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

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Publishable Executive Summary

Existing BEV vehicles have been often designed based on conventional architecture and integrating existing powertrain components (electric machine, battery, axle…) with the objective to reduce development and validation time, and investment cost but therefore leading to non-energy optimized solutions at probably a higher product cost. Design of battery electric vehicles (BEV), unlike their ICE counterparts, is quite flexible; this is because of the absence of intricate mechanical arrangements that are required to run a conventional vehicle.

Because of such flexibility, various powertrain topologies are emerging on the automotive market: EV powertrains can be front wheel drive, rear wheel drive, even all-wheel drive depending on the vehicle type or vehicle application (passenger, commercial vehicles) but with no relevant virtual integration tools to optimally choose or evaluate them. Current integration tools (commercial software or OEM in-house tools) could be used but they are very limited in number of topologies simulations.

Moreover, EVs can be considered as a combination of different subsystems. Each of these systems interacts with the others to make the EV work but with multiple and innovative technologies possibilities for electric machines, battery systems drivetrain systems increasing vehicle configuration possibilities. Finally, electric vehicle development introduced a change of paradigms in the design process, requiring considering earlier chassis and auxiliaries integration as some of them (HVAC, braking and damping) are impacting at first order the overall vehicle performances.

Providing new industrial tools and methods enabling to support at industrial level of new fully integrated EV architectures (electric, electronic, thermal, chassis) and designs, OEMs and tier 1 suppliers will be able to push beyond investigation of another generation of more efficient and affordable electric vehicles. This will enable new co-engineered optimizations of multiple combined components and controls to achieve higher overall vehicle performances, for conventional and automated operations.

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Project partners:

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