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Pressemitteilung

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29.10.2014 http://idw-online.de/de/news610720

Forschungsergebnisse, Forschungsprojekte Informationstechnik, Verkehr / Transport überregional



RESCAR 2.0: Reliability and Robustness of Electronic Systems in Electrical Cars Improved

Successful Completion of Research / Reliability and Robustness of Electronic Systems in Electrical Cars Improved / Future Control Unit Four Times More Durable

Joint press release of the partners in the German Research Project "RESCAR 2.0" Audi, Bosch, Elmos Semiconductor, FZI, Infineon

Munich/Karlsruhe, Germany – October 29, 2014 – Cars take on continuously more tasks: They communicate with each other, defuse critical traffic situations and will steer automatically in the future. All of this at reduced fuel consumption and lower CO 2 emissions. The research results of the project "RESCAR 2.0" under the leadership of Infineon Technologies AG (FSE: IFX / OTCQX: IFNNY) help the automotive industry find a solution to a dilemma here: Ever shorter innovation cycles must be reconciled with increasing vehicle complexity and greater requirements for the reliability of the automotive electronics systems and the chips installed in them. The three-year RESCAR research work was primarily focused on the electrical car where the requirements for electronic components are particularly high.

Task for RESCAR 2.0: To significantly improve the reliability and robustness of electronic automotive components

Be it in the powertrain, the electronic control units (ECU) or in the car's body and convenience electronics: Number and complexity of electronic components are rising. While a medium-sized vehicle has about 70 ECUs today, it will have about 100 in five years from now. These miniature PCs are connected in a network, and need to interact reliably without errors at all times – and consequently, depending on vehicle size, also their around 4,000 to 8,000 chips.

Especially electrical cars demand resistant, reliable and durable ECUs, as they have to meet thus far unparalleled, strict requirements. In addition to the driving operation, the electronic components and chips installed in them are also under stress during breaks; for example, in the battery management when quick-charging or charging overnight. Here, the electronic systems must be designed to last more than 30,000 operating hours. That is nearly four times longer than today's standard of about 8,000 operating hours in vehicles with combustion engines. Until now, the ECUs of electric cars have been improved through elaborate specific manual work to master these challenges.

The task for RESCAR 2.0 was to research methods and procedures for development processes, which can be used across the entire automotive value chain, and take into account the increasing vehicle complexity as well as the greater requirements for reliability. Before RESCAR there has not been anything of the kind with isolated solutions having usually been optimized selectively. The result of the RESCAR research is a cross-industry solution that enables upgrading of the ECUs in a considerably more efficient way.

"Robustness By Design": RESCAR 2.0 developed standardized processes for all stages of the automotive value chain

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The five research partners have developed processes and methods that are standardized across the entire automotive value chain – from the semiconductor provider to the system producer, to the automobile manufacturer – and these can be applied by everyone already in a very early stage of their development activities. For example, special robustness analyses have been devised. They help to check and confirm the suitability of planned ECUs or chips for the intended field of application as early as during their development phase. Also, they help to report the results to the automobile manufacturer. Therefore, already in the design phase of an ECU and of the chips the requirements of the automobile manufacturer, its requirement profiles, are now considered.

A requirement profile, as a fixed component of the technical specifications for the ECU, includes all relevant data for a vehicle. Among this data are the stress factors based on environmental conditions (such as temperature, humidity, voltage supply), specific conditions of the driving operation, key data on transport, storage, processing and continuous operation for the respective application. The RESCAR partners have broken down this data to the required level of detail within their respective value stage, and have standardized them in such a way that the data can be used consistently by all.

Owing to RESCAR, the development of ECUs that fulfill the new, very high standards in terms of robustness and durability is now tightly linked along the entire automotive value chain. ECUs in electrical cars can now, for example, fulfill the much higher requirements for reliability and robustness. Also in the changeover of central automotive ECUs, such as for steering and braking from completely mechanical and hydraulic to mechatronic systems, the RESCAR results help meeting the highest safety standards. Safety aspects, numerous different interactions between components and their interdependencies can now already be taken into account during the development of ECUs and chips. Also, they can be geared towards the requirements of the respective application.

RESCAR project partners

The five RESCAR project partners cover all stages of the automotive value chain: the automobile manufacturer AUDI AG, the system supplier Robert Bosch GmbH, the FZI Research Center for Information Technology and the two semiconductor companies, Elmos Semiconductor AG and Infineon Technologies AG (the latter also responsible for project management). Furthermore involved were the German Research Center for Artificial Intelligence (DFKI), Fraunhofer-Gesellschaft with the Institute for Integrated Circuits (IIS) and the Institute for Reliability and Micro-Integration (IZM), the Gottfried Wilhelm Leibniz Universität Hannover, Technische Universität Dresden and Universität Tübingen.

RESCAR stands for "Robust Design of New Electronic Components for Applications in Electromobility". Over the course of the project, about Euro 13.3 million was invested. RESCAR 2.0 was sponsored by the German Federal Department of Education and Research (BMBF) with rounded Euro 6.5 million within the scope of the announcement "Key Technologies for Electromobility (STROM)".

The German federal government has set itself the goal of making Germany the leading market and leading provider for electromobility. The results from the RESCAR 2.0 research project make a crucial contribution to reaching this goal. After all, only if electrical cars offer equal performance, safety and comfort as vehicles with combustion engines, there will be broadly based acceptance in the market.

Find more information about RESCAR at: https://www.edacentrum.de/rescar

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URL zur Pressemitteilung: http://www.infineon.com/cms/en/about-infineon/press/press-releases/2014/INFXX201410-004.html Press Release and Logo RESCAR





Thanks to the R&D; project "RESCAR 2.0" the reliability and robustness of electronic systems in electrical cars can increase and future electronic control units (ECUs) can be four times more durable.