



The ITWM-Technikum: Link Between Reality and Simulation

In system and vehicle development, it is key to simulate the physical system properties at an early stage in each of the different phases of the development process. To design, validate and improve new methods, we have special test facilities on site: In the Technikum of the division "Mathematics for Vehicle Engineering", we design and implement our own measurement and testing facilities, hand in hand with our modeling and simulation experts.

18 Projectors provide all- round visibility

In the Technikum, we develop, set up and operate our robot-based driving simulator RODOS®, our measuring system for highly flexible components (MeSOMICS®), the 3D laser scanner measuring vehicle REDAR as well as various test benches for cable and hose measurement.

The driving simulator RODOS® (Robot based Driving and Operation Simulator) allows to examine the human machine interaction under perfectly reproducible conditions and without any risk. Designed for a payload of 1,000 kilograms, the motion system (an industrial robot) carries commercial vehicle cabs and car bodies. Inside a ten-meter diameter projection dome,

18 projectors create a seamless projection of an interactive scene. For example, we investigate the interactions between drivers, the vehicle and the environment and validate advanced driving assistance systems together with industry partners. RODOS® is currently the most powerful driving simulator of the Fraunhofer-Gesellschaft.



Take a Walk in VR

Our virtual reality lab enables people to put themselves into complex virtual environments and scenarios, e.g. as pedestrians.

We use the technology both for coupling with driving simulation and for visualizing virtual production sites. In our lab, one or more people experience a virtual reality on a surface of ten by six meters.



Valid Data Thanks to Precise Measurement Technology

Numerical simulation of real systems or components generally depends on two things:

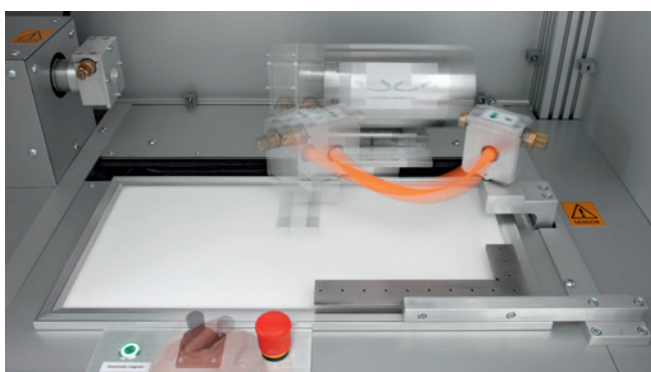
- On the one hand, a good mathematical model of the system is mandatory to obtain usable simulation results.
- On the other hand, the model must be fed with the correct parameters that also correspond to the real conditions. Often the determination of these parameters is difficult and has to be done individually for each new situation.

The same is true for the IPS Cable Simulation software developed by Fraunhofer FCC and our institute. This enables interactive and at

the same time exact simulation of highly flexible components such as cables and hoses for assembly and operation simulations. In order to correctly calculate the deformations and reaction forces of cables and hoses with IPS Cable Simulation, it is necessary to determine the mechanical component properties as model parameters.

For this purpose, the ITWM team has developed, designed, built, and applied for a patent for a highly automated measuring machine (MeSOMICS®) in the Technikum.

MeSOMICS® stands for "Measurement System for the Optically Monitored Identification of Cable Stiffnesses". It is a measurement system for the identification of effective cable stiffness properties.



Bending and curving – the MeSOMICS® measuring machine quickly and easily determines cable properties as they occur later in the vehicle. The measurement runs automatically. Employees simply clamp the cable and start the system.

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