



Economic Commission for Europe**Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Automated/Autonomous and Connected Vehicles****Eighteenth session**

Geneva, 22-26 January 2024

Item 4(f) (i) of the provisional agenda

Automated/autonomous and connected vehicles:**Coordination of work on automation between working parties (GRs)****Fitness of UN GTRs and UN Regulations for ADS****Proposal for a supplement to the [03 and 04] series of amendments to UN Regulation No. 79 (Steering equipment)****Submitted by the experts from the Task Force on Fitness for Automated Driving Systems***

The text reproduced below was prepared by the experts from the Task Force on Fitness for Automated Driving Systems (TF on FADS). The proposed amendments aim to adapt the regulation to allow for the approval of vehicles equipped with both an Automated Driving System and a manual driving mode. The modifications to the existing text of the Regulation are marked in bold for new and strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2024 as outlined in proposed programme budget for 2024 (A/78/6 (Sect. 20), table 20.5), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

I. Proposal

Introduction, amend to read:

“Introduction

...unforeseen object in the road.

Advances in technology have enabled the possibility for vehicles to be operated by an Automated Driving System (ADS) without the need for any human driver. As an initial step, this Regulation has been adapted to allow the approval of vehicles with an ADS where those vehicles are also equipped with manual driving controls. It is expected that in the manual driving mode the technical requirements can be applied as they would be for a conventional vehicle. In the automated driving mode, it is important that the requirements of Annex 6 are applied appropriately to the transmission links between the ADS and the steering equipment and, in the absence of a driver, that any faults in the steering equipment are identified by and/or transmitted to the ADS. It is also important that an ADS is only permitted to control the steering equipment if the ADS complies with the applicable regulatory requirements in the geographical area(s) where it can operate. In a second step, the Regulation will be further adapted to allow for the approval of automated vehicles which do not have manual steering controls, or which only have manual controls for use in limited circumstances such as vehicle recovery.

It was previously is anticipated that future technology **would** ~~will~~ also allow steering to be influenced or controlled by sensors and signals generated either on or off-board the vehicle. This ~~had~~ ~~has~~ led to several concerns regarding responsibility for the primary control of the vehicle and the absence of any internationally agreed data transmission protocols with respect to off-board or external control of steering. Therefore, the Regulation does not permit the general approval of systems that incorporate functions by which the steering can be controlled by external signals, for example, transmitted from roadside beacons or active features embedded into the road surface, **unless these functions meet the definition of an ADS**. Such systems, which do not require the presence of a driver, **but which are not ADS**, have been defined as "Autonomous Steering Systems".

This Regulation also prevents...”

Insert a new paragraph 1.2.4., to read:

- “1.1. This Regulation applies to the steering equipment of vehicles of categories M, N and O.¹
- 1.2. This Regulation does not apply to:
 - 1.2.1. Steering equipment with a purely pneumatic transmission;
 - 1.2.2. Autonomous Steering Systems as defined in paragraph 2.3.3;
 - 1.2.3. Steering systems exhibiting the functionality defined as ACSF of Category B2, D or E in paragraphs 2.3.4.1.3., 2.3.4.1.5., or 2.3.4.1.6., respectively, until specific provisions are introduced in this Regulation.
- 1.2.4. Vehicles which are not equipped with manual steering controls intended for use during normal operation.”**

Note by the secretariat: ECE/TRANS/WP.29/2024/12 proposes to delete para. 1.2.3.

¹ As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3), document ECE/TRANS/WP.29/78/Rev.6, para. 2 - <https://unece.org/transport/standards/transport/vehicleregulations-wp29/resolutions>

Paragraph 2.1.3., amend to read:

- “2.3.1. *“Steering control”* means the part of the steering equipment **directly actuated by a driver** which controls its operation, ~~it~~ **but which may also be operated with or without direct intervention of the driver (e.g. due to action by an Advanced Driver Assistance Steering System or ADS)**. For steering equipment in which the steering forces are provided solely or partly by the muscular effort of the driver the steering control includes all parts up to the point where the steering effort is transformed by mechanical, hydraulic or electrical means;”

Paragraph 2.3.3., amend to read:

- “2.3.3. *“Autonomous Steering System”* means a system, **other than an ADS**, that incorporates a function within a complex electronic control system that causes the vehicle to follow a defined path or to alter its path in response to signals initiated and transmitted from off-board the vehicle. The driver will not necessarily be in primary control of the vehicle.”

Insert new paragraphs 2.10., 2.11. and 2.11.1., to read:

- “2.10. *(reserved)*
- 2.11. *“Automated Driving System (ADS)”* means the vehicle hardware and software that are collectively capable of performing the entire Dynamic Driving Task (DDT) on a sustained basis.
- 2.11.1. *“Dynamic Driving Task (DDT)”* means the real-time operational and tactical functions required to operate the vehicle in on-road traffic.”

Paragraph 5.1.3., amend to read:

- “5.1.3. The direction of operation of the steering control shall correspond to the intended change of direction of the vehicle and there shall be a continuous relationship between the steering control deflection and the steering angle. These requirements do not apply to systems that incorporate an automatically commanded or corrective steering function, **to steering being controlled by an ADS**, or to ASE.

These requirements may also not necessarily apply in the case of full power steering when the vehicle is stationary, during low speed manoeuvres at speeds up to a maximum speed of 15km/h and when the system is not energised.”

Insert new paragraphs 5.8., 5.8.1., 5.8.2., 5.8.2.1., 5.8.3. and 5.8.3.1., to read:

- “5.8. **Special Provisions for vehicles equipped with an Automated Driving System**
- The steering equipment of any vehicle equipped with an Automated Driving System, other than Automated Lane Keeping Systems as defined in UN Regulation No. 157, shall fulfil the following requirements.**
- 5.8.1. **An ADS may control the vehicle’s steering equipment providing that the ADS is designed to comply with relevant national and/or international technical regulations and relevant national legislation governing operation, and providing that its activation is restricted by technical means to the jurisdiction(s) where these apply. Compliance with this requirement shall be declared by the manufacturer at the time of the application for approval.**
- 5.8.2. **Compliance with the applicable performance requirements of this UN Regulation whilst the ADS is active shall be demonstrated in accordance with Annex 6.**
- 5.8.2.1. **The transmission links between the ADS and the steering equipment (excluding the ADS itself), are subject to the requirements of Annex 6.**

- 5.8.3. Whilst the ADS is active, detected faults as described in paragraph 5.4. of this UN Regulation shall be transmitted to the ADS.**
- 5.8.3.1. Notwithstanding paragraph 5.4.1.1., faults which impair the steering function, and which can under manual driving conditions be detected by a driver due to vibration in the steering system or an increase in the steering force, shall be detected by the steering system and transmitted to the ADS unless the ADS itself is capable of detecting or sensing the presence of these faults.”**

II. Justification

1. At its 190th session in June 2023, WP.29 endorsed the report (ECE/TRANS/WP.29/2023/86) transmitted by the expert groups on regulatory fitness for automated vehicles, and invited the GRs to start the work on amending the Regulations identified by the expert groups in the report.
 2. At its seventeenth session in September 2023, the Working Party on Automated/Autonomous and Connected Vehicles (GRVA) agreed that the TF on FADS, which was tasked by GRVA to amend the UN Regulations and Global Technical Regulations under its purview to accommodate automated vehicles, should first submit amendments for automated vehicles which are also equipped with controls for manual driving. This significantly reduces the number of changes needed regarding testing provisions which can be carried out under manual driving, as well as those regarding definitions and requirements directly or indirectly related to the presence of a driver.
 3. A detailed informal document, explaining the changes and gathering questions and answers regarding this proposal, will be transmitted to GRVA by the TF on FADS.
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