HyHIL

New test platform for the development of hybrid vehicles

Rueil-Malmaison (France), 27 April 2009 – Launched in 2008 by D2T in partnership with IFP, Renault, the *Laboratoire de Génie électrique de Grenoble* (G2ELAB) and LMS-Imagine, and supported by the Mov'eo competitiveness cluster and FUI Fund, the HyHIL virtual hybrid test platform is now up and running. HyHIL uses a suite of generic tools to reproduce and assess the complex architectures of hybrid vehicles. The physical modeling of the components is done on the LMS Imagine.Lab AMESim simulation platform. Piloting of the powertrain test bench and model execution are based on the real-time functionalities of D2T's MORPHEE 2 test bench supervisor.

Three hybrid architectures have already been validated on this platform:
- "Pure thermal" mode, with simulation of an alternator-starter.
- "Stop & Start" mode, with simulation of the engine's frequent stop/start phases.
- "Hybrid" mode, with simulation of electric propulsion, energy recovery during deceleration phases and battery recharging.

These architectures have been tested over several standard driving cycles (NEDC, FTP, Artemis, etc.) using an energy supervisor developed by IFP, which is generic enough not to require specific calibration.

The parameters of the components can be adjusted directly on the powertrain test bench (electric engine power, vehicle mass, etc.) so that the effects on CO_2 emissions and drivability can be analyzed immediately.

Validation will now focus on a hybrid 4-wheel drive architecture, to evaluate the vehicle's dynamic behavior more accurately. This will also make it possible to fine-tune the development of functions relating to energy recovery and braking (interaction with ABS, ESP, etc.). In addition, some more relevant models of electrical components (electric powertrain, battery, etc.) will be gradually integrated. Finally, work will be carried out to enhance the generic nature of the energy supervisor.

Upon completion in 2010, the HyHIL platform is expected to significantly reduce the time required for the design and development stage of a new hybrid architecture.

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