

Continental Achieves Highly-Automated Driving Using Production-Ready Technologies

Continental's Architecture Migration Demonstrator shows how a vehicle automation system with basic functions can be developed using the technologies available today. The system could soon be developed further into series production.

Frankfurt am Main (Germany) / Borås (Sweden), June 21, 2011. Continental, the international automotive supplier, will today be presenting an Architecture Migration Demonstrator at the EU-sponsored HAVEit research project's final event; the demonstrator is equipped with production-ready technologies which allow highly-automated driving. Using a co-pilot system, the automated demonstrator can maintain a set speed or the distance from the vehicle in front and keep to its lane while, at the same time, using a camera to carefully monitor how attentive the driver is to the traffic situation. "The software developed as part of the HAVEit project could soon, i.e. within about five years, be developed into a production-ready, fully-integrated system covering the initial automated driving functions", said Holger Zeng, Continental's HAVEit project manager.

Focus on architecture and implementation

Producing a common HAVEit system architecture and bringing it close to production readiness were the main tasks when developing the Architecture Migration Demonstrator. The HAVEit system architecture was first worked out in detail top-down and clearly specified, followed by implementation, using the AUTOSAR methodology and the CESSAR configuration system. Continental's automotive control unit, the Chassis & Safety Controller (CSC), acted as the universal basic computer on which all the HAVEit system's sub-systems were programmed. Several of these CSCs are networked with standard CAN buses so that highly-automated driving can be achieved with inexpensive, currently available technology. Continental's CSC is also installed as an integral element of the HAVEit system in all the other HAVEit demonstration vehicles; so, they too are making use of a piece of series production technology. Other Continental components used are the long-range ARS 300 radar sensor for object detection, the electronically controllable braking system and electric power steering (EPS). The vehicle is also fitted with two Continental cameras: one keeps an eye on the road up to 60 meters ahead of the vehicle and recognizes traffic lanes; the other monitors the driver.

The data from the sensors is analyzed using data fusion, which enables the co-pilot system to achieve the automation functions. At today's HAVEit final event, these basic automation functions will be demonstrated using a motorway-type traffic situation. In the partially-automated mode, the system operates in the longitudinal direction like an adaptive cruise control system; the highly-automated mode provides an additional lane-keeping capability. During highly-automated driving, the onboard camera keeps a permanent watch on the driver, including observing where he is looking and how often he blinks; if the driver's attention wanders, he will be obliged to resume control of his vehicle. The system will also hand back control to the driver if conditions no longer make highly-automated driving possible, e.g. if no road markings can be detected or if the bends are too tight. If the driver fails to react, the vehicle's speed will be gradually reduced until the vehicle comes to a standstill.

"Although more complex extreme scenarios, such as lane changing, driving around obstacles and emergency braking, have not yet been implemented in this demonstration vehicle, it will nonetheless be technically possible to achieve them in future using the software which has already been developed, together with an upgraded system for monitoring the vehicle's immediate surroundings; this has already been demonstrated by some of the other HAVEit vehicles. This car proves that we have made the gap between research and product development smaller than ever before", Zeng added. As for the future, using the latest generation of the Chassis Domain Control Unit (CDCU) rather than the CSC as the universal basic computer offers the potential for either improving the vehicle's performance still further or alternatively for reducing cost and engineering effort. The research vehicle was developed at Continental's Regensburg site, assisted by our HAVEit project partners.

About HAVEit

The EU funded R&D project HAVEit („Highly Automated Vehicles for Intelligent Transport“) is set to develop research concepts and technologies for highly automated driving. This will help to reduce the drivers' workload, prevent accidents, reduce environmental impact and make traffic safer. Launched in February 2008, 17 European partners from the automotive and supply sector as well as from the scientific community collaborate in the project. In total, investments of EUR 28 million were made into HAVEit, EUR 17 million of which were EU grants and EUR 11 million were contributed by the 17 partners, of which EUR 7 million are invested by the automobile industry. The HAVEit consortium consists of vehicle manufacturers, automotive suppliers and scientific institutes from Germany, Sweden, France, Austria, Switzerland, Greece and Hungary:

Continental, Volvo Technology AB, Volkswagen AG, EFKON AG, Sick AG, Haldex Brake Products AB, Knowllence, Explinovo GmbH, German Aerospace Center (DLR), Ecole Polytechnique Fédérale

de Lausanne (EPFL), University of Athens, Institute of Communications and Computer Systems (ICCS), University of Applied Sciences Amberg-Weiden, Budapest University of Technology and Economics, Universität Stuttgart, Institut für Luftfahrtsysteme, Wuerzburg Institute of Traffic Sciences GmbH, Institut National de Recherche en Informatique et en Automatique (Inria), Institut français des sciences et technologies des transports, de l'aménagement et des réseaux (IFSTTAR).

For further information please visit: www.haveit-eu.org

With sales of €26 billion in 2010, **Continental** is among the leading automotive suppliers worldwide. As a supplier of brake systems, systems and components for powertrains and chassis, instrumentation, infotainment solutions, vehicle electronics, tires and technical elastomers, Continental contributes to enhanced driving safety and global climate protection. Continental is also an expert partner in networked automobile communication. Continental currently has approximately 155,000 employees in 45 countries.

The **Automotive Group** with its three divisions Chassis & Safety (sales of approximately €5.8 billion in 2010, 30,000 employees), Powertrain (sales of approximately €4.7 billion in 2010, 27,000 employees) and Interior (sales of approximately €5.5 billion in 2010, 30,000 employees) achieved sales of approximately €16 billion in 2010. The Automotive Group is present in more than 170 locations worldwide. As a partner of the automotive and commercial vehicle industry, it develops and produces innovative products and systems for a modern automotive future, in which cars provide individual mobility and driving pleasure consistent with driving safety, environmental responsibility and cost-efficiency.

The **Chassis & Safety** Division develops and produces electronic and hydraulic brake and chassis control systems, sensors, driver assistance systems, airbag electronics and -sensors, washer systems and electronic air suspension systems. Its core competence is the integration of active and passive driving safety into ContiGuard®. The **Powertrain** Division integrates innovative and efficient system solutions for vehicle powertrains. The comprehensive range of products includes gasoline and diesel injection systems, engine management, transmission control, including sensors and actuators, as well as fuel-supply systems and components and systems for hybrid and electric drives. Information management is at the very heart of the **Interior** Division, which provides a range of products that includes instrument clusters and multifunctional displays, control units, electronic car-entry systems, tire-monitoring systems, radios, multimedia and navigation systems, climate control systems, telematics solutions and cockpit modules and systems.

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