

## Driver Take-Over Time When Resuming Control from Highly Automated Driving in Truck Platooning Scenarios

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**Abstract :** With the rapid development of intelligent transportation systems, automated platooning of trucks is drawing increasing interest for its beneficial effects on safety, energy consumption and traffic flow efficiency. Nevertheless, one major challenge lies in the safe transition of control from the automated system back to the human drivers, especially when they have been inattentive after a long period of highly automated driving. In this study, we investigated driver take-over time after a system initiated request to leave the platooning system Virtual Tow Bar in a non-critical scenario. 22 professional truck drivers participated in the truck driving simulator experiment, and each was instructed to drive under three experimental conditions before the presentation of the take-over request (TOR): driver ready (drivers were instructed to monitor the road constantly), driver not-ready (drivers were provided with a tablet) and eye-shut. The results showed significantly longer take-over time in both driver not-ready and eye-shut conditions compared with the driver ready condition. Further analysis revealed hand movement time as the main factor causing long response time in the driver not-ready condition, while in the eye-shut condition, gaze reaction time also influenced the total take-over time largely. In addition to comparing the means, large individual differences can be found especially in two driver, not attentive conditions. The importance of a personalized driver readiness predictor for a safe transition is concluded.

**Keywords :** driving simulation, highly automated driving, take-over time, transition of control, truck platooning

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