CAN Newsletter Online

Knight Rider becomes reality

In the 80s, Michael Knight talked to his watch and KITT, his car, came. In the near future, this boyâ€™s dream will become reality. Volvo has already demonstrated a self-parking car, controllable by just giving a command to the smart phone.

AUTOMATED DRIVING IS ON THE AGENDA of high-end carmakers. Of course, the leading electronic suppliers are working on this topic, too. Recently, the Volvo Car Group demonstrated its self-parking car. This is an important step on the way to the speaking and self-driving KITT (Knight Industries Two Thousand) car. Volvo's concept car finds and parks in a vacant space by itself, without the driver inside. The "driver" just uses a smart phone app to activate the autonomous parking and then walks away.

This autonomous parking is achieved by several electronic systems, including car-to-infrastructure and in-vehicle equipment. Some of these electronics use CAN communication. Transmitters in the road and parking infrastructure inform the car, if and where a parking slot is available. The vehicle uses sensors to localize and navigate to a free parking space. The procedure is reversed, when the "driver" comes back to pick up the car.

Combining autonomous driving with detection and auto brake for other objects makes it possible for the car to interact safely with other cars and pedestrians in the car park. Speed and braking are adapted for smooth integration in the parking environment. "Our approach is based on the principle that autonomously driven cars must be able to move safely in environments with nonautonomous vehicles and unprotected road users," says Thomas Broberg, Senior Safety Advisor at Volvo.

Volvo Cars has also been the only participating car manufacturer in the Sartre (Safe Road Trains for the Environment) project, which was completed in 2012. The project involved seven European partners. It was focused on technology that can be implemented on conventional highways, on which platooned traffic operates in a mixed environment with other road users. The Sartre platoon included a lead truck followed by four cars driven autonomously at speeds of up to 90 km/h in some cases with no more than a 4m gap between the vehicles.

Safety and support features for the XC90 (read on)
Volvo Cars has revealed some technologies used in the XC90 model 2014. This includes autonomous steering and pedestrian detection in darkness.

"The autonomous parking and platooning technologies are still being developed. However, we will take the first steps towards our leadership aim by introducing the first features with autonomous steering in the new Volvo XC90, which will be revealed at the end of 2014," concluded Thomas Broberg.

From semi-automated to automated driving

Semi-automated and automated driving are hot topics at this year's IAA international Motor Show in Frankfurt (Germany). TRW will introduce its next generation S-CAM 3 video camera and AC1000 radar. In addition, the company will present its safety ECUs, which can integrate multiple chassis and driver assist functions, actuators including integrated brake control and electrically powered steering, and adaptive occupant safety technologies and improved rear seat safety solutions.
TRW's Peter Lake explained: "The automotive industry is entering a period of immense change as the market aims to significantly reduce the number of road related fatalities in this decade and beyond. While advanced safety technologies have been offered in luxury vehicles for several years, their fitment is now being spurred across multiple vehicle segments by a combination of regulatory mandates, New Car Assessment Program ratings, insurance incentives and consumer demand."

Continental expects automated driving to become as usual as ABS and ESC. At the Supplier Innovative 2013 congress, which is part of the BMW World event in Munich, Christian Senger, head of Continental's automotive electronics research department, stated: "Automated driving is set to become just as much a standard part of driving as anti-lock brakes (ABS) 35 years ago and electronic stability control (ESC) in 1995. However, the change to fully automated cars will not happen overnight, as there are still many challenges to overcome in terms of research and development work. Consequently, automation will be introduced step-by-step, from partial automation, through highly automated systems, to full automation."

Senger underlined the need for even closer cooperation between suppliers and automotive manufacturers: "The highest level of system reliability across domain boundaries is the indispensable basis on which automated driving must be built. This can only be achieved if manufacturers and system suppliers form an even closer alliance in research and development. Our joint research cooperation with the BMW Group is a clear recognition of this fact."

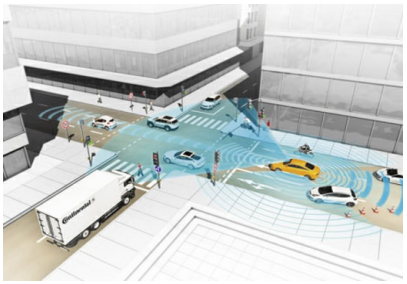
Christian Senger (Continental): "Alongside the

Automated driving to be implemented step-by-step

In terms of the technology involved, automated driving is an evolution of driver assistance systems already being industrialized. Its systematic networking with driver information and drive systems is gradually advancing

the concept toward its goal. From 2016, partially automated systems could already be assisting drivers in “stop & go” situations on the freeway at low speeds of up to 30 km/h. But this initial step toward automation does not relieve drivers of their responsibility to constantly pay attention to what is happening on the road. This step may come to fruition with the implementation of highly automated driving starting in 2020.

electrification of cars, automated driving is undoubtedly the biggest task facing the automotive industry in the next 10 to 15 years. The complexity of this technology is a major challenge, and one that, in terms of suppliers, only system suppliers will be able to meet.”



Automated driving requires detection of the environment by means of sensors; the drive commands at the end of the process are transmitted via the CAN-based in-vehicle networks

As well as covering higher speeds above 30 km/h on the freeway, highly automated driving will allow drivers to use the time they would ordinarily spend driving to carry out other activities, such as reading the latest headlines online. With both levels of automation, however, the driver must be able to take control of the vehicle at all times. But if fully automated driving will be possible in 2025, even this may no longer be necessary. On the freeway, a fully automated vehicle will have full and independent control of driving up to 130 km/h.

But when the vehicle reaches the desired exit, for example, the driver will have to take control, even with this high-level of automation. When fully automated systems become available, they will still be limited to driving on the freeway. However, if the driver fails to respond to a demand to take control, the vehicle will return to a safe state by itself, i.e. by braking and stopping on the hard shoulder.

After 2025, automated driving could become reality, 2020 could see the first highly automated vehicles, and by 2016 partially automated driving is expected in luxury cars and eventually in the higher mid-range class.

Automated driving is one of the central themes of the international automotive supplier's technology strategy. Today, more than 1300 specialists at Continental are already working on the basics of automated driving, including driver assistance systems such as adaptive cruise control and emergency brake assistance. For this and for further step-by-step automation, Continental is investing more than €100 million in research and development in 2013.

Continental already sees itself as a leading manufacturer of driver assistance systems. Since the first series project in 1999 for the Mercedes S-Class, the company has realized more than 100 projects for automotive manufacturers worldwide. What is more, Continental has racked up many years of experience in the design of display and user interfaces and in the energy management of drivetrain systems. The developed products and sub-systems are designed in a way that they can be integrated in different car platforms from different OEMs (original equipment manufacturer.

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The future of driver information (read on)
At the IAA 2013 Frankfurt Motor Show, Continental will show innovations for vehicle instrumentation. This includes autostereoscopic 3D displays, user-programmable instrument clusters, and larger head-up displays.

In conjunction with its network of partners in the field of information and communication technology, this setup enables Continental to realize a holistic approach to automated driving. The internationally operating supplier can also look back on several years of development activities in the field of automation. Back in 2011, for instance, as part of the EU research project Have-it, the company developed a highly automated assist system for driving in traffic jams and around road works as an example of a complex traffic scenario.

Alongside its involvement in other research projects (Aktiv, Darpa Urban Challenge), the company completed a two-week endurance test with close-to-production technology in the US-state of Nevada in early 2012. Over 15000 miles of mostly highly automated driving were completed on public roads. In December 2012, the Nevada Department of Motor Vehicles (DMV) authorized Continental's use of the company's vehicle in the state for the purpose of testing automated driving. Continental is the first automotive supplier to receive this kind of license from the relevant homologation authority.

Research partnership with the BMW Group

In January 2013, Continental and the BMW Group signed a research cooperation agreement in order to jointly develop highly-automated driving systems for the freeway. The cooperative project will run until the end of 2014. Several prototype test vehicles equipped for automated driving are set to be built in the course of these two years. The research prototypes will then be made available to a select team of trained test participants. Tests will involve analyzing highly automated driving functions using close-to-production technology not only on German Autobahns, but also on freeways in other European countries. The tests will cover all the challenges posed on freeways, such as interchanges, toll plazas, and road works.

Legislation is decisive when it comes to market launch

System reliability forms the basic technical requirement for the realization of automated driving. Road safety at the highest level is therefore the indispensable basis on which automated driving must be built. In concrete terms, this calls for fail-safe architecture that keeps the vehicle in a safe state in the event of a fault. However, the time frame

for development of this required safety architecture is not the only factor that determines when automated driving will be launched. Legislators will play a crucial role in determining when and how autonomous vehicles can be introduced to the market. The necessary legal framework has yet to be drawn up. This means, politics could delay the introduction of automated driving.