation

#### SIGNAL & DATA PROCESSING

- Telecom and networks
- Optical and radar remote sensing
- RF detection
- Optical technologies for satellite communication

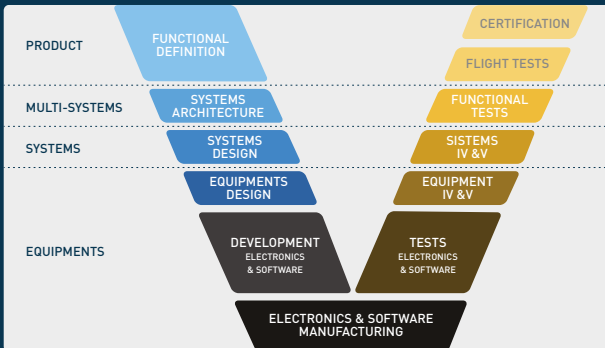
#### INTELLIGENT SYSTEMS

- Multi-agent systems
- Machine Learning
- Big data
- Cloud computing
- Human-system interactions
- Autonomous decision-making

TRANSVERSE AXIS  
Multidisciplinary Simulation & Optimization

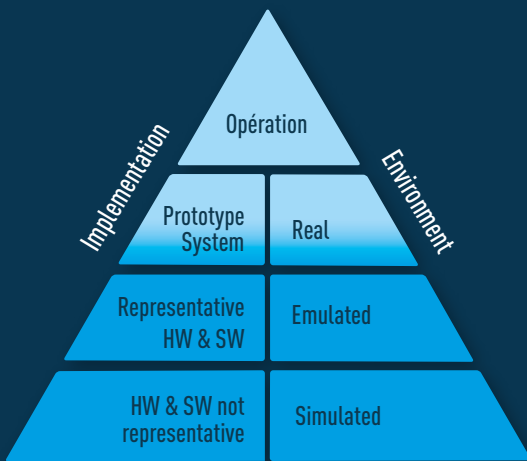


### Methods & Tools



- > All development & operational phases targeted, from early product design to maintenance
- > Increased maturation of processes, methods & tools before industrialization
- > Demonstration of scalability, usability, interoperability, integration

### Technologies



- > Focus on technologies bringing significant system advantages
- > Validation through simulated and emulated system and environmental conditions
- > Software technologies demonstrated on representative execution platforms



### Projets in progress

#### ALBS

Ground processing and transmission chains for RF and optical broadband satellite communication systems (new waveforms, interference and distortions management, ground stations handover, ground optical terminals).

#### OCE

Technologies for optimizing the end-to-end performance of Earth Observation space systems (smart programming of constellations, onboard and ground autonomous processing, ground infrastructures for big data processing).

#### INGEQUIP

Methods and tools for equipment engineering (system-hardware-software co-design, component-based development methods, formal verification methods).

#### MOISE

Methods and tools for model-based collaborative system engineering (requirement engineering, multi-view modeling and verification, system engineering in extended enterprise).

#### MDA-MDO

Methods and tools for multi-disciplinary analysis and optimization (aeronautical study cases).

#### MIMIKS

Smart multi-modal human-machine interfaces for the capture and transmission of production operators know-how.

### Competences

- System engineering: requirement engineering, modelling and simulation, formal methods, collaborative tools, standardization.
- Signal and data processing: telecom physical layer and network processing, RF signals detection, optical and radar image processing.
- Intelligent systems: combinatorial optimization, deep learning, multi-modal human-system interfaces.

### Technology Platforms

- Integrated collaborative system engineering.
- Multi-disciplinary analyses and optimization.
- Emulation of satellite communication chains.
- Simulation of Earth Observation systems and services.

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