

## **The BMW Group explores the future of vehicle safety in the Ko-FAS research initiative.**

**The results of Germany's biggest funded research project on cooperative vehicle safety are unveiled.**

**Aschaffenburg.** As an innovation leader in the premium segment, the BMW Group is firmly committed to the vision of accident-free mobility – not least because road safety is first and foremost about protecting human life. In order to prevent accidents through early corrective action, systems are required which support and facilitate the driving task. Driver assistance systems reduce driver stress in difficult traffic situations and make it easier for drivers to make confident decisions by providing the right information or warnings at the right time. “Based on the principle of cooperation with and consideration for other road users, which is a crucial factor in road safety, the benefits of driver assistance systems can be further substantially increased by adopting cooperative approaches,” says Dr Ralph Raschofer, BMW Group representative on the Ko-FAS steering committee. Four years ago, leading vehicle manufacturers and suppliers, universities, institutes of applied science and research establishments from throughout Germany teamed up to work on the research initiative “Cooperative Vehicle Safety (Ko-FAS)”. The aim of this project was to significantly improve road safety, with an attendant reduction in the number of road traffic accidents and fatalities. The approach centred on accurate detection of traffic environments using cooperative sensing and perception, comprehensive situation assessment to precisely evaluate collision risks, and subsequent activation of appropriate advance protection measures. The results have now been presented at the final Ko-FAS presentation in Aschaffenburg.

### **Three projects with a single goal: greater protection for pedestrians, cyclists and drivers.**

The Ko-FAS project, which was subsidised by the Federal Ministry of Economics and Technology, comprised the three subprojects Ko-TAG, Ko-PER and Ko-KOMP. BMW Group Research and Technology took a lead role in the Ko-TAG and Ko-PER subprojects.

### **Cooperative transponder technologies – “much more than just a chip”.**

The aim of Ko-TAG, as the successor project to “AMULETT”, was to further improve cooperative transponder technologies, with a view not only to protecting pedestrians but also cyclists as well as to supporting extremely accurate vehicle self-localisation.

For this purpose pedestrians and cyclists were equipped with miniaturised transmitting and receiving devices (transponders). When they receive an interrogation signal from the test vehicle's onboard locating system, these transponders send back information which indicates, among other things, the type of road user wearing the transponder and the position of the road user relative to the vehicle. The transponder is identified by means of a code which is frequently and randomly changed, making it impossible to link the transponder to its wearer and ensuring that data protection requirements are met.

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The transponder system developed under the Ko-TAG project is extensively based on the WLAN standard IEEE 802.11p. In contrast to the system used in the previous project, AMULETT, it features extensive synergies with Car-to-x communication.

Further miniaturisation – reducing the tag to the size of a chip – would allow future transponders to be fitted in articles such as a school satchel or a walking stick. The distinctive feature of this technology is that it makes it possible to detect people even when they are not visible to the car driver at the time of the hazard.

Effectiveness studies demonstrate that the transponder system investigated in this project offers high potential for mitigating or even preventing accidents, by warning drivers of hazards much earlier and in a more effective way.

**Cooperative perception for improved foresight.**

In the Ko-PER project, the specialists from the BMW Group researched cooperative perception techniques suitable for use in parallel traffic and at intersections to improve the driver's foresight in traffic.

The aim of the Ko-PER project was to provide the fullest possible traffic detection, based on the cooperative exchange of information between vehicles. At accident hot spots this information can be supplemented with infrastructure-based information. In these various ways it is possible to eliminate the effect of obstructions in both the driver's and the vehicle sensors' field of view. Drivers can therefore be alerted to hazards at an early stage, allowing them to take appropriate action.

The Ko-PER project made use of earlier results from the PReVENT project, as well as an intensive dialogue with the now concluded research project simTD ("Safe Intelligent Mobility – Test Field Germany").

In particular the BMW Group researchers focused on improved vehicle self-localisation, on individual vehicle-based perception, on cooperative perception, on situation interpretation and on risk assessment. In addition, human-machine interaction concepts were developed that allow this improved traffic foresight to be communicated to the driver in an appropriate form inside the vehicle.

**Ko-TAG and Ko-PER – a strong duo.**

The results of the research project show that, in future, use of cooperative transponder technologies (Ko-TAG) in combination with cooperative perception (Ko-PER) could bring important benefits for road safety. "By selectively combining different communication technologies we can come a further step closer to realising our vision of accident-free mobility," says Rasshofer.

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