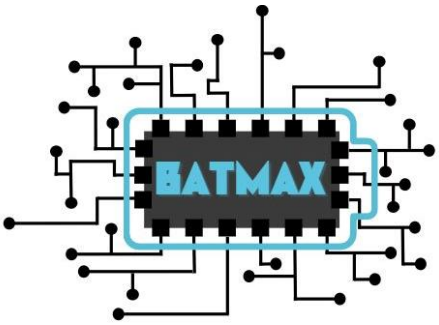

BatMax

Press Release

Problem:

The transportation sector is responsible for roughly one-quarter of the total greenhouse emissions in the EU, with road vehicles contributing to over 60% of the emissions. The electrified applications such as automotive, marine or stationary are strongly dependent on battery technologies in terms of energy, power, safety, and long lifetime as well as an acceptable cost. In this regard, next-generation lithium-based technologies can fulfil most of those requirements. Since the characteristics of those battery technologies are different from the conventional lithium-ion batteries, there is a dedicated need to develop non-invasive multi-sensing, real-time analytics as well as new and robust state functions that can estimate and predict the battery performances, accurately, which can be implemented into an open-access Battery management system (BMS).

Solution:

Physics and data-based battery management by multi-domain digital twins (BATMAX) sets out to pave the way for advanced next-generation data-based and adaptable battery management systems capable of fulfilling the needs and requirements of various mobile and stationary applications and use cases. The main objective of the project is to contribute to improving battery system performance, safety, reliability, service life, and lifetime cost and therefore to maximise the value created by the operation of the battery systems in various kinds of end-use applications. This is approached by creating a framework for next-generation of battery management based on large amounts of data, both experimental, operational and synthetic, adaptable physics-based models, suitable reduced-order models for both physical BMS algorithms and real-time multi-scale digital twins. BATMAX develops a framework to efficiently parameterise physics-based models, essential to reduce the cost of model development and encourage their use in BMSs. Advanced numerical methods accelerate the extraction of relevant parameters from experimental and numerical simulation data. BATMAX develops hardware and sensorisation on cell and system-level for collection and communication of battery measurement data and integrates an open-source BMS platform to a laboratory-scale prototype system. The BATMAX BMS framework (hardware and software) will enable to exploit advanced battery models with an integrated digital twin framework that is capable of coping with high amount of measured data, which will enable to monitor the battery aging in depth and to facilitate the key functions of systems. A central output is an extensive multi-purpose and scalable digital twin framework that is developed and validated for advanced battery management. Key impacts from BATMAX contribute to a 10% battery lifetime increase on average scenario, 20% performance increase in specific scenarios and contribution to lifecycle cost reduction by at least 10%.

Grant Agreement number: 101104013

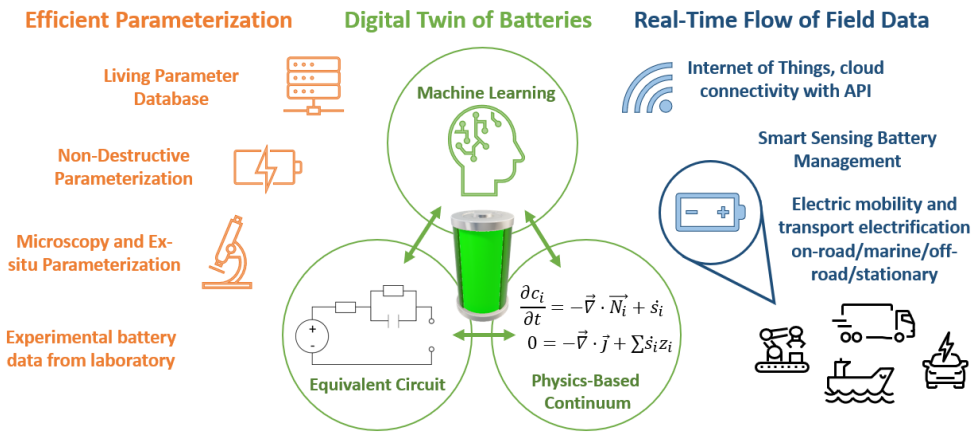

Figure 1: The conceptual approach of BATMAX.

Impact:

The BATMAX project has the potential to significantly contribute to meeting the challenges Europe faces today to support the green transition in both energy and transportation systems by supporting the optimal use and operation of battery systems in a wide range of applications. Better utilisation of battery storage will improve our capacity to adopt clean, secure, sustainable, and efficient energy and transport solutions. BATMAX responds to the market needs for batteries with lower cost, high performance and reliability, and sustainable lifecycle. This will contribute to improved competitiveness and attractiveness of the use of batteries in a wide range of transport and mobile applications and is a critical element in the clean energy system, providing increased flexibility. The Key Expected Results of BATMAX start pathways toward achieving broader impacts. The goal of BATMAX is to ensure that the target industry, various end users, as well as regulatory players, and the scientific community, can make the best use of the BATMAX outputs and carry them forward towards adoption and creation of added value. The policy framework will continue to increasingly promote do-no-significant-harm (DNSH) technologies and "polluter pays" legislation, further boosting the battery industry and utilization in all parts of the value chain.

Consortium:

	Partner	Short Name	Country
1	TEKNOLOGIAN TUTKIMUSKESKUS VTT OY	VTT	Finland
2	VALMET AUTOMOTIVE EV POWER OY	VA	Finland
3	SINTEF AS	SINTEF	Norway
4	SINTEF ENERGI AS	SINTEF EN	Norway
5	CORVUS NORWAY AS	CORVUS	Norway
6	RISE FIRE RESEARCH AS	FRN	Norway
7	RISE RESEARCH INSTITUTES OF SWEDEN AB	RISE	Sweden
8	AVESTA BATTERY & ENERGY ENGINEERING	ABEE	Belgium
9	LUMENCY	LUM	Belgium
10	FRAUNHOFER GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG EV	Fraunhofer	Germany

11	ELECTRICITE DE FRANCE	EDF	France
12	RTD TALOS LIMITED	TALOS	Cyprus
13	COMPANY FOR MANUFACTURING TRADE ANDSERVICES AVESTA BATERI AND ENERDZIINZINERING DOOEL IMPORT-EXPORT SKOPJE	ABEE MK	North Macedonia
14	CENTRE SUISSE D'ELECTRONIQUE ET DE MICROTECHNIQUE SA - RECHERCHE ET DEVELOPPEMENT	CSEM	Switzerland

Figure 2: BATMAX consortium

Title	Battery management by multi-domain digital twins
Grant Agreement number	101104013
Starting date	1 May 2023
Duration	42 Months
Total budget	€ 4.994.575,00

Funded by the European Union

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

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

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