Optimization of scalaBle rEaltime modeLs and functIonal testing for e-drive ConceptS

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Executive Summary

The OBELICS project focusses on the development of a systematic, comprehensive and advanced model-based design and testing framework to support the development of next generation of e-powertrains systems and new EVs lines-up. The overall objective is to reduce development efforts by 40% while improving efficiency of the e-drivetrain by 20% and increase safety by a factor of 10 by implementing the created OBELICS methodologies and tools in a vehicle development process (Figure 0-1). Advanced virtual integration tools, new heterogeneous model-based testing methods and tools, scalable and easy to parameterize simulations and real time models will be validated and evaluated here in UC demonstrators.

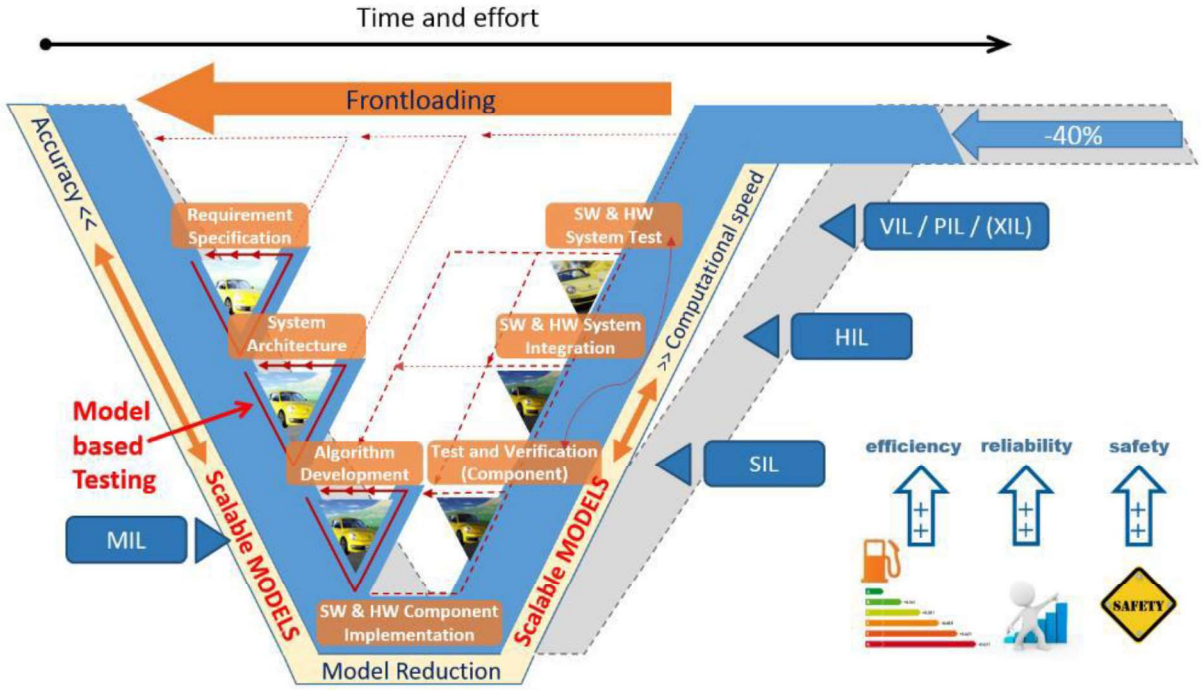

Figure 0-1: OBELICS model based development concept to reduce development and testing efforts.

These advanced model based methodologies and tools, developed in WP2, WP3, WP4 and WP5, are supported by the following use cases gathered in four clusters that can represent typical and important engineering areas within the electric vehicle development process (Figure 0-2).

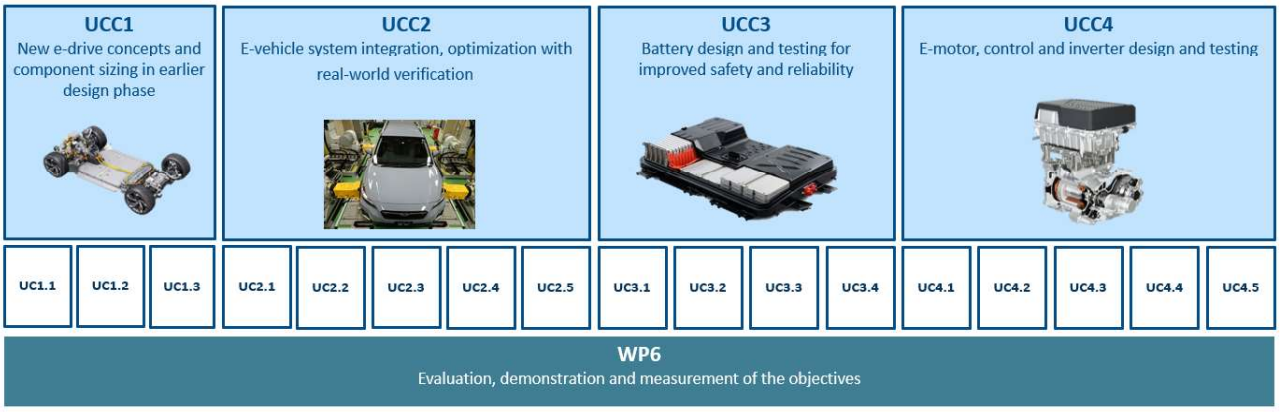

Figure 0-2: Deliverable cluster and use cases overview.

The focus here is on UCC1 “New e-drive concepts and component sizing in early design phase” and UCC2 “E-vehicle system integration, optimization with real-world verification”.
Deliverables D1.1, D1.2, D1.3 and D1.5 provided detail descriptions of these use cases. This deliverable D6.1 will focus on the validation of the created OBELICS methodologies and tools for the eight use cases which are related to clusters 1 and 2. In this deliverable, model based methodologies, virtual integration and simulation tools from WP2 and WP3 supporting new e-drive architecture exploration, powertrain dimensioning and performance assessment will be applied to show and demonstrate:

- Faster execution of workflow development for new e-drive concept exploration and evaluation in earlier vehicle design phase.
- Robust e-drive concept selection and optimized powertrain dimensioning compared to the baseline/state of-the-art practices considering real/representative driving conditions,
- Complete vehicle system simulation optimization under real operating conditions

These demonstrations will address:
- Faster optimal EV design
- Faster component definition
- Virtual system integration
- Virtual system optimization
- Virtual preliminary assessment

The following project objectives are part of this deliverable:
- Develop scalable, accurate, multiphyiscal models to improve the efficiency of the e-drivetrain by 20% or development time optimization 40%
- Develop virtual integration environment for seamless integration

- E-drive concepts and component for automotive midterm challenges
- Accelerated sizing process execution
- Sizing process execution, complete EV design trade-off execution based multi-level and multi-domain virtual system integration
- Virtual controller integration and calibration optimization demonstrations with real driving conditions
- Complete vehicle system simulation optimization under real operating conditions

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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
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16	University Florence	UNIFI
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