Success Story
COMET

K2-Mobility
VIRTUAL VEHICLE Kompetenzzentrum –
Das virtuelle Fahrzeug Forschungs-GmbH
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Combined safety systems in vehicles: the integrated safety toolchain

The issue of vehicle safety is ever present. At the Virtual Vehicle Research Center (K2 Mobility), a lot of attention is focused on integrated safety. There researchers have succeeded in developing an end-to-end simulation chain for precisely predicting the effectiveness of integrated safety systems. This tool enables the uniform determination and comparison of active, passive and integrated safety systems.

Integrated safety

Passive safety systems in vehicles are systems that come into play when an accident occurs, such as airbags, belt tensioners and side impact protection. By contrast, active safety systems aim to avoid or mitigate accidents. They include ABS and EPS, as well as driver assistance systems such as lane departure, distance warning and tiredness warning systems.

Integrated safety is a combination of passive and active safety systems. “For example, we can use data from active systems to prime configure the passive systems for a potential accident, such as tensioning the seat belt, putting the seat in a better position, closing windows and a lot of other things”, says Andreas Rieser, Area Manager Mechanics & Materials at VIRTUAL VEHICLE.

Source: Shutterstock

Unique: detailed results and a broad deployment area

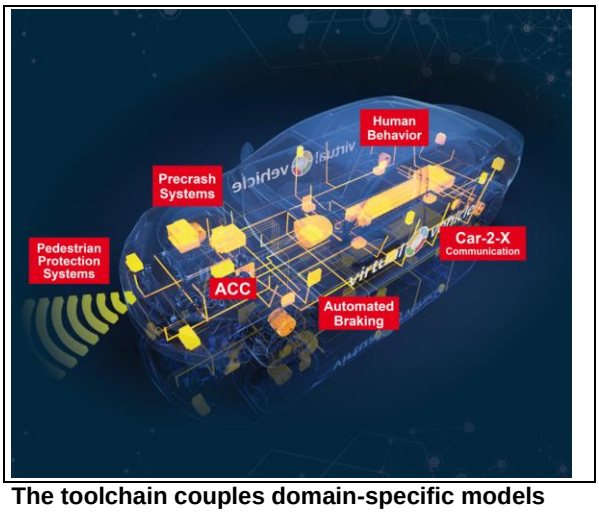
Comprehensive simulation of the entire system is seen as a useful way to study the effectiveness of integrated safety systems. However, developers encounter numerous obstacles with this approach because many different domains,

including driving dynamics, sensor systems and crash protection, must be taken into account.

With the methodology of end-to-end numerical simulation of accident scenarios, domain-specific models developed on the ICOS co-simulation platform at VIRTUAL VEHICLE are coupled to form an automated toolchain. “We call this method a toolchain because it consists of many different simulation tools interconnected by co-simulation”, says Rieser.

With this toolchain the parameters of an accident event can be systematically varied to assess the effectiveness of integrated safety systems. The previously incompatible requirements of detailed results and a broad deployment area are fulfilled by an overall simulation tool.

Issues that cannot be resolved within specific individual disciplines but instead require a multi-disciplinary approach are becoming increasingly significant for the automotive industry. This toolchain, which has been used in collaboration with BMW, DSD and TU Graz for many years, is an outstanding example of that.



The toolchain couples domain-specific models through a co-simulation platform.
Source: VIRTUAL VEHICLE

Impacts and effects

The toolchain developed at VIRTUAL VEHICLE couples domain-specific models to form an overall simulation tool. This tool enables the uniform determination and comparison of active, passive and integrated safety systems. This provides support for decisions about the selection of worthwhile safety equipment in the early phases of product development without prototypes.

The modular structure of the overall simulation tool makes it easy to adapt and extend for future projects.

Contact and information
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