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Convention on Road Traffic (1968): Automated driving
Establishment of Group of Experts on drafting a new legal instrument on the use of automated vehicles in traffic

Submitted by Finland

This document, submitted by the Ministry of Transport and Communications of Finland, relates to regulation of road transport automation. WP.1 will be invited to discuss it.

Summary

1. Finland stresses the importance to establish a Group of Experts on drafting a new legal instrument on the use of automated vehicles in traffic. We wish that this decision will be taken as soon as possible. This informal document represents our initial way of thinking on some core legal aspects and may be subject to development as the work proceeds.

2. The development of road transport automation has not been as fast as had been thought a few years ago. At present, however, there seems to be a good deal of activities, especially regulatory activities, in various international organisations, as well as horizontally and concerning all transport modes. Unless we solve the regulatory issues together, there is a threat that fragmentation and diverse ways of interpreting the agreements will increase.

3. Finland wishes to take this opportunity to stress the importance of a) building the 'big picture' of regulatory landscape, taking into account also the already ongoing discussion of ethical principles and rules governing artificial intelligence (AI); and b) the need to seek novel solutions to the new challenges we are currently facing.

4. The adoption of AI systems for highly and fully automated vehicles and the use of data will be central issues. It is of paramount importance that the development and deployment of these systems will be done with the aim of improving traffic safety, as already laid down in the WP.1 Resolution on the deployment of highly and fully automated vehicles on the road (referred to later as 'The Resolution').

5. Acceptance by the public is a precondition for the wide use of automated vehicles. Acceptance is built on trust, which requires clear accountability of responsibilities for the development and use of automated systems. Accountability goes hand in hand with transparency. Human end-users need to understand the basis of the decision-making carried out by the machines. We also need to be able to rely on the machines to respect the basic human rights and to be built in ways that guarantee safety and data security. Transparency implies traceability (e.g. logs), explainability and interpretability.

6. Initiatives aiming to build a framework for the horizontal principles of development and deployment of artificial intelligence have been presented for example by the Council of Europe, the European Union and the IEEE. On the sectoral level, the UNECE has already taken important steps towards the new regulatory paradigm through the above-mentioned WP.1 Resolution and the work done by WP.29 (e.g. the Framework document on automated/autonomous vehicles, later referred as the 'Framework document'). The work should be continued in a systematic and clear manner. It is important to reconcile the work done by other international organisations with the work of the UNECE. Furthermore, the work carried out by WP.1 and WP.29 must be aligned with each other so that 'the big picture' will remain clear. This requires, for example, that the definitions used and the understanding of the development of road transport automation will be the same.

7. In this document we wish to launch discussion of the following issues that we consider to be of key importance:

- Performance-based, technology-neutral regulation
- Safety first principle
- Importance of how 'highly and fully automated vehicles' is defined
- Accountability shift
- Transparency
- Other central sectoral ethical principles
- Data security

Strategic principles for development of the legal framework for road transport automation

1. Performance-based, technology-neutral regulation

8. Regulation needs to be enabling, based on risk, goals and performance, and technology-neutral in order to be future-proof. The regulation should enable new concepts and procedures, testing and pilots. Regulation should set goals, not technologies. The choice of technologies must be made by the industry partners according to their varying needs. These very important basic principles have been endorsed already in the framework document of WP.29, and it is vital that they are implemented in practice when drafting the future legislation and regulation.

2. Safety first principle

9. Automation needs to be developed in a human-centric manner. The aim must be the wellbeing of individuals and respect for fundamental human rights. Prevention of harm is one of the principles for the development and deployment of AI, established both by the EU and the Council of Europe. In transport automation, prevention of harm means the need to develop and deploy transport automation with the aim of improving traffic safety. This principle has already been included in the documents of both WP.1 and WP.29 in the following manner:

10. The resolution of WP.1

Highly and fully automated vehicles should:

- be capable of achieving a state that maximizes road safety when a given trip cannot or should not be completed for example in case of a failure in the automated driving system or other vehicle system
- React to unforeseen situations in a way that minimizes danger to the vehicle´s users and other road users.

11. The Framework document of WP.29

- The automated/autonomous vehicles should be able to detect its failures or when the conditions for the [ODD/OD] are not met anymore. In such a case the vehicle should be able to transition automatically (minimum risk manoeuvre) to a minimal risk condition.
- Automated/autonomous vehicle should include driver engagement monitoring in cases where drivers could be involved (e.g. take over requests) in the driving task to assess driver awareness and readiness to perform the full driving task.
- The automated/autonomous vehicles shall be able to detect and respond to object/events that may be reasonably expected in the [ODD/OD].
- Vehicle manufacturers should demonstrate a robust design and validation process based on a systems-engineering approach with the goal of designing automated driving systems free of unreasonable safety risks and ensuring compliance with road traffic regulations and the principles listed in this document.

12. It is necessary to establish a clear regulatory framework for implementing the ‘safety first’ principle in practice. The above-mentioned elements must be completed and taken to the legally binding level. The safety-by-design principle could be included, accompanied by methodologies for risk assessment.

3. Importance of definitions of 'highly and fully automated vehicles'

13. The previous discussions have concentrated on the concept of 'the driver' without reaching a solution that would contribute to resolving the regulatory challenges of automated driving. Yet both the Resolution and the Framework document state clearly that the essential requirement is that the vehicle must comply with traffic rules, irrespective whether it is a human or the machine conducting the dynamic control.

14. WP.1 has avoided references to the SAE levels in its Resolution where highly automated vehicles are defined as vehicles that operate within specific ODD and fully automated vehicles are defined as vehicles that have no ODD limitations. ODD is defined as environmental, geographic, time-of-day, traffic, infrastructure, weather, and other conditions under which an automated driving system is designed to function.

15. The definitions already established by WP.1 should be taken as the basis for further development of the regulatory framework. Up to the point of 'highly automated vehicles', automation can only be described as assisting the human driver to a greater or lesser degree. The amount of automation will increase, as will its capabilities, but this does not change this underlying legal picture. The systems will continue to develop even after entering to the phase of 'High automation'. The ODDs can be very limited in the first phases, and can expand later on.

4. Accountability shift

16. With AI systems, it is necessary to define clearly the (new) responsibilities of (new) stakeholders. With high and full automation, it is not possible to place accountability on the human driver for the periods when the vehicle has been taking care of the dynamic control. The accountability that was previously laid solely on human individuals (the driver) shifts to other stakeholders. The EU Commission, in its White Paper on AI. defines developers, deployers, end-users and policymakers as the stakeholders partaking in AI systems. By developers is meant those who research, design or develop AI systems while deployers refers to public or private organisations that use AI systems to offer products or services to others.

17. WP.1 has already embarked on this path as well by defining some new responsibilities of 'users' (as meaning the end-users, individual humans) of highly and fully automated vehicles and governments in its Resolution. Yet the most important responsibilities of section IV of the Resolution remain untargeted. Clear description of the accountabilities is one key element for creating trust towards the automated systems. It is necessary that this description be included in the legal framework.

18. Furthermore, accountability requires that it is possible to trace back the events (e.g. was the person or machine operating the dynamic control). WP.29 has already paid some attention to this end by stating:

- Automated/autonomous vehicles should have a function that collects and records the necessary data related to system status, the occurrence of malfunctions, degradations or failures, in a way that can be used to establish the cause of any crash and identify the status of the automated/autonomous driving system and the status of the driver.

19. Accountability may require other supportive elements as well. This is something that requires elaboration by the expert group.

20. It should be noted that defining accountability does not solve the issues of liability, even though it may have some implications therein. In any case, laws concerning product liability, tort liability and (mandatory) insurances will continue to dominate that legal area. They may need rethinking as well, but this work will be done in other fora.

5. Transparency

21. An essential trust-building block for transport automation is algorithmic transparency. End-users need to understand the basis of the machines' decision-making. They also must be assured that machines respect our basic human rights and are built in ways that guarantee data security and privacy. In order for this to happen, independent third parties (such as the authorities or the assessment bodies) must be able to assess AI systems. Transparency is also the key element for the validation of system safety, the importance of which will become even greater in the future regulative system than it is today. Some elements for regulating algorithmic transparency can be found in international acquis and various other documents, but it is the expert group's task to establish a sufficient regulatory framework for implementing this important element in the sector of transport automation.

22. Transparency also refers to people's need to know exactly when and how they are interacting with AI systems. WP.1 has already established guidelines for this in its Resolution:

- Communicate with their users and other road users in a clear, effective and consistent way, by providing sufficient information about their status and intention, and enabling an appropriate interaction
- Clearly and effectively provide appropriate notice, if the vehicle leaves its ODD
- Operate in a way that enables verification as to whether or not end-users are or were performing dynamic control.

23. It should be evaluated whether these principles need to be complemented in the legal framework.

6. Other central ethical principles of the sector

24. In addition to horizontal ethical principles — such as respect for fundamental human rights or the prohibition one using biased data for decision-making — there may also be sectoral fundamental principles that need to be established clearly. The starting point is the fact that human life enjoys top priority when balancing the legally protected interests. In spite of all the emphasis placed on safety and the requirement that systems must be designed to avoid accidents, some accidents and incidents will occur, though their number is expected to decrease considerably. It should be stated clearly that in the event of unavoidable accident situations, any distinction based on personal features, such as age or gender, is prohibited. This basic principle may need further elaboration and supportive elements.

7. Data security

25. Data security is an issue of concern, including from the perspective of public acceptance. As stated above, transparency is one way to address these concerns. Another way is to lay down clear duties as regards data security. In its Framework Document, WP.29 states the following:

- The automated/autonomous vehicle should be protected against cyber attacks in accordance with established best practices for cyber vehicle physical systems. Vehicle manufacturers shall demonstrate how they incorporated vehicle cyber security considerations into ADSs, including all actions, changes, design choices, analyses and associated testing, and shall ensure that data are traceable within a robust document version control environment.
- Vehicle manufacturers should ensure system updates occur as needed, in a safe and secured way, and should provide for after-market repairs and modifications as needed.

26. This issue should be evaluated and the requirements of general nature included in a legally binding document.