ni.com/automotive

National Instruments Solution Brief

Body ECU Hardware-in-the-Loop Test

Increasingly sophisticated and interconnected interior, infotainment, and advanced driver-assistance (ADAS) systems have expanded the number and complexity of body electronic control units (ECUs)—from active suspension, braking, and emergency steering to seat control and rearview mirror ECUs integrated with infotainment systems. When testing the embedded software on these ECUs, safety, availability, or cost considerations can make it impractical to perform the necessary validation tests using a complete system. Hardware-in-the-Loop (HIL) test methodology brings test earlier in the design cycle. Creating that tester on a flexible software-defined platform makes for a flexible system that can adapt as ECU design and test requirements change.

The NI + Aliaro Advantage

- Minimize cost and ensure reliability with HIL test methodology, reducing the need for costly real-world tests
- Reduce test development time and enjoy quick startup with a turnkey system built with Aliaro's integration and NI's modular platform
- Maximize system reuse with a flexible tester designed to be extended and customized to meet your changing requirements

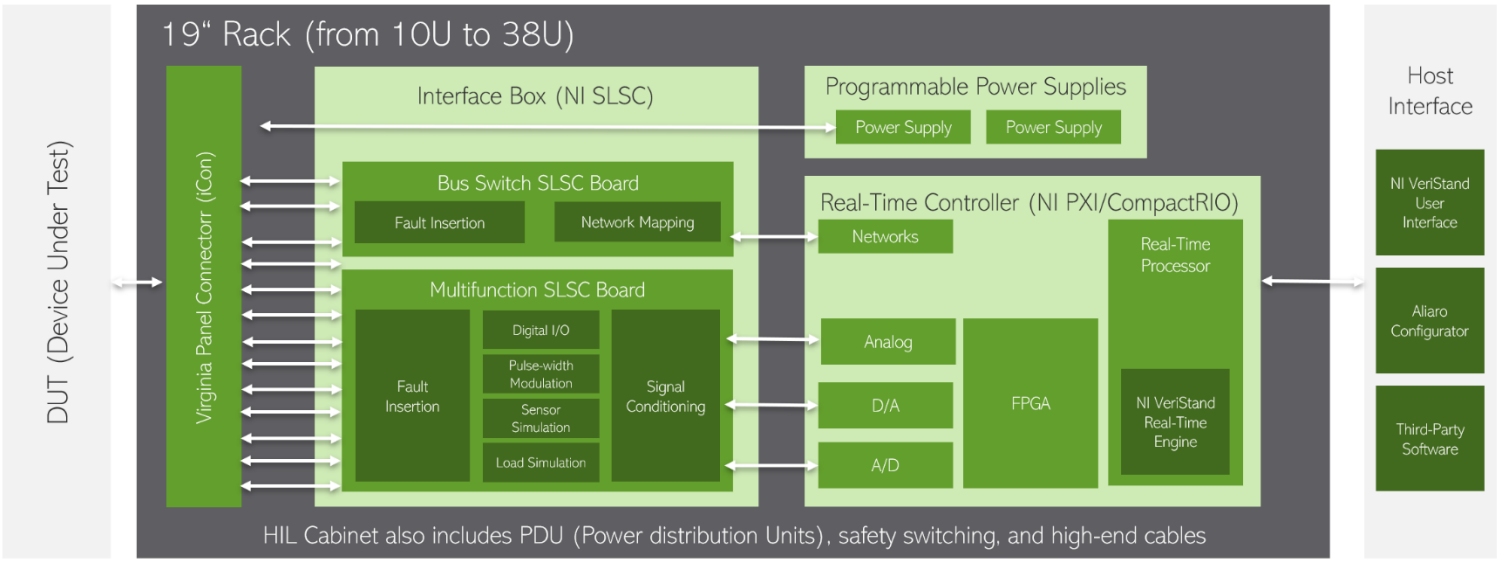
Application Requirements

- Adapt to inevitable changes in signal lists and I/O requirements
- Conduct fault insertion and signal conditioning
- Integrate models, third party devices, and toolkits to accurately simulate the full system

NI + Aliaro Solution

- If your ECU pinout changes, quickly reconfigure your system setup using Aliaro Configurator Software and the Aliaro AL-1010 switch load signal conditioning (SLSC) module, which provides flexible I/O, signal conditioning, and switching capabilities on each channel, and fault injection on all pins
- User-friendly model integration with NI VeriStand for sensor and actuation simulation, and I/O interfacing with NI PXI and CompactRIO hardware incorporating the latest Xilinx FPGA technology for µs-level, real-time, model-based simulation of power electronics, actuation, and sensors
- Suitable for multi-vendor test environments with an open platform and support for ASAM XIL, CANoe, dSPACE ControlDesk, and a number of Python frameworks

System Diagram



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

Key Specifications

Dimensions	38U (1.8m x 0.6m x 0.8m)
Max I/O per Cabinet	480
Flexible I/O Functionality	Analog I/O, Digital I/O, PWM I/O
Resistor Emulation Support	Yes (Flexible Configuration)
Electrical Fault Insertion	Yes, on All Channels
Bus Fault Insertion Support	Yes (CAN, LIN, Automotive Ethernet)
ASAM Support	Yes
Simulation Model Support	Yes (Supports Models Supported in VeriStand)
Current per DUT Channel	10 A (Max 40 A by Parallel Channels)

Figure 1. Aliaro Automotive Simulator

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 solutions for testing and HIL that enable customers to work with open and changeable devices where rapid changes are allowed.

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.

+46 31 533 900
sales@aliaro.com