Automated Driving

Definition for Levels of Automation
Motivation

• New automated driving and parking systems will be available in the foreseeable future
• To reach further progress and to avoid misunderstandings a classification of those new automated systems with a sufficient level of detail is needed.
• The classification should address legal and technical aspects
• A refined classification of existing driver assistance systems is not in the scope of this classification
• If harmonized worldwide, the definitions of the levels of automation create a common understanding for governmental institutions, regulatory bodies, OEMs, suppliers, etc.
• In future discussions, this classification can be used for
  • Legal assessment, e.g. for an evaluation which national and international laws or vehicle regulations need an amendment or clarification
  • Technical assessment, e.g. for a classification of automated driving functions with respect to functional safety
  • Communication, e.g. to outline a roadmap including introduction scenario for automated driving functions
Levels of Automated Driving

Level 0
Driver Only

Level 1
Assisted

Level 2
Partial Automation

Level 3
Conditional Automation

Level 4
High Automation

Level 5
Full Automation

**Level of automation**

*terms acc. to SAE J3016
Glossary of Terms

• **Dynamic Driving Task**: Performing the lateral and the longitudinal driving task by considering the driving environment.

• **Driving Environment**: The outside surrounding of the vehicle in on-road traffic e. g.:
  - Road markings, road signs, road infrastructure
  - Other vehicles, objects on the road/roadside, other traffic members (pedestrians, cyclists, etc…)

• **Monitoring (according to SAE J3016)**: The activities and/or automated routines that accomplish comprehensive object and event detection, recognition, classification, and response preparation, as needed to competently perform the dynamic driving task.

• **Defined Use Case**: A driving scenario (including e. g. the driving environment, expected velocities) for which the dynamic driving task (longitudinal and lateral control) is automated. Example: Highway Chauffeur – a function that performs only on a highway, up to a max. velocity and limited or not to certain manoeuvres (according to the system limitations and thus the level of automation).
Next Steps

Create a more detailed table which shows the different responsibilities at each Level of Automation:

• “Role of System” (ex. Lateral and/or Longitudinal control)
• “Role of Driver” (ex. Monitor, Dynamic driving …)