Valeo Siemens eAutomotive: Achieving 100% Quality Faster with the MES Test Center

The control software in Valeo Siemens eAutomotive's electric drive systems will be built on the basis of functional models. The models are designed and tested by experts in concrete application and software development. The software that is then used in vehicles will be generated from these software models via an automated process. In the past, MES specialists have also supported Siemens eCar in building its development process. Additionally, Siemens eCar makes thorough use of the MES tools for quality assurance - the MES Test Manager® and the MES Model Examiner® for static tests. With the help of MES tools, Siemens eCar and the new joint venture are implementing the safety standard ISO 26262 for the development of E/E components in the automotive sector.

Electric drive is one of the most safety-relevant systems in eCars. This means that the associated software must be comprehensively validated before the series production, with regards to its functions and further safety demands. For this purpose, Siemens eCar has built a very close collaborative process with the MES Test Center in order to ensure early, systematic, and comprehensive quality assurance in the development team, even during capacity limitations.

Collaborating with the MES Test Center

The MES Test Center specializes in quality assurance of model-based software development. The MES Test Center begins its support of the customer during the concrete formulation of the future system's technical requirements. Accordingly, the MES Test Center examines detailed technical requirements to see if they are comprehensible and testable. The future software's functional requirements provide the foundation for the overall development to ensure a high level of precision and quality. The software models developed by the customer also undergo a review. In this way, aspects such as compliance with modeling rules and the right level of complexity can be tested. Any possible optimizations are then discussed with the customer.

As part of the service contract with Siemens eCar, the MES Test Center handled test projects. The client provided software models as test objects and detailed requirements specifications. On the basis of this, the MES experts, in coordination with the functional experts at Siemens, develop the test cases for the future

system's individual modules and components. The MES Test Center performs the tests on the delivered modules both as Model-in-the-Loop (MiL) and Software-in-the-Loop (SiL) tests. The subsequent evaluation of the test results are interpreted through the lens of ISO 26262 on the basis of the functional requirements; this occurs in a highly efficient manner via automated test assessments.

The extensive results data of the test projects were made available to the customer on a regular basis so that the results can be reproduced and repeated internally at any time. With a complete test project such as this one, the results data encompass the actual test cases and the environmental parameters as well as the automated test assessments and an ISO-compliant documentation of the test results and the targeted test coverage. Beyond this, the results serve the customer as a basis for any independent regression tests that are carried out at a later stage. Siemens eCar can reproduce the test results at any time. This way, adaptations and modifications can be tested again at any time; there is no dependency upon the service provider.

Figure 2: Peter Ginal, Group Leader Function Development for Drive Systems at Valeo Siemens eAutomotive.

The cooperation between the in-house team and the external service provider from Berlin proved very successful. "MES helped the eCar team advance software development in electric drive systems quickly and efficiently. As a result, new functions can be put into practice faster and more safely," says Peter Ginal, Group Leader Function Development for Drive Systems at Valeo Siemens eAutomotive. Dr. Pohlheim, Managing Director and MES CTO, adds "MES can absorb capacity limitations before a release effectively. This helps our customers to adhere to arranged deadlines and ensure a high level of quality."

About Valeo Siemens eAutomotive GmbH

Valeo Siemens eAutomotive GmbH is a recently founded joint venture between Siemens AG and French automotive supplier Valeo that focuses on developing and producing drive trains for electric cars. The joint venture will continue the activities of Siemens eCar Powertrain. Siemens has extensive experience in developing electric drive systems for the automotive industry and, as part of this joint venture, is using this in the area of electromobility.

The Valeo Siemens eAutomotive GmbH and MES Collaboration

Valeo Siemens eAutomotive and Model Engineering Solutions GmbH (MES) in Berlin have been working together for some time to optimize development of control software for electric drive systems. From the outset, Siemens eCar, now Valeo Siemens eAutomotive, recognized the crucial importance of software in controlling electric drive systems, and has made control software a focus of product development.

Model Engineering Solutions: Software Quality. In Control.

Model Engineering Solutions GmbH (MES) is a software company that offers solutions for the quality assurance of software projects. MES supports its customers in developing model-based embedded software that complies with industry standards such as IEC 61508, ISO 26262 or ASPICE.

For further information and contact, please visit our website www.model-engineers.com

Headquartered in Berlin (Germany), MES was founded in 2006. Dr. Hartmut Pohlheim, one of the most eminent experts in model-based development, has been the managing director of MES since 2008. With subsidiaries in the U.S. and China, international sales partners, and major industrial customers such as Bosch, Daimler, Ford, Geely, Stihl, and VW, MES maintains a strong worldwide presence. All but a few of the world's top-selling manufacturers and suppliers in the automotive industry rely on MES' solutions in their development environments.

MXAM, MTest, MoRe, and MQC are the four MES quality tools. Together they form a toolchain for the comprehensive quality assurance of all phases of the model-based software development process. With the MES Jenkins Plugin, the toolchain can also be used in a continuous integration environment. The main application is the MATLAB® Simulink® platform. The MES Test Center and the MES Academy's main service areas are quality assurance and the optimization of development processes.

MES is a dSPACE Strategic Partner, MathWorks, and ETAS product partner, and cooperates with SAE International.