ART-04-2016 - Safety and end-user acceptance aspects of road automation in the transition period
H2020-ART-2016-2017

Improved Trustworthiness and Weather-Independence of Conditionally Automated Vehicles in Mixed Traffic Scenarios

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Result of field study with group of test persons in driving simulator

Executive Summary

As preparation for a larger simulation study, the pilot study carried out for this report aimed to: i) measure subjective experiences of human drivers during conditionally automated driving (CAD), such as trust in automation, mental workload and usability, ii) determine the physical state of human driver during CAD by looking at heart rate (variability), skin resistance and temperature, pupil size, and brain activity, iii) determine the eye gaze direction and upper body movement, and finally iv) use five different scenarios and two controller outputs as independent variables and examine their possible effects on the subjective experience and physical state of human drivers.

Recruited participants were fitted with sensors to measure their physical state and did a test drive of 10 minutes on the AVL driving simulator where they were in control of the vehicle. They then moved on to 5 randomized scenarios with good and bad vehicle controller where the vehicle was in automated driving mode. After the end of each scenario they were asked questions about their experience verbally or by the means of a digital questionnaire. Once the pilot study completed, the participants were asked to again complete the trust in automation questionnaire, followed by the NASA tlx, and the System Usability Scale.

Key Words

L3 automated driving, driving simulator, physical measurements, user acceptance, user expectations