The Research Institute for Automotive Engineering and Vehicle Engines Stuttgart (FKFS) was founded in 1930. Its highly qualified staff conducts research and development projects in the fields of powertrains, vehicles and automotive mechatronics. Highly specialized test benches as well as measurement, testing and simulation procedures developed internally at FKFS provide engineers with the means to solve complex and demanding problems.

**MAKING OF**

The Stuttgart Driving Simulator was launched by FKFS and Stuttgart University in 2012. Its unique technology is based on more than 15 years of research experience in driving simulation and the delivery of numerous highly specialized driving simulators to the automotive industry. Currently the Stuttgart Driving Simulator is the largest and most advanced facility of this type throughout the European research landscape. It is open for public research and industrial development. Various automobile manufactures and suppliers are using the simulator for the evaluation of new technologies. The Stuttgart Driving Simulator project is funded by the German Federal Ministry of Education and Research and the Ministry of Science, Research and Arts of Baden-Württemberg.

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The powerful eight-axis motion system enables vehicle dynamics simulation close to reality.

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ADVANCED DRIVER ASSISTANCE SYSTEMS (ADAS)

An “electronic horizon” in the driving simulator provides real-time position and geometry information of other objects (e.g. vehicles and pedestrians) and thus allows the simulation of ADAS based on optical, radar or ultrasonic sensors. A GPS simulator transmits RF signals for real positioning systems installed in the mock-up. Digital road maps are available. Thus, new assistance systems and user interfaces can be designed and tested with respect to functionality, usability and driver acceptance.

AUTOMATED DRIVING AND SAFETY-RELEVANT SYSTEMS

Upcoming automated driving functions will take over control from the driver and pass it back in certain situations. This process is highly relevant for safety. The Stuttgart Driving Simulator enables realistic testing of such “partial automation” without the hazard of test drives on real roads.

TECHNICAL PROPERTIES

›› Simulation dome with 5.5 meters diameter
›› Vehicle exchange system
›› Lateral and longitudinal acceleration up to 0.8 g
›› Yaw, pitch, roll and heave motion, vibration
›› Surround view with 12 LED projectors
›› Multi-channel spatial sound system
›› Force feedback for steering wheel and pedals

CHASSIS DEVELOPMENT AND VEHICLE HANDLING

Due to the high-end motion system it is possible for experienced test drivers to distinguish and evaluate different chassis setups in the Stuttgart Driving Simulator interactively. Parameters of suspension, tyres, steering and drivetrain can be varied easily and quickly.

Active chassis control algorithms, e.g. front and rear axle steering, active springs and dampers or torque vectoring, may be integrated into the simulation. Test drives are either performed in standard manoeuvres such as double lane change or on customer-defined test tracks. It is possible to use customer-specific simulation models.

UNSTABLE AERODYNAMICS

FKFS has made the impact of aerodynamic effects available in the driving simulator (e.g. transient side wind excitation and its compensation by the driver). This allows the evaluation of aerodynamic properties in early design stages of a new vehicle.