



**Optimization of scalaBle rEaltime models and functiOnal testing for e-drive ConceptS**

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## Publishable Executive Summary

This document describes the liaison with ongoing relevant EU projects in the field of e-components and systems modelling and testing. The goal of the OBELICS project is to develop innovative and reliable modelling approaches that are based on first principles (mechanistic, physical, electrochemical, electro-thermal, electromagnetic model basis), are real-time capable and allow for systematic scalability towards real-time models. The innovations will reduce the development efforts for new electric vehicles by 40%, improve the efficiency of the e-drivetrain by 20% and increase safety by a factor of 10.

This document is a copy of D7.6 (Initial and final Dissemination Plan), which describes the target audience, how that audience was reached and when it was be reached. Due to the strong overlap between D7.6 and D7.10, the same content is reproduced in D7.10.

# 1 Introduction

## 1.1 OBELICS objective and results

OBELICS developed innovative and reliable modelling approaches that are based on first principles (mechanistic, physical, electrochemical, electro-thermal, electromagnetic model basis), are real-time capable and allow for systematic scalability towards real-time models; systematic scalable approaches towards real-time models have also been elaborated within the project. Furthermore, it is ensured that the models are compatible between different components as well as development levels/phases.

The overall objective of OBELICS is to develop a systematic and comprehensive framework for the design, development and testing of advanced e-powertrains and EVs line-ups, to reduce development efforts by 40% while improving efficiency of the e-drivetrain by 20% and increase safety by a factor of 10 using OBELICS advanced heterogeneous model-based testing methods and tools; as well as scalable and easy to parameterize real-time models.

## 1.2 Dissemination plan

Work package 7 is part of OBELICS and has specified the strategy and activities for internal communication and external outreach during the project. The WP title is “Standardization, Dissemination, Exploitation, 2nd life usage”. This dissemination plan is a deliverable (D7.6) in WP7.

The goal of the dissemination plan was to make OBELICS known to the widest possible group of potential users, and pave the way to exploitation of the project results ultimately achieve more efficient e-drivetrains and safer systems. This document describes the target audience, how that audience was reached and when it was reached.

The procedure for dissemination as agreed in the OBELICS is described in the consortium agreement (article 15) and is set up following the European Commission guidelines for communicating EU research.

The dissemination activities and strategy were regularly discussed during the project in the work package leader board meetings (once every other month) and at every general assembly meeting (twice a year).

## 1.3 Monitor project and collect results

VUB is the leader for WP7 and is responsible for the communication and outreach. However, the information that needs to be communicated to the audiences comes from all the OBELICS partners. Therefore, the information sources are the other WPs in OBELICS.

UNR collected results from partners and evaluated the feedback. UNR continually monitored and collected the information. The communication and outreach activities were on the agenda for the meetings of the work package leader board (once every other month) and general assembly (twice a year).

## 2 Communication tools

Several tools have been established to assist the OBELICS partners to make their work known to the widest possible group of potential users, and maximize the impact of the work in this project.

### 2.1 Logo

A logo has been designed to make the project results and material easy to identify. See Figure 1 for the logo and the color information.



Figure 1. OBELICS project logo

### 2.2 Templates

Standard templates for presentations (PowerPoint file) and deliverable reports (Word file) have been designed and are available for participants on AVL Sharepoint.

### 2.3 Website

As reported in D7.1 (project website including project templates) an address has been registered (<https://obelics.eu>) and project webpages have been designed. The external website was launched at the start of the project and will be kept accessible for 5 years after the end of the project. Please see Figure 2 for a screenshot.

The progress and/or outcomes of the project were shown on the public website for anyone interested in OBELICS. It has an easy menu structure and gives a brief overview. Partner logos and a link to their website are shown. Newsletters and technical project publications were posted on the website, as well as links to EC documents and related activities. The texts are regularly updated.

The aim was to update the website 10 times or more per year and to have more than 1000 views per year. As Figure 3 shows, there have been more than 15,000 page views, well above that target. The top ten visiting countries were the US (744), Germany (537), Italy (467), Belgium (335), France (286), UK (207), Austria (202), Netherlands (198), India (140) and Spain (126). Especially the visitors from the US and to a lesser extent India and Spain are worth mentioning, as these countries are not represented in the consortium.

**obelics**

Restricted area Subscribe Search...

Project - Results Partners News/Events Development Blog

1 2 3 4

OBELICS addresses the urgent need for new tools to enable multi-level modelling and testing of EV and their components in order to deliver more efficient vehicle designs faster while supporting modularity to enable mass production and hence improved affordability. The overall objective of OBELICS is to develop a systematic and comprehensive framework for the design, development and testing of advanced e-powertrains and EVs line-ups, to reduce development efforts by 40% while improving efficiency of the e-drivetrain by 20% and increase safety by a factor of 10 using OBELICS advanced heterogeneous model-based testing methods and tools; as well as scalable and easy to parameterize real-time models.

f t in e p

**Latest news related to OBELICS**

Joint Final Event HIF-ELEMENTS-OBELICS-DEMOBASE  
May 28, 2020

TRA-2020 – OBELICS paper!  
May 1, 2020

OBELICS publication on Open Access Government  
January 10, 2020

**Results within the OBELICS project**

**RESULTS**

In due course of the project the reports on the results of the project will be published on the website.

Please note that when a report is confidential only a public summary will be available, which can be quite short.

**OBELICS partner locations**

**Events related to OBELICS**

No events

**Facts and figures**

Full name: Optimization of scalable realtime models and functional testing for e-drive Concepts  
Acronym: OBELICS  
Duration: 36 months  
Start date: 1 October 2017  
Total budget: € 9,077,497.50 million  
EC Funding: € 9,077,497.50 million

**Partners about**

NIC

"It is exciting to work with partners who are able to transform your daily scientific efforts into useful products."

**Project Collaboration**

The OBELICS project will collaborate with other GV 07 projects, such as HIF-Elements and DemoBase, for "Standardization" activities with regards to FMI/FMU and Battery safety standards.  
Aim is to create synergies and reduce overlap for these activities.

Figure 2. The OBELICS website <https://obelics.eu/> (screenshot November 2020).



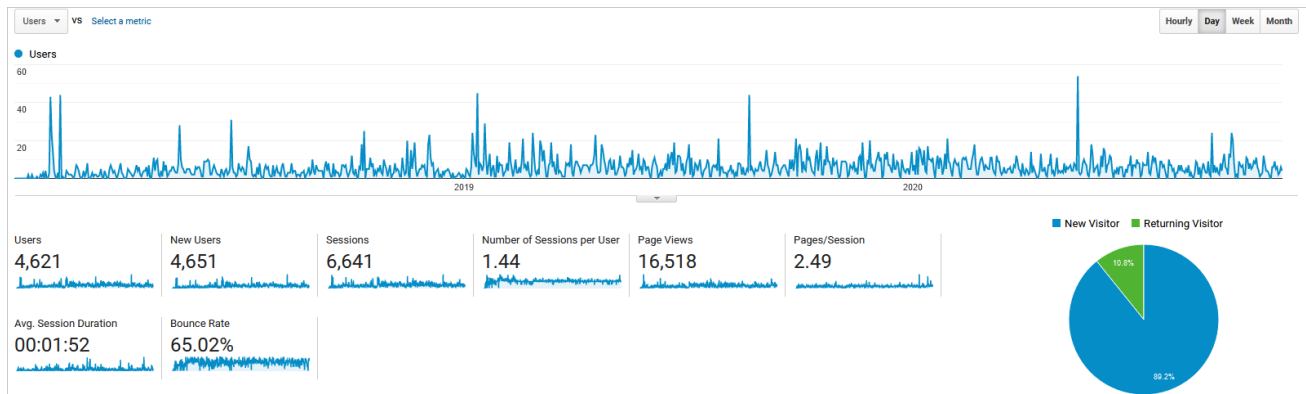


Figure 3. Statistics on the views of the OBELICS website <https://obelics.eu/> between January 1<sup>st</sup> 2018 and October 27<sup>th</sup> 2020.

## 2.4 Flyer

UNR has designed a flyer, so that OBELICS members can distribute these among their contacts, at conferences and at workshops.

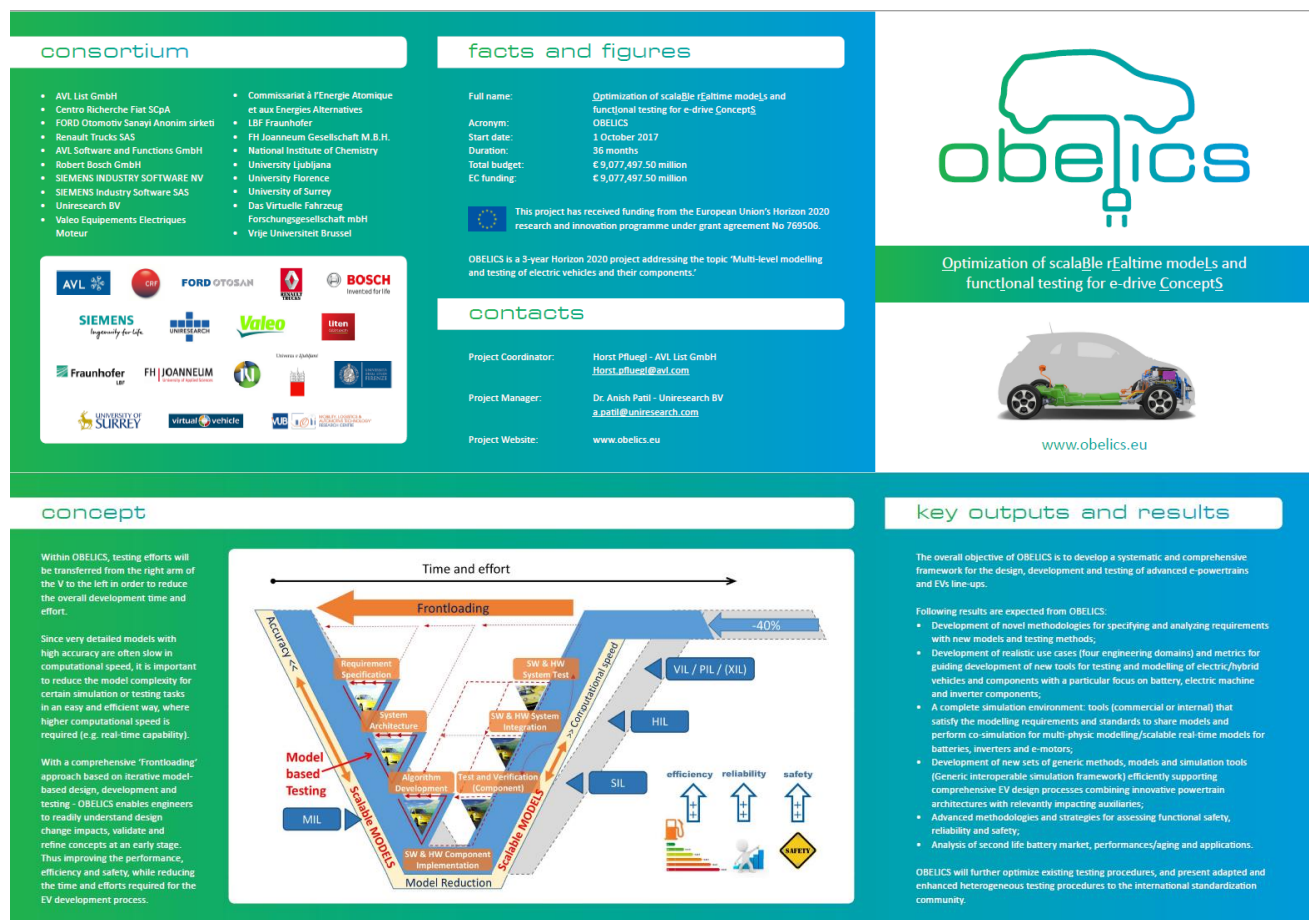


Figure 4. The OBELICS flyer.

## 2.5 Newsletter

UNR has published 4 electronic newsletters: July 2018, January 2019, June 2019 and January 2020. The newsletter was focused on informing interested parties about the project progress and results. The newsletter reached 36 people outside the project, in addition to the participants in OBELICS. Table 1 shows the statistics per newsletter.

**Table 1. Statistics per newsletter.**

Newsletter	Opened	Clicks
1	35	16
2	48	53
3	47	24
4	57	10

## **2.6 Communication database**

UNR collected contact details of stakeholders, interested parties and people in a database (xls-file). E-newsletters about OBELICS events was sent to these addresses. Due to the GDPR regulations, UNR can only send newsletters to people that explicitly signed up and agreed to receive it. In the OBELICS project 36 people signed up for the database.

### 3 Goals, audiences and channels

The following paragraphs describe the internal and external target groups, together with the channels to reach them.

#### 3.1 Internal

The **goal** is to make sure that the project runs smoothly, meets its targets in time and that all work is properly documented. The **audience** is the project members. The main **channel** is the AVL SharePoint, where members can access and share information.

The general assembly has decided that all face to face meetings (when travel is required and costs are made) need to be included in the project meeting list on AVL SharePoint. After the meeting the agenda and the participant list must be uploaded to the appropriate WP folder. Each member is responsible for keeping their records related to OBELICS.

#### 3.2 Liasing with related projects

The information from report D7.10 (Report on liaison with ongoing relevant EU projects in the field of e-components and systems modelling and testing) is included in this paragraph.

##### 3.2.1 Goal

In the framework of the OBELICS project, a clustering strategy has been defined with the most relevant ongoing EU projects funded in the same call GVO-2017 (i.e. HIFI-Elements and DEMOBASE). Dedicated activities have been defined to exchange and disseminate results and ideas. Coordinators and key partners of those projects will have been invited to the final joint public event and relevant dissemination activities.

##### 3.2.2 Audience

Table 2 shows related projects in the EU Green Vehicles Initiatives on Optimized Energy Efficiency in EVs. The EC/INEA expects the projects to cooperate on pre-competitive topics (such as a fundamental understanding of the processes), and on measurement protocols and calibration.

External stakeholders included partners in vertical GV2 projects, such as projects in which companies and institutes from the supply and development chain are represented. For OBELICS the closest link were the OPTEMUS & QUIET projects.

Table 2. Target audience: related projects

Project acronym	Relation with OBELICS Project	OBELICS partners involved
HIFI-Elements	Standardisation of model interfaces for common e-drive components (e-machine, inverter, battery, DC/DC converter, thermal management system), including compliant versions of existing models. Develop a model/data management tool and a co-simulation tool for MiL and HiL environments, together with automated methods for model parameterisation and test case generation.	VUB
DEMOBASE	Massive digitalization, allowing cells and battery systems to be developed in parallel. This new process can be achieved only using enhanced cells models including safety features and the battery management.	-
OPTEMUS, EC H2020, 2015-2018	Energy management and use for EVs: compact HVAC units, smart heated seats, smart panels for heating, predictive cabin pre-conditioning strategies and energy-saving solutions for extending electric range	ViF (Coordinator), CRF, FhG-LBF

XERIC, EC H2020, 2015-2018	Energy-friendly climate-control system capable of reduce energy used for passenger comfort in all weather conditions, combining a hybrid system.	FhG-LBF
JOSPEL, EC H2020, 2015-2018	Energy efficient climate system for the optimization of interior temperature control management in EV	FhG-LBF
QUIET, EC H2020, 2017-2020	User-centric design with enhanced passenger comfort and safety, lightweight materials with enhanced thermal insulation properties, and optimised vehicle energy management	FhG-LBF
IMPROVE, EC P7, 2013-2017	Thermal management optimization strategies for EV. Development of eco-driving strategies	ViF (Coordinator), FhG-LBF
EU-LIVE, EC FP7, 2015-2018	Cost- and energy-efficient electric light urban vehicles base on both user needs and acceptance	ViF, FhG-LBF

### 3.2.3 Channel: regular meeting

Project representatives of HIFI-Elements and DEMOBASE have met regularly, among others at the H2020 Results from Road Transport Research (RTR) meetings in Brussels (December 2017, 2018 and 2019). At these meetings there was a special session on the projects from the GV-07 call.

The projects will present their work also on the RTR meeting in 2020 (November 30<sup>th</sup> – December 1<sup>st</sup>).

### 3.2.4 Channel: workshop on battery and co-simulation

A workshop on battery and co-simulation was held at the INEA office in Brussels on February 12<sup>th</sup> 2020. Representatives from DEMOBASE, HIFI-ELEMENTS and OBELICS attended the one-day meeting.

### 3.2.5 Channel: joint public event

As a closing event of the project, the OBELICS partners organised a joint public event together with DEMOBASE and HIFI-ELEMENTS. The Joint public event took place on September 16<sup>th</sup> 2020, was hosted by Horst Pflügl (AVL), OBELICS coordinator, and was co-organised by Uniresearch.

The event was fully online, in view of the COVID-19 pandemic and was broadcast from the 4Events studio in Graz (Austria). More 200 people registered, and more than 130 international guests joined the event to see the results that have been achieved over the past three years.

The keynote speaker was DI Matthias Brendel, Vice President Business Field Electrification, AVL, who spoke about the challenges in e-vehicle development. The meeting was closed with a round table discussion between DI Matthias Brendel (AVL), Dr. Maurizio Maggiore (EU), Dr. Simon Edwards (Ricardo), DI Horst Pflügl (AVL), Dr.-Ing. Jens Ewald (FEV) and Dr. Philippe Desprez (SAFT).

### Agenda

Figure 5 shows the agenda for the day.

### Presentations

The online event was recorded, and the presentations can be viewed on Youtube:

1. [Key note presentation](#)
2. [OBELICS](#)
3. [HIFI-ELEMENTS](#)
4. [DEMOBASE](#)
5. Meet the projects
  - A. [Next generation e-vehicle design](#)
  - B. [Simulation toolchain and proposal for simulation standard](#)
  - C. [Advanced simulation tools and their use for EV battery design](#)

- D. [Safety concepts for batteries](#)
  - E. [From MiL to HiL](#)
  - F. [Improvement of EV battery safety through simulations, tests and advanced components](#)
  - G. [Inverter & e-motor design and testing](#)
  - H. [Simulation for optimal BEV concept and operation strategies](#)
  - I. [Towards low investment EV car production](#)
6. [Round table discussion](#)

# TIMETABLE

## OPENING

09:00 - 09:10 **Welcome Message, Opening**  
 09:10 - 09:25 **Dr. Marina Kousoulidou**  
 09:25 - 10:00 **DI Matthias Brendel**

## PROJECT INTRODUCTION

10:00 - 10:25 **OBELICS** // DI Horst Pflügl, AVL  
 10:25 - 10:50 **HIFI Elements** // Dr.-Ing. Jens Ewald, FEV  
 10:50 - 11:15 **DEMOBASE** // PhD Philippe Desprez, SAFTBATTERIES

11:15 - 11:45 **Coffee Break**

## MEET THE PROJECT I

11:45 - 13:00  
**A** Next generation e-vehicle design // OBELICS  
**B** Simulation Toolchain and Proposal for Simulation Standard // HIFI ELEMENTS  
**C** Advanced simulation tools and their use for EV battery design // DEMOBASE  
**D** Safety Concepts for batteries // OBELICS  
**E** From MiL to HiL // HIFI ELEMENTS

13:00 - 14:00 **Lunch Break**

## MEET THE PROJECT II

14:00 - 15:00  
**F** Improvement of EV battery safety through simulations, tests and advanced components // DEMOBASE  
**G** Inverter & E-Motor Design and Testing // OBELICS  
**H** Simulation for optimal BEV concept and operation strategies // HIFI ELEMENTS  
**I** Towards low investment EV car production // DEMOBASE

15:00 - 15:30 **Coffee Break**

## CLOSING

15:30 - 16:30 **Round table discussion** – Future needs in Research for Electrified vehicles  
 16:30 - 16:45 **Summary and Closure**

Figure 5. Agenda for the joint public event on September 16<sup>th</sup> 2020.

Impression from the day

Figure 6 shows an impression of the preparations and the broadcasting of the joint public event. The studio was in Graz (Austria) at 4Events, a multimedia company.



Figure 6. An impression from the studio.

(a) Preparations on September 15<sup>th</sup>. (b). Start of the joint public event with the recording in progress. (c) The technicians behind the equipment table. (d) The moderator organizes the discussion in the round table discussion.

### 3.3 Inform external stakeholders and share concrete knowledge

#### 3.3.1 Goal

Informing external stakeholders, and sharing concrete knowledge with them, gives opportunities for promoting OBELICS, receiving feedback and engaging in dialogue. The OBELICS project is an opportunity for the partners to showcase their state-of-the-art, and boost their reputation and visibility at an (inter)national level. To ensure that the project outcomes will be taken into production, external stakeholders need to understand the ambitious goals, and the products and knowledge that the partners have delivered.

In addition, the EU funds research and innovation to stimulate industry and science in Europe. In the case of OBELICS, intellectual property rights permitting, the technical results and know-how can be useful for the European automotive industry and related research. Visibility of the partners in OBELICS also encourages new talent to join the companies and institutes.

**Please note that the work package leader board decides on the information that is shared with external stakeholders.** Please see the consortium agreement (article 15 “Dissemination, publicity and press releases”) for more details.

#### 3.3.2 Audiences

**The audience is external stakeholders.** This group includes (but is not limited to): stakeholders who gave letters of support, original equipment manufacturers (OEMs), tier 1 and tier 2 suppliers, automotive research institutes, related industry platforms, scientists and standardization committees (e.g. ISO, SAE international).

Examples of transport industry platforms are listed in Table 3. OBELICS members are active in these organisations. Most partners are directly or indirectly members of ERTRAC, the European Technology Platform (ETP) for Road Transport; FCA (represented by CRF) is member of EUCAR, the European Council for Automotive R&D in which all major European vehicle manufacturers are involved; VALEO is member of CLEPA, the European Association of Automotive Suppliers. FHG-LBF and ViF are members of EARPA, the European Automotive Research Partners Association, VUB is member of EARPA and EUCAR. Many consortium partners have relationships with chief scientific



advisors, ministers or key influential people and are actively participating in (inter)national government groups for advances in sustainable transport.

**Table 3. Target audience: transport industry platforms**

Association	Short name	Website
European Road Transport Research Advisory Council	ERTRAC	ertrac.org
European Council for Automotive R&D	EUCAR	eucar.be
European Green Vehicles Initiative Association	EGVIA	egvia.net
European Automotive Research Partners Association	EARPA	earpa.eu
European Association of Automotive Suppliers	CLEPA	clepa.eu

### 3.3.3 Channel: international conferences and exhibitions

The OBELICS project has been represented at international conferences and exhibitions, including (but not limited to):

- the International Electric Vehicle Symposium (EVS32),
- the RTSI 2019,
- the 2019 Annual Congress of the Japanese Society for Automotive Engineers (JSAE),
- the International conference on applied energy (ICAE) 2019,
- the AVL-international simulation conference 2019 / Advanced Continuum Li-Ion Battery Modelling Framework,
- the Zero CO2 Mobility Conference / Strategies for Commercial Vehicles & Transport,
- the 2019 Siemens Simcenter conference,
- the Society of Automobile Engineers (SAE) world conference 2020
- the 15th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES).

In addition, OBELICS representatives have participated in workshops:

- the Deutsche Verband für Materialforschung und -prüfung (DVM) workshop "Reliability of mechatronic and adaptronic systems" (2020)
- the EARPA spring meeting (2019)
- the EUCAR program board meeting (2019).

### 3.3.4 Channel: publications

The OBELICS results have been published in the following publications.

#### Peer-reviewed

*Real time models of automotive mechatronics systems: Verifications on "toy models"*

Berzi, L., Favilli, T., Locorotondo, E., Pierini, M., & Pugi, L.

2018, Mechanisms and Machine Science, 68, pp. 141-148

*Revealing the Thermodynamic Background of the Memory Effect in Phase Separating Cathode Materials*

Klemen Zelič, Igor Mele, Ivo Pačnik, Jože Moškon, Miran Gaberšček, Tomaž Kutrašnik

2019, Journal of Mechanical Engineering

*Advanced Porous Electrode Modelling Framework Based on More Consistent Virtual Representation of the Electrode Topology*

Igor Mele, Ivo Pačnik, Klemen Zelič, Jože Moškon, and Tomaž Kutrašnik

2020, Journal of the Electrochemical Society

*Predictability of vibration loads from experimental data by means of reduced vehicle models and machine learning*

Benjamin Zillmann, Kai Sandmann, Daniel Kreuter, Malte Grube, Daniel A. Duecker, Helge Grossert, Leo Dostal, Robert Selfried  
IEEE Access (2020) 8 177180-177194  
10.1109/ACCESS.2020.3027499

*Brake blending and torque vectoring of road electric vehicles: a flexible approach based on smart torque allocation*  
Luca Pugi; Tommaso Favilli; Lorenzo Berzi; Edoardo Locorotondo; Marco Pierini  
2020, International Journal of electric and hybrid vehicles

*Revealing the Thermodynamic Background of the Memory Effect in Phase Separating Cathode Materials*  
Klemen Zelič, Igor Mele, Ivo Pačnik, Jože Moškon, Miran Gaberšček, Tomaž Katrašnik  
Strojniški vestnik – Journal of Mechanical Engineering  
10.5545/sv-jme.2019.6366

*A Powerful Transmission Line Model for Analysis of Impedance of Insertion Battery Cells: A Case Study on the NMC-Li System*  
Jože Moškon, Jan Žuntar, Sara Drvarič Talian, Robert Dominko, Miran Gaberšček  
Journal of The Electrochemical Society, 2020 167 140539  
<https://iopscience.iop.org/article/10.1149/1945-7111/abc769/meta>  
<https://doi.org/10.1149/1945-7111/abc769>

#### **Book chapters**

*Real Time Models of Automotive Mechatronics Systems: Verifications on “Toy Models”*  
Lorenzo Berzi, Tommaso Favilli, Edoardo Locorotondo, Marco Pierini, Luca Pugi  
Chapter in “Advances in Italian Mechanism Science” - Proceedings of the Second International Conference of IFToMM Italy  
10.1007/978-3-030-03320-0\_15

#### **Proceedings**

*Online State of Health Estimation of Lithium-Ion Batteries Based on Improved Ampere-Count Method*  
Locorotondo, E., Pugi, L., Berzi, L., Pierini, M., Pretto, A.  
Proceedings - 2018 IEEE International Conference on Environment and Electrical Engineering and 2018 IEEE Industrial and Commercial Power Systems Europe, | (EEEIC/I and CPS Europe 2018 8493825

*Online Identification of Thevenin Equivalent Circuit Model Parameters and Estimation State of Charge of Lithium-Ion Batteries*  
Locorotondo, E., Pugi, L., Berzi, L., Pierini, M., Lutzemberger, G.  
Proceedings - 2018 IEEE International Conference on Environment and Electrical Engineering and 2018 IEEE Industrial and Commercial Power Systems Europe, EEEIC/I and CPS Europe 2018, art. no. 8493924  
*Quantitative FMEA and Functional Safety Metrics Evaluation in Bayesian Networks*  
Rauschenbach, M., Nuffer, J.  
Proceedings - 2019 European Safety and Reliability Conference ESREL

*A Data-driven Approach for SoH Estimation of Lithium Batteries Using Signal Processing Techniques*  
Sahar Khaleghi  
IEEE 3rd international electrical and energy conference

*Advanced Continuum LI-ION Battery Modelling Framework*  
Tomaž Katrašnik, Igor Mele, Klemen Zelič  
ICAE 2019 / International Conference on Applied Energy 2019 (Paper ID: 679)

*Nonlinear modeling of all-solid-state battery technology based on Hammerstein-Wiener systems*  
Yousef Firouz, Joeri Van Mierlo, Peter Van den Bossche  
2019 IEEE Electrical Power and Energy Conference (EPEC)



*Modeling and Identification of an Electric Vehicle Braking System: Thermal and Tribology Phenomena Assessment*  
Thomas D'hondt, Bart Forrier, Mathieu Sarrazin, Tommaso Favilli, Luca Pugi, Lorenzo Berzi, Riccardo Viviani, Marco Pierini

WCX SAE World Congress Experience

*A Rapid Non-Linear Computation Model of Power Loss and Electro Thermal Behaviour of Three-Phase Inverters in EV Drivetrains*

H. Rasool, M. El Baghdadi, A. Manan Rauf, A. Zhaksylyk and O. Hegazy

International Symposium on Power Electronics, Electrical Drives, Automation and Motion (SPEEDAM), Sorrento, Italy, 2020, pp. 317-323, doi: 10.1109/SPEEDAM48782.2020.9161927.

*Development efficiency in power-electronic validation and testing*

Thorsten Fischer, Julian Koch (AVL SFR)

ecce2020

*Development efficiency in power-electronic validation and testing*

Thorsten Fischer, Julian Koch (AVL SFR)

Testing Expo 2020

*Scalable Electric-Motor-in-the-Loop Testing for Vehicle Powertrains*

Thomas D'hondt, Yves Mollet, Arthur Jacques Joos, Leonardo Cecconi, Mathieu Sarrazin and Johan Gyselinck  
ICINCO 2020

*In-Vehicle Identification of an Induction Machine Model for Operational Torque Prediction*

Bart Forrier, Alexander Loth, Yves Mollet

ICEM2020

*Electrochemical Impedance Spectroscopy of Li-Ion battery on-board the Electric Vehicles based on Fast nonparametric identification method*

Locorotondo Edoardo, Luca Pugi, Lorenzo Berzi, Marco Pierini

2019 IEEE International Conference on Environment and Electrical Engineering and 2019 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe)

*Application of Regenerative Braking on Electric Vehicles*

Pugi L.; Favilli T.; Berzi L.; Locorotondo E.; Pierini M.

2019 IEEE International Conference on Environment and Electrical Engineering and 2019 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe)

*Modeling and simulation of Constant Phase Element for battery Electrochemical Impedance Spectroscopy*

Locorotondo Edoardo, Luca Pugi, Lorenzo Berzi, Marco Pierini

2019 IEEE 5th International forum on Research and Technology for Society and Industry (RTSI)

*Analytical Model of Power MOSFET Switching Losses due to Parasitic Components*

Locorotondo, E., Pugi, L., Corti, F., Becchi, L., Grasso, F.

2019 IEEE 5th International forum on Research and Technology for Society and Industry (RTSI)

*Brake Blending Strategy on Electric Vehicle Co-simulation Between MATLAB Simulink® and Simcenter Amesim™*

Berzi, L., Favilli, T., Pierini, M., Pugi, L., Weiß, G.B., Tobia, N., Ponchant, M.

2019 IEEE 5th International forum on Research and Technology for Society and Industry (RTSI)

*A Low Cost Programmable Hardware for Online Spectroscopy of Lithium Batteries*

Locorotondo Edoardo, Luca Pugi, Lorenzo Berzi, Marco Pierini

2020 IEEE 20th Mediterranean Electrotechnical Conference (MELECON)

*Electrical lithium battery performance model for second life applications*

Locorotondo Edoardo, Luca Pugi, Lorenzo Berzi, Marco Pierini

2020 IEEE International Conference on Environment and Electrical Engineering and 2020 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe)

*Impedance spectroscopy characterization of lithium batteries with different ages in second life application*

Locorotondo Edoardo, Luca Pugi, Lorenzo Berzi, Marco Pierini

2020 IEEE International Conference on Environment and Electrical Engineering and 2020 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe)

*A model for system integration of second life battery, renewable energy generation and mobile network station*

Lorenzo Berzi, Locorotondo Edoardo, Luca Pugi, Marco Pierini

2020 IEEE International Conference on Environment and Electrical Engineering and 2020 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe)

*Online State of Health Estimation of Lithium-Ion Batteries Based on Improved Ampere-Count Method*

Edoardo Locorotondo, Luca Pugi, Lorenzo Berzi, Marco Pierini, Alessandro Pretto

2018 IEEE International Conference on Environment and Electrical Engineering and 2018 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe)

10.1109/eeeic.2018.8493825

*Online Identification of Thevenin Equivalent Circuit Model Parameters and Estimation State of Charge of Lithium-Ion Batteries*

Edoardo Locorotondo, Luca Pugi, Lorenzo Berzi, Marco Pierini, Giovanni Lutzemberger

2018 IEEE International Conference on Environment and Electrical Engineering and 2018 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe)

10.1109/eeeic.2018.8493924

*Quantitative FMEA and Functional Safety Metrics Evaluation in Bayesian Networks*

Rauschenbach, M., Nuffer, J.

Proceedings - 2019 European Safety and Reliability Conference ESREL

10.3850/978-981-11-2724-3 0509-cd

### 3.4 Influence Stakeholders

#### 3.4.1 Goal

The OBELICS vision and efforts will be aligned with policies and strategies developed by other stakeholders. The knowledge and practical experience in OBELICS gives partners insight into the current regulations. OBELICS partners therefore have opportunities to pave the way for new regulations, and assist policy-makers in designing and implementing effective regulations.

#### 3.4.2 Audience

Many consortium partners have relationships with chief scientific advisors, ministers and key influential people and are active in lobbying (inter)national governments for advancements in emission regulations and standards. Stakeholders are for instance ministers, senior government officials and key members of government groups for transport and logistics.

#### 3.4.3 Channels

The main channels are formal meetings, and informal discussions and contacts. Many consortium partners are frequently in touch with policy-makers and decision-makers, and discuss the findings and outcome of the OBELICS project when appropriate. The OBELICS consortium has been represented in meetings with EUCAR, such as the yearly EUCAR seminar 2019 May 22<sup>nd</sup>. Discussions with policy-makers are often in an informal setting; these discussions are not documented here.

### 3.5 Stimulate exploitation

The dissemination and outreach efforts prepare for the exploitation phase and bring new products on the market. The details of the exploitation efforts will be described in D7.7 – Initial and final exploitation plan (planned for month M37).

### 3.6 Inform and educate

The **goal** is to inform the general public and build public support. Research and development make Europe more competitive and raises the standard of life, and public funding is vital for stimulating the research. Informing the general public is therefore crucial for maintaining and extending public support. The project results are an opportunity to show the need and benefits of the innovation. OBELICS will help to achieve advanced energy efficient EVs that are attractive for customers in terms of functionality, performance, comfort, safety, durability etcetera and have a favorable price tag compared to conventional ICE models in competitive passenger car classes. Informing the public about what the partners are trying to achieve, helps them to understand how the new technology works and (in the end) the products they buy. Finally, showing the exciting aspects of the new technology can inspire new students to get an education in this field.

The **audience** is the general public, (inter)national newspapers and the wider press (TV, radio, schools/colleges/universities, etc.).

The public joint event was open to anyone to register and attend, and was the channel for informing the general public.

### 3.7 Feedback to Commission

If the European Commission receives clear feedback on the progress in the project, they can:

- monitor the progress,
- help to amplify the message,
- offer opportunities for policy input,
- identify new opportunities for future projects or topics,
- improve the quality of European innovation support.

The INEA project managers have been notified of events, and EC staff has been invited to all common meetings and workshops.



### **3.8 Protect intellectual property**

UNR assists with identifying sensitive knowledge and keeping an overview to protect IP right, in line with earlier set agreements in the consortium Agreement.



## 4 Deviations from Annex 1

This document is a copy of D7.6 (Initial and final Dissemination Plan), which describes the target audience, how that audience was reached and when it was reached. Due to the strong overlap between D7.6 and D7.10, the same content is reproduced in D7.10.



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### Project partners:

Partner no.	Partner organisation name	Short Name
1	AVL List GmbH	AVL
2	Centro Richerche Fiat SCpA	CRF
3	FORD Otomotiv Sanayi Anonim sirketi	FO
4	Renault Trucks SAS	RT-SAS
5	AVL Software and Functions GmbH	AVL-SFR
6	Robert Bosch GmbH	Bosch
7	SIEMENS INDUSTRY SOFTWARE NV	SIE-NV
8	SIEMENS Industry Software SAS	SIE-SAS
9	Uniresearch BV	UNR
10	Valeo Equipements Electroniques Moteurs	Valeo
11	Commissariat à l'Energie Atomique et aux Energies Alternatives	CEA
12	LBF Fraunhofer	FhG-LBF
13	FH Joanneum Gesellschaft M.B.H.	FHJ
14	National Institute of Chemistry	NIC
15	University Ljubljana	UL
16	University Florence	UNIFI
17	University of Surrey	US
18	Das Virtuelle Fahrzeug Forschungsgesellschaft mbH	VIF
19	Vrije Universiteit Brussel	VUB



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