Fraunhofer IISB

About Fraunhofer IISB

The Fraunhofer Institute for Integrated Systems and Device Technology IISB as part of the Fraunhofer-Gesellschaft conducts applied research and development for industry as well as public authorities in the field of electronic systems for application in, e.g., electric mobility, aerospace, Industry 4.0, power grids or energy technology. In this context, the institute uniquely covers the entire value chain - from basic materials to complete power electronic systems.

The department “Intelligent Energy Systems” develops the technologies for the digitalization of the power electronic and energy conversion in the transportation and energy domains. The department integrates these technologies in interconnected intelligent energy systems, building the “Cognitive Power Electronics” ecosystem initiated at the Fraunhofer IISB.

In the research area “Battery Systems” we work on innovative solutions for lithium-ion-based electrical energy storage systems for stationary and mobile applications. The activities range from the development of battery management systems (e.g., BMS platform foxBMS®), algorithms for battery state estimations and predictions, up to the design of full-custom battery systems, e.g., for large applications like racing cars, and submarine exploration robots.

In the research area “Data Analytics” we take an application-oriented approach that includes system analysis, conception, data collection, filtering, clustering, and finally the development and implementation of intelligent algorithms in industrial processes or in embedded systems.

Dr. Georg Roeder

Dr. Martin Schellenberger

About Fraunhofer IISB team

Dr. Georg Roeder, senior researcher at Fraunhofer IISB, department of Intelligent Energy Systems, expert in data analytics and machine learning (Leader WP 3).

Dr. Martin Schellenberger, group manager “Data Analytics” at Fraunhofer IISB, department of Intelligent Energy Systems, expert in application of data analytics (contact for data analytics and AI)).

Radu Schwarz, group manager “Battery Systems” at Fraunhofer IISB, department of Intelligent Energy Systems, expert in BMS electronics (Fraunhofer IISB main contact for BATMAX).

Stefan Waldhör, senior engineer at Fraunhofer IISB, department of Intelligent Energy Systems, expert in BMS software and battery system integration (Leader WP 5).

GRANT AGREEMENT: 101104013

Funded by the European Union. Views and opinions however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.

Project funded by:

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Federal Department of Economic Affairs, Education and Research EAER
State Secretariat for Education, Research and Innovation SERI

This work was supported by the Swiss State Secretariat for Education, Research and Innovation (SERI)

BATMAX

How will the BATMAX project make Europe more sustainable?

For a resource-efficient society and an environmentally friendly economy, batteries as key enablers especially in the electric mobility and energy sector. BATMAX will strengthen European competence in the relevant area of system integration applying highly advanced battery management systems characterized for state-of-the-art and upcoming environmentally friendly battery technologies.

Dr. Georg Roeder

Dr. Martin Schellenberger

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What will the BATMAX project add to the current scientific state-of-the-art?

BATMAX will contribute to the implementation of next-generation battery management by enabling true IoT capabilities on the BMS and thereby enhancing the connectivity and usability of battery systems across domains. BATMAX will further establish a concise digital-twin framework, which integrates experimental and operational data and data-based, physics-based, and hybrid models, that can be connected and continuously updated with operational units.

What will be the main impact of the project?

The BMS platform foxBMS® as well as the digital twin framework will accelerate the development and integration of battery systems into new and existing applications across different domains.

Why is the BATMAX project important?

Connectivity, data aggregation, management, and usage are key components for the next generation BMS and the further development of IISB's open source foxBMS® platform will help to address these topics in different battery powered applications. BATMAX establishes well-parametrized digital twins for state-of-the-art battery systems including the perspective for a real-rime flow between models and operational data relevant for application in electric mobility in different domains (on-road, marine, stationary).

What will be the role of your organization in the project?

FHG will provide excellence in applied research in the fields of battery management systems and data analytics for the implementation of the digital twin. As a key element to the project, FHG supplies the foxBMS® platform with IoT interfaces and secure, interoperable. In the course of the project, the foxBMS® platform enables further sensorisation, standardized, IOT interfacing, and execution of algorithms. Data analytics methods are supplied to enable concise data aggregation, data-based prediction of relevant battery states (SOX), and their usage and implementation with the digital twin.

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