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Convention on Road Traffic (1968):

Automated driving

Draft resolution on the deployment of highly and fully automated vehicles in road traffic

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

This document contains draft, work-in-progress resolution on the deployment of highly and fully automated vehicles in road traffic that was elaborated by the Global Forum for Road Traffic Safety (WP.1) during its Special session (Geneva, 6-7 December 2017), **during its 76th plenary session (Geneva, 19-23 March 2018) and reviewed by the Informal Group of Experts on Automated Driving in preparation of the WP.1 Special Session of May 2018.** It is submitted to the **WP.1 Special Session of May 2018.** It is based on document **ECE/TRANS/WP.1/2018/4/Rev.1** elaborated at the **76th session of WP.1.** **the changes compared to that document are indicated in bold characters for new text and strikethrough characters for deleted text.**

I. Introduction Preamble

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

- (a) Noting that the 1949 Convention on Road Traffic and 1968 Convention on Road Traffic have had significant bearing ~~in-on~~ the definition of domestic road traffic ~~policies~~ **legislation and regulation** and have noticeably improved road safety,
- (b) Noting the continuous progress of automotive and digital ~~technological~~ **technologies advances, which could improve road safety, including through the deployment of highly and fully automated vehicles**
- (c) Noting that the road safety principles **and legal provisions** in the 1949 Convention on Road Traffic and 1968 Convention on Road Traffic ~~should be~~ **not preclude and hence should be** ~~not~~ exclude the use of **highly and fully** automated vehicles in road traffic,
- ~~Acknowledging the importance of setting global road safety principles taking into account the continuous progress of automated technologies~~
- (d) Recognizing the potential for innovative safety technologies to improve social well-being by preventing motor vehicle ~~crashes~~ **accidents**, 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, **that could offer significant benefits**,
- (e) Recognizing the potential for the mentioned technologies to improve **both** road traffic safety, **and** inclusive mobility (**including for those who cannot currently drive a motor vehicle**), in a way 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,
 - ~~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,~~
- (f) Desiring to establish at ~~global level~~ **uniformity in the principles relating to the governance of recommendations for safely deploying Highly highly and fully Automated Vehicles** automated vehicles in the road traffic environment, 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;~~
- (g) Recommends Governments to take **the recommendations in this resolution** into account ~~for~~ **when adapting** their national ~~legislations relating to~~ **legislative and regulatory frameworks for** traffic and road safety, ~~the principles incorporated in the above mentioned Conventions on Road Traffic and the principles incorporated in this Resolution.~~

II. Preamble Scope

- (a) 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 **the road** traffic environment, to support the enhancement of road traffic safety, mobility and socio-economic progress.
- (b) This Resolution does not supersede the legal obligations arising from the 1949 and 1968 Conventions and 1971 European Agreement.
- (c) Rather, this Resolution **provides complements complementary recommendations** to the principles and **provisions** 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

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:

- (d) The Resolution offers recommendations which will evolve as technology develops and as experience and evidence accumulate regarding the deployment of highly and fully automated vehicles.
- (e) Therefore, the explicit inclusion of a **principle recommendation** in this Resolution should not be construed as the implicit exclusion of any other.
- (f) 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~~ **further actions related to the deployment of highly and fully automated vehicles** if this is deemed necessary in the future.

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

- (g) **This Resolution takes into consideration the role of human beings in the context of automated driving, 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 vehicle(s) refer to/mean vehicles equipped with an automated driving system that can exercise dynamic control (without the need for human intervention as a fall back to ensure road traffic safety), for which the system is a fall back?, for some or all of a journey (SAE 4-5)?.~~
- (a) **Automated driving system means refers to** the combination of hardware and software that **can exercise exercises** dynamic control of a vehicle on a sustained basis.

- (b) “Dynamic control” ~~means~~ **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.**
- (c) “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**
- (d) “Fully automated vehicle” refers to a vehicle equipped with an automated driving system. **This automated driving system operates without any operational design domain limitations for some or all of the journey, without the need for human intervention as a fall-back to ensure road safety.**
- (e) “Operational design domain” (ODD) refers to the environmental, geographic, time-of-day, traffic, infrastructure, and other conditions under which an automated driving system is specifically designed to function.
- (f) “Minimal risk condition” refers to a condition that an automated driving system automatically resorts to, in response to a system failure, or when the human driver fails to respond to a request to resume dynamic control, with the aim of reducing the potential of harm to the vehicle’s users or other road users.

IV. 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 highly and fully automated vehicles should:

- (a) Make road safety a priority,
- (b) **[Be capable of monitoring the surrounding road traffic environment and, as far as possible, safely interact with it] / [monitor and safely interact with the surrounding traffic environment]**
- (c) Endeavour to safely tolerate detectable ~~human~~ errors of ~~road~~ **the vehicles’** users, inside and outside of the vehicle, and **of other road users in order to** minimize potential effects of such errors,
- (d) Comply with traffic rules, especially those referring to:
 - i. Interacting safely with other road users,
 - ii. Following instructions from **law enforcement authorities, and those** authorized ~~officials directing to direct traffic~~ / ~~Following instructions from authorized officials directing traffic such as in the area of road works and location of road accidents~~
 - iii. Maintaining smooth and safe flow of traffic
- (e) Only ~~function~~ **operate** within their **ODD** ~~operational design domain~~.
- (f) 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
- (g) **Communicate with the vehicle’s user, and provide appropriate notice, when the vehicle leaves its ODD**
- (h) React to unforeseen situations in a way that minimizes danger to the vehicle’s ~~occupants~~ **users** and other road users.
- (i) Be capable of clearly **and effectively** communicating ~~[relevant information such as about its status]~~ with ~~its~~ **their** users and other road users, in a way that is consistent, **that provides sufficient information about**

their status and intention, and that enables an appropriate interaction. ~~In addition, be capable of monitoring and interacting with the road traffic environment~~

- (j) Operate in a way that enables verification as to whether or not ~~it is~~ **they are** or ~~was were~~ performing dynamic control
- (k) Enable ~~its~~ **their** deactivation in a safe manner.

V. Recommendations for users of automated driving systems in 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:

- (a) Be aware **and** informed of the proper use of the vehicle prior to starting the journey.
- (b) ~~Be able to communicate with the systems or~~ **Meet the requirements for safely using the vehicle, including being able to communicate with it, [unless another user can]**
- (c) ~~Be able to follow the procedures for safe use of the vehicle~~
- (d) ~~Comply with traffic rules pertaining to users of the vehicle including, when appropriate, those applying to users exercising dynamic control such as holding a driving permit for part of a journey /or~~
- (e) ~~be aware/informed when the vehicle leaves its ODD~~
- (f) ~~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~~
- (d) **Understand if, and when, it is necessary for them to exercise dynamic control of the vehicle to complete a journey. If the vehicle user must exercise dynamic control, or chooses to do so, they must:**
 - i. **hold the necessary driving permits; and**
 - ii. **comply with traffic rules**
- (e) ~~Adapt their behaviour [based on the functionalities] of the vehicle and 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)~~ **[Act lawfully and] not compromise road safety at all times regardless of if they are exercising dynamic control or using the automated driving system.**

VI. Further 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:

- (a) **Work with civil society and industry incorporate the recommendations in this Resolution into their domestic legal and policy frameworks for road traffic in a way that recognises their national context.**
- (b) **Governments may need to review and, if necessary, adapt their legislation to accommodate relevant legislative and regulatory frameworks, and where necessary adapt or add rules to support the safe use of highly and fully automated vehicles that conform with any applicable international law for the construction, technical certification and registration of vehicles. Topics could include provisions for monitoring their system safety performance:**
 - i. **vehicle registration**
 - ii. **vehicle roadworthiness [/ certification/system validation]**
 - iii. **driver training, testing, and licencing**
 - iv. **issuing driving permits**
- (c) **Consider promoting public awareness and understanding of the safe use of highly and fully automated vehicles to help secure the potential safety, mobility, and socioeconomic benefits.**

Alternative 1

- ~~(d) [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:

- (d) **Adopt policies if necessary, in accordance with their privacy regulations, for recording and sharing of regarding the necessary data to evaluate by highly and fully automated driving systems dedicated 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. :**
 - i. **the safety impact of the use of highly and fully automated vehicles to support technological and regulatory advancement;**
 - ii. **the causal factors involved in road traffic safety incidents, such as collisions, or traffic rule violations with highly and fully automated vehicles to resolve legal issues.**
- (e) **work on measures to promote security and cybersecurity, to safeguard the functioning of properly fitted automated driving systems in highly and fully automated vehicles from misuse, or abuse.**
- (f) **facilitate international road traffic by:**
 - i. **making all applicable traffic rules regarding the deployment of highly and fully automated vehicle readily available; and**
 - ii. **[the causal factors involved in road traffic safety incidents, such as collisions, or traffic rule violations with highly and fully automated vehicles to resolve legal issues] / [co-ordinating such regimes with other countries where it is desirable to do so]**
- (g) **update these recommendations as highly and fully automated vehicle technologies develop**

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.~~
