

Tips and Technology

For Bosch business partners

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Electrical and Electronics Systems



BOSCH
Invented for life

Automated Driving

Hollywood did it first: In the 1980s, the super high-tech factory in the action series Knight Rider brought a talking and self-driving Pontiac Firebird Trans Am named K.I.T.T. to the television screen.



Just 30 years later, automated driving is no longer restricted to television fantasy. Bosch has turned science fiction into a reality. Automobiles with Bosch technology now take control in specific situations such as traffic jams or parking.

Since 2011, Bosch has been working on automated driving in Palo Alto, USA and Abstatt, Germany. Both teams draw on a worldwide network of more than 5,000 Bosch engineers in the field of driver assistance systems. The primary consideration in development at Bosch is safety. Worldwide, an estimated 1.3 million people die in traffic accidents, a number which is on the rise. In 90% of these fatalities, improper human behavior is at fault.

From the emergency braking system to the traffic jam assistant

Taking over driving in critical driving situations can save the lives of drivers. Studies show that predictive braking systems by Bosch, would for example, prevent up to 72% of all collisions involving personal injury if all of the vehicles had the system on board. Drivers of cars with the Bosch traffic jam system get where they are going safe and relaxed. In heavy traffic up to 60 kph, the system independently brakes, accelerates and keeps the car in the lane.

Driver assistance systems are the foundation for the incremental approach to automated driving. Bosch is already looking at highly automated driving in which the driver does not have to continuously monitor of the vehicle. In 2020, cars with Bosch highway pilots will drive automatically from start to destination. During the following decade, these fully automated systems will be on the road handling every situation that arises while driving.

Bosch sensors are the sensory organs of automobiles

Automated driving affects everything that goes on in a car – driving, braking and steering – and requires an overarching understanding of the automobile's systems. This understanding is mediated by radar, video and ultrasound sensors. Sensors are the sensory organs which perceive the surroundings of the automobile. High-performance software and computers process the collected information and ensure that automated vehicles can safely navigate through road traffic while saving gas.



The data from the individual sensors are compiled and converted into a comprehensive model of the surroundings. All static and dynamic objects are depicted. Entirely new hardware and software technologies and algorithms are used in these calculations. Then the identified objects are placed in a precise relationship to traffic lanes, and the vehicle is located on digital maps. The automated driving system can interpret the situation, identify unrestricted routes and to develop a driving strategy.

iBooster - The key to automated driving

As an increasing number of driving tasks are taken over by the automobile, systems that affect safety such as braking and steering are subject to special requirements. To maximize availability when one of these components fails, a failsafe system is required which Bosch has already developed for brakes, for example. For example, the electromechanical braking force amplifier iBooster and the braking control system ESP® independently brake the automobile without requiring driver intervention.



The iBooster by Bosch therefore satisfies an important requirement of automated driving. The braking force amplifier can build up to braking pressure independently and three times faster than an ESP®-System. If for example the predictive emergency braking system identifies a hazardous situation, the vehicle comes to a stop much faster. At the same time, the iBooster also handles the smooth braking of adaptive cruise control ACC up to a standstill almost entirely noise-free.

The iBooster is also a key component of hybrid and electric vehicles. On the one hand, it does not require a vacuum generated with great effort either by the internal combustion engine or a vacuum pump. On the other hand, the braking force amplifier working together with the ESP®hev which was developed especially for hybrid and electric vehicles almost entirely converts braking energy into electrical energy and thereby extends the range of electric driving. If more forceful braking is required or if the generator is unable to provide the required braking torque, the braking force amplifier provides the additional braking force through the main brake cylinder in the conventional manner.



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