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**Economic Commission for Europe**

Inland Transport Committee

**Global Forum for Road Traffic Safety**

**Group of Experts on drafting a new legal instrument  
on the use of automated vehicles in traffic**

**Third session**

Geneva, 16 May 2022

Item 4 of the provisional agenda

**Substantive Activities**

**Road Safety Risks and Challenges related to Automated  
Driving**

**Submitted by the experts from the International Organization of Motor  
Vehicle Manufacturers**

The text below was prepared by the experts from the International Organization of Motor Vehicle Manufacturers, invited by the Chair of the Group of Experts on drafting a new legal instrument on the use of automated vehicles in traffic (LIAV) also called WP.1/GE.3.

## I. Background

1. OICA was invited by GE.3 to contribute to the work of GE.3 and to outline from industry's perspective the relevant road safety challenges posed by the use of ADS (Automated Driving System) equipped vehicles.

## II. Challenges related to traffic laws

2. National traffic laws are based, in most countries, on either the 1949 or 1968 Convention (on Road Traffic) which are in the remit of the Global Forum for Road Traffic Safety (WP.1). Traffic rules existing obligations in today's traffic laws were developed to address drivers, passenger/occupants, other road users, i.e. human beings.

3. For automated driving the ADS takes over the role of the human driver to perform the dynamic driving task and to comply with the relevant traffic rules. For the first time in history, traffic rules become a key requirement for automobile system development. The ADS algorithms must be developed and programmed according to the respective national traffic laws, i.e. the vehicle or system manufacturers must translate human-oriented driving rules into technical algorithms of the ADS. However, traffic laws need to allow for an ADS to serve as the driver in handling the driving task, as codified in Article 34bis amending the 1968 Vienna Convention on Road Traffic.

(a) Additionally, there may be exceptional circumstances in which human drivers decide to violate a traffic rule in order to preserve traffic flow (e.g. temporary crossing of a solid line to go around construction or disabled vehicles). The formally strict adherence to traffic rules by the ADS, without accounting for such exceptions, can be impractical and affect traffic flow (e.g. some highway accesses have a really short acceleration lane and a lot of high-density fast traffic such that, if drivers respected speed limits so strictly without accelerating or decelerating to the speed necessary to merge, the access manoeuvre would fail most times). Depending on the use-case and operational design domain (ODD), the reaction of other road users to such ADS driven vehicles might affect traffic safety, e.g. when other road users overtake slower ADS driven vehicles.

(b) Today's Conventions on Road Traffic focus on general traffic compliance provisions which are however applied nationally by the signatories. In addition, specific national/local traffic specificities influence the national traffic codes. This leads to a fragmentation among the different countries and creates additional challenges for the developers and manufacturers when it comes to "customizing" an ADS to suit several, possibly contradicting countries' traffic rules. The same applies for national obligations as regards ADS equipment (e.g. data recorder storage durations / deletion periods, access to such data, etc.). While we expect variation to continue between domestic traffic requirements and internationally harmonised areas, we believe a new legal instrument including harmonized traffic law regulations for automated vehicle operation presents an opportunity to enable cross-border travel of ADS, which isn't codified in any regulations today, and could substantially impede the transport of persons and goods with an ADS, as compared to conventional vehicles.

(c) Provisions related to the performance of the dynamic driving task are only one category of rules that are typically included in traffic laws around the globe. In addition, traffic laws include drivers' provisions that go beyond the dynamic driving task – this affects duties like e.g. securing the scene of an accident or the interaction/communication with law enforcement officers. When discussing updates to international legal instruments, this requires an analysis to what extent the existing obligations can be transferred to a machine/ADS and to what extent these existing "drivers' obligations" can be complied with using alternative means (i.e. what are acceptable alternative means for compliance in case of machines/automated driving systems).

(d) In addition to the harmonization of traffic rules linked to system design, traffic rules in general need to be defined to govern the operation of ADS. The more these rules are accurate and harmonized, the more a smooth and safe ADS operation can be ensured.

**Industry statements:**

4. In order to facilitate cross-border traffic, efficient system development and recognition value of road users when interacting with ADS in different countries, the development of an internationally harmonised understanding/expectation of an ADS driving behaviour conforming to traffic laws is essential, while formalising reciprocity and cross-border travel for ADS-equipped vehicles.

5. In addition, harmonisation means flexibility in enforcement of traffic rules when applied to an ADS, when ambiguous or conflicting traffic laws may create issues in legal interpretation. It is e.g. expected that the instrument addresses the behaviour of the road safety and the enforcement authorities' agents regarding interaction with ADS equipped vehicles (e.g. gestures)..

6. In addition to the harmonization of traffic rules linked to system design, traffic rules in general need to be defined to govern the operation of ADS. The more these rules are accurate and harmonized, the more a smooth and safe ADS operation can be ensured. In this view, the harmonisation of international traffic rules in regard of the ADS is a powerful tool to decrease the origin of a large part of the road safety risks and in consequence is a key for the quality of the ADS driving behaviour.

### III. Administrative and procedural aspects about ADS operation

7. WP.1/GE.3 could help facilitating the following aspects:

(a) Inconsistency in safety determinations between differing levels of government: The legal instrument could reiterate that contracting parties should strive to ensure that a unique regulator at a national regulatory body produces the formal determination about the safety for a Level 4 system to be deployed on public roadways, rather than splitting the authority between multiple enforcement agencies or multiple levels of government, which could create confusion in safety determinations for governments, manufacturers, and the public alike.

(b) Authorizing Cross-border AV operation via mutual legal recognition between governments of AV safety and operating regimes: This covers a wide spectrum set of issues, ranging from mutual recognition that an AV has been appropriately certified/licensed for L4 operation - similar to the driver licensing issues for IDP (international driving permit)

(c) Legal frameworks: Ensuring governments retain suitable legal frameworks that ensure legal certainty for operation of L4 and L3 systems from manual driving requiring the permanent supervision of a driver for safe operation. There is a risk of domestic confusion of assisted and automated driving that may e.g. lead to frameworks with inappropriately calibrated requirements for "driverless" L4-vehicles that transpose legacy requirements (i.e. relevant to human driving) which however have limited applicability to L4.

(d) Delimitation of the AV operating domain: ADSs are designed to best function in a limited and defined domain whose boundaries are clearly defined. While the conception of the ADS provides the technical boundaries for the operation of the AV, i.e. define the Operating Design Domain (ODD), whether e.g. by geographies, weather, road speed, etc. one road safety authority may decide to implement traffic rules defining the legally permitted Operational Domain (OD) in a narrower manner than the manufacturer of the ADS-equipped vehicle, for reasons not necessarily linked to the ADS design or capabilities. Such nationally-set ODD limits could lead to consequences detrimental to road safety at international level.

**Industry statements**

8. Industry welcomes any effort within WP.1 and their members to help making AV operation rules converge amongst the countries which are signatories to the Vienna Convention and the Geneva Convention. The future legal instrument could be a helping tool in this regard.

9. WP.1 can help facilitate mutual legal recognition around categories of cross-border vehicle practices that would enable AV deployment across borders. This effort could be of a long-term perspective since refining these categories is itself a challenge.

10. The future legal instrument is expected to help internationally determining commonalities for such traffic rules, or at least the principles governing these rules, and to ensure that the manufacturers can continue to set ODDs that are as narrow or as broad as their technology develops.

#### IV. Overview Technical Items addressed by WP.29

11. WP.29 has identified and prioritized the following key issues which have guided the work of its subsidiary bodies (especially GRVA) since 2019 to develop appropriate provisions/recommendations with the aim to address challenges/risks linked to safe operation:

- a) **System Safety** (technical performance) - including ensuring compliance with road traffic regulation (cite NATM)
- b) **Failsafe Response**
  - including detection of failures/system limits and mitigation measures like e.g. minimum risk manoeuvre.
  - Failures also include loss of system relevant wireless telecommunication connections. System limits include the non-availability of relevant road infrastructure e.g. missing lane markings.
  - Besides, the performance of a minimum risk manoeuvres needs to consider potential impact to traffic flow.
- c) **Human Machine Interface (HMI)**
  - including transition scenario and takeover demands,
  - mode awareness,
  - and driver availability recognition/driver monitoring.
- d) **Object Event Detection and Response (OEDR)**
  - including the detection and handling of the effects of wear/aging on the environmental sensing system
- e) **Operational Design Domain (ODD)**
- f) **Validation** for System Safety
- g) **Cyber Security**
- h) **Software Updates**
- i) **Event data recorder / Data Storage Systems for Automated Driving**
- j) Manufacturer **In-Service-Monitoring** and **In-Service Reporting** to authorities
- k) Vehicle **maintenance and inspection**
- l) **Consumer Education and Training**
- m) **Crashworthiness and Compatibility**
- n) **Post-crash AV behaviour**
- o) Handling of **Artificial Intelligence** in the context of vehicle certification

##### Industry statement

12. For these areas an information exchange between WP.29 and WP.1 is essential, but parallel activities under WP.1 and its subsidiary bodies should be avoided.

#### V. Further aspects

13. The following items are jurisdiction-specific and therefore typically handled on national level:

- (a) Traffic Laws
- (b) Data protection
- (c) Ethics
- (d) Road infrastructures should continue to be improved and harmonized as well, to the far as possible, since it impacts road traffic flow / road safety for both human drivers and

ADS-equipped vehicles. This concerns e.g. the following roadway attributes and physical infrastructure:

- Clearly visible, non-ambiguous lane markings
- Reflective lane markings whenever possible, in order to support detection not only by cameras but also by Lidar sensors
- Sufficient adhesion of the road under all environmental conditions
- Well-announced construction zones whenever present

14. Similarly, infrastructure technology / operations data should ideally also be improved/harmonised to help provide supplemental information to both conventional and ADS-equipped vehicles. This concerns e.g. the following roadway attributes and physical infrastructure:

- Information data on construction sites/work zones and mobile roadwork vehicles
- Information data on speed limits and other traffic signs (e.g. lane closures)
- Information data on traffic light status
- Information data on emergency/police vehicles approaching or present at the side of the road
- Mobile (cellular) data connectivity network in general

**Industry statement:**

15. As the above items can reasonably not be addressed, for the time being, in an international legal instrument, Industry believes that they should be kept apart of the GE.3 roadmap. They nevertheless could be included into the long-term agenda of WP.1.

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