

## Efficient Virtual Testing of Real Sensor Technologies

### Lidar RSI completes real-time capable sensor models in the CarMaker product family release 8.0

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**Sensor technology as part of future forms of mobility such as automated driving will continue to rise in importance. Deploying sensors for environment detection in driver assistance systems requires a huge test scope within the development process since the reliable and robust performance of the sensors must be ensured in any conceivable scenario. As a result, virtual test driving for the validation of functions in simulation is assuming an ever-greater role. With the release 8.0 of the CarMaker product family, IPG Automotive has added the Lidar Raw Signal Interface (Lidar RSI) to its extensive sensor portfolio. The Lidar RSI is a physical sensor model based on ray tracing that is suited for detailed modeling of lidar sensors. With this latest addition, users now have access to virtual models of all physical sensor technologies in the simulation solution.**

A lidar determines the distance to its surrounding objects by measuring the time of flight. The CarMaker product family release 8.0 enables virtual modeling as well as the individual definition of specific lidar properties using a variety of parameters. This allows users to define the mounting position and orientation, cycle time or transmission power, for instance, and even the beam pattern (see Image 1). In addition, it is possible to model rotating lidar systems for 360-degree surround view.



Image 1: Sample user-defined beam pattern

For tests of the algorithms or assistance systems downstream, properties of the objects to be detected can be modeled, such as transmissive, retroreflective, diffuse or specular reflection types as well as reflectance dependent on the objects' colors. The intensity of the reflected beam is compared using a threshold-based method for which the threshold itself can be parameterized as well in order to adjust the sensitivity of the receiver unit. "With the option of real-time capable modeling and generation of raw signals from radar, lidar, camera and ultrasonic sensors, our software solutions offer all that is needed for the virtual development of raw data based fusion and detection algorithms or driving functions based on these," explained Dr. Andreas Höfer, Product Manager Simulation Software at IPG Automotive. Whether the tests focus on detecting objects or on the resulting decisions, the sources of errors can be identified and eliminated at an early stage of development.

### Parallel tests on multiple GPUs

In order to accelerate tests with the new Lidar RSI as well as established sensor models, the release 8.0 enables the parallel use of multiple GPUs. This allows real-time tests of extensive sensor configurations such as those needed for (semi)autonomous driving. If large test catalogs are involved, parallel testing is possible on an HPC system or in the cloud with multiple GPUs.

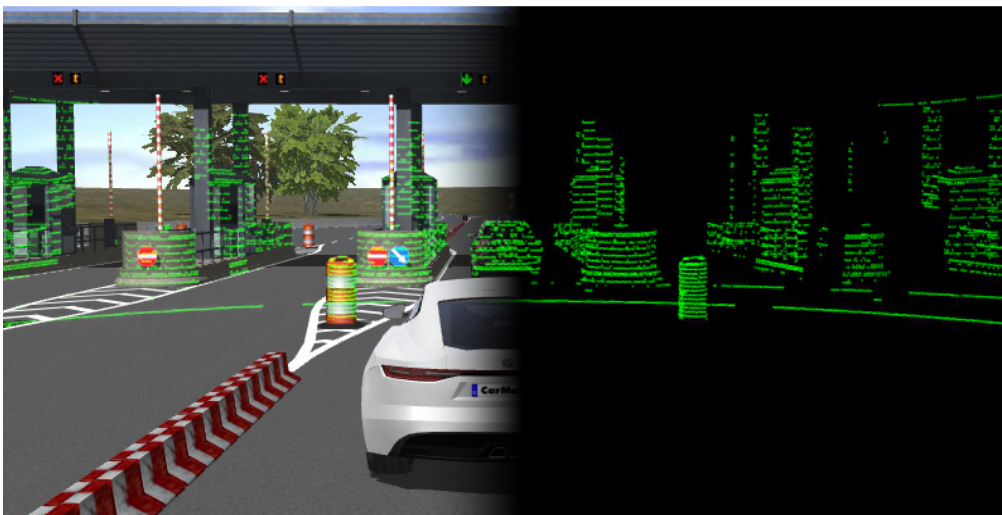


Image: Detailed modeling of lidar sensors with the Lidar RSI

### **About IPG Automotive GmbH**

As a global leader in virtual test driving technology, IPG Automotive develops innovative simulation solutions for vehicle development. Designed for seamless use, the software and hardware products can be applied throughout the entire development process, from proof of concept to validation and release. The company's virtual prototyping technology facilitates the automotive systems engineering approach, allowing users to develop and test new systems in a virtual whole vehicle.

IPG Automotive is an expert in the field of virtual development methods for the application areas of ADAS & Automated Driving, Powertrain and Vehicle Dynamics, committed to providing support to master the growing complexity in these domains. Together with its international clients and partners, the company is pioneering simulation technology that is increasing the efficiency of development processes.

By taking real test driving into the virtual world as a complement to on-road testing, IPG Automotive contributes significantly to technical progress and shares in shaping the mobility of tomorrow with regard to comfort, safety, economic efficiency and environmental friendliness.

In addition to the company headquarters in Karlsruhe, Germany, IPG Automotive provides innovative development services to its customers and partners at the national offices in Braunschweig, Frankfurt and Munich as well as in China, France, Japan, Korea, Sweden, the UK and the USA.

Further information at [www.ipg-automotive.com](http://www.ipg-automotive.com)

### **Press contact**

Katja Rische

IPG Automotive GmbH

Bannwaldallee 60

76185 Karlsruhe

Phone: +49 (721) 98520-209

Fax: +49 (721) 98520-99

E-mail: [press@ipg-automotive.com](mailto:press@ipg-automotive.com)

Press area: [press.ipg-automotive.com](http://press.ipg-automotive.com)