

POLLUX

Process oriented electronic control units for electric vehicles developed on a multi-system real-time embedded platform



Motivation and Objectives

The electrified mobility market is showing some 40% annual growth worldwide while conservative outlooks estimate that some 50 million e-means will be on EU roads by 2020. The driving forces are to reduce primary energy consumption and greenhouse gas emissions while addressing at the same time the scarcity of raw materials. Up-to-date nanoelectronics and embedded systems technologies are mature for grasping the first opportunities on electric mobility (Light EVs and city cars) by joining in a strong, pan-european, supply-chain based approach the OEMs, the Tier 1 and Tier 2 suppliers and the semiconductor industry. The upcoming Electric Vehicle (EV) architectures will be based on distributed energy storage, propulsion and computing allowing significant energy saving, with enhanced fun-to-drive, safety and comfort. They will also contribute to a radical overall reduction of the complexity of the vehicle in that they will be characterized by a reduced number of control units through the relocation of functionalities into a distributed embedded system network.

Project Plan, Milestones and Deliverables

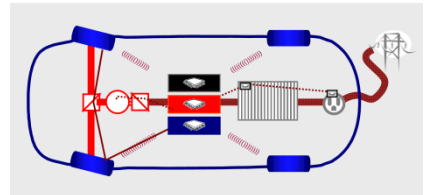
The work plan is based on five R&D work packages (WPs), one DEMO work package, one work package for dissemination & exploitation, and one work package for project management.



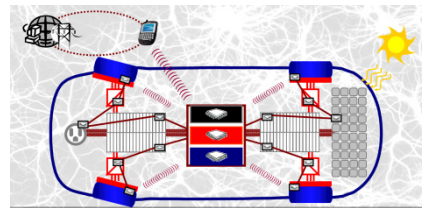
Technical Approach

The key technological innovations are related to:

- Embedding fail-safe concepts and devices in processing units, sensors actuators, power supply systems and power distribution buses, aiming at improving the overall safety,
- The development of parallel computing real-time and secure platforms and operating systems in order to optimize the number of the computing devices while maintaining fault tolerance, safety and enhancing reliability,
- The support to the development of automotive multi-core microcontrollers,
- Smart domain partitioning into autonomous sub-systems across a multi-layer domain abstraction,
- Implementation of deterministic, safe, secure and reliable in-vehicle network links enhanced towards EV needs.



Conventional architecture



Distributed architecture

Achievements

- WP1:** Overall system specification, subsystem specification released for Energy, Propulsion, PASD, Chassis, B&B domains.
- WP2:** Energy and Propulsion simulation models, network simulation tools, distributed architecture simulation framework.
- WP3:** Microcontroller single/multi core platform assignment. Fault tolerant methodologies/functions and control platform for propulsion and energy domains.
- WP4:** Safety critical methodologies and SW design guidelines definition.
- WP5:** Electric vehicle network architecture and protocol implementation. (CAN, FlexRay, Wireless, Ethernet). Preliminary validations.
- WP6:** Light EV platform integration plan.

Budget	33 M€	Funding	16 M€
Duration	36 months	Start	March 2010
DG	INFSO / ARTEMIS JU	Contract n°	100205
Coordinator	Marco Ottella, CRF	Contact	marco.ottella@crf.it
Partners	36 partners, among them CRF, PSA		
Website	www.artemis-pollux.eu		

Integrated Safety

