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Convention on Road Traffic (1968):

Automated driving

Clarifications and integrative additional proposals to the draft resolution on the deployment of highly and fully automated vehicles in road traffic (ECE/TRANS/WP.1/2018/4)

Submitted by WP.1 Chair, Belgium, Spain, Germany, the Netherlands, United-Kingdom, France, Luxemburg, Japan, Sweden, Finland, Switzerland, and OICA.

This informal document has been produced by the experts from contracting parties and from non-governmental organizations, regularly participating to the Informal Group of Experts on Automated Driving (IGEAD), during a dedicated meeting held in The Hague (31 January 2018 - 1 February 2018). The Chair of the Global Forum attended as well. The experts from the USA attended the meeting via real time- web connection.

It is meant to offer a preliminary contribution to the discussion about the draft Consolidated Resolution on automated driving, as elaborated by the Global Forum for Road Traffic Safety (WP.1) during its Special Session (Geneva, 6 - 7 December 2017) and available as document ECE/TRANS/WP.1/2018/04.

The proposed changes to the document ECE/TRANS/WP.1/2018/04 are indicated in strikethrough characters as far as the deleted words are concerned, and in bold characters for the proposed added words (except for the titles, where the new words are indicated in italic). The comments as in document ECE/TRANS/WP.1/2018/04 from the UNECE Secretariat remain in italic strikethrough characters to facilitate understanding and discussion during the 76th Session, March 2018.

I. Introduction

Comment: The text below was suggested by the WP.1 Chair and is still pending review by WP.1

The Global Forum for Road Traffic Safety (WP1) of the United Nations Economic Commission for Europe,

- Noting that the 1949 Convention on Road Traffic and 1968 Convention on Road Traffic have had significant bearing in the definition of domestic road traffic policies and have noticeably improved road safety,
- Noting the continuous progress of automotive and digital technological advances,
- Noting that the road safety principles in the 1949 Convention on Road Traffic and 1968 Convention on Road Traffic do not **preclude and hence do not** exclude the use of highly and fully automated vehicles in road traffic.
- Acknowledging the importance of **encouraging setting global** road safety principles taking into account the continuous progress of automated **vehicle** technologies ,
- Recognizing the potential for innovative safety technologies to improve social well-being by preventing motor vehicle crashes, both in ways that can now be foreseen and in ways that cannot yet be predicted, and desiring to avoid further obstacles that could impede the development of such beneficial technologies,
- Recognizing the potential for the mentioned technologies to improve road traffic safety, inclusive mobility, that could help to deliver the United Nations Sustainable Development Goals, and accomplish strategies where safe and efficient mobility is a tool for socio- economic growth and governance,
- Desiring to establish ~~at global level uniformity in the~~ principles **for safely deploying relating to the governance of Hhighly and fully Aautomated Vvehicles in the** road traffic environment, in order to improve road **traffic** safety at global level and facilitate **safe** international traffic,
- ~~— Recommends Governments, which have not done so yet, to ratify or accede to the Convention on Road Traffic done at Geneva on 19 September 1949, and the Convention on Road Traffic done at Vienna on 8 November 1968, that have contributed, and will continue , significantly and promisingly, reduce the number of fatalities and injuries caused by collisions;~~
- Recommends Governments to take into account for their national legislations relating to traffic and road safety, ~~the principles incorporated in the above mentioned Conventions on Road Traffic and~~ the principles incorporated in this Resolution.

II. Preamble

Comment: The text of this preamble was adjusted to refer to highly and fully automated vehicles.

1. The Consolidated Resolution is intended to guide Parties to the Convention on Road Traffic done at Geneva on 19 September 1949, and the Convention on Road Traffic done at Vienna on 8 November 1968, as well as the European Agreement Supplementing the 1968 Convention on Road Traffic done at Geneva on 1 May 1971 with respect to the safe

deployment of highly and fully automated vehicles in traffic environment, to support the enhancement of road traffic safety, mobility and socio-economic progress.

2. This Resolution does not supersede the legal obligations arising from the 1949 and 1968 Conventions and 1971 European Agreement.

3. Rather, this Resolution complements the principles of the 1949 and 1968 Conventions and 1971 European Agreement in the context of facilitating the safe deployment of highly and fully automated vehicles in the road traffic environment.

Comment: Paragraph 4 has not been agreed yet upon by WP.1. Two alternatives are provided below.

Alternative 1:

~~4. — These principles will evolve as technology develops, and as experience and evidence accumulate regarding the deployment of automated vehicle technologies. As this Resolution is continually under development, the explicit inclusion of a principle or topic should not be construed as the implicit exclusion of any other. Nor does it prevent the development of binding legal instruments on similar topics if this is deemed necessary in the future.~~

Alternative 2:

4. The Resolution offers **principles and** recommendations which will evolve as technology develops and as experience and evidence accumulate regarding the deployment of highly and fully automated vehicles. Therefore, the explicit inclusion of a principle in this Resolution should not be construed as the implicit exclusion of any other. Moreover, this Resolution may facilitate the development, under the guidance of the Global Forum for Road Traffic Safety, of ~~binding legal instruments on similar topics~~ **future actions related to the deployment of highly and fully automated vehicles** if this is deemed necessary in the future.

Comment: WP.1 has not yet agreed on the below paragraph 5 nor on its placement in the resolution.

~~5. Therefore, governments [including those at a sub-national level] should work with civil society and industry to ensure that the principles outlined in this Resolution are incorporated into their domestic traffic frameworks in a way that recognises their specific context] to be worked on.~~

This Resolution takes into consideration the role of human beings in the context of automated driving technological progress, and offers recommendations to achieve a safe interaction between human beings and highly and fully automated vehicles.

Comment: WP.1 agreed that a paragraph on the relationship between the resolution and the conventions should be included in the preamble. However, it has not formulated any text to that end.

~~Insert the text on relationship with the Conventions here.~~

III. Definitions

Comment: WP.1 has so far agreed to include three definitions as provided below.

For the purpose of this Resolution,

(a) **“Highly- and fully automated vehicles”** refers to ~~a-~~vehicles equipped with an automated driving system that **can** exercises full dynamic control (without the need for

human intervention **to ensure road traffic safety**), for which the system is a fall back, for some or all of a journey.

(b) **“Automated driving system”** ~~means~~ **refers to** the combination of hardware and software that exercises dynamic control of a vehicle on a sustained basis.

(c) **“Dynamic control”** ~~means~~ **refers to** carrying out all the real-time operational and tactical functions required to move the vehicle.

(d) **“Operational Design Domain”** **refers to the environmental, geographic, time-of-day, traffic, infrastructure, and other conditions under which an automated driving system is specifically designed to function.**

IV. Principles/recommendations for *automated driving systems in highly and fully automated vehicles*

Comment: WP.1 has so far agreed to include recommendations for vehicles as provided below.

Automated driving systems in Hhighly and fully automated vehicles should:

- Prioritize road safety
- Endeavour to **safely tolerate** ~~compensate for~~ **detectable** human errors of road users **and minimize potential effects of such errors** (inside and outside of the vehicle),
- Comply with applicable domestic traffic rules, including those referring to:
 - (a) Safe interaction with other road users, road **infrastructure operators** ~~traffic safety agencies~~, law enforcement authorities; and
 - (b) **Optimizing the M**aintenance of smooth traffic flow and safe performance of any manoeuvre **while allowing for reasonable exceptions for the benefit of safety.**
- Only operate within their operational design domain.
- **Be capable of achieving a minimal risk condition when necessary, for example in case of a failure in the automated driving system or other vehicle system, or in case the vehicle exits the ODD.**
- React to system malfunctions in a way that minimizes danger to the vehicle’s occupants and other road users.
- ~~- Be equipped with appropriate, consistent and [preferably internationally standardised] Human Machine Interfaces/displays and controls for communication with their users, other road users, road traffic safety agencies and law enforcement authorities.~~
- **Be capable of clearly communicating with its users about its status, and also with other road users, in such a way as to enable an appropriate response. In addition, be capable of monitoring and interacting with the traffic environment as well as with information provided by road infrastructure operators and law enforcement authorities.**
- **Operation of the system should enable verification as to whether the dynamic control was performed by the system or by the user of the system.**

- enable the possibility of safe manual system deactivation, without lowering the system safety performances.

(Comment: This point is to be further developed)

V. Principles/recommendations for users of automated driving systems in of highly and fully automated vehicles

Comment: WP.1 has so far agreed to include recommendations for users as provided below.

Users of **automated driving systems in** highly and fully automated vehicles, **depending on the functionalities offered by the system**, should:

- Be aware/informed of the proper use of the automated driving system prior to starting the journey.
- Possess the necessary capability to use the automated driving system including being able to communicate with it
- **Follow procedures for safe use of the vehicle.**
- **Comply with traffic rules pertaining to users of the vehicle including, when appropriate, those applying to users exercising dynamic control for part of a trip.**
- **use an automated driving system only within its operational design domain**
- Be able to, and hold the necessary driving permits, to exercise dynamic control so as to begin or complete a journey where the automated driving system is only engaged for some of the journey, unless another user does so.
- ~~Only use a highly and fully automated vehicle within its operational design domain. if they are not able to, or do not hold the necessary permits, to operate the vehicle, unless another user does so.~~
- Adapt their behaviour ~~{based on the functionalities}~~ **to the automated driving system** of the vehicle and **the** applicable traffic rules. *(Comment: to be further developed on whether this recommendation should refer to functionalities or rather continuation of a journey as a driver).*

VI. Further principles/recommendations

Comment: WP.1 has not agreed yet on any recommendation under this section. There has been only ideas proposed for which alternative text exists.

Comment: There has been alternative text proposed as below regarding performance monitoring/inspection and registration:

Alternative 1

Governments should:

- ~~Adapt vehicle safety performance monitoring to accommodate highly and fully automated vehicles as necessary~~
- ~~Adapt policies for the registration of highly and fully automated vehicles as necessary~~

Alternative 2:

~~Governments may need to adapt their legislation to accommodate highly and fully automated vehicles that conform with any applicable international law for the construction, technical certification and registration of vehicles.~~

~~*Comment: The text below regarding recording and sharing of data has not been agreed upon. Alternatives are provided as basis to further develop the recommendation on data recording and sharing.*~~

~~Governments should:~~

~~*Alternative 1:*~~

~~— Work [with industry] so that highly and fully automated vehicles record the necessary data related to exercising the dynamic control by the automated driving system, especially in case of an unexpected event that could impact road traffic safety, such as a collision or violation of traffic rules. This data should be recorded, secured and made available, in accordance with regional or domestic privacy regulations, as necessary.~~

~~*Alternative 2:*~~

~~Adopt policies for recording and sharing of data by highly and fully automated vehicles related to the functioning of their automated driving system, especially in case of an unexpected event that could impact road traffic safety, such as a collision or violation of traffic rules. This data should be recorded, secured and made available, in accordance with regional or domestic privacy regulations, as necessary.~~

Governments should review their relevant regulatory frameworks, and where necessary adapt or add rules to support the safe use of highly and fully automated vehicles, including provisions for monitoring their system safety performance.

Governments should consider concerted actions to increase public awareness and acceptance. Such actions could include introducing updated requirements for issuing driving permits in order to align user requirements with technological progress.

~~*Comment: The recommendation below has not been discussed in the context of formulation of recommendations for user of highly and fully automated vehicles.*~~

~~Governments should:~~

~~Adapt the requirements for issuing driving permits to align with technological progress.~~

Governments should adopt policies regarding the necessary data for the purposes of the following:

- **enable the evaluation of the safety impact of the use of highly and fully automated vehicles;**
- **enable the evaluation of the causal factors involved in road traffic safety incidents, such as collisions, traffic rule violations or driver interactions with highly and fully automated vehicles.**

Governments should work on measures concerning security and cybersecurity, in order to safeguard the functioning of automated driving systems in highly and fully automated vehicles from misuse, or from use for any unintended purposes.

Governments, Industry and the civil society are encouraged to work together to ensure that the principles outlined in this Resolution are incorporated into their domestic traffic frameworks.