



Department
for Transport

Automated vehicle terminology

Comparison between WP.1 and WP.29



Summary

- Important to ensure consistent terminology between the intended functionality of a vehicle system (WP.29) and its use on the road (WP.1)
- Review of literature undertaken between WP.1 and WP.29 referencing automated vehicles
- No direct contradictions found but many inconsistencies in exact definitions and use of language, even within WPs
- Difference in perspective noted – What parts of the driving task is the system capable of (WP.29)? What parts of the driving task is the human able to hand over (WP.1)?



Documents in bold have already been adopted

Documents in light are informal / non-adopted texts

Documents in red have since been adopted by GRVA (subject to modifications)

WP.1 Documents

Global Forum for Road Traffic Safety (WP.1) resolution on the deployment of highly and fully automated vehicles in road traffic

Autonomous Vehicles: Challenges and Opportunities A regulatory framework supporting innovation

Global Forum for Road Traffic Safety (WP.1) resolution on the activities other than those related to driving, that a driver of a vehicle equipped with an automated driving system, could undertake when the automated driving system is engaged (DRAFT)

Automated Driving: Proposal for identifying how the 1968 Vienna Convention on Road Traffic may need to be amended to clarify the use of automated vehicles (Informal proposal)

Automated driving: Situations when a driver operates a vehicle from the outside of the vehicle

WP.29 Documents

Regulation 152.00 (Advanced emergency braking)

Regulation 79.03 (Steering equipment with lane change manoeuvre)

Consolidated Resolution on the Construction of Vehicles (R.E.3)

Revised Framework document on automated/autonomous vehicles

Reference document with definitions of Automated Driving under WP.29 and the General Principles for developing a UN Regulation on automated vehicles

Draft text for regulation on ALKS

Draft text for regulation on cyber security

Draft text for regulation on DSSAD

Draft text for regulation of over the air updates

Working document GRVA/2019/21e





Comparison tables

Excel sheet showing a reduced set of terminology – with definitions and highlighting where there is overlap



Microsoft Excel
Worksheet





- ▶ Few examples of direct overlap in terminology, significant examples include:
 - ▶ “Highly automated vehicle” – *refers to a vehicle equipped with an automated driving system. This automated driving system operates within a specific operational design domain for some or all of the journey, without the need for human intervention as a fall-back to ensure road safety* - **Global Forum for Road Traffic Safety (WP.1) resolution on the deployment of highly and fully automated vehicles in road traffic**
 - ▶ “Highly automated (vehicle)” – *the automation executes control of essential parts of the driving task, such as integrated lateral and longitudinal control and the driver mainly monitors the automation, takes over when necessary, hand-on or hand-off driving can be both classified as highly automated* - **Consolidated Resolution on the Construction of Vehicles (R.E.3, WP.29)**





- ▶ “Driver assistance system” - *means the combination of hardware and software that assists, but does not replace, the driver in exercising dynamic control.* - Automated Driving: Proposal for identifying how the 1968 Vienna Convention on Road Traffic may need to be amended to clarify the use of automated vehicles (Informal proposal – January 2019)
- ▶ “ADAS (Advanced Driver Assistance Systems)” - *have been developed to support drivers and enhance road safety* - **Consolidated Resolution on the Construction of Vehicles (R.E.3, WP.29)**
- ▶ WP.29 specifically defines a number of different levels of driver assistance systems (e.g. ADAS L1-3 in R.E.3, and ACSF A-E in Regulation 79.03)





- ▶ Operational design domain – “*refers to the environmental, geographic, time-of-day, traffic, infrastructure, weather and other conditions under which an automated driving system is specifically designed to function.*” - **Global Forum for Road Traffic Safety (WP.1) resolution on the deployment of highly and fully automated vehicles in road traffic**
- ▶ Operational Design Domain (ODD/OD) – “*For the assessment of the vehicle safety, the vehicle manufacturers should document the OD available on their vehicles and the functionality of the vehicle within the prescribed OD. The OD should describe the specific conditions under which the automated vehicle is intended to drive in the automated mode. The OD should include the following information at a minimum: roadway types; geographic area; speed range; environmental conditions (weather as well as day/night time); and other domain constraints.*” - **Revised Framework document on automated/autonomous vehicles (WP.29)**

In these descriptions the intended meaning is consistent between WP.1 and WP.29 but the definitions differ





- ▶ Although there is no direct contradiction, some use of terminology is inconsistent e.g.
 - ▶ “Dynamic control” refers to carrying out all the real-time operational and tactical functions required to move the vehicle. This includes controlling the vehicle’s lateral and longitudinal motion, monitoring the road environment, responding to events in the road traffic environment, and planning and signalling for manoeuvres - **Global Forum for Road Traffic Safety (WP.1) resolution on the deployment of highly and fully automated vehicles in road traffic**
 - ▶ “Dynamic Driving task” means the control of all longitudinal and lateral movements of the vehicle – **Regulatory text for ALKS**

Should “dynamic control” be defined in terms of the “dynamic driving task” or should they be the same?





- ▶ SAE levels mentioned in various documents between WP.1 and WP.29 but definitions are not consistent and not those of SAE J3016
- ▶ Sometimes “Levels” mentioned with no reference to SAE
- ▶ E.g. Cyber Security text intentionally does not reference SAE levels, but levels defined in the reference document with definitions of Automated Driving under WP.29
 - ▶ “... automated driving functionalities from level 3 onwards, as defined in the reference document with definitions of Automated Driving under WP.29 and the General Principles for developing a UN Regulation on automated vehicles (ECE/TRANS/WP.29/1140).”





“SAE Level”	1	2	3	4	5
SAE Definition	The <i>sustained</i> and <i>ODD-specific</i> execution by a <i>driving automation system</i> of either the <i>lateral</i> or the <i>longitudinal vehicle motion control</i> subtask of the DDT (but not both simultaneously) with the expectation that the <i>driver</i> performs the remainder of the <i>DDT</i> .	The sustained and ODD-specific execution by a driving automation system of both the lateral and longitudinal vehicle motion control subtasks of the DDT with the expectation that the driver completes the OEDR subtask and supervises the driving automation system.	The sustained and ODD-specific performance by an ADS of the entire DDT with the expectation that the DDT fallback-ready user is receptive to ADS-issued requests to intervene, as well as to DDT performance-relevant system failures in other vehicle systems, and will respond appropriately.	The sustained and ODD-specific performance by an ADS of the entire DDT and DDT fallback without any expectation that a user will respond to a request to intervene.	The sustained and unconditional (i.e., not ODD-specific) performance by an ADS of the entire DDT and DDT fallback without any expectation that a user will respond to a request to intervene.
Autonomous Vehicles: Challenges and Opportunities A regulatory framework supporting innovation (WP.1 informal document) definition	Driver remains engaged at all times, controlling lateral OR longitudinal movement while the system is active, and monitors road environment. System exercises lateral OR longitudinal control in specific use cases. System exercises lateral OR longitudinal control in specific use cases.	When system is active, driver actively monitors the road environment and system performance, intervening as necessary. System exercises sustained lateral AND longitudinal control in specific use cases	Driver is a fallback ready user, being prepared to intervene in response to a system takeover demand. System can control lateral AND longitudinal movement, and monitors the road environment, in specific use cases. When system encounters a situation it cannot manage, it will issue a takeover demand, handing control back to the driver.	Driver only has control when the system is not in use. System can control lateral AND longitudinal movement and monitor its own performance in specific use cases. As the system is fully capable of providing the fallback function, driver intervention is not needed while the system is in use.	Driver, if present, only has control when the system is not in use. System can control lateral AND longitudinal movement in ALL use cases. Driver intervention is not needed
Reference document with definitions of Automated Driving under WP.29 and the General Principles for developing a UN Regulation on automated vehicles definition	System takes care of longitudinal or lateral control. Monitoring by the driver	The system takes care of both longitudinal and lateral control. Monitoring by driver necessary because the system is not able to detect all the situations in the ODD. The driver shall be able to intervene at any time.	The system is able to cope with all dynamic driving tasks within its Operational Design Domain (ODD) or will otherwise transition to the driver offering sufficient lead time (driver is fallback). The system drives and monitors (specific to the ODD) the environment. The system detects system limits and issues a transition demand if these are reached.	The system is able to cope with any situations in the ODD (fallback included). The driver is not necessarily needed during the specific use-case, e. g. Valet Parking/ Campus Shuttle. The system may however request a takeover if the ODD boundaries are reached (e.g. motorway exit).	The system is able to cope with any situations on all road types, speed ranges and environmental conditions. No driver necessary.
Pseudonyms	Driver assistance	Driver assistance, partially automated, semi-automated	Highly automated, conditionally automated	Highly automated	Fully automated

