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New Siemens simulation offering hastens the arrival of self-driving cars

- **Using TASS' PreScan virtual sensor imagery with the Mentor DRS360 platform can automate the development of algorithms for sensor fusion and processing**
- **New partnership established with Cepton for physics-based LiDAR modeling**

Today at Siemens U.S. Innovation Day in Chicago, Siemens introduced a breakthrough solution for the development of autonomous driving systems. The solution, part of the Simcenter™ portfolio, minimizes the need for extensive physical prototyping while dramatically reducing the number of logged test miles necessary to demonstrate the safety of autonomous vehicles.

According to the findings of a report issued by the Rand Corporation, autonomous vehicle prototypes would have to be driven hundreds of millions of miles, and in some cases hundreds of billions of miles, over the course of several decades to demonstrate their reliability in terms of fatalities and injuries – an outcome the authors deemed inconsistent with the near-term commercial viability of self-driving cars. For possible solutions to these challenges, the researchers pointed to innovative testing methods such as advanced simulation technologies.

Leveraging advanced, physics-based simulation and innovative sensor data processing technologies, the new Siemens solution is designed to help automakers and their suppliers address this industry challenge with the potential to shave years off the development, verification and validation of self-driving cars.

The new solution integrates autonomous driving technologies from recent Siemens

acquisitions Mentor Graphics and TASS International. TASS' PreScan™ simulation environment produces highly realistic, physics-based simulated raw sensor data for an unlimited number of potential driving scenarios, traffic situations and other parameters. The data from PreScan's simulated LiDAR, radar and camera sensors is then fed into Mentor's DRS360™ platform, where it is fused in real time to create a high-resolution model of the vehicle's environment and driving conditions. Customers can then leverage the DRS360 platform's superior perception resolution and high-performance processing to test and refine proprietary algorithms for critical tasks such as object recognition, driving policy and more.

"Automakers are quickly realizing that physical prototypes and road testing alone cannot reproduce the multitude of complex driving scenarios self-driving cars will encounter. In fact, many of the deadliest scenarios are impossible to reproduce, while others are so dangerous to reproduce that ethics preclude pre-testing," said Dr. Jan Leuridan, senior vice president, Simulation and Test Solutions, Siemens PLM Software. "It is clear that the near-term commercial availability of fully autonomous vehicles is highly dependent on advanced, physics-based simulation technologies, where Siemens is setting the pace for the larger worldwide automotive industry."

To deliver the most comprehensive and accurate solution possible, Siemens PLM Software is working with many of the world's leading manufacturers of LiDAR, radar and vision sensing products to develop physics-based, 3D simulated versions of specific sensor modules. Compatible with the new Siemens toolchain, the simulated sensors are attuned using detailed design information from sensor suppliers, and validated using real-world measurement data for optimal accuracy. One of the most important sensor partners is Cepton Technologies, an innovative Silicon Valley-based company notable for its long-range, small-footprint LiDAR sensors. Additional sensor partners will be announced later this year.

"Simulation technology is increasingly valuable to developers of automated vehicles as they face mounting pressures to speed development, validation, and performance of their AV solutions," said Phil Magney, founder and principal for AV researcher VSI Labs. "Siemens now offers simulation solutions for each stage in the development process from sensors, to processors, to sub-systems, to the entire

vehicle. Having a greater scope in simulation solutions offers Siemens the ability to play a leading role in the validation and verification of automated vehicle solutions."

Availability

The Siemens PLM Software automated driving solution is planned for availability in Q3 of CY 2018.

Siemens PLM Software, a business unit of the Siemens Digital Factory Division, is a leading global provider of software solutions to drive the digital transformation of industry, creating new opportunities for manufacturers to realize innovation. With headquarters in Plano, Texas, and over 140,000 customers worldwide, Siemens PLM Software works with companies of all sizes to transform the way ideas come to life, the way products are realized, and the way products and assets in operation are used and understood. For more information on Siemens PLM Software products and services, visit www.siemens.com/plm.

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