

IESF Automotive EE Design Conference

## New Siemens thermal simulation solution addresses autonomous electric vehicle design challenges

- **Easy-to-use solution helps electronics and automotive design engineers tackle critical thermal changes early in the design process**
- **Leverages thermal design data to support the safety and reliability requirements of autonomous driving without sacrificing drive range, passenger comfort or in-cabin experience**
- **Delivers the most complete digital twin, generating precise thermal models for predicting real-world performance while helping reduce cost and time penalties associated with physical prototyping and extensive testing**

Siemens today introduced a new Simcenter™ software solution for design-centric thermal simulation of Autonomous Electric Vehicles (AEVs) – the industry’s first comprehensive, easy-to-use solution engineered to address critical, thermal-driven challenges associated with AEV design, such as extending electric drive range, optimizing in-cabin comfort, designing sensors and ensuring the reliability of all autonomous drive (AD) systems.

“Strategy Analytics expects that the vast majority of self-driving cars will feature electrified powertrains,” said Ian Riches, executive director, Automotive Practice for Strategy Analytics. “The OEMs who distinguish their vehicles with trusted AD performance, long drive range per charge and optimal in-cabin experiences are likely to be the winners in this new era of mobility. Thermal design software such as Siemens’ new Simcenter solution is ideally suited to help OEMs and suppliers differentiate and win in the competitive AEV markets of the future.”

Successful AEV design requires automotive engineers to simultaneously address a range of interdependent requirements. AD functionality must execute safely including sensor fusion boxes and a broad array of sensors. The precise and correct thermal design of these sensors and other AD systems is vital to ensuring safe autonomous drive functionality. However, the thermal and power loads of the vehicle's high-performance AD systems can reduce electric drive range as much as 35 percent. Similarly, in-cabin passenger comfort requirements and machine driving behavior can significantly impact the vehicle's electric powertrain energy efficiency and drive range. Efficient, co-dependent thermal design of AD electronics -- from ICs and vehicle integration, to electric powertrain and cabin design -- is necessary to successfully develop AEVs.

Siemens' new thermal simulation solution, delivered as part of the Simcenter portfolio, is the industry's first solution specifically designed to help design engineers overcome these challenges. It unleashes the power of information-rich computational fluid dynamics (CFD) technology for mainstream automotive engineers, generating highly accurate thermal digital twin simulations of the powertrain, processors, sensors and other key enabling technologies powering next-generation AEV designs.

Other new capabilities include co-simulation of component thermal and electric powertrain performance, connectivity between simulation of electric motor performance and system simulation for electrical and thermal management, and design space exploration using thermal digital twin models. This Simcenter solution also features seamless connectivity to electronic design automation tools and CAD design platforms, helping engineers to easily account for design co-dependencies across electronic, electrical and mechanical domains from the earliest stages of development.

"Creating successful first-generation AEVs will require the intelligent integration of thermal, mechanical and electrical design – a capability that Siemens is uniquely qualified to deliver," said Jan Leuridan, senior vice president of Simulation and Test Solutions at Siemens PLM. "Our new Simcenter thermal design solution addresses electrification and autonomous vehicle functionality, allowing design teams to create virtual prototypes with ease and accuracy for optimal design efficiency. This new

solution provides a significant competitive advantage for our customers who can now design safer, more reliable AEVs with confidence.”

Siemens will present a paper on the new solution, entitled “Design-centric Energy and Thermal Management in Autonomous EVs,” today at the 19th annual Integrated Electronics Solutions Forum (IESF). The presentation takes place at 3:00 p.m. EDT in the Galilee meeting room of the Inn at St. John’s in Plymouth, MI.

### **Product Details and Availability**

The Siemens solution for design-centric thermal simulation consists of Simcenter FLOEFD™ software for electronics and electric powertrain thermal simulation within native CAD environment, Simcenter Motorsolve™ software for electric motor design, and unparalleled component design to 1D system thermal design co-simulation with 1D CFD Simcenter Flomaster™ software. General availability is planned for October 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](http://www.siemens.com/plm).

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which ended on September 30, 2017, Siemens generated revenue of €83.0 billion and net income of €6.2 billion. At the end of September 2017, the company had around 377,000 employees worldwide. Further information is available on the Internet at [www.siemens.com](http://www.siemens.com).

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