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Automated Vehicles in the EU: Proposals to Amend the Type Approval Framework and Regulation of Driver Conduct

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Automated and connected vehicles will "help improve road safety, reduce emissions... and could provide significant economic, environmental and social benefits, including improving social inclusion," according to the German and British governments.[1] A study, which was commissioned by the German Federal Ministry of Economics, estimates that the German market for driver assistance systems and automated vehicles will be worth EUR 8.8 billion and create nearly 130,000 jobs by 2025.[2]

Considering the various benefits forecast, it is not surprising that serious efforts are being made at all levels of the law to turn automated cars into a reality in Europe. More haste in the legal work is needed to prevent technology from progressing faster than the law. Audi has largely developed a "traffic jam pilot" system, which would allow a car to go up to 60 km/h without driver intervention in certain situations on the motorway. Audi has already announced the feature will be available in a series in early 2017.[3] The British government plans to change its national law by summer 2017 (to facilitate the development of driverless technology and similar systems) and to work on amending international law by the end of 2018.[4]

This article presents the current state of legislation regarding autonomous vehicles in Europe and the changes being made. As a result, the text focuses on type approval standards and regulatory laws. National references are illustrated using German law. For liability aspects, I refer to Mathias Schubert's article "Autonomous Cars – Initial Thoughts About Reforming the Liability Regime".[5]

Type Approval Framework

The fundamental requirement for automated cars is that their use on public roads is permitted by law. To this end, production vehicles that are sold in EU member states require EC type approval, which is issued on the basis of Directive 2007/46/EC.[6] This Directive contains no technical requirements. In appendix IV, it states that the majority of ECE Regulations are applicable. These regulations are formulated in accordance with the 1958 ECE Agreement[7] – an international treaty that aims

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to standardise the technical requirements for vehicles and auto parts across borders. An individual ECE Regulation exists for virtually every component of a vehicle, containing the relevant technical requirements.

Problems With ECE Regulations

ECE Regulation 79,[8] which contains requirements for the steering configuration, is problematic for automated cars.[9] An "Advanced Driver Assistance Steering System" is only allowed to control the steering as long as the driver remains in primary control of the vehicle at all times, according to paragraph 2.3.4. In addition, such systems "shall be designed such that the driver may, at any time and by deliberate action, override the function" (paragraph 5.1.6.).

Paragraph 2.3.4 distinguishes between two types of assistance systems.

The "Automatically commanded steering function" (paragraph 2.3.4.1), which generates continuous control action assisting the driver in following a particular path, in low speed manoeuvring or parking operations, is limited to 12 km/h (10 km/h + 20% tolerance), paragraph 5.1.6.1.

The "corrective steering function" (paragraph 2.3.4.2.) such as ESP[10] (Electronic Stability Programme) or lane assist is not subject to speed limitations. This function can change the steering angle to maintain the desired direction for the vehicle or influence its movement. Since this function may only operate for a limited duration, the driver must keep his hands on the steering wheel at all times.

Automatically commanded braking is authorized in ECE Regulation no. 13-H without restrictions. As a result, automatic braking is authorized under current law.

It is worth examining ECE regulations no. 6 and 48, which govern the usage of directional signals and provide specifications for mounting them on vehicles respectively, because they would be activated or deactivated during automated overtaking. One view is that ECE Regulation no. 6 needs to be adapted because it doesn't mention the automatic activation of directional signals.[11] However, this view is contradicted by the fact that neither the operation nor the manual use of directional signals addressed in ECE Regulations no. 6 and no. 48, meaning that no conclusion can be drawn.

Nevertheless, this view cannot be supported by ECE Regulation no. 6 paragraph 1.1.,[12] where an indicator is defined as "a device mounted on a motor vehicle or trailer which, when operated by the driver, signals his intention to change the direction in which the vehicle is proceeding". It is clear that the legislator primarily assumes that the indicators will be operated manually by the driver of the vehicle. A probable explanation for this view is that the possibility of automated activation was not considered when the regulation was created. More importantly, the requirements stipulated in the legal definition are fulfilled verbatim, whether the indicators are operated manually or automatically. After all, the additional possibility of automatic activation of indicators does not stop a driver from signalling his intention to change the direction of the vehicle by manual operation of the indicator.

As result, until now ECE Regulation no. 79 has been the primary regulatory hurdle for the type approval of automated vehicles in Europe.

Proposed Amendments

The World Forum for Harmonization of Vehicle Regulations is responsible for the modification of existing ECE regulations and the development of new ones. It is a working party of the United Nations Economic Commission for Europe (UNECE).[13] The need to adapt ECE Regulation no. 79 has also been recognized by an informal group (of UNECE member state representatives and industry experts) that has been tasked with the development of amendment proposals. The amendments envisaged below are based on the current status of discussions.[14]

In the future ECE Regulation no. 79 will differentiate the five types of automatically commanded steering function (ACSF), each of which will need to adhere to specific requirements.

- Category A will include automatic parking systems, which are legal under current regulations and may operate at a maximum speed of 12 km/h.
- Category B is an automated steering function that is initiated or activated by the driver to keep the vehicle in a lane by influencing its movement.
- Category C includes systems that extend the functionality covered by Category B. It includes systems that can perform a single manoeuvre (e.g. lane change) when activated by the driver.
- Category D systems would include a function that can indicate and execute it only after the driver's confirmation.
- Category E covers functions initiated or activated by the driver and can continuously determine manoeuvres (e.g. lane change) and complete them for extended periods without additional intervention from the driver.

Until now requirements have only been developed for the most advanced systems in Category E from which specifications for Categories A to D will be derived at the end of the discussion process. Their basic structure is described below.

Automated steering functions will be allowed to operate up to a maximum speed (130 km/h is under discussion), and the driver must be able to deactivate or override the system at all times. Conversely, upon reaching the limits of its capabilities (e.g. end of the motorway, roadworks, failure of a sensor), the system will alert the driver at least four seconds before he needs to resume control of steering. In order to guarantee that the driver only carries out other activities that allow a timely resumption of control of the vehicle, and to prevent the driver from falling asleep or leaving the driver's seat, a "Driver Availability Recognition System" will be compulsory. If the driver fails to respond to the alert, the system must carry out a "Minimal Risk Manoeuvre" – for example, safely bringing the vehicle to a stop on its own.

If a sudden and unforeseen event causes a critical situation in which the required warning period of four seconds cannot be upheld, an immediate transition demand is envisaged. The system must also carry out an emergency manoeuvre appropriate to the situation (e.g. braking or swerving).

Finally, detailed specifications for the detection distance of the sensors used as well as a variety of tests, in which the correct behaviour of the vehicle will be scrupulously verified (e.g. automatic lane assist, correct behaviour where the driver is incapacitated, missing lane markings), are planned. Mandatory introduction of a data storage system, which would make the proper/precise operation of automated steering function verifiable in accidents, is also in discussion.

This description, which has been simplified, still shows how far discussions have progressed; an informal sub working group met for the sixth time in April so that by the end of the year they can provide a complete amendment proposal to the WP.29.

Regulation of Driver Conduct

Driver Conduct and German Law

Even if automated vehicles are eligible for approval under ECE Regulation 79 after its revision, this does not mean that drivers will be allowed to use them to the full extent of their technical capability. The driver might be obliged to monitor the automated driving process constantly and remain prepared to resume control of the vehicle in the event of problems that have not been recognised by the system. This is how the State of California, which until now has been regarded as especially progressive, has chosen to proceed in a recently proposed bill:[15] the bill, which only contains basic technical requirements, states under § 227.84 lit. c) that "the operator shall be responsible for monitoring the safe operation of the vehicle at all times and be capable of taking over immediate control of the vehicle in the event of an autonomous technology failure or other emergency". In addition, according to § 227.84 lit. d) "the operator shall be responsible for all traffic violations that occur while operating the autonomous vehicle".

Discussions in Germany have until recently primarily focused on highly and fully automated vehicles, which, according to the German Federal

Highway Research Institute (BASt), will enable the driver to pursue other activities for sections of the journey.[16] These degrees of automation form the basis for the work of the "Roundtable of Automated Driving" (Runder Tisch Automatisiertes Fahren), an expert group created by the Ministry of Transport; they have also been incorporated in the Federal Government's strategy for automated and connected driving (Strategie automatisiertes und vernetztes Fahren).[17] However, highly and fully automated vehicles were regrettably called into question by the Ministry of Justice at the end of 2015. It appears that the relevant authorities prefer drivers to maintain constant control and reject changes to the law that would explicitly allow them to pursue other activities while driving.

The approach of the German Ministry of Justice and California authorities, which would force the driver to monitor automated driving at all times, fails to convince for a variety of reasons: constantly monitoring automated driving is hardly less strenuous than driving, and the driver would also quickly become tired if his or her job is only to monitor the car and would be tempted to take on unforeseen and potentially dangerous activities. Therefore, it is preferable that only vehicles that do not require constant monitoring for every section of the journey be approved, as appears to be the requirement in the proposed amendments to ECE Regulation 79. The increased development requirements and the resulting increased cost are therefore only sufficiently beneficial if the legislator permits the driver to take on other given activities for brief periods.

The required amendments to proposed German regulation would be straightforward in this case. Most of the rules in the German Highway Code (StVO) are not aimed at the driver, but rather at standardizing the abstract requirements for driving manoeuvres and the vehicle itself.

The rules in the current law could be equally fulfilled by an automated vehicle.[18] The Highway Code does not explicitly prohibit other activities while driving, except mobile phone usage in § 23 paragraph 1a. It is likely that the situation would be similar in most other European states.

However, problems arise in supranational law: The prevailing opinion[19] is that other activities by the driver are incompatible with the Vienna Convention on Road Traffic (VC). Under this convention, Germany and 72 other states,[20] including most EU member states, committed themselves to guaranteeing – in accordance with Article 3 paragraph 1 lit. a) sentence 1 VC – that their corresponding national traffic laws comply in substance with the provisions set out in Chapter 2 of the Vienna Convention.[21]

Questionable Requirements

While varying in detail, the prevailing opinion refers to the following provisions of the Vienna Convention:

Article 8 Driver

(1) Every moving vehicle or combination of vehicles shall have a driver.

...

(5) Every driver shall at all times be able to control his vehicle or to guide his animals.

Article 13 Speed and distance between vehicles

(1) Every driver of a vehicle shall in all circumstances have his vehicle under control 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...

The author of the article believes that the intended purpose of Article 13 paragraph 1 sentence 1 of the Vienna Convention is to preclude the pursuit of additional activities, as the driver may no longer be able to complete all the manoeuvres for which they are responsible, as required.[22] Due to their obligations as signatories of the convention, Germany and other countries may not be allowed to permit drivers to take on other activities at the wheel. This is why the Vienna Convention has until now been seen as a significant obstacle on the road to automated vehicles.

Upcoming Amendment of the Vienna Convention

An amendment of the Vienna Convention (VC) was initiated in early 2014 by Austria, Belgium, France, Germany and Italy. As the UN recently announced, the signatories accepted this unanimously and the amendment will come into effect on 23 March 2016.[23] In the context at hand, the new paragraph – known as "5bis" – will be added to Article 8 of the VC. It will be worded as follows:[24]

Article 8 paragraph 5bis

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 [a footnote here refers to the ECE Agreement of 1958 and the GTR Agreement of 1998].

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.

In the future, according to Article 8 paragraph 5bis VC, the absolute presumption will therefore be that a vehicle system is in accordance with the requirements of Article 8 paragraph 5 and article 13 paragraph 1 VC if it either fulfils the requirements of the ECE Regulations (according to sentence 1), or it may be overridden or switched off by the driver (in compliance with sentence 2). As mentioned earlier, these paragraphs were viewed as especially problematic in the past; however, the wording of Article 8 paragraph 5bis VC does not allow one to draw a conclusion as to whether the change also allows the driver to take on other activities. In support of the argument against the permissibility of other activities, one can refer to the detailed requirements for the driver stated in other provisions of the Vienna Convention that are not affected by the amendments: Specifically, Article 12 paragraph 1 VC states that the driver must ensure a certain distance when swerving, and Article 8 paragraph 6 VC explicitly requires him to minimize other activities.

According to the opinion of the author, the newly added Article 8 paragraph 5bis VC takes precedence over other requirements aimed at the driver by the Vienna Convention. The arguments below back this view.[25]

Initially, the secretariat of the Working Party on Road Traffic Safety (WP.1), which is responsible for the amendments to the VC, explicitly informed the delegates prior to the adoption of the resolution that the amendment proposal allows automated vehicles to be used as long as a driver remains present.[26] In this respect, a corresponding intent of the signatories is assumed.

This understanding is also supported by a systematic argument: Article 8 paragraph 5bis sentence 2 VC explicitly defines systems as being compliant with the requirements laid out in Article 8 paragraph 5 and article 13 paragraph 1 VC if they can be switched off or overridden by the driver. Clearly, Article 8 paragraph 5bis sentence 1 VC must therefore also apply to systems that can neither be switched off nor overridden, otherwise sentence 1 would never be applicable. If the vehicle is controlled by a system that cannot be overridden, it is impossible for the driver to fulfil alternative duties to act. Article 8 paragraph 5bis VC must therefore be given priority over other requirements stipulated in the Vienna Convention. This also applies to Article 8 paragraph 6 VC, as the duty to minimize other activities fulfils no meaningful purpose, if it is impossible to override the systems.

Furthermore, the unambiguous wording and the systematic position at the beginning of Chapter two (in which traffic regulations are laid down) show that the relationship between driver and vehicle is being addressed exhaustively in Article 8 paragraph 5 and Article 13 paragraph 1 VC. Hence the amendments resulting from Article 8 paragraph 5bis must affect the entire Vienna Convention, and take precedence over other requirements. This especially applies to the relationship between

Article 8 paragraph 5 and Article 8 paragraph 6 VC. Diverging from the non-binding German translation, the original versions in English, French and Russian of Article 8 paragraph 5 VC only require that the driver is "able to" control the vehicle.[27] From this requirement it already follows that the driver must minimize other distracting activities; Article 8 paragraph 6 is therefore only a secondary clarification.[28] This restriction is also supported by the structure of Article 8, in which the leading paragraph sets the premise for the norm contained in the following paragraph. For example, control of the vehicle stipulated in Article 8 paragraph 5 is virtually unthinkable if the driver does not possess the required knowledge of driving stipulated in Article 8 paragraph 4. Also within Article 8 VC, the changes made by Article 8 paragraph 5bis to Article 8 paragraph 5 have priority over the subordinate paragraph 6.

As a result, automated vehicles will be compliant with the VC following the amendments that will come into effect on 23 March 2016, provided that the system can be overridden by the driver, or fulfils (future) requirements of the ECE regulations.

Further Proposals

Last year Belgium and Sweden made two additional pushes for amendments to the VC. A proposal presented in March 2015 aims to make fully automated vehicles a possibility. To this end, the legal definition of a vehicle driver in Article 1 lit. v) VC should be extended to include a "vehicle system which has the full control over the vehicle from departure until arrival" as long as it complies with the ECE Regulations or Global Technical Regulations.[29] Further regulation of vehicles that only allow the automation of parts of a journey and are therefore still reliant on a human driver has apparently not been considered necessary at this point in time.

In the following meeting of WP.1, held in October 2015, Belgium and Sweden yet again submitted a heavily modified second amendment proposal.[30] This calls for a redesign of Article 8 paragraph 5bis VC – only now entering into force – as well as the addition of two further paragraphs – "5ter" and "5quater" – to Article 8. Belgium and Sweden intend to distinguish between automated driving functions that take over part of the task of driving, the complete task of driving for a certain section of the journey or the complete task of driving for the whole journey, from beginning to end.

This proposal was not immediately accepted by WP.1, but it will be considered by a newly created informal group, which will take a closer look at automated vehicles.[31]

As neither of the proposals submitted by Sweden and Belgium was decided upon, further changes to the VC are not possible in the short term. Once the amendment procedure has been initiated by WP.1, the acceptance and waiting periods of 18 months (defined in Article 49 paragraph 1 sentence 3, paragraph 2 lit. a. sentence 3 VC) are to be taken into account. Additionally, it takes several months for the required translations to be created and sent by the UN to the signatories. Even if a further amendment was agreed upon in the next session of WP.1 in March this year, it would not enter into force until the beginning of 2018 at the earliest.

Conclusion

As demonstrated, an amendment of ECE Regulation 79 can be expected relatively soon, and the VC will be more open to a technology-friendly interpretation. Both Germany and the UK intend to take on pioneering roles in automated driving.[32] To achieve this, proposals to amend national legal frameworks are required in the short term. It remains to be seen whether these, too, will support the possibility of the driver pursuing certain other activities, as the potential of automated vehicles would otherwise be largely squandered.

About the Author

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Endnotes

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2 Cacilo et al., Highly automated driving on motorways – Hochautomatisiertes Fahren auf Autobahnen – industrial and political consequences, 2015, page 120 ff., available at http://www.bmwi.de/BMWi/Redaktion/PDF/H/hochautomatisiertes-fahren-auf-autobahnen,property=pdf,bereich=bmwi2012,sprache=de,rwb=true.pdf.

3 Audi press release 10 April 2015.

4 Department for Transport, l.c. (Footnote 1), pages 31 and 34 ff.

5 Schubert, PHi 2015, 46–51 (in German) and Insurance Issues, May 2015 (in English).

6 For example, under German law Directive 2007/46/EC is implemented by EG-FGV (EU vehicle approval regulation).

7 Agreement concerning the adoption of uniform technical prescriptions for wheeled vehicles, equipment and parts which can be fitted to and/or be used on wheeled vehicles and the conditions for reciprocal recognition of approvals granted on the basis of these prescriptions, available at www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/505ep29.pdf.

8 The (internationally binding) English version is available at http://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/r079r2e.pdf. Links to translations in various relevant EU languages can be found under http://ec.europa.eu/DocsRoom/documents/11401/attachments/1/translations/en/renditions/native.

9 See also Lutz in: Hilgendorf/Hötitzsch/Lutz, Legal Aspects of self-driving Cars (Rechtliche Aspekte automatisierter Fahrzeuge), 2015, pages 33, 45 ff.

10 Electronic Stability Programme, which avoids skidding of the vehicle, especially in curves.

11 Cacilo et al., l.c. [see endnote 2], page 116.

12 Which can also be found in paragraph 2.7.12. of ECE Regulation 48.

13 Source of the term "ECE Regulation".

14 Informal Documents ACSF-05-03 and ACSF-02-20, available at https://www2.unece.org/wiki/pages/viewpage.action?pageId=2523223 under ACSF 4th Session and ACSF 5th session.

15 The bill is available at www.dmv.ca.gov/portal/wcm/connect/ed6f78fe-fe38-4100-b5c2-1656f555e841/AVExpressTerms.pdf?MOD=AJPERES.

16 Gasser et al., Legal consequences of increasing vehicle automation (Rechtsfolgen zunehmender Fahrzeugautomatisierung), book F 83 (BASt reports), page 9.

17 Federal Government, l.c. [see footnote 1], page 5 f.

18 Lutz, NJW 2015, 119, 122; in contrast Cacilo et al., l.c. [see endnote 2], page 110.

19 For example Lutz, NJW 2015, 119, 122; Hötitzsch/May, in: Hilgendorf, Robotics in the context of law and morality (Robotik im Kontext von Recht und Moral), 2014, S. 189, 197; Frenz/Casimir-van den Broek, NZV 2009, 529, 533; Gasser, VKU 2009, 224, 229 ff.

20 Of which several have merely signed the Convention but not yet ratified it. A complete list of the signatories and the status of their participation is available to view at http://www.unece.org/trans/conventn/legalinst_08_RTRSS_RT1968.html.

21 In addition, the VC contains regulatory content for admission law according to article 3 paragraphs 2 and 3. In the case of a contradiction, ECE Regulations have priority. A comprehensive comparison by Lutz can be found in Hilgendorf/Hötitzsch/Lutz, Legal Aspects of self-driving Cars (Rechtliche Aspekte automatisierter Fahrzeuge), pages 33, 49 f.

22 In further detail: Lutz, NZV 2014, 67-72; Cacilo et al., l.c. [see endnote 2], page 332 ff.

23 Depositary Notification C.N.529.2015.TREATIES-XI.B.19, available at https://treaties.un.org/doc/Publication/CN/2015/CN.529.2015.Reissued.06102015-Eng.pdf.

24 An official German version does not exist, as German is not a contract language of the Vienna Convention, article 56 sentence 1 VC. The binding English version can be found in ECE/TRANS/WP.1/145, S. 10, available at http://www.unece.org/fileadmin/DAM/trans/doc/2014/wp1/ECE-TRANS-WP1-145e.pdf.

25 In detail Lutz, DAR 2013, 446, 449 f.; ders., in: Hilgendorf/Hötitzsch/Lutz, l.c. (endnote 7), pages 33, 40 ff.; also Cacilo et al., l.c. (endnote 2), page 120 ff.; Lohmann, First barriers for self-driving vehicles conquered – developments in admission law (Erste Barriere für selbstfahrende Fahrzeuge überwunden – Entwicklungen im Zulassungsrecht), 13.12.2015, section III, available at http://sui-generis.ch/17; dies., Self-driving vehicles under the light of Swiss admission and liability law (Automatisierte Fahrzeuge im Lichte des Schweizer Zulassungs- und Haftungsrechts), 2016, forthcoming; also Hilgendorf, in: VGT 2015, pages 55, 61 f.

26 Secretariat WP.1, Presentations for the 68th session, slide 6, available at http://www.unece.org/fileadmin/DAM/trans/doc/2014/wp1/ECE-TRANS-WP1-Presentation-4e.pdf

27 Lutz, NZV 2014, 67, 70 ff., Lutz, in: Hilgendorf/Hötitzsch/Lutz, Legal Aspects of self-driving Cars (Rechtliche Aspekte automatisierter Fahrzeuge), pages 33, 42.

28 Ibid.

29 Available at www.unece.org/fileadmin/DAM/trans/doc/2015/wp1/ECE-TRANS-WP1-INT-2e.pdf.

30 ECE/TRANS/WP.1/2015/8, available at http://www.unece.org/fileadmin/DAM/trans/doc/2015/wp1/ECE-TRANS-WP1-2015-8e.pdf.

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32 Federal Government, l.c. [see endnote 1], page 12; Department for Transport, l.c. (endnote 1), page 32

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