
Evaluation of a User Interface Displaying Augmented Video Streams to Support Remote Assistants of Highly Automated Vehicles

Andreas Schrank, Marc Wilbrink, Michael Oehl

German Aerospace Center (DLR), Institute of Transportation Systems, Braunschweig, Germany

Remotely operating vehicles enables the effective use of vehicle automation even when fully automated driving is not feasible. A human operator ensures safety and availability from afar and supports the vehicle automation when its capabilities are exceeded. The vehicle's remote assistant, legally defined as a Technical Supervisor ("Technische Aufsicht"), is a prerequisite to operate highly automated vehicles (SAE 4) on public roads in Germany. Assessing traffic situations and providing effective assistance heavily depends on the video stream from the surroundings of the supervised vehicle. However, view-obstructing objects, adverse weather and light conditions, as well as poor video resolution may deteriorate the remote assistant performance regarding the correct assessment of traffic situation and adequate decision-making on how to react to a given traffic situation that the vehicle's automation cannot handle on its own. This talk presents HMI concepts for how to augment the video stream as a part of the remote assistant's workplace. The HMI concepts were evaluated in an experimental user study regarding their performance, workload, situation awareness, and usability. The results of the study inform the iterative workplace development and further research on the remote assistance of highly automated vehicles.

Keywords: remote operation, remote assistance, human-machine interface, Technical Supervisor ("Technische Aufsicht"), highly automated driving

Presentation type: Oral presentation / Talk

Session: Experimental Engineering Psychology and Human Factors II