



Scaleo chip and IFP Energies nouvelles unveil OLEA in a plug-in hybrid car

Sophia Antipolis - Rueil Malmaison, France, June 17th, 2014. Scaleo chip and IFP Energies nouvelles (IFPEN) announced today "[FlexHybrid powered by OLEA](#)", the first plug-in hybrid electric vehicle (PHEV) driven by OLEA microcontrollers.

Scaleo chip, the leading fabless semiconductor company in automotive electronics, has recently introduced OLEA, its new family of powertrain microcontrollers embedding two unique technologies surpassing the current market solutions: AMEC® (Advanced Motor Events Control) and SILant® (Safety Integrity Level agent) technologies provides unprecedented hardware flexibility, timing events predictability, processing performance, functional safety and design cycle reduction.

IFPEN, a public-sector research, innovation and training center, has activities covering the fields of energy, transport and environment. Among these domains of expertise and know-how, IFPEN has an extensive experience and technologies on the improvement of internal combustion engines and powertrain electrification, development of control laws and energy optimization algorithms. Based on its work on fuel economy analysis, IFP Energies nouvelles has recently released an eco-driving mobile application for the general public.

Scaleo chip, IFPEN, Continental and CEA partnered within the NextSTEP program (Next Solution for Thermal and Electrified Powertrain), to demonstrate the ability of Scaleo chip's OLEA microcontroller's to control the plug-in hybrid electric vehicle, called FlexHybrid. This program was also actively supported by Bpifrance, the French public investment bank.

NextSTEP is aimed at developing and demonstrating leading edge technologies that address three essential challenges for the design of clean, cost effective and safe vehicles: (i) improve energy efficiency of automotive powertrain, (ii) manage the complex embedded electronics systems and (iii) extend the in-vehicle network. These goals were achieved by implementing OLEA microcontrollers into the FlexHybrid vehicle.

Within the NextSTEP program, [three powertrain electric control units](#) (ECU's) using the new OLEA microcontrollers were designed: the first ECU handles the spark ignition engine and automated manual gearbox controllers, the second ECU includes the power converters and electric motor controllers, and the third ECU hosts the hybrid vehicle supervisory controller, the transmission control law and the electronic/electrical components manager. A rapid prototyping tool chain enables automated software and hardware code generation for the embedded cores and the programmable logic of the OLEA microcontrollers. This code generation flow allows complex algorithms porting from MATLAB®/Simulink® models.

The FlexHybrid car is built on a Renault Kangoo platform powered by a 1.4l PSA gasoline engine (66 kW), a VALEO starter-alternator, a permanent magnet synchronous motor (37 kW), and a Li-ion battery from SAFT. The transmission features an automated 5-speeds manual gearbox with a mechanical speed reducer for electric motor coupling. FlexHybrid has 30 km of range in full electric mode and its battery is recharged during regenerative braking, when the gasoline engine is running or when plugged into a conventional power outlet. All the software functions necessary to control the vehicle were developed by IFPEN. The OLEA embedded

software stack includes 7 control/management functions (engine control, transmission control, actuators / sensors processing, energy supervision, powertrain synchronization, electrical functions management) and 8 communication functions (CAN, Ethernet and Inter-Core) distributed over the connected ECU's by a determinist Ethernet link.

« Our strong and fruitful partnership with IFPEN has concluded with this first prototype car which demonstrates all the benefits of OLEA from end-to-end integration: silicon, software, and system in a vehicle” says Bruno Paucard, President and CEO of Scaleo chip.” Moreover, it provides to OLEA customers fast application development and scale-up with implementation examples in ECU design, software development, AMEC® development and calibration with OLEA”.

According to Gilles Corde, program director at IFPEN, «Working with a leading technology company on a very innovative product such as OLEA, generated a strong motivation on IFPEN researchers. We designed a modular OLEA-based electronic control unit which runs our algorithms dedicated to the plug-in hybrid vehicle control. We were able to contribute to a tangible innovation that emphasizes our ability to support OLEA technologies. IFPEN is proud of this rewarding collaboration with Scaleo chip and this successful project marks the beginning of a longer-term partnership between our two companies. »

OLEA, FlexHybrid and all joint development results will be shown at the 9th annual Convention of SYSTEMATIC to be held in Montrouge, France, on June 24th 2014. Others events will be announced in the coming months for FlexHybrid and OLEA exhibitions.

About Scaleo chip:

Scaleo chip is a fabless semiconductor company that designs, develops and sells complete and high value solutions, combining System-on-Chip (SoC) and embedded software for the future of automotive electronics industry. Scaleo chip product offering includes standard automotive microcontrollers addressing powertrain, body control, driver information and infotainment applications. The company leverages its technology and know-how by offering additionally custom products development and manufacturing for applications requiring added quality constraints as in defense or industrial markets. Scaleo chip is headquartered in Sophia-Antipolis, France. For more information, visit: www.scaleochip.com.

About IFP Energies nouvelles:

IFP Energies nouvelles (IFPEN) is a public research and training player. It has an international scope, covering the fields of energy, transport and the environment. From research to industry, technological innovation is central to all its activities. As part of the public-interest mission with which it has been tasked by the public authorities, IFPEN focuses on providing solutions to take up the challenges facing society in terms of energy and the climate, promoting the emergence of a sustainable energy mix and on creating wealth and jobs by supporting French and European economic activity, and the competitiveness of related industrial sectors. For more information, visit: <http://www.ifpenergiesnouvelles.fr/>

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