

The BMW Group gets cars and motorcycles talking to each other in the simTD research project.

One of the world's most extensive field operational tests of Car-to-X communication has got under way in Hessen.

Frankfurt am Main. Intelligent driving that saves energy and increases safety always means anticipating what's ahead, too. An array of sensors is today already at work in vehicles to help drivers do just that. The anticipation "horizon" of these sensors is often limited, however, and confined to the vehicle's immediate surroundings. "Car-to-X communication greatly extends the anticipation horizon and will in future allow drivers to look far into the distance, see things that are hidden, and even peer round several corners," explains Karl-Ernst Steinberg, Manager Projects IT Drive at BMW Group Research and Technology.

Car-to-X communication means networking vehicles and infrastructure with one another electronically, enabling a direct exchange of information between both the vehicles themselves and between vehicles and the traffic infrastructure, such as traffic light systems. This makes Car-to-X a comprehensive messaging network that every road user can be involved in. As the potential of Car-to-X communication can only be fully exploited through mass use, it makes sense to research this technology in alliance with other partners. That's why numerous companies from the automotive and telecommunications industries, the federal state government of Hessen, the city of Frankfurt am Main and a number of prominent universities and research institutes have joined forces to work on the research project sim^{TD} (a German abbreviation standing for Safe Intelligent Mobility – Testing Ground Germany). Their common objective is to test out the functionality, everyday practicality and effectiveness of Car-to-X communication under realistic conditions for the first time.

Car-to-X communication. The networking technology of the future.

Car-to-X communication essentially takes place via wireless LAN and mobile network connections. It is based on high-speed WLAN, which is derived from the high-frequency WLAN standard IEEE 802.11p or ITS G5A and allows real-time communication. The protocol is structured in such a way that many different subscribers can communicate with one another in parallel with zero interference. At the same time, mobile communications networks are becoming more and more powerful too, with higher bandwidths and ever shorter delays in data transmission, or latency as it is known. As a result, they are playing an increasingly important role for Car-to-X communication, for instance as a way of supplementing the WLAN communication.

20 BMW cars and five BMW motorcycles are taking part.

Following four years of research work, the field operational test has now started, one of the biggest of its kind in the world. Using a fleet of 120 test vehicles, the technology will now be put to the test for the first time in real traffic conditions on autobahns and major highways as well as urban routes in and around Frankfurt

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am Main. The BMW Group is the only project partner to have both cars and motorcycles taking part in the field trial.

BMW ConnectedRide. Active protection for motorcyclists too.

The BMW Group always gives consideration to all road user groups in its efforts to keep raising road safety standards. Besides applications for BMW Group cars and for protecting pedestrians and cyclists, integrating motorcycles into the system of reciprocal networking, too, is an especially important aspect of Car-to-X communication. BMW Motorrad ConnectedRide is the two-wheeled equivalent of BMW ConnectedDrive and focuses on enhancing safety for motorcyclists. One of the project's key elements centres on the development of rider assistance systems on the basis of Car-to-X communication. Motorcyclists have to contend with other dangers out on the road than motorists. Certain situations, such as fog, slippery roads or heavy rainfall, pose far more of a challenge for motorcyclists. Also other drivers unfortunately often fail to see motorcycles due to their slim outline. So, it can be of great benefit to motorcyclists if they receive advance notification of specific situations. It is often the cars which play a crucial role here, by acting as the warning triggers, as it were: switching on the foglamps, activating the fastest windscreen wiper setting or intervention by the car's DSC system during normal driving can all point to adverse conditions at a particular spot. This information is relayed to the motorcycle to keep its rider fully informed of what's ahead.

The BMW Group assistance systems in the sim^{TD} research project.

Various driver and rider assistance systems based on Car-to-X communication are being tested out for BMW Group cars and motorcycles as part of the sim^{TD} research project. By getting traffic light systems to transmit information on their phase times, for instance, a driver assistance system can either indicate the ideal speed for catching all the lights on green or warn drivers before they drive through on red (Traffic Light Phase Assistant). By transferring specific data about traffic levels, the state of the road surfaces, as well as other factors, it is possible for a vehicle to issue advance warnings of accidents (obstruction warning), traffic tailbacks (end of tailback warning) or black ice (road weather warning) to other road users in the vicinity. It is furthermore possible to calculate the risk of a collision on the basis of the transmitted vehicle data, meaning that drivers can be alerted to possible crashes at road junctions, for example (Intersection Assistant). Further Car-to-X functions featuring in the sim^{TD} research project include an emergency vehicle warning, electronic brake light, as well as the Traffic Sign Assistant.

Traffic management as a vital element.

Besides the development of vehicle-specific applications, the government-backed sim^{TD} project also seeks to improve traffic management. To this end, the city of Frankfurt am Main and the German state of Hessen are working on intelligent systems for optimising traffic flows on our roads. The necessary data

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is provided by the sim^{TD} test vehicles and can be used, for example, to cut congestion, lower CO₂ emissions and reduce waiting times at traffic lights.

The sim^{TD} research project.

The German Federal Ministry of Economics and Technology, the Federal Ministry of Education and Research and the Federal Ministry of Transport, Building and Urban Development are providing funding for sim^{TD}, as this alliance has the ability to take anticipatory driving, traffic control and accident prevention into a new dimension. Establishing a uniform standard is vital for the successful commercialisation of Car-to-X communication. sim^{TD} is a joint project between leading German carmakers, car suppliers, telecommunications companies and research institutes, as well as the public sector. The project partners are: Adam Opel AG, AUDI AG, BMW AG, BMW Forschung und Technik GmbH, Daimler AG, Ford Research Centre Aachen, Volkswagen AG, Robert Bosch GmbH, Continental, Deutsche Telekom AG, Fraunhofer Society for the Advancement of Applied Research, German Research Centre for Artificial Intelligence (DFKI), Technical University of Berlin, Technical University of Munich, Saarland University of Applied Sciences, University of Würzburg, Hessen Mobile – Road & Traffic Management, city of Frankfurt am Main. The project is supported by the state of Hesse, the German Association of the Automotive Industry (VDA) and the Car 2 Car Communication Consortium. The Federal Ministry of Economics and Technology, the Federal Ministry of Education and Research and the Federal Ministry of Transport, Building and Urban Development are providing around €40 million of funding for sim^{TD}, with a further €31 million coming from the project partners. Further information can be found by visiting <http://www.simTD.de>.

The BMW Group

With its three brands – BMW, MINI, Husqvarna Motorcycles and Rolls-Royce – the BMW Group is one of the world's most successful premium manufacturers of cars and motorcycles. It operates internationally with 25 production and assembly plants in 14 countries and a global sales network with representation in more than 140 countries.

During the financial year 2011, the BMW Group sold approximately 1.67 million cars and more than 113,000 motorcycles worldwide. The profit before tax for 2011 was € 7.38 billion on revenues amounting to € 68.82 billion. At 31 December 2011, the BMW Group had a workforce of approximately 100,000 employees.

Long-term thinking and responsible action have long been the foundation of the BMW Group's success. Striving for ecological and social sustainability along the entire value-added chain, taking full responsibility for our products and giving an unequivocal commitment to preserving resources are prime objectives firmly embedded in our corporate strategies. For these reasons, the BMW Group has been sector leader in the Dow Jones Sustainability Indices for the last seven years.

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