

National Instruments Solution Brief

Vehicle Systems Integration HIL

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.

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

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

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 platform-based 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

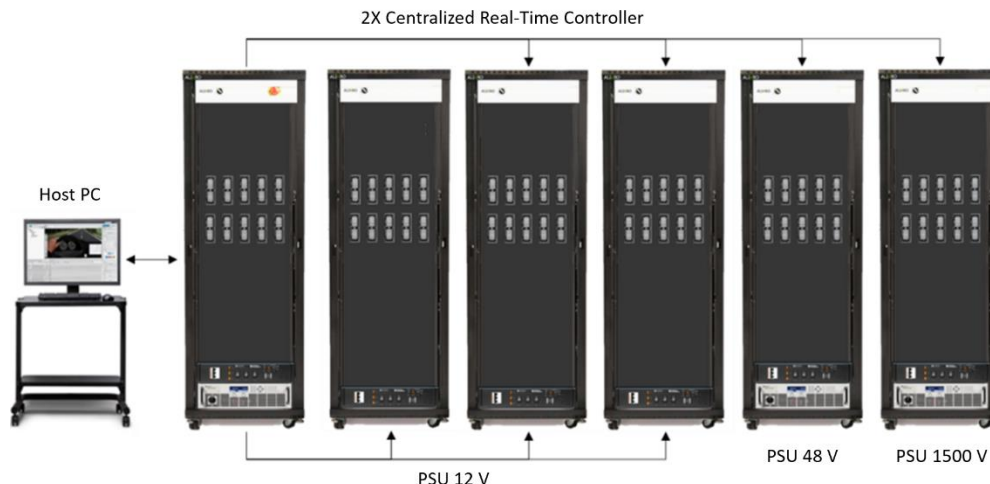


Figure 1. Aliaro Full Vehicle HIL Simulator

Agile and Cost-Effective Solution Delivery

“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

System Architecture

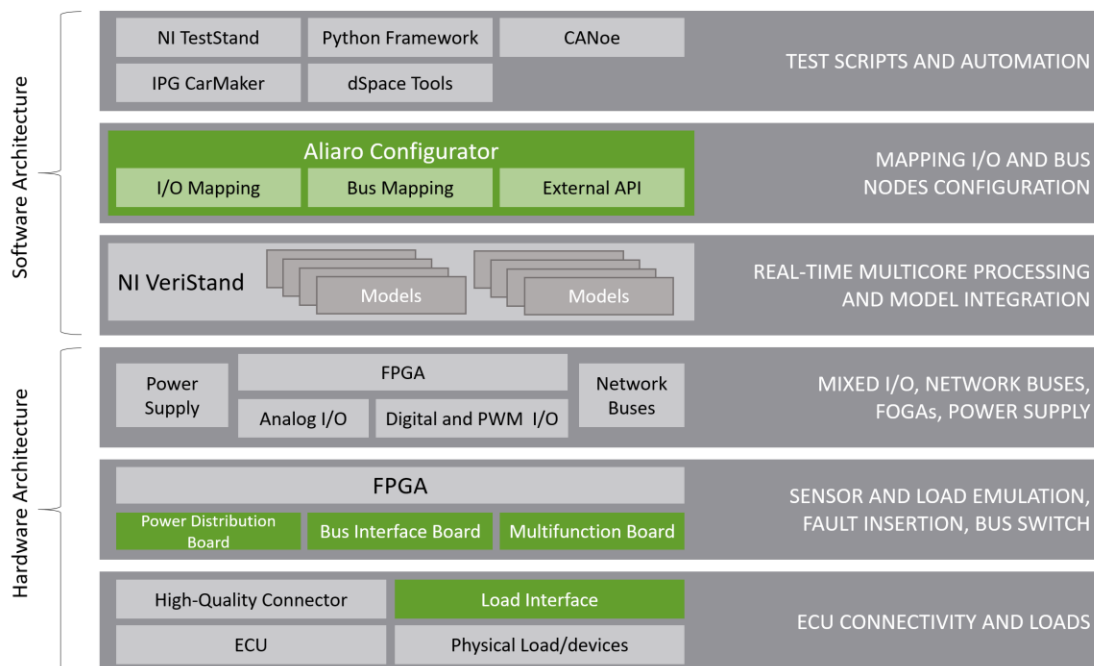


Figure 2. Open Platform HIL Architecture

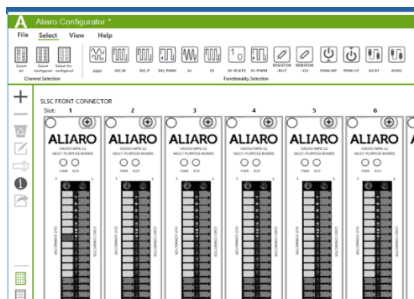


Figure 3. Aliaro Configurator software

Aliaro Configurator

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

About Aliaro

Aliaro is an established test solution and HIL provider and NI Silver Alliance Partner in Sweden, with offices in Sweden, UK, China, and the USA. Together with NI, they design modular, flexible, and cost-efficient testing and HIL solutions so that customers can work with open and rapidly changeable devices.

Contact your NI account manager or Aliaro to learn more about how NI and Aliaro can help you increase product quality and accelerate testing timelines.

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