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**Situationally Aware Innovative Battery Management
System for Next Generation Vehicles**



InnoBMS - Deliverable report

D2.2 - Advanced functionalities edge



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Project summary

The core objective of InnoBMS is to develop and demonstrate (TRL6) a future-ready best-in-class BMS hard- and software solution that maximizes battery utilization and performance for the user without negatively affecting battery life, even in extreme conditions, whilst continuously maintaining safety. Concretely, the InnoBMS proposal will deliver a 12% higher effective battery pack volumetric density, a 33% longer battery lifetime and a demonstrated lifetime of 15 years. The results will be demonstrated using novel testing methods that give a 36% reduction in the testing time of a BMS. The results will be demonstrated in two use cases, one light commercial vehicle (Fiat Doblo Electric) and one medium-duty van (IVECO eDaily). The key outcomes will enable a cost reduction of 12% and 9.7% for passenger cars and light-duty vehicles, respectively. The core objective will be achieved through five technical objectives. 1) advanced hybrid physical and data-driven models and algorithms to enable a flexible and modular BMS suitable for a wide range of batteries. 2) Software for a fully connected and fully wireless BMS that acts as a communication server inside the vehicle E/E-architecture, the center of connection, on-board diagnostics and decision-taking for all battery-related information. 3) A scalable, fully wireless and self-tested BMS hardware that enables using different battery sizes at different operating voltage levels, and smart sensor integration. 4) Better battery utilization and exploitation using cloud-informed strategies and procedure. 5) A heterogeneous simulation toolchain and automated test methods.

Publishable summary

The core objective of InnoBMS project is to develop and demonstrate (TRL6) a future-ready, best-in-class BMS hardware and software solution that maximizes battery utilization and performance for the user without negatively affecting battery life, even in extreme conditions, while continuously maintaining safety.

InnoBMS leverages on seven work packages, with WP2 focusing on the Advanced functionalities covered by the BMS, simulation of them and testing methods performed. Delivery report D2.2 is based on Task 2.2, which is in charge of the development of a smart functionality able to ensure optimal charging based on the trip, SoC level, battery aging and charging infrastructure, and also safety functionalities in order to have a complete view of the battery performance.

These works will be focused on the development of predictive models and simulations of the state of the battery depending on the different scenarios possibly faced, Thermal Runaway events and Lithium plating along the battery life, using machine learning algorithms and full electrochemical models to analyse different battery and cell models and be able to adapt it to the models developed. Models will work in real time since will be developed on the Edge and on the Cloud to have a constant update of parameters and states and therefore, a true picture of the battery health and safety status.

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8.1 The consortium

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Project partners:

#	Partner short name	Partner Full Name
1	VUB	Vrije Universiteit Brussel
2	TOFAS	TOFAS Turk Otomobil Fabrikasi Anonim Sirketi
3	BOSCH	Robert Bosch SRL
4	AVL	AVL List GmbH
5	AVL-SFR	AVL Software and Functions GmbH
6	IDIADA	Idiada Automotive Technology SA
7	CID	Fundacion Cidetec
8	UL	Univerza v Ljubljani
9	THIL	Tajfun Hil Društvo sa Ograničenom Odgovornošću za Istraživanje, Proizvodnju, Rgovinu i Usluge Novi Sad
10	UNR	Uniresearch BV
11	FMF	FPT Motorenforschung AG
12	PTE	Potenza Technology Limited

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