PRESS RELEASE

Dynamic Steering Force Emulator

AVL and Stähle Enable Active Steering on Vehicle Testbeds

AVL and Stähle are pleased to present the Dynamic Steering Force Emulator. The innovation, developed jointly by the two partners, allows dynamic simulations for the first time on vehicle testbeds with active steering interventions and the resulting steering forces. As part of AVL's Vehicle-in-the-Loop method – and retrofittable for existing vehicle testbeds – the Dynamic Steering Force Emulator optimizes the process of testing modern vehicles with sophisticated driver assistance systems and autonomous driving functions.

Graz, Austria / Wimsheim, Germany, July 2021: AVL and Stähle are expanding their long-term partnership. The latest result of the cooperation is the Dynamic Steering Force Emulator. The innovative solution allows active steering interventions on vehicle testbeds and takes into consideration the reaction forces arising as a result. The technical highlight is an innovative actuator concept, which has a direct effect on the rack in the steering system. The joint development adds to the test and simulations possibilities of the AVL DRIVINGCUBE™, and can easily be implemented on existing chassis dynamometers and powertrain testbeds.

The Emulator, which is patented by AVL, is the only one of its kind in the world. It opens a new dimension in validation, particularly in the field of automated driving, in which active steering interventions are an essential component. This makes it possible to test driver assistance systems (ADAS) and automated driving systems (ADS), like the Automated Lane Keeping System (ALKS) and enhanced highway driver functions, even more comprehensively and realistically. The automotive industry also benefits from the flexibility offered: the system can be adjusted easily, as soon as the requirements for functional release change – for example, due to the latest UN regulation No. 157, which sets new standards for the approval of ALKS.

The innovation from AVL and Stähle complements the AVL DRIVINGCUBE™. This links the real vehicle with the virtual world, generating a high-performance test environment for ADAS/AD systems. Connecting the real sensors used in the vehicle with the computer-generated virtual environment requires the latest simulation technology, particularly as conditions on vehicle testbeds are fundamentally different to those in an isolated sensor laboratory.

Within the Vehicle-in-the-Loop technology, the Dynamic Steering Force Emulator forms an important bridge between the real and the virtual world. A special linear actuator plays a key role here. This drive unit converts electrical signals from the driving dynamics simulation into physical forces, which then have a direct effect on the rack on the steering system. One of the key advantages of this is that it can easily be configured without any structural changes. The emulator is compatible with AVL full-vehicle testbeds (powertrain testbeds and chassis dynamometers) and, as such, is an important addition to the range of applications.

"Steering on vehicle testbeds is a hotly-debated subject among experts – particularly in the context of automated driving. The Dynamic Steering Force Emulator is a real milestone in this area. Especially as the system can easily be added to existing vehicle testbeds. We are pleased to have an experienced and reliable partner on our side in Stähle, in order to ensure that innovative solutions like these are ready for the market," said Tobias Düser, Head of ADAS/AD Virtual Testing Solutions at AVL.

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Klaus Stähle, Managing Director of Stähle, added: “Up until now, steering systems have primarily used an actuator on the steering wheel in trials at proving grounds and on flat-band testbeds. This no longer meets all the demands of testing on automated vehicles. However, we are pleased with the development of the Dynamic Steering Force Emulator. Its actuator concept is based on our core technology. It makes it possible to accurately test different assistance systems on the testbed – automated, reproducible and 24/7 if required. This not only simplifies the process of development and homologation, but also makes an important contribution on the road to highly-automated and safe vehicles.“

About AVL
With more than 11,000 employees, AVL is the world’s largest independent company for development, simulation and testing in the automotive industry, and in other sectors. Drawing on its pioneering spirit, the company provides concepts, solutions and methodologies to shape future mobility trends. AVL creates innovative and affordable technologies to effectively reduce CO_2 by applying a multi-energy carrier strategy for all applications – from hybrid to battery electric and fuel cell technologies. The company supports customers throughout the entire development process from the ideation phase to serial production. To accelerate the vision of smart and connected mobility AVL has established competencies in the fields of ADAS, autonomous driving and digitalization.
AVL’s passion is innovation. Together with an international network of experts that extends over 26 countries and with 45 Tech- and Engineering Centers worldwide, AVL drives sustainable mobility trends for a greener future. In 2020, the company generated a turnover of 1.7 billion Euros, of which 12% are invested in R&D activities.

More information: www.avl.com/adas

About Stähle GmbH
STÄHLE is a leading global manufacturer of robot systems and actuators for testing and validating vehicles and vehicle components on testbeds and at proving grounds. The close cooperation between Software & Hardware Development and Manufacturing and Application, and the use of state-of-the-art development tools and production machines allow dynamic, innovative and efficient product development – even in smaller batches.
As well as driving robots on roller and powertrain testbeds for endurance tests, R&D, emissions, FE, EV range detection, and homologation & certification for cars, trucks and motorcycles, the product portfolio also includes special steering and robot systems for cars and trucks, for endurance tests, driving dynamics, RDE and NCAP/ADAS/AD applications at proving grounds.
Globally, the company has a very large customer base with over 1000 robot systems installed.
The Stähle driver module rounds off the range of products and allows a consistency in the vehicle regulation, from SIL-HIL-VIL to the proving ground.

More information: www.staehle-robots.com

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