

## ACoRTA-3: The successful research project for reliable real-time co-simulations enters the third round

**Early predictions and corresponding early concept decisions are essential success factors in modern development processes. Using co-simulation, different subsystems can be integrated to allow mixed virtual / real system validation. Successes so far have motivated all partners to address the next challenges: automatic configuration of real-time co-simulations, automatic determination of optimal coupling strategies, and development of methods for splitting non real-time subsystems to ensure real-time capability.**

Graz, March 1, 2018 - Since 2012, VIRTUAL VEHICLE, together with its partners AVL, Porsche and Graz University of Technology, has been researching new methods for model-based coupling. Initially, the goal was to develop industry-based real-time co-simulation solutions that could include hardware. In 2015, the successful collaboration of the research consortium in ACoRTA-2 with the newly added Volkswagen AG was continued.

### From idea to realization: Successful use cases

The previous successes are quite impressive: Industrial applications were successfully implemented and put into operation with the help of the ACoRTA coupling methodology - for example the "Virtual Driver's Seat" at Porsche AG, an innovative trailer manoeuvring assistant at Volkswagen AG or a newly designed Powertrain test bench at the AVL List GmbH.

Following the successful development of model-based coupling and the development of diagnostic concepts to improve usability, the newly launched ACoRTA-3 research program aims to realize the automatic configuration of complex real-time co-simulation problems.

### Co-simulation: the challenges

Whether vehicle, industrial plant or aircraft - the use of co-simulation in development is now indispensable. But there are a number of challenges to consider: how do you link systems with very different dynamics? Is a correct data exchange and thus the correctness of the simulation results guaranteed? An obvious addition to co-simulation is the integration of real hardware, which in turn creates additional difficulties: the interaction between real-time and non-real-time systems is typically made much more difficult by communication dead times, data loss, and noisy switching signals.

### ACoRTA-3: real-time co-simulation saves costs and system resources

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Dr. Georg Stettinger, ACoRTA-3 Project Manager at the VIRTUAL VEHICLE outlines the goals of the project: "The configuration of complex real-time co-simulations still requires a lot of effort and expert knowledge. With ACoRTA-3 we want to automate the configuration to a high degree, thereby saving misconfiguration as well as resources in the form of scarcely available experts."

Dr. Martin Benedikt, head of the co-simulation & software research department at the VIRTUAL VEHICLE, is constantly confronted with a key challenge in his work with leading OEMs and suppliers to the automotive industry: "The concept of real-time co-simulation is finding more and more application fields in modern development processes, therefore, within ACoRTA-3, we also want to develop efficient methods for partitioning sub-real-time subsystems to ensure reliable real-time capability under a wide variety of operating conditions."

ACoRTA-3: The facts

Total budget: 600k €

Duration: 1.1.2018 - 31.12.2019 (2 years)

Partners: Volkswagen AG, Porsche AG, AVL List GmbH, Graz University of Technology (Institute of Control and Automation Technology)

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Das erfolgreiche Forschungsprojekt für zuverlässige Echtzeit-Co-Simulationen geht in die dritte Runde: VIRTUAL VEHICLE forscht gemeinsam mit den Partnern TU Graz, AVL, Porsche und Volkswagen bereits seit 2012 an neuen Methoden zur modellbasierten Kopplung. Phase 3 des Forschungsprojektes legt nun den Schwerpunkt auf die automatische Konfiguration von Echtzeit-Co-Simulationen, die automatische Bestimmung der optimalen Koppelstrategien sowie die Entwicklung von Methoden zur Aufteilung von nicht-echtzeitfähigen Teilsystemen, um die Echtzeitfähigkeit sicherzustellen.

Quelle: VIRTUAL VEHICLE