

## Investigation of Factors Influencing Perceived Comfort During Take-over in Automated Driving

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**Abstract :** The functions of automated driving will initially be limited to certain so-called Operating Driving Domains (ODD). Within the ODDs, the automated vehicle can handle all situations autonomously. In the event of a critical system failure, the vehicle will establish a condition of minimal risk or offer the driver to take over control of the vehicle. When the vehicle leaves the ODD, the driver is also prompted to take over vehicle control. During automated driving, the driver is legally allowed to perform non-driving-related activities (NDRAs) for the first time. When requested to take over, the driver must return from the NDRA state to a driving-ready state. The driver's NDRA state may imply the use of items that are necessary for the NDRA or interior modifications. Since perceived comfort is an important factor in both manual and automated driving, a study was conducted in a static driving simulator to investigate factors that influence perceived comfort during the take-over process. Based on a literature review of factors influencing perceived comfort in different domains, selected parameters such as the TOR modality or elements to support handing over the item used for the NDRA to the interior were varied. Perceived comfort and discomfort were assessed using an adapted version of a standardized comfort questionnaire, as well as other previously identified aspects of comfort. The NDRA conducted was Using a Smartphone (playing Tetris) because of its high relevance as a future NDRA. The results show the potential to increase perceived comfort through interior adaptations and support elements. Further research should focus on different layouts of the investigated factors, as well as under different conditions, such as time budget, actions required within the intervention in the vehicle control system, and vehicle interior dimensions.

**Keywords :** automated driving, comfort, take-over, vehicle interior

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