Hyundai Motor Group, Timing-Architects and Infineon Technologies work in a joint project at the migration of multiple single-core automotive controller units to one multi-core processor platform

South Korea/Germany; Hyundai Motor Group uses the Timing-Architects TA Toolsuite to evaluate the migration of multiple single-core automotive controller units to one multi-core processor platform.

Increasing demands for more sophisticated functions like comfort features, eco-friendliness and state-of-the-art safety mechanisms are just a few of the factors that express the need for Hyundai Motor Group to introduce additional processing power within their automotive electrical control systems. However, despite continued increases in clock rates, single-core processors are no longer adequate to satisfy many of the next generation embedded automotive system requirements. This makes the change to a new processing technology inevitable. Multi- and many-core processors will be the basis technology for future embedded automotive systems.

Multi-core processors are superior to their single-core predecessor in calculation power and energy efficiency. However, to use multi-core processors for the embedded automotive domain, engineers are faced with various new challenges. These are for example handling the overhead in communication between cores, allocating tasks and functions to the correct cores as well as guaranteeing data consistency, which is not guaranteed by scheduling mechanisms alone anymore. As a result, projects using multi-core architectures without a change in the development process have become larger, longer, and farther behind schedule than those utilizing single-core processors [1].

Hyundai Motor Group did recognize this trend early and prepares to face the new challenges which will arise due to this multi-core technology. For this, a joint project together with Infineon Technologies AG and Timing-Architects Embedded Systems GmbH was started. The project focuses on the evaluation of a strategy for the migration of existing automotive software systems to new multi-core processors like the Infineon AURIX^{TM} [2]. Timing-Architects supports Hyundai Motors Group with its expertise on multi-core systems and the TA Toolsuite is used to model, simulate and automatically optimize the existing software for the multi-core processor system. The objective is a tool-based migration concept for integrating software components of different electronic control units on one powerful multi-core processor. This includes the consolidation of system models, automated timing and memory optimal task allocation and the determination of data consistency needs.

As a result of this joint project Hyundai Motor Group expects to develop methodologies for its future multi-core systems. Further goals are to gain new insights on the technology and tools as well as building new partnerships to utilize this new technology. With this technological innovation Hyundai Motor Group expects to provide its customers exciting new and sophisticated functions in future car generations and will meet the expectations as innovation leader in its domain.

About the Companies:

Hyundai Motor Group: Established in 1967, Hyundai Motor Co. has grown into the Hyundai Motor Group, with more than two dozen auto-related subsidiaries and affiliates. Hyundai Motor - which has seven manufacturing bases outside of South Korea including Brazil, China, the Czech Republic, India, Russia, Turkey and the U.S. - sold 4,4 million vehicles globally in 2012. Hyundai Motor, which employs approximately 100.000 worldwide, offers a full line-up of products including small to

large passenger vehicles, SUVs and commercial vehicles. Further information about Hyundai Motor and its products is available at www.hyundai.com.

Infineon Technologies AG: Infineon Technologies is a leading innovator in the international semiconductor industry. The company designs, develops, manufactures and markets a broad range of semiconductors and complete system solutions targeted at selected industries. Products serve applications in the wireless and wire-line communications, automotive, industrial, computer, security and chip card markets. See www.infineon.com for more information.

Timing-Architects Embedded Systems GmbH: Timing-Architects provides model-based simulation and optimization tools (TA Toolsuite) for embedded system design and development. With the TA Simulator Timing-Architects provides a unique solution for the model-based design, test and analysis of embedded real-time multi- and manycore systems. With the TA Optimizer it is possible to automate for example the partitioning and allocation of functions to cores with respect to real-time requirements and further configurable constraints like memory consumption, waiting times, inter-core communication and many more. For customers from the automotive domain, Timing-Architects provides a comprehensive portfolio of expert tools as well as consulting services in the area of timing, performance and reliability evaluation of embedded multicore systems. See www.timing-architects.com for more information.

[1] VDC Research, "Next Generation Embedded Hardware Architectures: Driving Onset of Project Delays, Costs Overruns, and Software Development Challenges", September 2010

[2] Find out more on the Infineon AURIX^{TM} multi-core platform after the link.

For more information, please visit:

www.timing-architects.com

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