Vehicle Systems Integration HIL Test

As vehicles grow more complicated, systems integration testing ('full vehicle' or 'network' hardware in-the-loop [HIL]) is more important than ever. Rigorous systems integration HIL testing ensures that engine control units (ECUs) across the vehicle—in different systems, developed by different teams— all function correctly and safely together.

The NI + Aliaro Advantage

- Scalable system design (can be distributed)

- Efficient system reconfiguration: Rapidly adapt to changing test requirements and system configurations/models

- Multivendor test environment with ASAM XIL/Python support

- High-power and mixed-signal I/O capabilities

Application Requirements

- Scale to large channel counts (thousands of signal paths) across multiple ECUs

- Support real and simulated loads and sensors with fault insertion on all signal paths to simultaneously simulate all used-ECU physical interfaces

- Multi-ECU bus communication and fault insertion—generate all bus traffic normally flowing in a vehicle •

   Execute dynamic models simulating the behavior of all connected ECUs and simulated models

NI + Aliaro Solution

Reconfigure more than 2000 channels in minutes and store multiple test system configurations with the Aliaro Configurator for SLSC and NI VeriStand

Shorten system configuration and test development time so that you can expand test coverage using an NI platformbased approach combined with Aliaro SLSC cards and system configuration tools

Model integration and real-time model-based control and provisions for real/simulated switching to accommodate testing different system configurations and decouple requirements on other teams
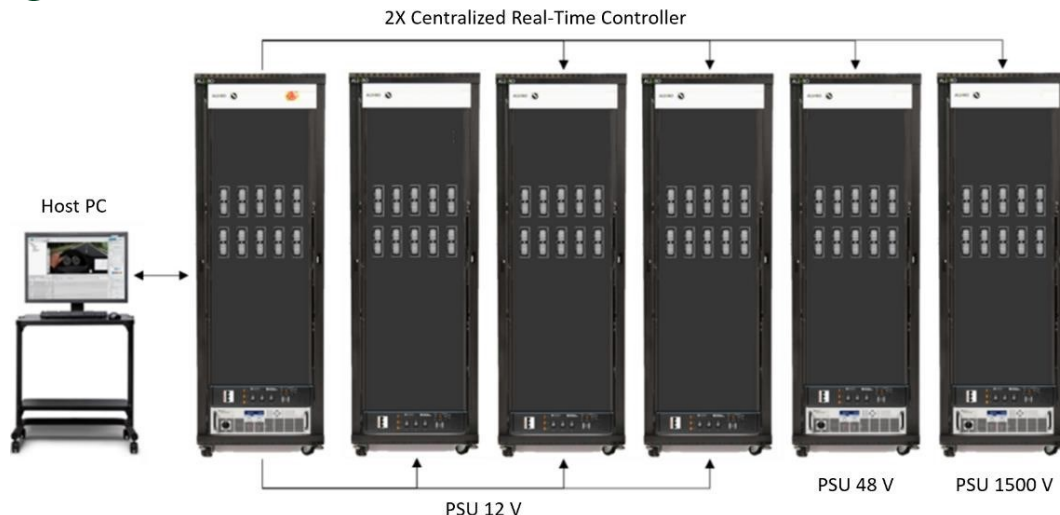
System Diagram

2X Centralized Real-Time Controller

Host PC

PSU 12 V

PSU 48 V

PSU 1500 V

FIGURE 01 ALIARO FILL VEHICLE HIL SIMULATOR
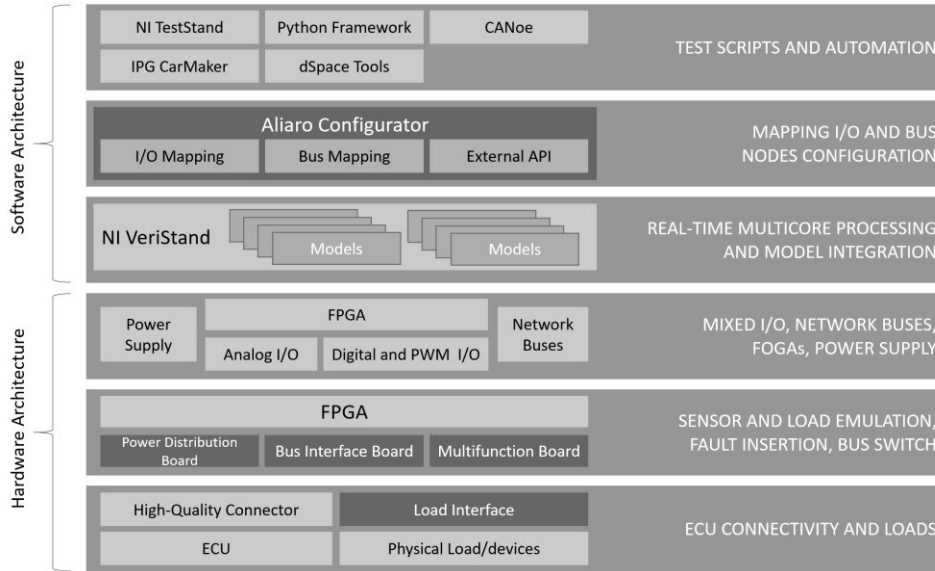
System Architecture

FIGURE 02 OPEN PLATFORM HIL ARCH ITECTURE

"The major advantages which made us pick NI and Aliaro were third-party integration of smaller suppliers, time to delivery, price advantage, agile development, and VeriStand. We found VeriStand to be very intuitive and easy to work with.

The car project for which the HIL is intended evolved as we created the specs for the HIL, which meant that we could not deliver a full spec order. NI and Aliaro were flexible and preferred communicative delivery."

—Test Coordinator, Major OEM

Aliaro Configurator Software

- Decrease downtime during system reconfiguration
- Change and update a large number of channels
- Save channel and system configurations
- Use included API for external access

FIGURE 03 ALIARO CONFIGURATOR SOFTWARE

CONTACT PARTNER