Automated Vehicles and Infrastructure Design
An insight into the implications of a dedicated lane for Automated Vehicles on the highway in the Netherlands

Urban road traffic is increasing, and it is expected that this trend will continue. Automated Vehicles (AVs), as one of the proposed solutions, are expected to contribute to improve the traffic flow efficiency, traffic safety, and the environment. Deployment of AVs on highways is expected to be the first step towards their implementation. One of the main concerns is how will human drivers interact with automated vehicles. Dedicated lanes have been suggested as a possible solution. However, evidence-based research on the implications of dedicated lanes is still missing.

In this research a driving simulator study and traffic flow modelling were combined. A driving simulator experiment was conducted to observe behavioral adaptation of drivers of Manual Vehicles exposed to a platoon of AVs on four different road design scenarios of a dedicated lane. The results of this experiment are incorporated in VISSIM traffic flow models to test the influence of these road design scenarios on the traffic flow. It appeared that drivers decrease their time headway when they are driving directly next to a platoon of AVs while this was not observed when there was a guardrail separation. Regarding a dedicated lane with continuous access, the traffic flow is improved once penetration rates of AVs of 15- to 20% have been reached.

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Figure 1: Average THW over time per road design scenario of the dedicated lane.
Figure 2: Traffic flow per road design scenario per penetration rate of Automated Vehicles.