Highly Automated Driving Functions (HAD-F) will be able to avoid accidents.

- Nowadays, accidents are mainly caused by human factors.
- Accidents databases give insights to the causation andchronicles of accidents.
- However, causes for accidents may be different for Highly Automated Driving Functions.
- These causes have to be identified early and systematically.

In this scenario the lane markings are missing (e.g. due to a cleared construction side). While human drivers are able to cope relatively easy with this situation, a HAD-F may not.

(1) Impacts of the environment on the automation
- Misguided perception of the environment
- Misguided interpretation of the situation
- Misguided prediction of trajectories of other traffic participants

(2) Impacts of the automation on other traffic participants
- Misinterpretation of the HAD-F behaviour
- Reaction of automation cannot be anticipated
- Social Acceptance

(3) Interaction with the human driver
- Mode confusion
- Loss of confidence
- Misuse of function
IDENTIFICATION OF CHALLENGING SCENARIOS FOR HIGHLY AUTOMATED DRIVING

(1) Impacts of the environment on the automation
- Systematic approach based on established HARA methods (HAZOP, FTA) [1]
- Modified for the application to HAD-F
- Based on functional description of the system
- Designed to be applicable in early development stages
- Combined bottom-up, top-down approach

(2) Impacts of the automation on other traffic participants
- STPA based method
- Expectations always related to the expectation of a human driver regarding behavior of the HAD-F
- Control actions (CA) are actions performed by the HAD-F
- If actual behavior of the HAD-F deviates from expected behavior, risks may arise

(3) Interaction with the human driver
- Definition of possible Interaction Scenarios
- Derivation of possible challenges arising in these Interaction Scenarios
- Derivation of requirements on the HMI concept

Output:
Challenging scenarios and requirements for the development of safe HAD-F

A challenging scenario specified as Traffic Sequence Chart [3]

JSON Format

PEGASUS Database [2]
References

