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Convention on Road Traffic (1968)

Automated driving

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Submitted by France

This document has been submitted by the Government of the Republic of France. It has requested the secretariat to disseminate it to Contracting Parties of the 1968 Convention on Road Traffic. The document aims at proposing a draft amendment to the 1968 Convention on Road Traffic to ensure a solid legal basis to the future introduction of highly and fully automated vehicles in road traffic.

- **Automated Driving** -
Proposal for an amendment to the 1968 Vienna Convention on Road Traffic
(see § 14 below)

1. Introducing more automation in vehicles is envisioned to trigger benefits in terms of road safety. While some of the stakeholders aim to develop automated control under specific conditions (partial automation), others are working towards a higher level of automation. These different approaches to automation witness the many challenges that the automotive industry and society face. It may be easy to believe that the challenge is primarily technical in nature, such as ensuring the reliability of these systems. However, today's road traffic system is very complex, with interaction among its various elements which is often difficult to predict and control. For example, the technology has to be adapted to human criteria and restrictions and the infrastructure may need to be adapted to vehicle technology. According to research the most prominently matters are related to human factors issues of safety, usability and acceptance, as well as institutional and legal issues. These are problems that are many times more difficult to overcome and must be overcome, largely in parallel with the traditionally "hard" technological issues.
2. An important challenge is the human factors perspective on the technology. For probably a rather long time there will still be some kind of interaction between the driver and the vehicle. Consequently different human factor challenges need to be taken into consideration.
3. The Convention on Road Traffic regulates the obligations (but not the legal responsibility) of the driver through traffic rules regarding how to behave in different traffic situations. By doing so, the intention is that drivers will act according to the rules and hence road traffic will be safe. However, we know that drivers or road users will not always follow all these rules for different reasons. Consequently we are at the moment using technology in order to support the driver to follow the rules or to be "in control" (ADAS) and we will be in the future using new technologies in order to lighten the driving task as much as possible (Automated Driving – AD), and even to withdraw it for the driver in a more long-term objective.
4. It is important to discuss where and how these issues should be regulated. It is obvious that the technology and the road user cannot be regulated in isolation from each other. However, the structure of UNECE Working Party seems today to very much support such an isolated approach with WP.29 dealing mostly with vehicle technology and WP.1 with the driver/road user. Of course, some issues may still be solely the responsibility of a single Working Party but increasingly WP.1 has to take technology into consideration much more in its work since it is not possible to isolate the driver from technology. Otherwise WP.1 will be left behind. Another way around is a need for WP.29 to take human factors issues into consideration in their work. WP.29 is not any longer dealing only with discrete technical components which properties can be regulated in isolation. The components are often parts of a complex system which includes the human being. The knowledge of human behaviour in relation to complex technology (Human Factors) will be of utmost importance in the future. For clarification it should be noted that WP.29 deals with some HMI-issues (Human Machine Interface) which however only constitutes a limited part of the Human Factors-issue. For that reason it is not only important, but necessary, to increase the cooperation between WP.29 and WP.1: the common work in close cooperation of both groups has already started.
5. In the same time WP 1 has set up a group of experts on automated driving, i.e. the informal group of experts on automated driving (IGEAD). This group met several times during three years and came to some conclusions, endorsed by Contracting Parties representatives in different WP 1 sessions :
 - The amendment of Article 8 (§5) of the Vienna Convention which entered into force on 23 March 2016 is also applicable to automated driving functions;
 - No need to amend the Convention in order to perform experiments in different countries, provided all necessary safety measures are taken by their public authorities;
 - The provisions of the Convention apply as long as there is a driver of the vehicle;

- There is no need to amend the Convention (Article 8 - §6) regarding other possible activities of the driver when an automated driving system is engaged, provided two principles are respected, which are 1) these activities do not prevent the driver from responding to demands from the vehicle system for taking over the driving task and 2) these activities are consistent with the prescribed use of the vehicle systems and their defined functions;
 - The IGEAD shall propose to WP 1 delegates a more elaborated document of these “other activities than driving” while an automated driving system is engaged: this work is ongoing;
 - The IGEAD shall elaborate in terms of road safety on the situations where the driver is outside of the vehicle although he or she is in full and safe control of the vehicle;
 - In the 77th WP 1 session a document is likely to be adopted: a draft “resolution on the deployment of highly and fully automated vehicles in road traffic” which is intended to be a non-binding instrument serving the Contracting Parties to the 1949 and 1968 Conventions on Road Traffic. It could nevertheless be prepared in such a way to allow Contracting Parties to use it as a more binding instrument linked to the Conventions above mentioned.
6. This very important work done especially during these last three years in the WP 1, with the determination of its board and in particular of its Chair, has to be continued and it will be. In the same time the technical progress is hugely accelerating in the last years – in some cases we can speak in terms of months - so that we have now to face some legal challenges regarding the deployment and the development of very highly automated vehicles. While it is undoubtedly paramount to make sure that the draft resolution mentioned above shall be adopted as soon as possible, it does not eliminate the consideration that we must have to legal issues.
 7. In all countries lawyers, new technologies providers, software providers in this area, and car manufacturers express more and more a huge need of legal certainty regarding the insertion of more and more automated vehicles in the traffic.
 8. Irrespective of the work that shall be continued by the IGEAD in elaborating more comprehensive documents to be proposed to countries delegates at WP 1 sessions on different issues like “other activities than driving” or “the driver outside of the vehicle” for instance, it has been thought necessary now by some countries to consider as a very important issue to launch the reflection on legal issues regarding highly automated driving, autonomous driving and finally driverless vehicles.
 9. Due to the increase and the changes observed in the road traffic and the development of new technologies in vehicles it is more and more important that domestic traffic rules are internationally harmonized through legally binding instruments, basically the Conventions on Road Traffic. These conventions are constantly reviewed and periodically amended in order to keep them relevant and up-to-date. While the process of updating the traffic rules is continuous, it appears that a turning point in this process - induced largely by technological change - is being rapidly approached. This is so because until today, traffic rules have been developed for road users, among them for drivers who are meant to possess specific skills and knowledge, to be in control of their vehicles, as well as to possess the necessary physical and mental ability and be in a fit physical and mental condition. These legal provisions explicitly and implicitly assume that the driver is human, is inside the vehicle, and occupies the driver’s position (i.e. behind the ubiquitous steering wheel in front and having foot pedals below). With the arrival of highly automated and driverless vehicles, characterized by technical functions that allow a vehicle to be operated remotely and of those that may make a human driver superfluous, a question arises how suitable the existing traffic rules are for the purpose of regulating and facilitating the international traffic of tomorrow.
 10. The 1949 Convention on Road Traffic requires the driver to be in control of the vehicle at all times (Article 8, point 5). At the same time, there is no provision in the 1949 Convention that would require the driver to minimize the activities other than driving when being in control, nor is there any provision specifying whether a human driver can (or cannot) be supported by vehicle systems when driving.
The 1968 Convention on Road Traffic also requires the driver to be in control of a vehicle at all times. Nevertheless, based on its current provisions, the “operation” (driving) of highly automated vehicles in international traffic is in conformity with the Convention provided that:
“Vehicle systems which influence the way vehicles are driven shall be deemed to be in conformity with paragraph 5 of this Article and with paragraph 1 of Article 13, when they are in conformity with the conditions

of construction, fitting and utilization according to international legal instruments concerning wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles.

Vehicle systems which influence the way vehicles are driven and are not in conformity with the aforementioned conditions of construction, fitting and utilization, shall be deemed to be in conformity with paragraph 5 of this Article and with paragraph 1 of Article 13, when such systems can be overridden or switched off by the driver” (paragraph 5bis of Article 8).”

These provisions appear not only to allow for a vehicle to be driven by vehicle systems but also allow for a human driver to engage in activities other than driving. As a consequence, it seems that the paragraph 6 of Article 8 would not be not applicable to the human driver when their driving is supported by the vehicle system. Moreover, any interpretation of the driver being other than “human” makes the Conventions difficult to understand: for instance it is difficult to envisage that a system could minimize any other activity than driving!

11. There are functions and/or legal obligations arising from the existing rules in the Conventions that a driverless vehicle cannot assume on behalf of the human driver. Some are linked to regulations required for safe travel in some circumstances like the two examples below (they are of course more numerous and will have all to be considered):
 - Loading of cargo – should and can vehicle systems of a driverless vehicle react to inappropriately stowed cargo/load or too many passengers?
 - Behaviour in case of accident – should and can vehicle systems of a driverless vehicle instruct vehicle occupants to assist the injured?
12. On the other hand we could agree that there is no need to revise the traffic rules related to vehicle manoeuvres such as position on the carriageway, overtaking, passing or changing direction, slowing down and/or giving way on the intersection. A driverless vehicle could be programmed to drive according to these rules and so assumes many of the roles of the human driver.
13. In this respect, some other issues are to be carefully considered, namely those that are linked to the role of the driver and how the dynamic driving task is performed depending on the level of automation of the vehicle:
 - Article 1 (§ v), of the Convention defines a driver as any person who drives a motor vehicle or other vehicle (including a cycle), or who guides cattle, singly or in herds, or flocks, or draught, pack or saddle animals on a road. The Convention in essence lays down rules of conduct for drivers, this is proven by the fact that the word "driver" is used 175 times and is mentioned in almost each article (except in arts. 9, 20, 24, 26, 29, 36, 37, 38 and 40) and in all the annexes.
 - The main question is thus to determine, in relation to the different levels of automation, if a driver is still necessary, and if so, to define the role of the driver. A tree step approach seems to be the best way to deal with this issue:
 - (a) Systems taking over some of the driving tasks = a fit and skilled driver is necessary, the driver be attentive the whole time and must assume control over the vehicle when the system alerts him to do so (amendment already approved in WP.1);
 - (b) Systems taking over all driving tasks on a certain road or journey = a fit and skilled driver is necessary, the driver does not have to be attentive when the system takes over the control, but must be able to assume control over the vehicle when the system alerts him to do so;
 - (c) Systems taking over all driving tasks from departure to arrival = a driver is not necessary, and even if there is a "driver" he does not have to be attentive, may use his mobile phone, etc.. Does he or she still have to be physically and mentally fit, does he or she still need to have the skills to drive? These are for instance questions that will have to be answered and solved with regards to road safety principles and in continuously respecting the traffic legislation.

14. In order to strengthen road safety and to ensure certainty at legal level to the increasing use of new technologies/automated functions in the forthcoming years, **it seems that the Vienna Convention on Road Traffic shall be amended regarding its Article 8. In this respect two new paragraphs (i.e. paragraphs 5b and 5c are to be inserted into Article 8, just after paragraph 5a:**

- “5b: Vehicles systems taking over all of the driving tasks of the driver within a limited geographical design domain, other than those meant in article 5c, shall be deemed to be in conformity with paragraph 5 of this Article and with the first sentence of paragraph 1 of Article 13, when they are in conformity with the conditions of construction, fitting and utilization according to international legal instruments concerning wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles¹.

When an automated driving system assuming all dynamic driving tasks within a limited geographical design domain, with the expectation that the driver will respond to requests to intervene, is active, the driver behind the wheel is exempted from the driving task except in case he has to obey to instructions given by authorized officials, to follow the rules which apply towards priority vehicles, in case of an evident vehicle system failure and has to respond upon any request to intervene in accordance with what is requested by the automated driving system.”

- “5c: Vehicles systems taking over all of the driving tasks of the driver at all times, without restricted geographical designed domain, shall be deemed to be in conformity with paragraph 5 of this Article and with the first sentence of paragraph 1 of Article 13, when they are in conformity with the conditions of construction, fitting and utilization according to international legal instruments concerning wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles. When vehicles are driven by such a vehicle system, paragraphs 1 and 6 of this Article do not apply. The provisions of the convention which apply to drivers, other than those linked to driving, apply to the person who has engaged the autonomous driving system and to the other occupants of the vehicle.”

¹ Those legal instruments are the UN Regulations annexed to the "Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be fitted and/or be used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions" done at Geneva on 20 March 1958 or the UN Global Technical Regulations developed in the framework of the "Agreement concerning the Establishing of Global Technical Regulations for Wheeled Vehicles, Equipment and Parts which can be fitted and/or be used on Wheeled Vehicles" done at Geneva on 25 June 1998.