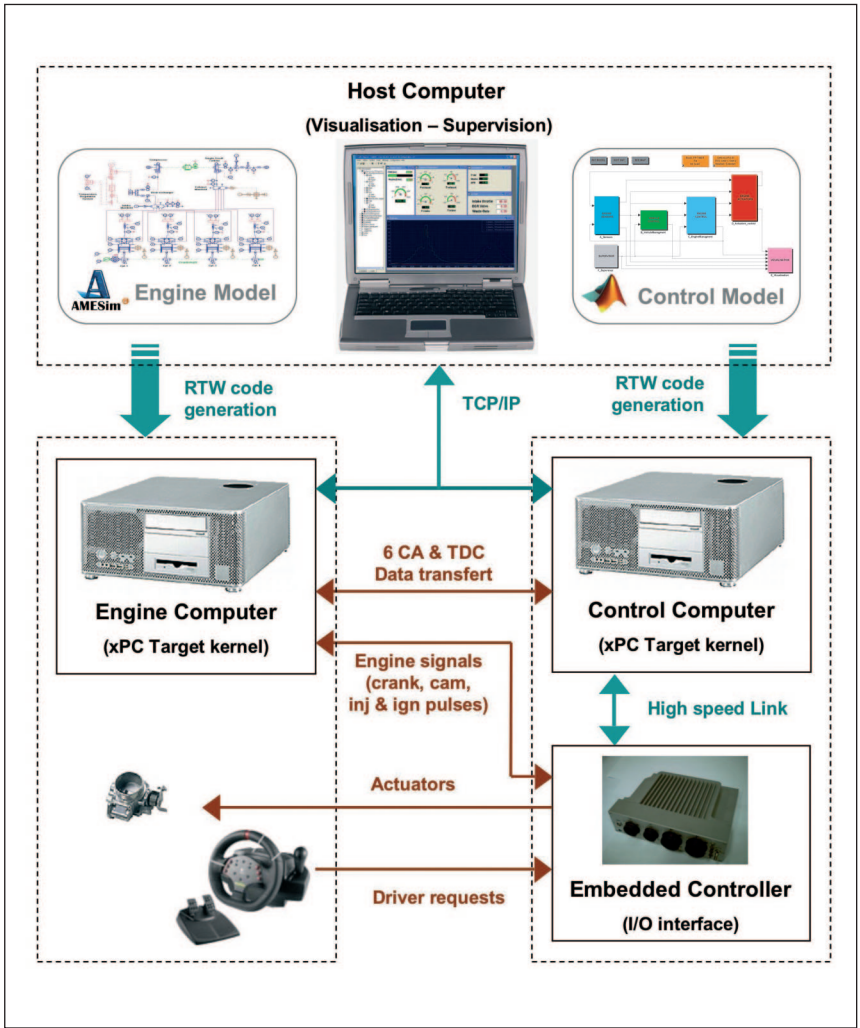


IFP Hardware-in-the-Loop A Platform for Control Design



The Hardware-in-the-Loop platform is designed to test and validate the complete engine control system implemented in a Simulink-based framework.

This HiL platform is not intended to reproduce all signal conditioning to match a standard ECU interface, but rather to allow the transparent transfer of engine control strategies from the engineer's PC to the testbed or vehicle.

Thanks to an advanced modeling approach and a specific calibration methodology developed by IFP in the AMESim software, a crank angle degree simulator can be run in real time and used as a virtual engine or vehicle.

The power-plant simulator of the HiL platform uses a 4.8-GHz ATHLON computer running the xPCTarget® real-time operating system. It delivers powerful floating-point computing in real time.



IFP's Engine control unit uses a target computer that runs the control algorithms and exchanges data (commands, sensor outputs, etc.) with IFP's embedded controller via a real-time communication link.

Real-time exchange between the engine simulator and the control unit is ensured first by a dual-port shared memory connected between the engine and control computers.

This dual-port memory is synchronised with time events and engine events (TDC and 6°CA interrupts) and exchanges almost all needed data.

A second link between the engine computer and IFP's embedded controller serves to validate specific engine signals (crankshaft, camshaft, injection and ignition pulses) according to engine speed and control commands.

It also assures good synchronisation between the engine and control parts.

The I/O interface of the IFP embedded controller makes it possible to plug any physical device into the HiL platform, for example actuators to validate its behaviour during transient tests.

A driver can also be added to the loop in order to validate engine control strategies during the European Driving Cycle.

CONTACTS

Worldwide:

Nicolas des Courtils

IFP - Powertrain Engineering

Marketing & Business Development

1 et 4, avenue de Bois-Préau

92852 Rueil-Malmaison Cedex

France

Tel.: +33 1 47 52 59 85

Fax: +33 1 47 52 53 04

<http://engines-fuels.ifp.fr>

Germany:

Oliver Schmidt

IFP - Powertrain Engineering

Key Account Manager

Gustav-Heinemann-Ring 60

D-81739 München - Germany

Tel.: +49 700 44 76 91 96

Fax: +49 700 44 76 91 97

Mobil: +49 171 44 33 305

schmidto.ifp@t-online.de



ISO 9001: 2000 certification

for all IFP Powertrain Engineering activities



www.ifp.fr

IFP - Powertrain Engineering

IFP (Head Office)

1 et 4, avenue de Bois-Préau - 92852 Rueil-Malmaison Cedex - France

Tel.: +33 1 47 52 59 85 - Fax : +33 1 47 52 53 04

IFP-Lyon

BP 3 - 69390 Vernaison - France

Tel.: +33 4 78 02 20 20 - Fax : +33 4 78 02 20 15