



Presse-Information
15. Dezember 2014

BMW Innovations at the 2015 Consumer Electronics Show (CES) in Las Vegas. 360-degree collision avoidance and fully-automated parking in multi-storey car parks.

Munich/Las Vegas. BMW was already demonstrating at the Consumer Electronics Show (CES) 2014 how perfect control technology can provide highly automated mastery of all drive statuses right through to very tight margins. Innovative sensors will allow BMW to demonstrate a number of features at the CES 2015 (6 to 9 January, Las Vegas) including the possibility of entirely collision-free driving. This success plots another benchmark defined by the specialists at the BMW Group on the road route to individual mobility free of accidents with a driver and also in fully-automated mode with no driver at all.

The platform for 360-degree collision avoidance is secure position and environment recognition. The research vehicle is a BMW i3. Four advanced laser scanners record the environment and reliably identify impediments such as columns, for example in a multi-storey car park. If the vehicle approaches a wall or a column too quickly, the system brakes automatically to prevent the threat of collision. The vehicle is brought to a standstill very precisely with centimetres to spare. If the driver steers away from the obstacle or changes direction, the system releases the brakes. This system relieves the burden on the driver in an environment with poor visibility and makes a further contribution to enhanced safety and comfort. Like all BMW assistance systems, this research application can be overridden at any time by the driver.

Fully automated parking in multi-storey car parks – dynamic and safe even without the driver. The fully automated Remote Valet Parking Assistant in the BMW i3 research vehicle combines information from the laser scanners with the digital site plan of a building, for example a multi-storey car park. If the driver uses the Smartwatch to activate the fully-automated Remote Valet Parking Assistant, the system will steer the vehicle independently through the levels, while the driver has already got out of the car and is on his way to a business appointment. The fully automated Remote Valet Parking Assistant recognises the structural features of the car park and equally reliably steers round any obstacles that appear unexpectedly – such as incorrectly parked vehicles. Once the BMW i3 has arrived at the parking space, the vehicle locks itself and waits to be called

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by Smartwatch and voice command. The fully automated Remote Valet Parking Assistant then calculates the exact time until the driver arrives at the car park and starts up the BMW i3 so that it arrives at the car park exit at exactly the right time.

Navigation without GPS signals.

BMW has succeeded in achieving fully automated control of the vehicle by connecting up vehicle sensor systems and a digital site plan. This avoids dependence on the GPS signal, which is not at all precise in multi-storey car parks. Alongside the laser sensors, the research vehicle also has the processing units and necessary algorithms on board and this means it can determine its exact position in the car park, monitor the environment perfectly, and carry out independent and fully automated navigation. It is not necessary to provide car parks, for example, with complex infrastructure in order to allow cars to orientate and navigate around the area safely.

Long track record of experience in vehicle automation.

Once again, the BMW Group is a global pioneer with BMW Active Assist, which empowers implementation of partially and highly automated systems.

As early as October 2009, the BMW Group gave a highly automated demonstration of driving round the North Loop of the Nürburgring – the world's toughest racing track – on an ideal line in the precursor research project BMW Track Trainer. Later on, the BMW Track Trainer developed by engineers from BMW Group Research and Engineering demonstrated its superior performance on the race tracks at Laguna Seca, Zandvoort and Valencia, and back home on the Hockenheimring and the Lausitzring. The researchers gathered some important practical experience under extreme conditions at these venues for vehicle control and positioning.

Additional important findings were also provided by the research project entitled BMW Emergency Stop Assistant. If the driver collapses, for example in a medical emergency such as a heart attack, the vehicle changes to highly automated mode and can steer safely to the side of the road and initiate an emergency call.



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In the middle of 2011, a test vehicle from the BMW Group drove along the A9 motorway from Munich towards Nuremberg without any interventions from the driver. In the meantime, this research prototype has been consistently developed. The test vehicle brakes, accelerates and overtakes entirely independently. These interventions are carried out in response to the momentary traffic situation in a speed range from 0 to 130 km/h and in compliance with the highway code. Our specialists have now driven some 20,000 test kilometres. The vehicle is equipped with sensor systems like lidar, radar, ultrasound and camera recording on all sides.

Since January 2013, the BMW Group has been working with international automobile supplier Continental with the aim of moving the project forward. The overarching goal of the research partnership is to lay the groundwork for highly automated drive functions up to the year 2020 and beyond.

The different levels of vehicle automation.

Assistance systems increase safety and comfort in road traffic, although the degree of driver support varies. The highest level of automation is provided by fully automated assistance systems.

Drive functions are fully automated if they no longer need to be monitored by the driver. There is no longer even any need for the driver to be in the vehicle – as in the case of the fully automated Remote Valet Parking Assistant.

The precursors for fully automated driving are highly automated systems which do not need to be monitored continuously by the driver. They take over the linear steering (forward and reverse motion) and transverse steering (sideways motion with the steering wheel) of the vehicle.

In contrast to fully automated systems, partially automated systems take control of linear and transverse steering of the vehicle (e.g. Congestion Assistant), but they need to be monitored at all times by the driver.

Assisted systems (e.g. ACC) in turn only provide support for the driver in linear or transverse steering.

BMW

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The BMW Group

With its three brands BMW, MINI and Rolls-Royce, the BMW Group is the world's leading premium manufacturer of automobiles and motorcycles and also provides premium financial and mobility services. As a global company, the BMW Group operates 30 production and assembly facilities in 14 countries and has a global sales network in more than 140 countries.

In 2013, the BMW Group sold approximately 1.963 million cars and 115,215 motorcycles worldwide. The profit before tax for the financial year 2013 was € 7.91 billion on revenues amounting to approximately € 76.06 billion. As of 31 December 2013, the BMW Group had a workforce of 110,351 employees.

The success of the BMW Group has always been based on long-term thinking and responsible action. The company has therefore established ecological and social sustainability throughout the value chain, comprehensive product responsibility and a clear commitment to conserving resources as an integral part of its strategy.

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