The market for automated and connected mobility

We also see major growth potential for the Bosch Group in the field of automated and connected mobility in passenger cars. Projections by the “Connected Car Effect 2025” study by Bosch and the consultants Prognos illustrate the benefits of connected and assisted driving for Germany, the U.S., and China. The study calculated that in the year 2025, 260,000 accidents would be prevented, 350,000 fewer people injured, 4.3 billion euros saved on collision damage, and nearly 400,000 metric tons less CO₂ emitted, in addition to significant time savings for drivers. In the three countries alone, around 70 million hours of driving would be saved through connected parking functions.

We are currently focusing our efforts on making the search for a parking space much easier, and on automating the parking process step by step. This will also ease pressure on traffic and the environment, particularly in cities and conurbations. In Germany, for example, drivers currently clock up as many as 4.5 kilometers in unnecessary driving each time they look for parking. We are significantly refining our current driver assistance systems for parking, such as parking aids and parking assistants, and are opening up new markets. We follow an integrated approach when it comes to parking.

With our active parking lot management, we want to make it easier for drivers to find parking and to help parking garage operators fill all their spaces. Sensors installed in the pavement detect whether a parking space is occupied. The sensors wirelessly relay this information via a gateway to a server, where the data is transferred to a real-time map. Drivers can then use an app to access the information online. We are also developing systems for automated valet parking. This function enables the fully automatic use of parking garages based on intelligent parking garage infrastructure, on-board sensors in vehicles, and reciprocal connectivity. The benefits are greater convenience for drivers and improved use of capacity in parking garages, particularly as fully automated parking means more vehicles can fit in the same space. The third promising area is community-based parking. This is intended to make it easier to find curbside parking in residential and downtown areas. It makes use of ultrasonic sensors in parking assistants, which are already available in nearly one-third of new vehicles.

Vehicles collect information about available parking spaces as they drive past, and this information is used to create a digital parking map. The data is then available to nearby vehicles via the cloud. Together with Daimler AG, we launched a community-based parking project in the greater Stuttgart area in fall 2016. This solution runs on an open platform that can be used by other partners.

We are also working on automated driving on freeways and similar controlled-access highways, building on a wide range of assistance systems that are already available, such as adaptive cruise control, emergency braking assistants, and lane-keeping assistants. As well as surround sensors, we have all the necessary technology such as powertrains, brakes, steering, and navigation systems in-house. We have further expanded our development activities in this area. As part of this, we have been developing a highway pilot not only for Germany and the U.S., but also for Japan and thus for left-hand driving, since early 2016. The key component is an intelligent interface between the vehicle and the driver—otherwise known as the HMI (human-machine interface). At the same time, we are working on flexible, intuitive display and control concepts.

Automation and connectivity intermesh. Like scarcely any other company, Bosch is driving connected mobility forward. We are developing the necessary connectivity technologies, sensors, and cloud solutions. We can also offer the complete system, including communication control units, the central gateway for ensuring communication with all domains, and transmission and encryption technologies from our subsidiaries ETAS and escrypt. This means that the secure availability of the cloud-based updates can be ensured throughout the entire lifetime of the vehicle. Our vision is the intelligent assistant. At the Consumer Electronics Show (CES) at the beginning of 2017, we presented a concept vehicle that can also be connected with its environment, such as a smart home or car repair shop.

We are also working on connected transport solutions for the international market. In 2016, we presented the iTraMS intelligent transport management system in India. This new, flexible solution is suitable for all types of vehicles. The connectivity platform comprises vehicle
positioning, condition monitoring, and performance analysis. As well as being installed in new vehicles, it can also be retrofitted. It can improve fleet management and can offer basic support in emergencies, off-road applications, and comprehensive transport solutions.

Through our subsidiary Bosch Engineering, we offer expertise in other areas of mobility, such as collision warning and emergency braking for streetcars. Our aim is to think beyond roads when it comes to automated mobility. The same applies to connectivity. Introducing connectivity in the transportation of goods by rail has been difficult up to now, as rail freight cars do not have their own energy supply or their own sensors. Bosch Engineering is now offering solutions in this field. We have strengthened our activities in individual systems and software development for automotive and non-automotive applications with the acquisition of ITK Engineering AG, which was completed in early 2017.

More focus needed

With mobility becoming electrified, automated, and connected, and given the high upfront investments associated with this trend, we also need to sharpen our focus. As announced, we have spun off the Starter Motors and Generators division to form an independent unit, and have now begun the sale process. We see better opportunities for this unit with a new owner. Further development of this division, and especially the necessary expansion of its international activities, would have tied up considerable additional capital at Bosch.

In January 2017, we also announced in conjunction with our joint venture partner, the MAHLE Group, that we are seeking to sell our joint turbocharger business Bosch Mahle Turbo Systems (BMTS). The global market for turbochargers is set for further growth over the next few years, as the trend toward small engines with turbochargers, particularly for hybrid powertrains, is continuing. However, success in this cost-driven market is possible only if the company reaches a certain size. Bosch and MAHLE have decided not to pursue the further expansion of BMTS themselves. We also announced in 2016 that we would discontinue the operations of the Stuttgart-based Bosch Emission Systems GmbH & Co. KG at its plant in Neunkirchen, Germany, owing to a continuing difficult economic environment. This also affects the activities of Bosch Emission Systems in the United States. Bosch Emission Systems produces and installs exhaust-gas treatment systems. In addition, we announced that we would sell our transmission components business for on-highway commercial vehicles in Japan to Knorr-Bremse AG. In the Automotive Electronics division, we announced plans to sell our U.S. company Akustica Inc., headquartered in Pittsburgh, PA, which manufactures miniaturized MEMS microphones.

We also decided on a series of structural measures to improve competitiveness and align ourselves with changing markets in 2016. In particular, these include measures for locations in the Mobility Solutions business sector and relocations within the Automotive Aftermarket division concerning the processing of used parts, spark plugs, and diagnostic devices. The affected locations are mainly in Germany and the United States. Moreover, in our Automotive Steering division we are adjusting to the trend away from hydraulic steering and toward electric steering, and are working on attractive and competitive products in this field. Electric steering is a key component of future automated driving. In Automotive Steering we are therefore carrying out restructuring measures in the areas of hydraulic steering and pumps, and have announced adjustments to locations as well as relocations in Germany and other countries such as Brazil.