Research project on accident-avoiding vehicle concluded

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PRORETA in use: The driving corridor is displayed while driving through road works. Picture: Continental.

PRORETA 3 is completed after three and a half years of research work: The comprehensive driver assistance and automated maneuver concept supports the driver in keeping the vehicle in a safe driving corridor- with the main aim of preventing accidents. Research results and research vehicle were presented to the public on Thursday (September 11).

During the research project PRORETA 3, which lasted for a period of three and a half years, the international automotive supplier Continental and the Technische Universität Darmstadt explored a comprehensive driver assistance and automated maneuver concept.

"So far, assistance systems such as Lane Keeping Assist or Forward

Collision Warning have been working as independent, individual systems in vehicles. In PRORETA 3, we have integrated the driver assistance systems in such a way that the functions have been enhanced and functioning synergies have been achieved," explains Professor Dr. Hermann Winner, Chair of the Institute of Automotive Engineering at TU Darmstadt and the PRORETA 3 project manager.

"Integration allows optimum exploitation of the existing sensor infrastructure in the vehicle. The driver in the research vehicle is supported by a complete system for driving safety and assistance – with the ultimate objective of avoiding accidents," adds Dr. Peter Rieth, Head of Systems & Technology in the Continental Chassis & Safety Division. In addition, research was carried out on an innovative information and warning concept which takes the pressure off drivers and helps them cope with the driving situation. The PRORETA 3 research results and the research vehicle were presented at the August Euler Airfield in Griesheim (near Darmstadt, Germany).

Vehicle is kept permanently in a safe driving corridor

While driving, the vehicle is kept permanently in a safe driving corridor in conformity with traffic regulations – the so-called safety corridor. This happens, as long as possible, without any intervention. If critical situations arise, the system intervenes with warnings or even corrective maneuvers if necessary – for example, when cornering at excessive speeds, when obstacles suddenly appear, at intersections and construction sites as well as during turning maneuvers, wrong-way driving or non-compliance with a red light.

Automatic emergency braking: PRORETA intervines directly in critical situations.

For this safety corridor, the PRORETA 3 concept determines the free space available for the vehicle. The model takes into account the predicted positions of other vehicles, road boundaries and obstacles as well as road lane markings. These are all used to calculate the vehicle's trajectory. The regulation of this trajectory and the information displayed to the driver in the Human Machine Interface (HMI) constitute a consistent driver assistance concept that assists the driver and protects against potential hazards.

Automated execution of selected vehicle maneuvers

In addition to the permanent safety function, PRORETA 3 offers the driver a 'cooperative automation' option, which is a maneuver-based and

partly automated way of driving. On driver command, the research vehicle takes over longitudinal and lateral movement for whole maneuvers.

These include both lane changes and turning maneuvers at intersections. In order to delegate turning, for example, it suffices if the driver activates the turn signal at a certain distance before an intersection – this initiates automated execution of the maneuver. "PRORETA 3 is the first time such a concept of automation on a maneuvering level has been able to be implemented in a research vehicle," Professor Dr. Hermann Winner reports.

Intuitive, transparent Human Machine Interface

Research was done on an innovative information and warning concept for the PRORETA 3 research vehicle: the PRORETA instrument cluster, a 360-degree light strip with coordinated audible warning signals as well as the Accelerator Force Feedback Pedal (AFFP) inform the driver in an intuitive way about the current assistance mode and relevant hazard situations. A camera inside the vehicle continually analyzes the driver's viewing behavior. Depending on the viewing direction, the driver's attention is drawn specifically to critical traffic situations with the aid of a 'light comet.' "The transparent way that these innovative instruments work allows drivers to familiarize themselves quickly and easily with the new function," Ralf Lenniger, Head of Interior Electronics Solutions at Continental's Interior Division, elaborates.

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