Testing and Safeguarding – Stand 22

**VERIFICATION**

Korbinian Groh, Sebastian Wagner  
Thomas Kühbeck, Alois Knoll

Simulation can not be validated as a whole and therefore not be used for assessment.

Infeasibility to conduct the whole test volume on real roads.

**Problem**  

**Solution**  

Cross-Verification of scenarios on real roads and simulation.

**Result**  

In cross-verified test cases, simulation can contribute to the test volume through variations.
Method for Assessment of Highly Automated Driving including Verification.

**Methodology:**
- **Scenario**
  - Extraction
  - Input
  - Creation
- **FOT / NDS**
  - Traces
  - Evaluation
  - KPIs
- **Simulation**
  - Traces
  - Evaluation
  - KPIs
- **Variation**
  - Test Space
- **Cross-Verification**
  - Information

**Measurements:**
- **sensor data** (SD) for HAD function recorded (odometry and environment model)
- **ground truth** (GT) in form of dGPS available

**Scenario Description:**
- **deterministic** actions for all traffic objects (TOs) except the EGO
- HAD function is **free to perform** after the start
- start conditions related to OpenDrive map
- **unambiguous** trace representation for TOs

**Simulation:**
- **same HAD function** deployed as in real-world
- has to **fulfill the start conditions** set in the scenario description
- has to **match defined traces** of the TOs

**Evaluation:**
- **measures and metrics** reflect the behavior of the HAD function
- focus is mainly on **risk-related measures**
Cross-Verification:

- **Object matching** between GT, SD and resimulation of both
- Reveals **ghost objects** and **missed detections**

- **Detailed error analysis** throughout the whole pipeline
- **Major errors in simulation:**
  - GT: AD function is presented with ideal information in simulation → improved behavior
  - SD: Some sensor errors are corrected by the consistent scenario description → likewise idealized information