

# HIFI-ELEMENTS

High Fidelity Electric Modelling and Testing

## Facts & Figures

**Full name:** High Fidelity Electric Modelling and Testing

**Acronym:** HIFI-ELEMENTS

**Duration:** 36 months

**Start date:** October 1, 2017

**Total budget:** €7.5 million

**EC Funding:** 100%

**EC Contract number:** 769935

**Website:** [www.hifi-elements.eu](http://www.hifi-elements.eu)

---

## Summary of the Project

In light of the increasing relevance of simulations in the automotive product development cycle reusable functional simulation models and a seamless workflow are critical for saving redundant effort and thereby development time and cost.

HIFI-ELEMENTS addresses these problems by defining guidelines and standards for simulation models of electric vehicles as well as an agile model development framework. [Read more...](#)

---

## Welcome to the first HIFI-ELEMENTS project newsletter

Dear reader,

Nowadays we face a technological world with increasingly complex vehicles and at the same time the pressure to reduce the cost of vehicle development and production. To achieve this goal, simulations in the development phase of vehicles are indispensable. We also strive for an increase of simulation efficiency and fidelity at this point. As one step towards this goal, the modelling environment needs to cover all aspects of the entire vehicle. To date, fragmented simulations for each aspect of the vehicle are being used separately, because no simulation environment can cover the entire E-Drive/EV development. The existing models cannot be extended to cover additional aspects. Currently these models must be recreated at other development levels all over again.

HIFI-ELEMENTS examines a more efficient use of existing tools in order to optimise the development workflow. For this reason, a recommendation for the standardisation of model interfaces for common e-drive components will be published. A methodology for parameter identification and test case generation is going to be integrated. Furthermore, the proposed interface specification will be independent of the application used for the implementation of the model in order to promote model inter-operability and scalability. The objective is to reduce the development and testing effort by more than 50% when compared to the current fragmented workflow. This research should enable a reduction in vehicles energy consumption of up to 20% through early system optimisation. Moreover, validation test coverage should be increased by a factor of 10, when compared to the current SotA workflow. For this validation, a SYNECT/XMOD workflow in combination

## HIFI-ELEMENTS Consortium



The consortium consists of [19 partners](#) from [10 different European countries](#).

Ricardo | DENSO | Cidetec | IVECO  
| FEV | Tecnalia | Tofaş | Ford  
Europe | Mondragon University |  
dSPACE | TNO | Applus+ IDIADA |  
Vrije Universiteit Brussel | Magna  
Powertrain | Yasa Motors | RWTH  
Aachen University

---

### Website

[www.hifi-elements.eu](http://www.hifi-elements.eu)

Our website was released on December 1, 2017, providing a wide range of information. Featuring a unique project identity, it enables us to reach a high number of readers such as professionals, the general public and potential participants or users of HIFI-ELEMENTS. Maintaining a continuously evolving platform, the Dissemination Team is in permanent contact with the consortium in order to distribute news on all important activities taking place within the project.

[Read more...](#)

---

with automatic test case generation, prioritisation and selection will be used.

Overall, HIFI-ELEMENTS will build on existing standards to improve scalability, modularity and real-time deployment of simulations for system characterisation, optimisation and validation. This is necessary to enable a faster time-to-market of new e-drive technologies. To achieve these goals, 19 renowned partners from 10 different European countries are working on together. It involves 13 partners from the industry and 6 research institutions. The project collaborates closely with OBELICS, another EU project that investigates research topics. FEV coordinates the project from Germany. Until now, some concepts regarding the architecture, the model interfaces and the toolchain have been developed.

In the coming project year, implementation will be carried out on the basis of these concepts. Four focused scenarios are used for validation and verification.

I hope you enjoy reading this first newsletter.

Dr. Thorsten Schnorbus

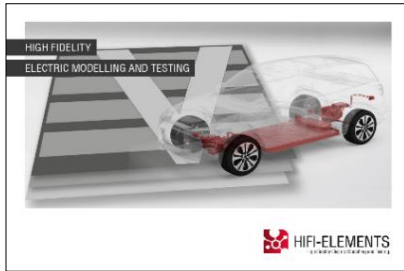
---

### General Assembly in Aachen



The Kick-off Meeting for HIFI-ELEMENTS took place in Aachen, Germany at [FEV Europe GmbH](#) in October 2017. All Work Packages were presented in detail by the partners in charge.

## HIFI-ELEMENTS - Project Flyer



<https://www.hifi-elements.eu/hifi/files/HIFI-Flyer.pdf>

---

## European Commission

This project has received funding from the European Union's Horizon 2020 Program for research, technological development and demonstration under grant agreement no. 769935.



---

## Horizon 2020 Meeting



The Horizon 2020 Cross-Project Synchronisation Meeting and Dissemination Event took place in Paris, France at Siemens Industry Software SAS in April 2018.

## Results

The following abstract addresses the results that were achieved in the first year of the HIFI-ELEMENTS project. Various reports were published, and their contents are briefly presented below.

One major project objective was to reduce design and validation effort for electric vehicles by defining standards and guidelines for respective simulation models to ensure interoperability and reusability. In addition, an agile model development framework was designed to provide tool solutions for appropriate requirements management, model management, interface management as well as variant management. Moreover, a workflow enabling the automatic configuration, parameterisation and execution of simulation models based on exchangeable software components using a co-simulation platform was part of the development. Furthermore, the automatic execution of software tests and the management of test results was investigated.

[Read more...](#)

To achieve the goal of design and validation effort reduction, modelling guidelines for simulation models were developed. This includes a set of considered vehicle powertrain topologies, component model interfaces, naming conventions and tool chain dependencies. In a further step, requirements for the simulation models have been derived based on four focused simulation scenarios. Concepts for automatic parameter identification have been developed and an assessment of safety requirements and modelling guidelines was taken into account. Overall, guidelines have been drawn up to enable future automated build-up and execution of co-simulations based on reusable and standardised simulation model components. [Read more...](#)

In a second report, standardised component interfaces and simulation model architectures were defined to ensure reusability of e-vehicle simulation models. Additionally, definitions of multi-modelling and scalability as well as maintainability and variant handling were specified. In general, the simulation model standardisation shall enable interchangeability as well as easy future extension of simulation model elements and by this, increase the efficiency of simulation based development. [Read more...](#)

## Upcoming events

**General Assembly in  
Shoreham-by-Sea**  
October 18 – 19, 2018

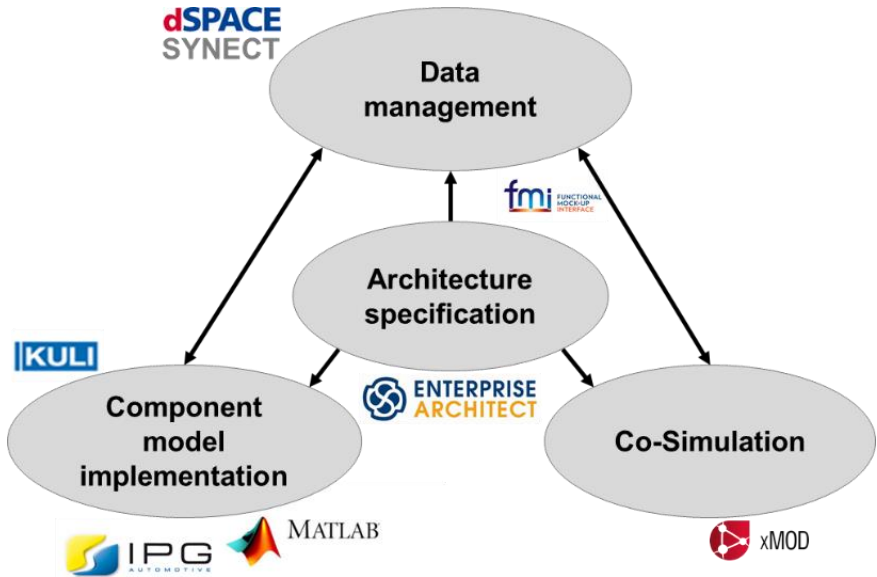
---

## Project Presentations

**Re:Work Conference in Berlin**  
September 16 – 18, 2018

**Thermal Management Systems  
Symposium in San Diego**  
October 9 – 11, 2018

**Antriebstechnisches  
Kolloquium in Aachen**  
March 12 – 13, 2019



In a third report, an agile model development framework (AMDF) is published. It includes conceptual workflows, description of a tailored toolchain for data management as well as automatic configuration, parameterisation, execution and testing of simulation models under usage of a co-simulation platform. [Read more...](#)

---



Please [contact us](#) for any questions concerning this newsletter.