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Automated Driving

Submitted by United Kingdom

This document, submitted by the Government of the United Kingdom of Great Britain and Northern Ireland, discusses how the 1968 Convention on Road Traffic may need to be amended to clarify the use of automated vehicles. The document is not a statement of UK government policy. It is reproduced as received.

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.*

Introduction:

The UK government position is that neither the 1968 Vienna Convention on Road Traffic or its predecessor, the 1949 Geneva Convention on Road Traffic, need to be amended to enable the use of automated vehicles. That said, a future amendment – or even a new convention – is a valuable option that cannot and should not be dismissed out of hand. The UK recognises the desire of some states party to the 1968 Vienna Convention to amend that convention to provide clarity on the legal use of automated vehicles (notwithstanding the legal status of the Resolution with respect to article 31 of the Vienna Convention on the Law of Treaties).

A successful amendment for automated vehicles cannot just focus on Article 8, rather it will need to consider each provision of the conventions and how they apply or do not apply to the use of automated vehicles, and then how they may need to be amended or supplemented to provide the desired legal clarity.

The text below begins this task, identifying areas where changes or supplements to the existing text is needed. Where those areas have been identified a proposal has been made (drawing from the Resolution, and other amendment proposals), or a question posed. Other elements of the 1968 convention may/will need to be considered in detail as this work is not intended to be a definitive list of changes or areas where change may be needed. A similar exercise will be needed for the 1949 Convention to ensure that the Conventions do not diverge unnecessarily.

This work is not a statement of UK Government Policy.

Identifying areas for change

Text in **bold** represents an amendment to the existing text of the 1968 Convention. *[Italic text in square brackets is either an explanatory note or a question]*.

DEFINITIONS:

[note 1: if WP1 is to clarify the convention for automated vehicles there are definitions that need to be changed or included as well to accommodate automated vehicles, and other new technology such as platooning. The text below is either proposals for amendment or inclusions.]

[note 2: terminology is going to be key here and as the IGEAD has discussed, the SAE terminology has not worked as well for WP1 or WP29 as it might have done. The joint meeting in February 2019 will begin the process of codifying a common language, and any amendment should properly reflect that to avoid confusion. To facilitate this document, language from the Resolution has been used]

(t) “Combination of vehicles” means **two or more** vehicles which travel on the road as a unit **due to being coupled through [mechanical or non-mechanical] means**. *[question: is non-mechanical the best term? Electronic may be too limiting. For example, coupling could be achieved via LIDAR or SONAR, not just through radio-frequency communications]*

(v) “Driver” means any person who, **from inside or outside of the vehicle**, drives a motor vehicle or other vehicle (including **a vehicle with an ADS or a cycle) or combination of vehicles**, or who guides cattle, singly or in herds, or flocks, or draught, pack or saddle animals on a road.

(ab) “Dynamic control” means **carrying out all the real-time operational and tactical functions required to manoeuvre a vehicle, including 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**. *[note: using the term dynamic control to align with the Resolution] [Question: this leaves a question about needing to define “drives” and the “strategic driving task” open – dynamic control defines part of “drive”]*

(ac) “Driver assistance system” means **the combination of hardware and software that assists, but does not replace, the driver in exercising dynamic control**.

(ad) “Automated driving system” (ADS) means the combination of hardware and software to exercise dynamic control on a sustained basis on behalf of the driver.

ARTICLE 6

2. Road-users, **including drivers and their vehicles under dynamic control of an ADS**, shall promptly **comply with** all instructions **from law enforcement authorities, and those authorised to direct** traffic. [*note: change suggested to reflect provisions of the resolution and avoid teleological arguments*]

ARTICLE 7

1. Road-users, **including drivers and their vehicles under dynamic control of an ADS**, shall avoid any behaviour likely to endanger or obstruct traffic, to endanger persons, or to cause damage to public or private property. [*note: change suggested to reflect provisions of the resolution*]

2. It is recommended that domestic legislation should provide that road-users, **including drivers and their vehicles under dynamic control of an ADS**, shall not obstruct traffic or risk making it dangerous by throwing, depositing or leaving any object or substance on the road or by creating any other obstruction on the road. If road-users, **including drivers and their vehicles under dynamic control of an ADS**, have been unable to avoid creating an obstruction or danger in that way, they shall take the necessary steps to remove it, **or have it removed**, as soon as possible and, if they cannot remove it immediately, to warn other road-users of its presence. [*note: change to ensure the smooth flow of traffic – automated vehicles should not be subject to a lower standard than human drivers*]

3. Drivers, **and their vehicles under dynamic control of an ADS**, shall show extra care, **behaving in an safe and appropriate way** in relation to the most vulnerable road-users, such as pedestrians and cyclists and in particular children, elderly persons and the disabled. [*note: change suggested to reflect desirable outcomes*]

4. Drivers, **and their vehicles under dynamic control of an ADS**, shall take care that their vehicles do not inconvenience road-users or the occupants of properties bordering on the road, for example, by causing noise or raising dust or

smoke where they can avoid doing so. [*note: change suggested to ensure consistency*]

ARTICLE 8

[*note1: changes expand upon suggestions from other amendment proposals*]

[*note2: there is a general question about both terminology. This document use terminology from the resolution without drawing too heavily from the SAE and where possible reflects initial thoughts from the UK WP29 representatives to help create language that reconciles WP1 and WP29 ambitions.*]

[*note 3: with respect to safety. Given the concerns about the use of conditionally automated vehicles, should we be legislating to enable their use? WP1 would be in a position of moral hazard if we were to legislate for a technology that would reduce road safety, and we should first take account of ongoing discussions about 'other activities' and their results before drafting any 'hard law' in this area*]

1. Every moving vehicle, including those with ADSs, or combination of vehicles shall have a driver. **The driver may exercise the dynamic driving task himself, with or without the help of a Driver Assistance System, or may delegate dynamic control to an ADS. The driver must be able to activate or deactivate the ADS by way of express command.**

1bis. The ADS shall comply with the provisions of Chapter II (Rules of the road) applicable to exercising dynamic control. [*note: reflecting the provisions of the Resolution*]

1ter. Any reference in Chapter II to a driver or road user shall, where appropriate to exercising dynamic control, also apply to an ADS and to vehicles under the dynamic control of an ADS. Subject to any express requirements of Chapter II, domestic laws may specify what persons may be required to comply with provisions that apply to an ADS or a vehicle under the dynamic control of an ADS. An exception is made for the provisions of Article 27, unless the vehicle is a moped, or motorcycle with an ADS. [*note: the reference to article 27 is to avoid a contradiction*]

1quater. When an ADS requests that the driver resume dynamic control, and the driver fails to do so within an appropriate time, the ADS shall be capable of achieving a state that maximises road safety for all road users and support smooth flow of traffic [*note: this reflects comments about the need for a*

fail-safe or fail-operate where the driver does not resume control within the operational domain (conditionally automated), or when the vehicle leaves the operational domain (highly automated)]

1quinques. If the ADS is forced to terminate its own operation, for whatever reason, it must be capable of achieving a state that maximizes road safety for all road users and supports smooth flow of traffic. [note: this reflects the Resolution]

2. It is recommended that domestic legislation should provide that pack, draught or saddle animals, and, except in such special areas as may be marked at the entry, cattle, singly or in herds, or flocks, shall have a driver.

3. Every driver shall possess the necessary physical and mental ability and be in a fit physical and mental condition to drive. *[question: do we need an equivalent requirement for an automated driving system? What about keeping software up to date, periodic roadworthiness tests, and data storage systems? WP29 will have thoughts. This further raises the possibility that the perhaps a definition of "Driver" may need to be further amended to include the combination of software and hardware responsible for delivering dynamic control would be subject to the requirements of a driver – where appropriate of course.]*

4. Every driver of a power-driven vehicle, including those with ADSs, shall possess the knowledge and skill necessary for driving the vehicle; however, this requirement shall not be a bar to driving practice by learner-drivers in conformity with domestic legislation. *[note: changed for consistency]*

5. Every driver shall be acquainted with road traffic and safety regulations and be aware of the factors which may affect his behaviour such as fatigue, taking of medication, of driving a vehicle, including those with ADSs, under the influence of alcohol and drugs. Every driver should be aware of factors that may distract him, including when using a driver assistance system. [note: this reflects and expands on the provisions of the resolution whereby users need to be able to use the ADS safely]

5bis. Every driver shall be aware and informed of the proper use of an ADS, meet the requirements for using an ADS, and follow the procedures for its safe use [note: included to align with the resolution]

5ter. Every driver shall at all times be able to guide his animals.

5quater. Every driver shall be able to control his vehicle, including while using a driver assistance system and/or when outside of the vehicle, and by delegating dynamic control of his vehicle to an ADS.

5quater. Every ADS shall follow, road traffic and safety rules and regulations. *[note: it is worth recognising that some contracting parties use Rules as their legal framework rather than Regulations.]*

5. 6. A driver of a vehicle shall at all times minimize any activity other than driving. **It is recommended that domestic legislation guides the extent of this minimisation by reference to a combination of factors including whether an ADS is engaged, the abilities of the driver, the capability of the vehicle's systems, and other relevant domestic legislation or guidance.** *[note: this issue is still under discussion by the IGEAD and WP1, and it is far from clear what activities would be safe in that they do not prevent a driver from resuming proper and safe dynamic control. Additional independent, scientifically valid, peer reviewed evidence is needed, and WP1 agreed that the conventions did not need to be changed to reflect these principles. However, this formulation reflects the latest thinking from the IGEAD]*

6bis. Domestic legislation should lay down rules on the use of mobile telecommunication devices by drivers of vehicles, including when that device is used exclusively to remotely control the vehicle. In any case, domestic legislation shall prohibit the driver of that vehicle from holding a mobile telecommunication device while the vehicle is in motion unless the ADS is exercising dynamic control. *[note: change from phone to mobile telecommunication device to reflect and cover technological development such as smartphones, tablets, and other internet connected devices, and reflect the use of remote controls]*

7. The driver shall be able to communicate with an ADS if present in his vehicle. *[note: change suggested to reflect provisions of the resolution. WP29 will have views on this point; should the emphasis be on the ADS communicating with the driver – inferring standardised symbols or signals plus, where appropriate, local language options – all of which would fall to WP29 to deliver but WP1 may be able to facilitate with mirroring text.]*

8. The passenger(s) in any vehicle shall comply with safety instructions given by the driver, or ADS as appropriate. Passengers should not distract the driver unnecessarily, nor should they interfere with the proper operation of the ADS. [*note: change suggested to ensure that passengers do not reduce road safety*]

ARTICLE 13

1. Every driver of a vehicle shall in all circumstances **be able to either a) exercise dynamic control his vehicle or combination of vehicles, including when using a driver assistance system,** so as to be able to exercise due and proper care and to be at all times in a position to perform all manoeuvres required of him, **or b) delegate dynamic control to an ADS.** [*note: change suggested to ensure consistency. However, there is an open question about whether or not the ADS may be better placed to make judgements – particularly in critical situations. Therefore, WP1 must take care not to rule out possibilities to improve road safety*]

1bis. The driver, **or their vehicle under dynamic control of an ADS,** shall when adjusting the speed of the vehicle, pay constant regard to the circumstances, in particular the lie of the land, the state of the road, the condition and load of the vehicle, the weather conditions and the density of traffic, so as to be able to stop the vehicle within the range of their forward vision, or sensors, and short of any foreseeable obstruction. The driver, **or their vehicle under dynamic control of an ADS,** shall slow down and if necessary stop whenever circumstances so require, and particularly **when their awareness of the road traffic environment** is not good. [*note: change suggested to ensure consistency*]

Article 20: [*question: do we need to make specific rules about stopping pedestrians and other road users from “teasing” automated vehicles? This may necessitate changes to the jaywalking rules while recognising that national circumstances may vary*]

ARTICLE 30bis

Passengers shall not be carried in such numbers or in such a way as to interfere with driving or obstruct the driver’s view **or interfere with the proper operation of an ADS when it is exercising dynamic control of a vehicle.** [*note: change*]

suggested to ensure consistency of outcomes between manually driven vehicles and those using an ADS]

CHAPTER 3

ARTICLE 35 – *[question: does this need to be amended to record if the vehicle is capable of automated mode? WP29 will have views; it is understood that the current expectation is that this will be able to be determined by the approval of the vehicle and discernible from documentation at the time of registration.]*

ARTICLE 39

1. Every motor vehicle, every trailer and every combination of vehicles in international traffic shall satisfy the provisions of Annex 5 to this Convention. It shall also be in good working order. When these vehicles are fitted **with driver assistance systems or ADS that are in conformity with nationally and/or internationally recognized vehicle standards relating to construction, performance, approval, and validation**, they shall be deemed to be in conformity with Annex 5. *[note: restriction to the 1958 or 1998 agreement standards may not be appropriate – especially if there is a desire to capture vehicles built to national standards that deliver equivalent levels of safety to the UNECE standards, for example, USA Federal Motor Vehicle Safety Standards, and may enable the EU to bring forward vehicles via Article 20 of Framework Directive 2007. See also text for inclusion to annex 1 below. This is an area for discussion with WP29.]*

Annex 1

8. **Contracting Parties may refuse to admit to their territories in international traffic, motor vehicles, trailers or combinations of vehicles, including those with ADS, that are only in conformity with national vehicle standards and not internationally recognized vehicle standards** *[note: included as a counterpoint to the proposed article 39 changes.]*

Annex 4 *[question: does this need to be amended to enable us to record whether a vehicle has an ADS or not?]*

Annex 5 [*question: Several commentators have suggested that automated vehicles should indicate whether they are under ADS control (in other words, in automated mode) or under human control. The indication may be visual (so everyone is aware), or via some other means, for example, a radio beacon (so that only the authorities are aware). Does this need to be included here? WP29 will have views. WP1 should note that an indication that is visible to everyone may encourage other road users to “tease” an automated vehicle. That said, options such as a tell-tale light in the driver side rear view mirror – similar to the blind spot detection warning for the driver are available, but WP1 should engage with WP29 on this issue.*]

not UK government policy