

Automated Driving Functions

Resolution of the DVR Board taken on 8th November 2017 based on a recommendation by the DVR Executive Committee for Vehicle Safety with the contribution of the Executive Committees on Adult Road Users and Young Drivers

Preamble

In the year 2015 the DVR Board took a resolution on highly automated driving. The individual demands thereof remain valid. In view of legislative developments, in particular the amendment of the German Road Traffic Regulations as of 21st June 2017, recent consultations on the amendment of the UN/ECE regulations as well as the results of the Ethics Commission¹ on automated driving, DVR once again makes a statement.

Background

DVR expects that the implementation and use of partly, highly and fully automated driving functions will make a significant contribution to increasing road safety.

Legal requirements resulting from road traffic regulations

Traffic regulations, in particular the German Road Traffic Regulations (StVO), specify the rights and duties of natural persons as road users. It has to be investigated to what extent their contents and rules can be applied to automated systems.

¹ Source: Ethics Commission, Automated and Connected Driving, report June 2017, www.BMVI.de

To avoid confusion or setting a bad example for road users in mixed traffic settings, the driving behaviour of automated systems should not be different from the driving behaviour expected from human beings, even if this appears plausible from a technological and safety related perspective. In exceptional circumstances, e.g. platooning at close distance, such vehicles should be recognisable as automated vehicles by third parties. (Recommendation 1)

Comparing safety levels

DVR agrees with the assessment of the Ethic Commission that the advantages outweigh the risks inherent in the systems (page 15, report of the Ethic Commission).

Given the current state of the art, there will be situations where highly or fully automated systems are not yet as efficient as human driving.

Certain risks, which are inherent in any complex technical system, cannot be ruled out for automated vehicles.

However, it must be ensured that highly or fully automated vehicles achieve a permanent increase in safety for all road users in comparison with current vehicles. This comparison should also consider typical human errors when using automated and non-automated vehicles, such as distraction, erroneous interpretation or even willful misconduct.

The technology of these systems must be designed in such a way that a maximum level of safety is ensured. The use of redundant information from independent sources can optimise automated driving.

For the approval of these systems, it must be considered on an individual basis whether the expected increase in safety outweighs the possible risks. (Recommendation 2)

Field trials and simulations

Field trials and simulations are required for the further development of partly, highly and fully automated driving functions. There should be additional options to evaluate the safety gains of driving functions prior to their approval.

After their approval, new technologies should be monitored by means of field trials. (Recommendation 3)

Approval for research projects

In the context of research projects, the approval of driverless vehicles for passenger transport is being investigated. For this purpose, uniform criteria and processes should be established to assist the authorities responsible for approval. (Recommendation 4)

Approval by means of exemption

Approved vehicles in Europe have to comply with the directive 2007/46/EC of the European Parliament and the Council. In this context, the regulations of the United Nations Economic Commission for Europe (UNECE Regulations) also apply to vehicle approvals.

Due to the fact that there is not yet any valid regulation regarding partly, highly or fully automated vehicles in Europe, a type-approval can be granted according to article 20 of the framework directive (Exemptions for new technologies or new concepts). Furthermore, a member state may grant a provisional approval, which is only valid within its territory.

DVR recommends that those vehicles with automated driving functions, for which an exemption is sought, should conform to the appropriate requirements for conventional vehicle technology as contained in the Economic Commission for Europe (ECE) technical regulations. (Recommendation 5)

Safe operation

It is foreseeable that vehicles will be equipped with automated driving functions of different types and varying performance in the future. To ensure safe operation of automated driving functions, DVR demands that manufacturers, standards organisations and legislators develop a uniform set of

- terms and definitions,
- operating principles,
- warnings and instructions to alert users of automated driving functions.

(Recommendation 6)

Sufficient information

There will be a range of automated driving functions. Therefore, drivers must be sufficiently informed about the limits of such systems, the circumstances under which the system will require the user to take over control, how this will be done and the adequate driver response to this. (Recommendation 7)

Prevention of erroneous or improper use

Appropriate technical and communication measures (human-machine interfaces) are required to prevent erroneous or improper use of driving functions. (Recommendation 8)

Terminology

The new edition of the German Road Traffic Act (StVG) states that the driver must remain 'attentive' at all times during the automated journey. The driver would be obligated to resume control of the vehicle, if the driver realised or, due to 'obvious circumstances', should have realised that the conditions for 'use of the highly or fully automated driving functions in accordance with the intended purpose' were no longer fulfilled.

DVR demands that the term 'attentiveness' of the car driver should be replaced by a technically informed description of the minimum requirements for using vehicles with defined degrees of automation. The conditions that apply to 'obvious circumstances' and 'in accordance with the intended purpose' must be defined in such a way that the car driver understands their full meaning. (Recommendation 9)

Special accident analysis

As the development of automated driving functions is still at an early stage, there should be monitoring and special analysis of accidents involving vehicles equipped with automated driving function in order to increase the safety of the systems and to use the findings for preventing possible hazards. DVR recommends that legislators establish the regulatory framework which allows the police to identify automated vehicles when recording accidents involving such vehicles, e.g. by means of the vehicle identification number, and hence in the public interest enabling a separate analysis of such accidents. (Recommendation 10)

Updates

Automated driving functions will be included in type-approval. It is to be expected that installation of regular software updates will be required for vehicles with automated driving functions within the context of changes in national regulations (e.g. StVO) or product improvements by the manufacturer. The provisions of data protection and data security must be considered.

It must be ensured that safety-relevant modifications in the software are approved by the relevant agency and that software integrity is checked as part of the PTI (periodic technical inspection). In addition, the vehicle-related documentation of such updates must be as transparent as possible.

In addition, it must be ensured that the vehicle manufacturer provides safety-relevant software updates during the life cycle of the vehicle, i.e. for at least 20 years. (Recommendation 11)

Inspection of fully and highly automated vehicles

The future introduction of automated driving functions will considerably increase the requirements regarding vehicle reliability. In this context vehicle modifications will have to undergo more complex assessments. Roadworthiness, operational safety and data security must be checked as part of the PTI (periodic technical inspection). Because of this, the responsible bodies will have to receive any information necessary for vehicle-related diagnosis as well as relevant nominal data, in order to enable the proper PTI (periodic technical inspection) of highly and fully automated vehicles with regard to type, condition, function and effect of their components and systems, including software integrity. (Recommendation 12)

Recommendations:

1. The driving behaviour of automated systems should not be different from the driving behaviour expected from human beings, unless such vehicles are recognisable as automated vehicles by third parties (e.g. platooning at close distance).

2. For the approval of these systems, it must be considered on an individual basis whether the expected increase in safety outweighs the possible risks.
3. There should be additional options to evaluate the safety gains of driving functions prior to their approval. After their approval, new technologies should be monitored by means of field trials.
4. Legislators should develop the legal framework as well as criteria for real-world tests of highly and fully automated driving functions prior to their final approval.
5. The approval of vehicles with automated driving functions, for which an exemption is sought, should conform to the appropriate requirements for conventional vehicle technology as contained in the Economic Commission for Europe (ECE) technical regulations.
6. To ensure safe operation of automated driving functions, DVR demands that manufacturers, standards organisations and legislators develop a uniform set of
 - terms and definitions,
 - operating principles,
 - warnings and instructions to alert users of automated driving functions.
7. Drivers must be sufficiently informed about the limits of the systems, the circumstances under which the system will require the user to take over control, how this will be done and the adequate driver response to this.
8. Appropriate technical and communicative measures (human-machine interfaces) are required to prevent erroneous or improper use of driving functions.
9. DVR demands that the term 'attentiveness of the car driver' should be replaced by a technically informed description of the minimum requirements for using vehicles with defined degrees of automation. The conditions that apply to 'obvious circumstances' and 'in accordance with the intended purpose' must be defined.

10. DVR advises legislators to establish the regulatory framework which allows the police to identify automated vehicles when recording accidents involving such vehicles, e.g. by means of the vehicle identification number, and hence enabling a separate analysis of such accidents in the public interest.
11. It must be ensured that safety-relevant modifications in the software are approved by the relevant agency and that software integrity is checked as part of the PTI (periodic technical inspection). In addition, the vehicle-related documentation of such updates must be as transparent as possible. Data protection and data security must be ensured. Safety-relevant software updates must be available during the life cycle of the vehicle.

The owner or more specifically the user should be informed by the system that an update will be required. In addition, it should be possible to postpone such updates.

12. Legislators should ensure that any information as well as the nominal data necessary for vehicle-related diagnosis will be provided and that test and measuring devices will become mandatory, in order to enable the proper PTI (periodic technical inspection), in particular of highly and fully automated vehicles, with regard to type, condition, function and effect of their components and systems, including software integrity.

signed
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