European Commission

DREAMS

Towards a European Strategy for Cyber-Physical Systems

Concertation Workshop on Mixed-Criticality Systems and Multicore

Distributed REal-time Architecture for Mixed criticality Systems (DREAMS)

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SEVENTH FRAMEWORK PROGRAMME

Project General Information

- Project full title: Distributed REal-time Architecture for Mixed criticality Systems
- Project duration: October 1, 2013 – Sept. 30, 2017
- Type of project: Integrated Project (IP)
- Budget Total: 15.5 mill. EUR
- Coordinator: Roman Obermaisser (Univ. of Siegen)

Industry	Thales SA	France
	Alstom Wind S.L.	Spain
	STMicroelectronics	France
	TÜV Rheinland	Germany
SME	TTTech	Austria
	RealTime-At-Work	France
	Virtual Open Systems	France
	FENTISS	Spain

Research Org.	ONERA	France
	Ikerlan	Spain
	SINTEF	Norway
	Fortiss	Germany
Univ.	Universität Siegen	Germany
	TU Kaiserslautern	Germany
	UPV	Spain
	TEI	Greece

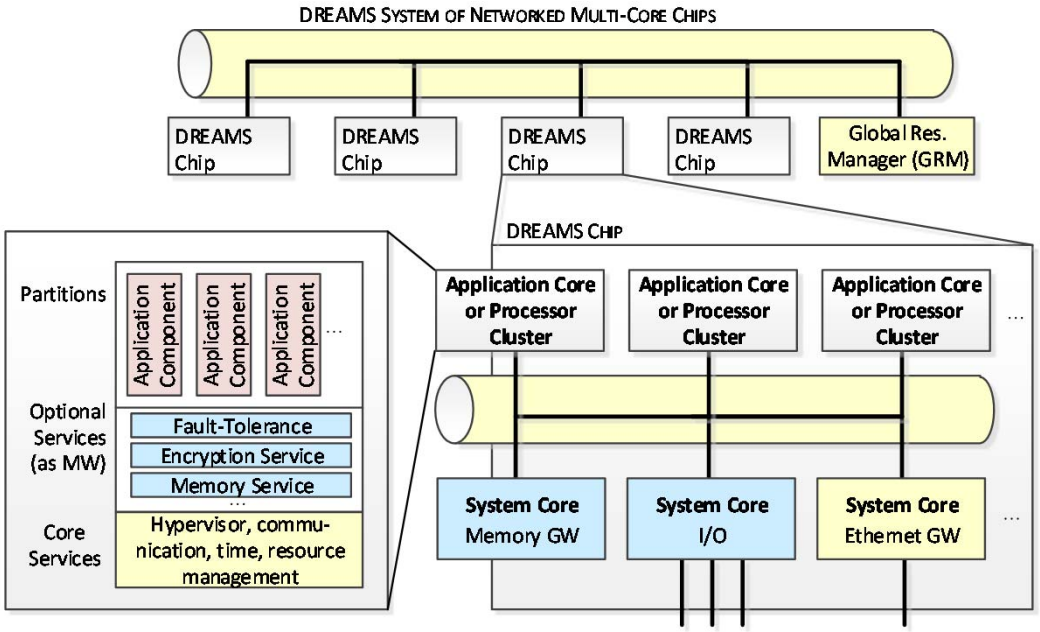
Project Description

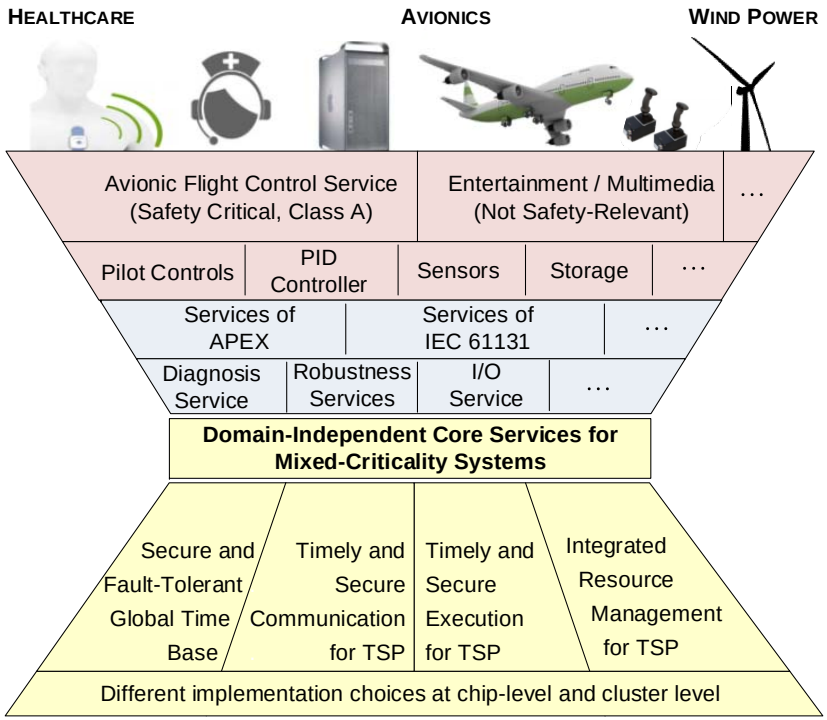
Mixed-criticality architecture based on networked multi-core chips

1. Architectural style and modelling methods
2. Virtualization technologies for security, safety, real-time performance, integrity in networked multi-core chips
3. Adaptation strategies for mixed-criticality systems
4. Development methodology and tools based on model-driven engineering
5. Certification and mixed-criticality product lines
6. Feasibility of DREAMS architecture in real-world scenarios
7. Promoting widespread adoption and community building

Main Technical Activities

- Cross-domain architectural style and models for MCS
- Modular certification and mixed-criticality product lines
- Platform with virtualization at chip and network level
- Adaptation strategies for mixed-criticality systems
- Development methodology, variability management and tools





Main Outcome and Results

- Reduced development cost and time-to-market for mixed-criticality applications
- Exploitation of economies of scale through cross-domain components and tools
- Consolidation and integration of virtualization solutions and development methods from previous projects
- Significant advances in virtualization techniques leading to higher reliability, security and safety
- Higher flexibility, adaptability and energy efficiency through integrated resource management
- Leverage multi-core platforms for a system perspective of mixed-criticality applications combining the chip-level and network-level

Exploitation Plans

- Exploitation in the industrial application domains (avionic, wind power, and healthcare domains)
  - Integrating the DREAMS methodology and the related tools into respective production processes
  - Tailoring of DREAMS outcomes to the individual application fields and company approaches
- Cross-domain exploitation and transfer to additional domains (e.g., automotive, railway)
- Exploitation of DREAMS platform and methodology building blocks
  - Translation of DREAMS platform and methodology into product-ready implementations
  - Examples
    - Commercialization of tools and use in R&D studies (e.g., simulation tools, tools for architecture exploration)
    - Extension of execution environments for MCS using resource virtualization techniques (e.g., distributed, extensible hardware IOMMU, hardware-enhanced virtualization, …)
- Contribution to standards, regulations and open source (e.g., SAE, IEEE, ARINC and ISO/IEC)