# Pushing Battery Performance Further with Model-Based BMS Testing

Across industries, there is a growing reliance on Battery Management Systems (BMS) to deliver the safest and best possible battery performance in all circumstances. Using a BMS is required to maintain safety, extend lifespan, and optimize performance of advanced battery packs by balancing cell voltages, regulating charge and discharge behavior, and preserving operation within required ranges of performance. The traditional approach to BMS development uses physical battery cells for testing, requiring high costs for battery packs and posing significant dangers when testing fault scenarios. To move beyond these limitations, industry leaders have moved to model-based Battery Management System (BMS) test platforms due to their virtually unlimited flexibility for BMS development.

A team of engineers from Maplesoft and Bloomy set out to create a powerful BMS test platform that offers the flexibility of an integrated model-based solution. By combining MapleSim's high-fidelity battery models and the Bloomy BMS HIL Test System, it's now easier to test and develop advanced BMS firmware for the best possible battery performance in new products.

Courtesy Bloomy Controls, Inc

During the collaboration, engineers used a Hardware-in-the-Loop test platform to integrate battery models, allowing high flexibility while maintaining the real-time speeds required for HIL testing. By using a BMS HIL test platform, the physical signal channels of a BMS can connect to high-precision battery models, giving an unparalleled amount of flexibility to optimize the BMS for any given battery configuration. In these test platforms, batteries are represented by mathematical models that can be simulated in real-time, allowing for rapid BMS development with any required battery configuration. This industry trend is allowing engineers to rapidly develop BMS firmware in a scalable, flexible environment that reduces both costs and dangers of traditional methods while giving engineers new abilities for system optimization.
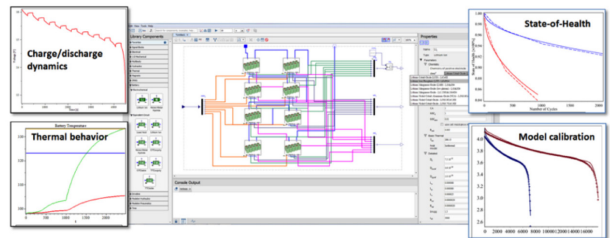
Bloomy's collaboration with Maplesoft has now brought industry-leading battery models to the Bloomy BMS HIL Test System, creating new abilities for rapid, flexible BMS development. The MapleSim Battery Library brings full-fidelity, highly customizable battery models to the BMS test platform, and is optimized for the fastest simulation performance across the industry. Together, Bloomy and Maplesoft are providing engineers with the most comprehensive platform available to push their Battery Management Systems further.

About Bloomy:

Bloomy provides innovative products, platforms, and custom turnkey systems by combining the latest hardware and software from National Instruments, our own best engineering practices, and expert knowledge of applications in our key focus industries. Our mission is to provide high-quality products and services that stimulate employees, benefit customers, and innovate industry. Our vision is to remain the leader. For more information, visit www.bloomy.com.

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