**ALIARO**

Aliaro Solution Brief

# Battery Management System (BMS) HIL Test

Verify your battery management system (BMS) function with HIL testing by emulating battery cells and simulating sensors, I/O, and communication to other ECUs. Ensure that your communication, safety functions, cell balancing, and fault monitoring algorithms are working properly. When testing the embedded software on these BMS, safety, availability, or cost considerations can make it impractical to perform the necessary validation tests using a complete system. 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.

## Application Requirements

- Adapt to inevitable changes in signal lists and I/O requirements

- Emulate cells on battery models.

- Conduct fault insertion and signal conditioning on BMS.

## Aliaro Solution

- If your ECU pinout changes you can quickly reconfigure your system setup using the Aliaro Configurator Software and the Aliaro AL-1010 SLSC module, which provides flexible I/O, signal conditioning and switching capabilities on each channel, and fault injection on all pins.

- Emulate 12 battery cells with a high-precision BCS unit connected to the system through a PXI CAN interface module. Easily add more channels.

- Integrate battery models configured to simulate most battery types (NiMH, LiON, and so on) with different discharge characteristics, connect to third-party equipment, and execute real-time tests with VeriStand.

## The 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

## System Diagram
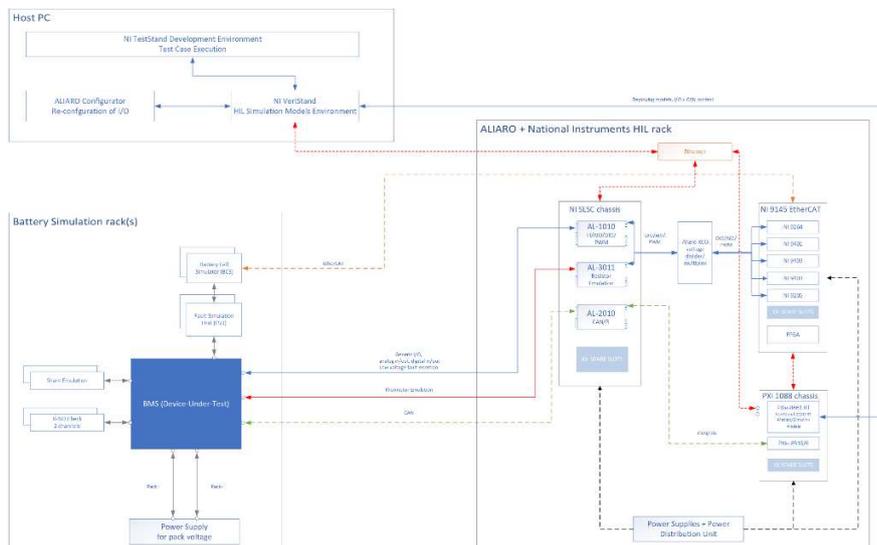
## The NI and ALIARO Advantage

NI for hardware and VeriStand software, Aliaro for integration and models, and Comemso for battery emulation results in a very competitive solution.

The NI real-time simulation system helps you develop and test products and designs in a safe environment

NI and Aliaro combined technologies help you to simulate models of batteries, high-fidelity power electronics and motors, and cooling or visual control units in real time.

## Key Specifications

| Area | Value |
|------|-------|
| Flexible I/O Functionality | Analog IN/OUT, Digital IN/OUT, PWM IN/OUT |
| Resistor emulation support | Yes (flexible configuration) |
| Electrical fault insertion | Yes, on all channels |
| Support for fault insertion of busses | Yes, CAN, LIN, Automotive Ethernet |
| ASAM Support | Yes |
| Supported Simulation models in VeriStand | http://www.ni.com/product-documentation/31488/en/ |
| Number of Cells per Emulator | 12 |
| Voltage Range | 0.01…8 V |
| Nominal Current | 0…4.9 A |
| DC Accuracy | ±0.5 mV |
| Ripple | ±3 mV |
| Communication with NI PXI | CAN/Ethernet |
| Electrical Failure Simulation | Broken wire, short circuit, polarity reversal; up to 144 cells per rack, 240 cells total |



## About Aliaro

Aliaro is an established test solution & HIL provider and NI Silver Alliance Partner in Sweden with offices in Sweden, UK, China and 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** Aliaro to learn more about how NI & Aliaro can help you increase product quality and accelerate testing timelines.

+46 31 533 900
sales@aliaro.com