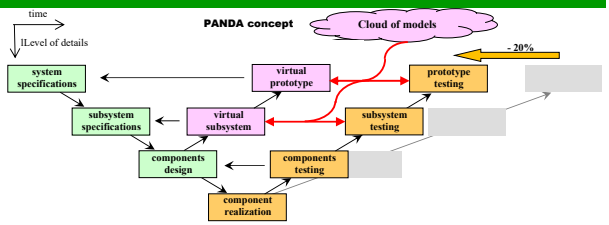
Powerful Advanced N-level Digital Architecture for models of electrified vehicles and components

H2020 call LC-GV-02-2018 (Virtual product development and production of all types of electrified vehicles and components)

SCOPE



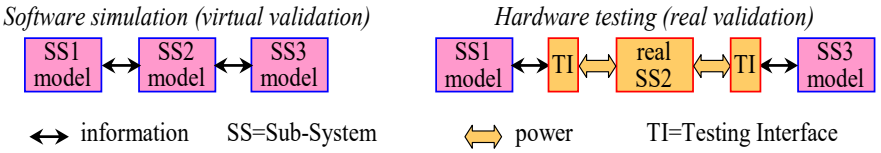
The V-model is used in industry to develop more efficient products, from the development axis to the validation axis. A simulation axis is more and more used for virtual validation of components and subsystems. Moreover, new testing procedures such as "Hardware-In-the-Loop" (HiL) are used in the validation axis. Many models are thus required from accurate models at the component level to global models at the system level, off-line models for pure simulation and real-time models for hardware testing. Actually, different models and tools are thus used without a strong interconnection that leads to reduced performances while requiring important development time.This project aims to develop unified organisation of digital models for seamless integration in virtual and real testing of all types of electrified vehicles and their components. The V-model is rearranged in a W-model to highlight the trend in "virtual homologation". A cloud of models will be developed using that method using a common industrial software tool with a dedicated innovative library developed during the project.

Stand-alone and cloud computing virtual testing of a Battery Electric Vehicle, a Fuel Cell Vehicle and a Hybrid Vehicle will be achieved in that philosophy, More over stand-alone and cloud computing of real testing using HiL will also been realized for electrical subsystem of the hybrid electric vehicle. TRL2 to TRL5.

CHALLENGES

1. Interconnection of the various models involved in the V-model. Any model should be organized in a unified way for seamless integration in the complete simulation of the studied electrified vehicles.
2. Development of real-time models of the subsystems for virtual and real testing of the different parts of the system.
3. Cloud-computing for virtual and real testing toward Industry 4.0

These challenges will be achieved by using an innovative organization method based on the Energetic Macroscopic Representation formalism to describe the models in a unified way for an easy reuse in the V-model to reduce the development time and increase the reliability.



IMPACTS

A seamless integration of the different models of the V-model process will enable:

- a reduction of development the time-to-market by 20%, thanks to modular and flexible models,
- an increase of the reliability by the re-use of the models in the different tasks of the V-model,
- easy development and test of new components / subsystems by the high flexibility of the connected models

The outputs of the project will lead to high-level jobs in European companies by:

- the development of an open interconnection method for models organisation towards standards,
- the development of virtual and testing facilities for the component integration in future electrified vehicles.

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