Sandia National Laboratories

Open-source Software-Hardware Platform for Grid Integration of Hybrid Batteries

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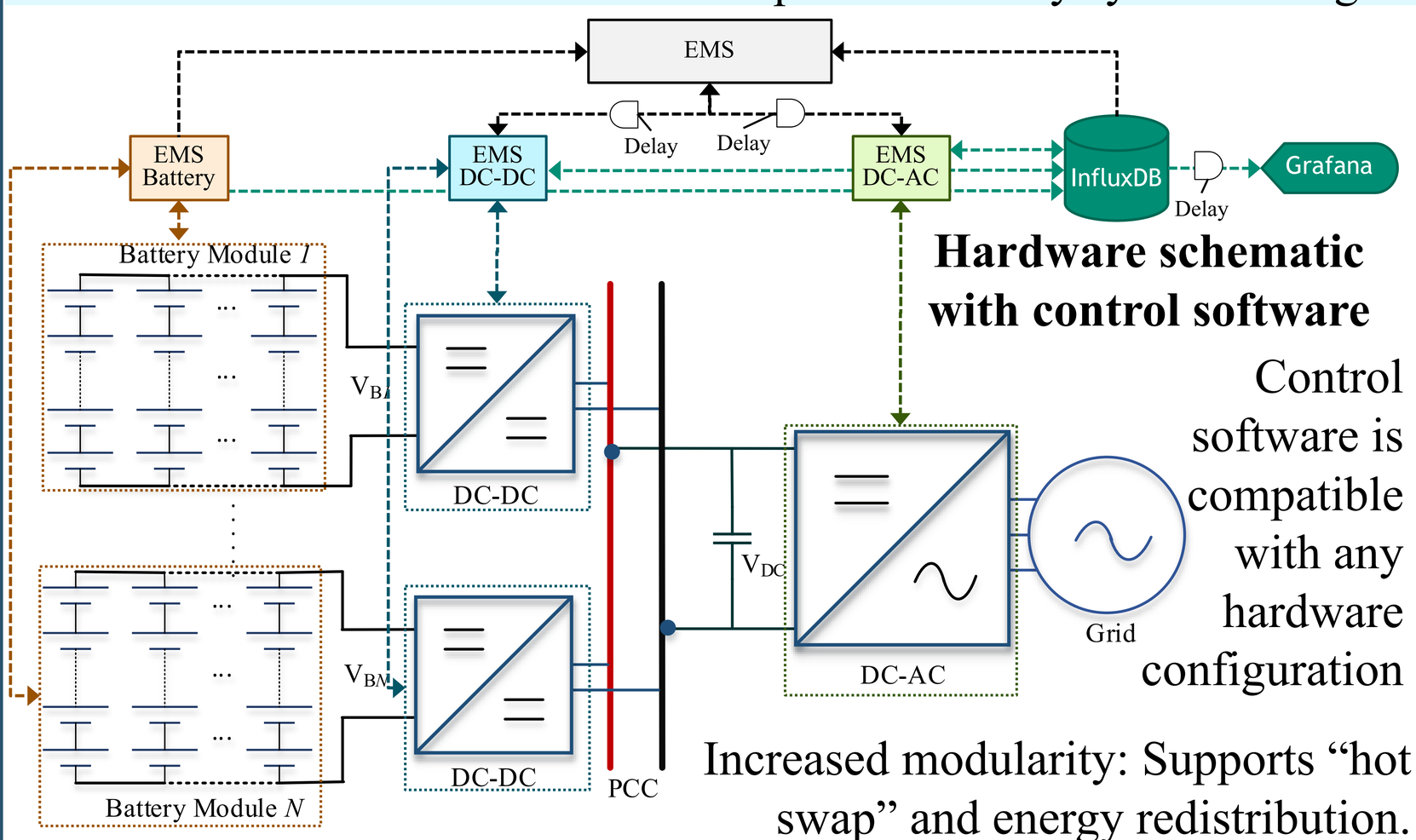
Motivation: A battery energy storage system comprises multiple components that are manufactured by different vendors, thereby making system integration challenging. A standardized & readily available platform will facilitate seamless integration/removal of batteries with operational reliability & safety. This project has developed a open-source software-hardware integration platform that is battery agnostic, modular and can operate with any system configuration.



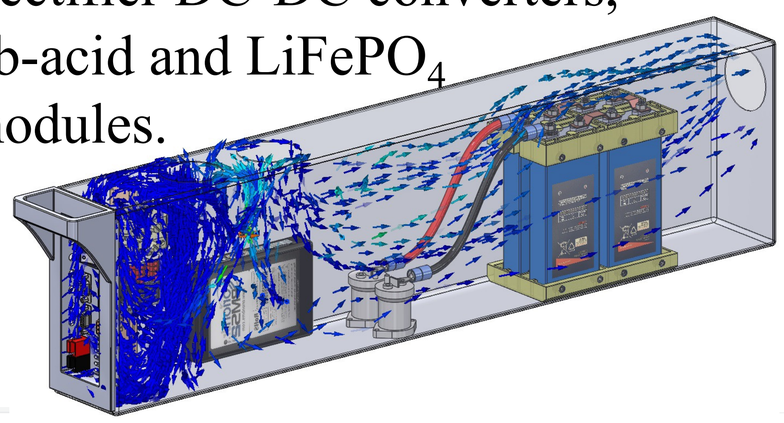
Hardware schematic with control software

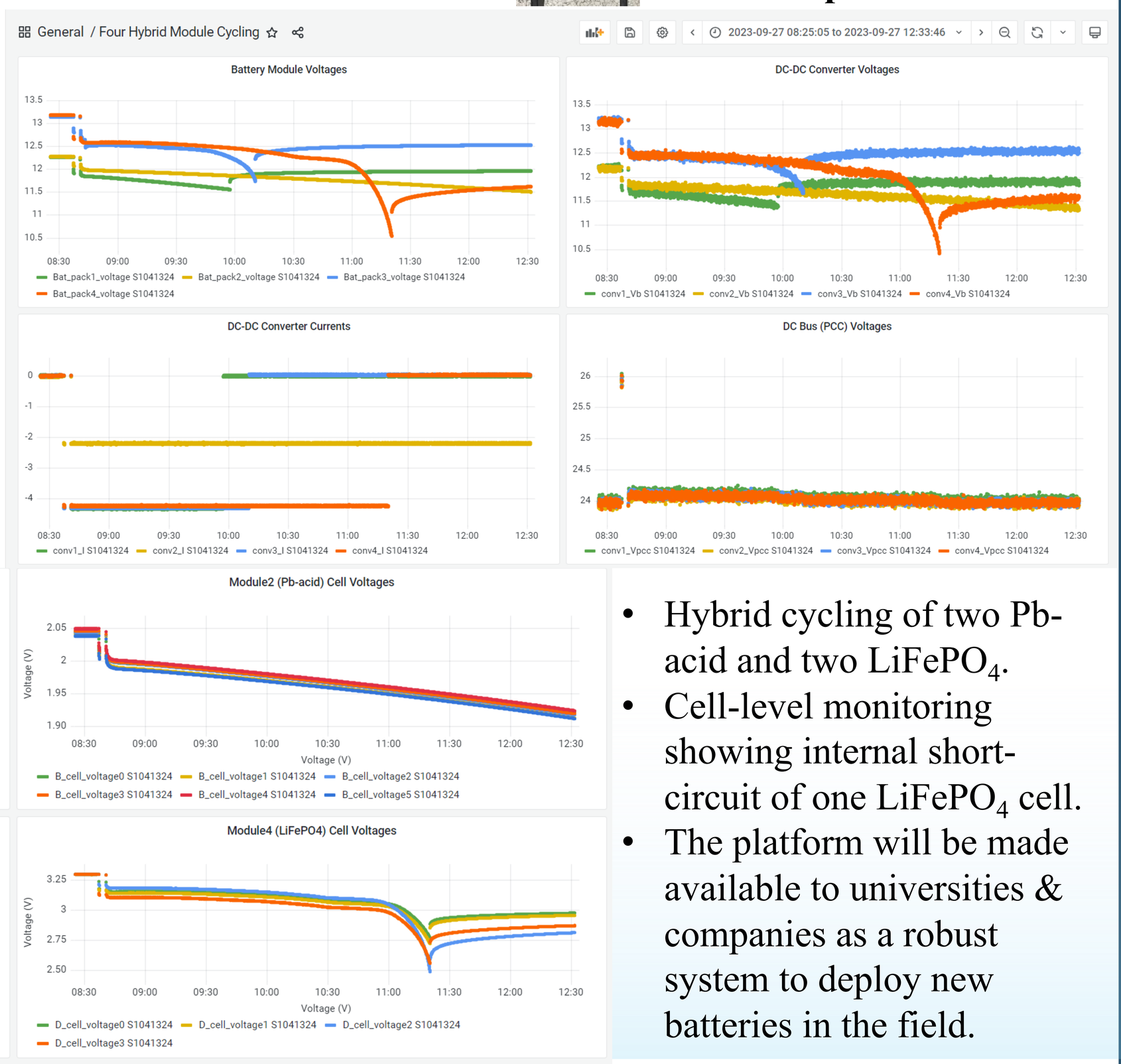
Control software is compatible with any hardware configuration

Increased modularity: Supports "hot swap" and energy redistribution. Mix old and new cells.

Modular system built to UL 1973 specifications

Case study with Synchronous Rectifier DC-DC converters, Pb-acid and $LiFePO_4$ modules.





- Hybrid cycling of two Pb-acid and two $LiFePO_4$.
- Cell-level monitoring showing internal short-circuit of one $LiFePO_4$ cell.
- The platform will be made available to universities & companies as a robust system to deploy new batteries in the field.

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