Networked cars make traffic safer and more efficient

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Vehicles and infrastructures exchanging information with one another and notifying drivers about dangers and traffic situations make traffic safer and more efficient. This has been proven by one of the biggest field tests ever conducted on 'car-to-x communication', as it is known. Companies, research institutes and public institutions tested the jointly developed simTD system using 500 test drivers in moving traffic.

The system developed within the framework of the simTD (Safe Intelligent Mobility – Test Field Germany) project links vehicles and infrastructure together electronically. Cars, motor bikes and roadside stations installed along the route receive information about traffic situations and external factors, such as bad weather, via sensors. Using specially developed radio technology, based on the WLAN standard, they exchange information directly among themselves. They also transmit anonymized information to a traffic center, which then forecasts and manages traffic developments.

Drivers with simTD technology equipped vehicles are in a significantly better position for anticipatory driving. For one thing, they can view a display offering them suggestions for the best route to take and recommendations such as the optimum speed needed to ride a 'green wave' (a succession of green traffic lights along a stretch of road).

For another, drivers receive acoustic and visual warnings to advise them of imminent risks. For example, a light signal is displayed if a car ahead brakes sharply – even if there are several other vehicles between the car that is braking and the driver's car. This means that the driver can react even if he or she cannot yet see the danger. Traffic backups, emergency vehicles and dropped loads that may be blocking the road are also signaled in good time.

Does this system work in everyday situations? Which functions are accepted by users? In order to find out more, the simTD project sent around 120 vehicles out onto highways, country roads and city streets in and around Frankfurt for a period of six months. Five hundred test drivers traveled almost one million miles (1.6 million kilometers) as part of the experiment. The 'scripts', containing various scenarios for the field test, were designed mainly by traffic engineers at Technische Universität München. They also analyzed the data that was collected – more than four terabytes in total. The scientists not only analyzed the

actual effects of the experiment on the traffic situation in the test region, they also simulated how traffic would react if a certain number of all vehicles were equipped with the system.

"The field test clearly shows that the system provides for enhanced safety, efficiency and comfort in road traffic," says Professor Fritz Busch, TUM's Chair of Traffic Engineering and Control. "Drivers have used the information to adapt their speed and driving behavior earlier to a particular traffic situation. The benefits of networking are great, particularly in situations where hidden dangers lurk."

For example, more than half of all accidents at intersections could be prevented if all vehicles were equipped with the simTD system. The system notifies drivers in city traffic in good time before they reach an intersection about vehicles that are approaching from the other street.

Even if a small number of cars are fitted with the system, some of the functions will benefit all road users. For example, when the test drivers were informed about imminent road works, they slowed down and, if necessary, changed lane. As a result, the risk of a pileup was also reduced for the other vehicles.

"The car-to-x technology is now ready for market," says project coordinator Dr. Christian Weiß. As a first step, a system is planned for a corridor between Rotterdam and Vienna, via Frankfurt/Main. This system, planned for 2015, will record the traffic situation at road works and issue the relevant warnings to drivers. To standardize the technology further, the project partners are working with other European automakers and authorities.

If the simTD function was implemented in all vehicles, the project partners estimate that savings of up to EUR 6.5 billion could be achieved in Geramny alone due to the number of accidents prevented. Another

EUR 4.9 billion could be saved each year through shorter travel times and lower environmental pollution.

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