

Germans want automated freeway driving

According to the Continental Mobility Study 2013, German motorists appreciate the idea of automated driving on Autobahns. The market researchers from IHS predict that in about 20 years there will be about 54 million self-driving cars on the roads.



THE CAR IS SUPPOSEDLY THE GERMANS' FAVORITE TOY. And it is said that the no-speed-limitation on many of the German Autobahns (freeways) satisfies especially male drivers. Therefore, the results of the Continental Mobility Study are at first glance a bit surprising: 76 percent of participants voted for using automated driving on long

trips and 70 percent for using self-driving cars in traffic jams on the freeway. Those surveyed considered it less relevant for routine driving (27 percent), city driving (39 percent), and driving on non-divided highways between towns (36 percent). When asked when they themselves would want to use the technology, German drivers specified they would like to be driven through roadwork on the freeway (69 percent) and traffic jams (54 percent) and would like to have their cars park themselves in parking garages. The Infas institute has conducted the study on behalf of the German automotive supplier. The representative survey among motorists in Germany, United States of America, Japan, and China is based on interviews as well as discussions with experts from science and the automotive industry. Additionally, qualitative surveys in France, India, and Brazil were done. It seems that the study is the most comprehensive of its kind looking into the acceptance of advanced driver assistance systems (ADAS) and self-driving cars (SDC).

"The needs of German motorists match up perfectly with the development possibilities in the upcoming years. Indeed, partially automated vehicles will initially be able to navigate through roadwork and traffic jams on the freeway; up next is the ability to park on their own in parking garages," stated Dr. Elmar Degenhart, chairman of the Continental Executive Board. "What's more, the results illustrate that the successful introduction of ADAS worldwide, combined with the direct customer benefits derived from these, has paved the way to the acceptance of automated driving."

The "Emerging Technologies: Autonomous cars - not if, but when" study by IHS Automotive forecasts nearly 12 million yearly self-driving cars sales in 2035. The market researcher predicts that in twenties years there will already be 54 million cars on highways with autonomous driving capability. The study also notes some potential barriers to SDC development and two major technology risks: software reliability and cyber security. The barriers include implementation of a legal framework for SDCs and establishment of government rules and regulations.

Several carmakers have said publicly that they will offer autonomous driving cars by 2020. The necessary technology is already affecting ADAS such as adaptive cruise control (ACC), lane-keep assist (LKA), and collision-mitigating brake systems. Additionally, the IHS study reports that the first group of autonomous cars will have so-called level-3 capability - limited self-driving that enables the driver to cede full control of all safety-critical functions under certain traffic and environmental conditions and includes auto pilot for highway travel and parking. Coming later in the decade will be SDCs with level-4 capability - self-driving but with human controls.

North America is forecasted to account for 29 percent of worldwide sales of SDCs with human controls (level-4) and self-driving only cars (level-5) in 2035, or nearly 3,5 million vehicles. China is predicted to capture the second largest share at 24 percent, or more than 2,8 million units, while Western Europe will account for 20 percent of the total, 2,4 million vehicles.

OEMs and suppliers are investing a lot of money into the development of automotive technologies, in particular companies in Germany. In 2012, the German automotive industry, carmakers and suppliers, spent a total of € 23,5 billion (including external expenditure). That represents a rise of nearly six percent compared to the previous year. These figures are based on a research and development survey by the "Stifterverband" (the business community's innovation agency for the German science system). According to this study, about 93000 researchers and

developers are employed in the German automotive industry, which is about one quarter of all German R & D engineers.

CAN FD for automated driving

For automated driving a lot of new technologies need to be developed and existing technologies need to be improved. In general, the automotive industry is conservative: Never change a running system is one of its most popular strategies. This is why Bosch has improved the CAN protocol, which has been used in passenger cars since 1991. "With CAN FD – a new CAN-bus with a flexible data-rate – we are already working on the communication systems of the future," explained Dr. Hans-Peter Hübner Bosch's strategy to improve in-vehicle networking. Of course, for automated driving new technologies for car-to-car and for car-to-infrastructure communication are required.

Additionally, in-vehicle networks require more bandwidth. Networking with the electronic horizon allows us not only to look around the corner, but also to look at the route ahead. For example: ACC can automatically reduce the vehicle's speed before bends, speed limits, and city limits. In a further step, the data from the electronic horizon can be integrated into the powertrain's operating strategy as well as the energy management of vehicles with conventional, hybrid, or electric drives. "Using the detailed route preview, we calculate how much energy the powertrain needs and control the motor accordingly," said Dr. Hübner. "For instance, when the system identifies a segment of the route in which a hybrid vehicle will be able to recuperate more energy, it can engage the electric motor in advance, thus discharging the battery." This can lead to a reduction in emissions of up to two grams of CO₂ per kilometer.



Reducing the fuel consumption is another important requirement by governments and customers: Bosch has recently introduced a start-stop system with coasting mode, which saves up to 10 percent fuel [Read on](#)

ADAS for China

This investment into new technologies is not just happening in the Western European and North American markets: China is another target. According to a study by IHS Automotive, the ADAS market in China will increase by a factor of three from 2013 to 2019. The total market revenue for ADAS is forecast to grow to € 2,8 billion. This includes a broad range of safety and convenience systems such as blind-spot detection (BSD), parking assist, ACC, stability control, and night vision. Today, the fitment rate for ADAS is very low in China, but there are huge demands especially for BSD and self-parking cars. "BSD is a quite useful and practical ADAS system for Chinese road and driving conditions," explained Michael Liu, senior analyst with IHS Automotive. "Motorists are realizing that BSD is useful in China because most cities are overwhelmed with the amount of vehicles on the roads. Furthermore, lots of Chinese drivers are used to changing lanes frequently. Thus, it is quite dangerous for inexperienced drivers because they may not be aware of other cars in the blind spot before they change lanes, which may cause collisions. BSD can greatly reduce this risk by warning the driver when there are vehicles in the blind spot of the side-view mirrors."

Prices will increase

"German motorists have a realistic idea as to price. What's more, they will be able to use partially automated driving features earlier than they expect," said Christian Senger, head of automotive electronics advanced development at Continental. On average, they feel € 2900 is a fair price for fully automated freeway driving technology, € 1900 for freeway traffic jam technology, and € 1700 for technology enabling automated parking on a parking ramp. This works out to between six percent and ten percent of the average price of a car at present. The IHS study expects additional costs for the necessary electronics of about € 6000 to € 9000 in the year of 2025, which will drop to € 4000 in the following years when not just high-end cars provide self-driving functionality.

To summarize, the majority of German drivers is still against a speed limit and likes to steer the car by themselves. However, in case of situations when self-driving is more or less boring (e.g. in traffic jam) or stresses them out, they appreciate cars with autonomous driving functionality. Additionally, they like the reduction of energy consumption and accident avoidance is also a welcome value.