

Battery Cell Simulation in eVTOL

The growing need to deploy Electric Vertical Take-Off and Landing (eVTOL) aircraft increases the need for flexible and adjustable test environments focusing on the safety and quality of the electric propulsion and batteries.

The **xMove Battery Cell Simulator (BCS)** empowers users to verify the Battery Management System (BMS) functionality. It simulates both the battery cells and sensors to ensure that your communication, safety functions, cell balancing, and fault monitoring algorithms work as expected.

When testing the embedded software on the BMS, safety, availability, or cost considerations can make it impractical to perform the necessary validation tests using a complete test system.

The simulator allows test teams to verify Battery Management System functionality in a lab environment without using the real battery. The Battery Cell Simulator can be used in both production and validation testing which will enable a unified testing workflow.



Customer Needs

01

Test the functionality of Battery Management Systems with a focus on battery communication and capabilities.

02

Simulate all characteristics of a battery cell or battery pack using simulation hardware and/or mathematical models using Simulink.

03

Deploy systems quickly using existing models, tools, and workflows. Test systems need to be up and running quickly with fast delivery schedules.

ALIARO + NI Solution

01

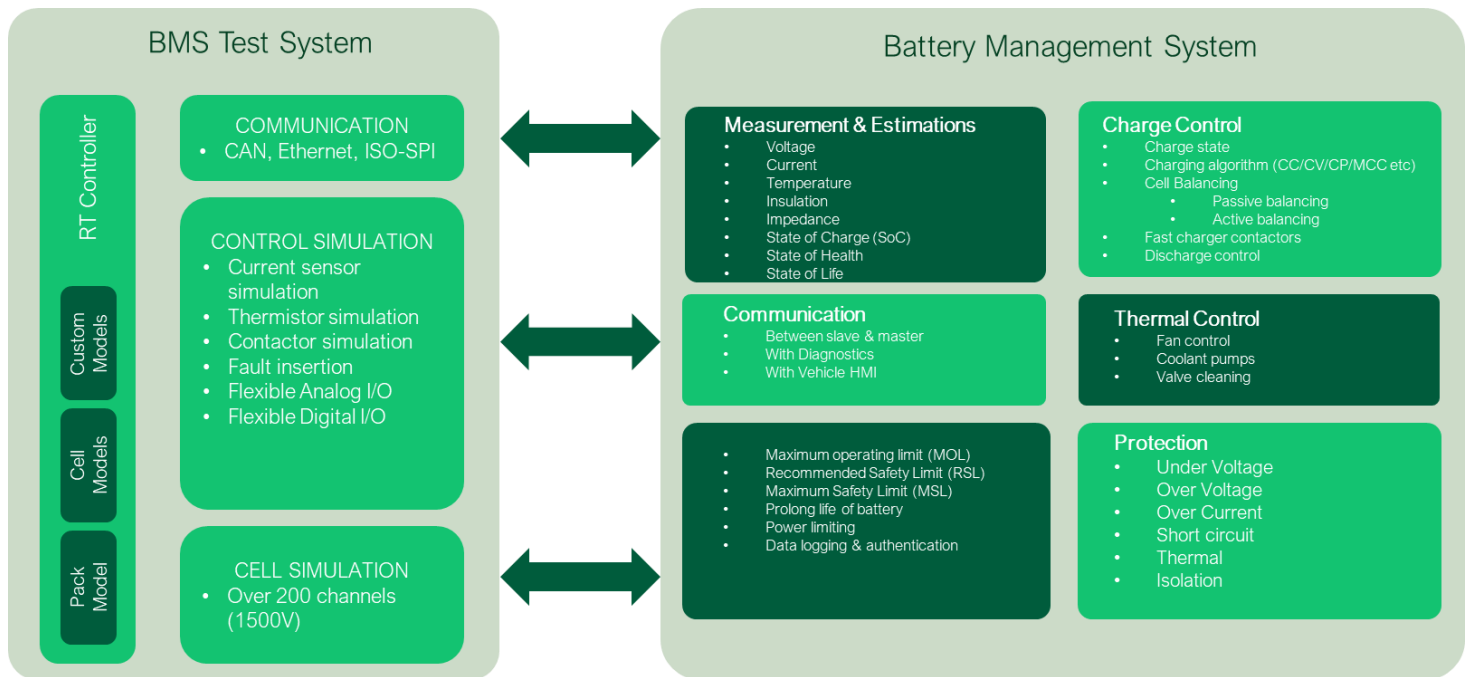
Run simulation and/or test software from different controllers depending on focus of testing, performance requirements, and/or the complexity of the BMS.

02

Battery Cell Simulation SLSC modules simulate/replace the real battery. Cell temperature is emulated through standard SLSC modules

03

Battery models can be deployed on the test system for testing battery characteristics with having the real batteries.

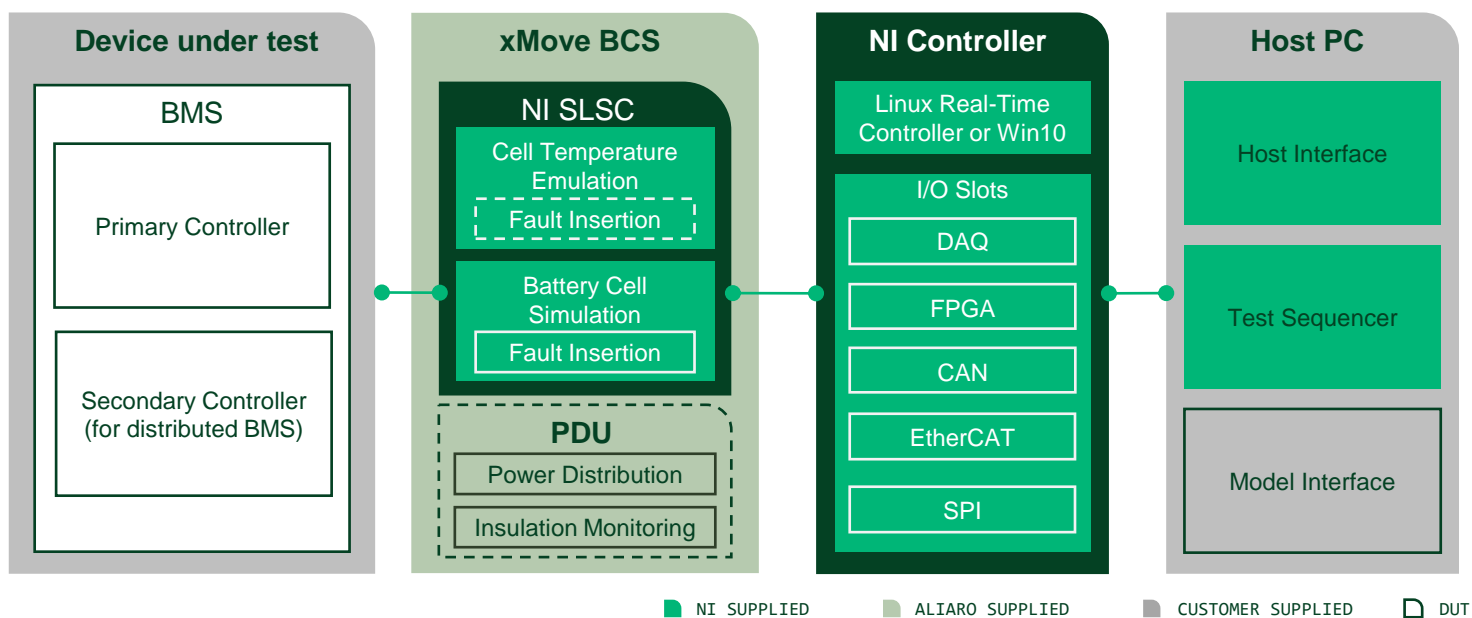


THE ALIARO ADVANTAGE

- 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 expertise and NI's modular platform.
- Maximize system reuse with a flexible tester designed to be extended and customized to meet your changing requirements.



xMove Battery Cell Simulator With An NI Controller - Block Diagram



SIMULATOR SPECIFICATIONS	141206-01	141231-01	141231-02	141231-03
Simulated Cell Quantity (AL-4010 SLSC Modules)	6	UP TO 48	UP TO 144	UP TO 216
Cabinet Quantity	ONLY SLSC CHASSIS	1 (DESKTOP)	1 (19" RACK)	2 (19" RACKS)
Control interface	SPI (Serial Peripheral Interface)			
Power Distribution Unit with Safety Switch	Not included	Rig Power Supply and Battery Cell Power Supply		
Isolation	1500 V			
Voltage Measurement Range	+/- 8 V (accuracy +/-1 mV)			
Current Measurement Range	+/- 2.5 Amps Low current range: 0-10 mA Low current accuracy: 10 µA High current range: +/- 2,5 A High current accuracy: 2 mA			
Electric Failure Simulation	Broken wire, Short Circuit (5 Amps, peak 10 Amps) and Polarity Reversal			
Simulated Temperature sensors Quantity (AL-3011 SLSC Modules)	16 (OPTIONAL)	16	48	64
NTC Thermistor Value Range	10 OHM - 8 MOHM			