

Unlocking EU Roads:

The importance of policy
for automated driving

Abstract:

The concept of self-driving vehicles has grown beyond a sci-fi fantasy and could be the next step in vehicle mobility. EU regulators are being approached by the automotive industry, which is already calling out for the necessary preconditions, yet uncertainty remains a key issue. This briefing paper aims to present a clear and synthesized overview of self-driving regulations in the EU. It argues that certain regulations such as those regarding type approval, need to be either updated or reinvented, thus allowing the UNECE and its subsidiary bodies to refer to appropriate legislation in technical decision-making and hopefully meet more frequently in order to keep up with technological developments. Aligning the EU's ambitious vision of CAM with a proper policy framework calls for establishing a European identity in the development of automated driving with safety and innovation at its core.



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Introduction

The automatization of vehicles can be understood as a response to an increasingly values-driven society. By reducing the human factor, the automotive industry can make a substantial attempt at making transportation safer, more sustainable, and more inclusive. This aspiration can be realized if different areas of technical expertise work together with the automotive industry in order to make automatization safe and reliable, e.g., with the technological developments of intelligent software systems (AI) and 5G networks. But the industry alone cannot push for change all by itself.

Legislation plays a key role in allowing this new technology to be both tested and deployed, which in turn reflects the geographical disparity in the deployment of automated driving. One commonly addressed issue is how a Palo Alto-based car company's autopilot functions are generally allowed across the US, while to a large extent they are restricted or prohibited within the EU. Thus, questions have been raised over why EU regulators are hindering the introduction of automated vehicles in Europe.¹ In order to understand this discrepancy in deployment, one has to understand how EU regulations and policy on issues such as liability and type approval are set out, as well as how the relevant decision-making bodies work with approving automated driving systems. Whether the vehicle is equipped with driver assist functions, such as speed monitoring and lane-keeping assistance, or fully adopts the human task of driving from point A to point B, this is inevitably the direction the automotive industry is heading towards.

Automated vehicles explained and contextualized

How can an automated vehicle be understood today and/or in the future? What possibilities and challenges arise with the deployment of automated driving? To answer these questions, it has to be understood that the automatization of vehicles not only relates to developing certain technical standards of the vehicle but also places considerable demands on the whole transportation infrastructure. Automatization is not a task for the automotive industry alone but instead stretches across multiple industries.

Connected infrastructure

The communication needs of an automated vehicle are a convincing argument for the rollout of the 5G network on roads. A future 5G infrastructure would not

1 A. Voigt, "Safety As The #1 Priority For Semi-Autonomous Vehicles Requires A Reform Of European Regulations", Clean Technica (5 December 2020), <https://cleantechnica.com/2020/12/05/safety-as-the-1-priority-for-automatic-driving-vehicles-requires-a-reform-of-european-regulations/>.

only enable automated driving but is also crucial for connected driving, with its reliance on sound and fast connections.² Here, there seems to be a consensus, as the EU's digital strategy supports 5G cross-border corridors; one reason for this is the deployment of Connected and Automated Mobility (CAM).³ Germany has already implemented 5G coverage requirements in spectrum allocations, with the target of covering all federal highways, national, and state roads by 2024.⁴ Another context in which automated driving should be considered in the future is in connection with electric road systems (ERS). Experts argue that automatization and electrification go hand in hand, while electric vehicle batteries could be heavily reduced when vehicles can be charged on the road instead of carrying onboard energy storage. With automated vehicles requiring a lot of energy to power different components and systems, ERS could make them more reliable.⁵

Cross-competence collaborations

As automated driving technologies develop, the number of stakeholders is rapidly increasing. Both software and hardware equipment are becoming more complex in order to functionalize with autonomous solutions; hence, skills in AI, computing, and cloud services are demanded, which in turn has led to different cross-competence collaborations.

Highly automated vehicles require different fields of expertise to complement each other.

For several years, a large telecommunications company has been performing cybersecurity tests related to 5G, featuring IoT devices and in collaboration with automakers developing automated and connected vehicles.⁶ This is a crucial aspect, due to these devices' vulnerabilities related to potential AI shortcomings, and their access to personal data could act as an incentive for hijacking.

Most automated vehicles require over-the-air services such as software updates. Still, of course, it is likely that large en-

tertainment systems will also be part of them as the driver's task is transferred to the vehicle. Some even compare the development of automated vehicles to smart phones: these computerized functions could run on the same wireless network.⁷ Consequently, it did not come as a surprise when Microsoft and the

2 P. Dialani, "5G is pivotal for autonomous cars and auto industry", Analytics Insight (2 January 2021), <https://www.analyticsinsight.net/5g-is-pivotal-for-autonomous-cars-and-auto-industry/>.

3 European Commission, "5G cross-border corridors" (9 March 2021), <https://digital-strategy.ec.europa.eu/en/policies/cross-border-corridors>.

4 Bundesnetzagentur, "Mobile Project-2018", https://www.bundesnetzagentur.de/EN/Areas/Telecommunications/Companies/FrequencyManagement/ElectronicCommunicationsServices/MobileBroadbandProject2018/project2018_node.html.

5 Rise Research Institute of Sweden, "The connection autonomous driving and electrification", <https://www.ri.se/en/what-we-do/expertises/electrified-autonomous-vehicles>.

6 Ericsson, "Cybersecurity Testing and Certification", <https://www.ericsson.com/en/portfolio/digital-services/transform-business/device-and-network-testing/device-and-application-verification/cybersecurity-testing-and-certification>.

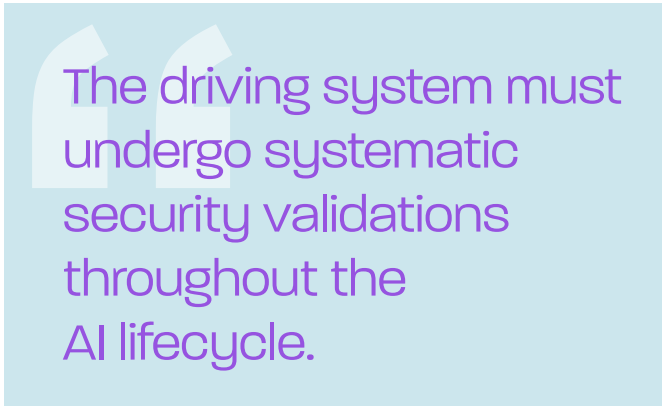
7 J. Lanhee Lee & S. Nellis, "How Big Tech is helping transform cars into smartphones", Reuters (9 January 2020), <https://www.reuters.com/article/us-tech-ces-autos-idUSKBN1Z81AG>.

Volkswagen Group announced their new collaboration on a new digital platform where over-the-air driving functions could be made available rapidly and on a large scale.⁸ What we can see is that highly automated vehicles require different fields of expertise to complement each other; furthermore, issues commonly foreign to traditional automakers, whether these be cybersecurity threats or software engineering, can be solved in a competent manner through these kinds of collaborations.

Cybersecurity

Data sharing between objects over the cloud, also known as the Internet of Things (IoT), relates to both automated driving technology and 5G. However, data flow imposes great risks.

A report from JRC and ENISA shows how AI weaknesses in autonomous vehicles pose cybersecurity risks and that vehicle malfunctions can have either intentional or unintentional causes. The traffic environment could be manipulated, or the automated vehicle's computing system could simply make a misinterpretation.



The driving system must undergo systematic security validations throughout the AI lifecycle.

The report was published just as vehicle manufacturers are preparing for the upcoming WP.29 cybersecurity regulation, which is to be implemented for all new vehicle types from July 2022. For all newly produced vehicles, it will be mandatory from July 2024. The report is an important step in creating future AI legislation, which is crucial for enabling AI in automated

vehicles. The recommendations that follow in order to prepare decision-makers are, for example, that the driving system must undergo systematic security validations throughout the AI lifecycle, which extends the responsibility of the manufacturer further. The report also claims that cybersecurity policies should be developed along the supply chain so that resilience is not affected by security breaches in supply chain management.⁹ The latter recommendation is worth being considered, as it could prove challenging for automakers to keep cybersecurity risks at a minimum when different components of the vehicle, such as software systems, are developed by third-party suppliers. How information can move freely but safely is also relevant when discussing automated vehicles and their communications needs as part of the digital infrastructure—be it with other vehicles, the cloud, or other parts of the future infrastructure.

⁸ Microsoft News Center, "Volkswagen Group teams up with Microsoft to accelerate the development of automated driving", (10 February 2021), <https://news.microsoft.com/2021/02/10/volkswagen-group-teams-up-with-microsoft-to-accelerate-the-development-of-automated-driving/>.

⁹ European Union Agency for Cybersecurity & Joint Research Centre, "Cybersecurity challenges in the uptake of artificial intelligence in automated driving", ENISA (11 February 2021), <https://www.enisa.europa.eu/publications/enisa-jrc-cybersecurity-challenges-in-the-uptake-of-artificial-intelligence-in-autonomous-driving/>.

Guidelines and strategies on automated driving in Europe

The European Commission's views on CAM

The European Commission uses the concept of Connected and Automated Mobility (CAM) when referring to automated vehicles. The terminology implies a vision, similar to what has been mentioned above, of automated vehicles as part of a digital and connected infrastructure. 5G corridors are part of this vision, where vehicles should be able to move smoothly across borders without risking connection breaches. The Commission has two initiatives in order to support the deployment of CAM: The Cooperative Intelligent Transport Systems (C-ITS) and the High Level Group GEAR 2030.¹⁰ C-ITS is part of the Commission's strategy for the horizontal deployment of intelligent transport systems. This means that both vehicles and infrastructure would be equipped with ITS, in other words digital technologies, and the C-ITS would enable communication between each unit and ITS.¹¹ Through this high performance infrastructure on roads and for road users, warnings of harmful traffic situations or congestion could be communicated.¹² The Commission, together with road authorities on the C-ROADS platform, brings this initiative in order to harmonize the deployment of C-ITS across Europe.¹³ The working group GEAR 2030 was launched in 2016 in order to work towards a coherent and appropriate policy framework for CAM to be put into place by 2030. In 2018, this resulted in a strategy for automated mobility within the EU, including policy recommendations, which are discussed further ahead in this paper under "The EU's view on liability".¹⁴ Another initiative is the innovation project Horizon 2020, co-funded by the Commission. This sprung the L3Pilot project, a large-scale pilot project on automated driving in Europe that launched September 2017 and is still underway.¹⁵ More about the L3Pilot can be found under the "Testing on open roads" section of this paper.

10 European Commission, "Shaping Europe's digital future", <https://digital-strategy.ec.europa.eu/en/policies/connected-and-automated-mobility>.

11 European Commission, "A European strategy on Cooperative Intelligent Transport Systems, a milestone towards cooperative, connected and automated mobility" (30 November 2016), <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0766&from=EN>.

12 European Transport Safety Council, "Cooperative Intelligent Transport Systems (C-ITS)" (November 2017), <https://etsc.eu/wp-content/uploads/ETSC-Briefing-on-Cooperative-Intelligent-Transport-Systems-C-ITS.pdf>.

13 C-roads, <https://www.c-roads.eu/platform/about/about.html>.

14 European Commission, "On the road to automated mobility: An EU strategy for mobility of the future" (17 May 2018), <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1527002536861&uri=CELEX:52018DC0283>.

15 European Commission, "Extensive tests to steer the future of self-driving cars" (5 June 2019), <https://ec.europa.eu/research-and-innovation/en/projects/success-stories/all/extensive-tests-steer-future-self-driving-cars>.

UNECE's framework

In 2019, a framework was set by the World Forum for Harmonization of Vehicle Regulations to guide the regulatory work of the United Nations Economic Commission for Europe (UNECE) in autonomous/automated vehicle levels 3–5. The framework puts safety as the number one cornerstone of the development and deployment of automated vehicles, stating that “The level of safety to be ensured by automated/autonomous vehicles implies that an automated/autonomous vehicle shall not cause any non-tolerable risk, meaning that automated/autonomous vehicle systems, under their automated mode (ODD/OD), shall not cause any traffic accidents resulting in injury or death that are reasonably foreseeable and preventable.”¹⁶ This also means that the automated driving functions must comply with all road traffic regulations in order to ensure road users' safety.

The framework outlines a priority list of topics regarding the work of automated vehicles, stretching from System Safety to the Data Storage System for Automated Driving (DSSAD) and Event Data Recorder (EDR). Draft proposals covering these thematic safety priorities have been drafted by the Working Party on Automated/Autonomous and Connected Vehicles (GRVA), which since 2018 consists of four technical expert groups, in order to accelerate the harmonization of regulations in the development of automated vehicles.¹⁷ These expert groups are important decision-making bodies, as they have the role of setting the technical standards and requirements for automated vehicles, and their work is highly influenced by the safety priority of the framework. More about how the GRVA works will be further discussed in the section “The work of WP.29” of this paper.

Current international regulations

International conventions

For a long time, the most significant regulation regarding road traffic has been the Vienna Convention on Road Traffic. The main legal limitation on the development of automated vehicles has been Article 8 of the Convention, which states that all moving vehicles must have a physical driver in control of the vehicle, something that restricts the possibility of highly automated driving functions.

In 2016, an amendment entered into force that further defined the meaning of being in control of the vehicle. This can be found in Article 34, which states that the

16 UNECE, “Revised Framework document on automated/autonomous vehicles” (3 September 2019), <https://unece.org/DAM/trans/doc/2019/wp29/ECE-TRANS-WP29-2019-34-rev.1e.pdf>.

17 UNECE, “Safety at core of new Framework to guide UN regulatory work on autonomous vehicles” (3 September 2019), <https://unece.org/transport/press/safety-core-new-framework-guide-un-regulatory-work-autonomous-vehicles>.

above requirement in Article 8 is deemed satisfied if the vehicle is equipped with an automated driving system that complies with domestic and other international regulations.¹⁸ This removed the main obstacle regarding the development of automated driving amongst the states that have ratified the Vienna Convention. However, as the convention still specifies drivers, fully autonomous driving is not yet possible.

UN regulations

With this obstacle removed, we can focus on the regulations. The most prominent regulation is the UN Regulation on Automated Lane Keeping Systems (ALKS), which was the first binding regulation regarding level 3 in automated driving when it entered into force in January 2021.¹⁹ In short, level 3 means that the driver is not driving when the automated driving system is engaged but must be able to intervene when the driving system requests it.²⁰ The Regulation defines safety requirements for various actions that an automated vehicle has to be able to manage. This includes actions such as emergency maneuvers, assessing the risks of different optional maneuvers, and the transition between driver and system control of the vehicle. While ALKS enables higher automated driving functions, it is important to note that the current ALKS Regulation limits the operational speed to 60 km/h.

UN Regulation No 79 has a substantial impact on the vehicle's steering equipment. The technical requirements in this Regulation have to be met according to the vehicle's type approval, therefore making this a major obstacle regarding which automated vehicles can be put on the roads. In September 2020, a series of amendments proposed by the GRVA were put into force.²¹ The Regulation now specifies requirements regarding automatic steering functions, as in a lane change procedure, for example. In the case of an automatically initiated manoeuvre, the lane change has to be completed in no less than 3 seconds and no more than 5 seconds. If the lane change is initiated manually by the driver, it shall commence within 3 and 7 seconds. If the automated system fails to operate the lane change within these time spans, the manoeuvre shall be aborted automatically by the system.²² This regulates automated driving functions on a very detailed level, down to the exact second, regardless of the situation, raising the question of whether this really is the safest manner every manoeuvre should be carried out in.

18 UNECE, "Report of the Global Forum for Road Traffic Safety on its eighty-first session" (14 December 2020), <https://unece.org/sites/default/files/2021-01/ECE-TRANS-WP.1-173-Add1e.pdf>.

19 UNECE, "UN Regulation on Automated Lane Keeping Systems is milestone for safe introduction of automated vehicles in traffic" [press release] (24 June 2020), <https://unece.org/transport/press/un-regulation-automated-lane-keeping-systems-milestone-safe-introduction-automated>.

20 UNECE, "The 5 levels of driving automation", https://unece.org/DAM/Corrected_5_Levels_of_Driving_Automation.pdf.

21 UNECE, Agreement of Supplement 2 of the 03 series of amendments to UN Regulation No. 79 (2 November 2020), <https://unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2020/R079r4am2e.pdf>.

22 UNECE, "Proposal for Supplement 2 to the 03 series of amendments to UN Regulation No. 79 (Steering equipment)" (6 January 2020), <https://undocs.org/ECE/TRANS/WP.29/2020/11>.

The work of WP.29

As mentioned earlier, the UNECE is the leading body regarding policy development of automated vehicles. The main body under the UNECE is the World Forum for Harmonization of Vehicle Regulations (WP.29). WP.29 functions as a global forum for discussions regarding motor vehicle regulations, and its participants are mainly UN member countries. Important regulations, such as the ALKS and Regulation 79, are the product of work carried out by WP.29.

With the rapid development of new technology in automated vehicles, there is a need for equally rapid development of regulations and harmonization.

There is, however, a problem. With the rapid development of new technology in automated vehicles, there is a need for equally rapid development of regulations and harmonization. The WP.29 group convenes only three times per year, and its subsidiary bodies only meet twice a year for important technical decision-making, such as approvals of software updates. The subsidiary bodies consist of experts from each

department, and the subsidiary body responsible for automated vehicles is the GRVA.²³ In November 2020, the calendar meeting frequency for 2021 of the subsidiary bodies was brought up for discussion by the Commission, whereby it suggested an additional GRVA session in order to keep up with necessary regulatory changes.²⁴ Even though it is unclear if this increased meeting frequency will be recurring annually, it is still doubtful that one additional session will be adequate for the task of accelerated decision-making. The consequence of having such a low meeting frequency is that it may act as a bottleneck, hindering the fast development of international harmonization regarding the regulation of automated vehicles. This may in turn hamper developments, as the developers risk designing automated driving functions that may not be compatible with future regulations. Investments in R&D resources could thus suffer as a consequence of this uncertainty.

These regulations will soon be accompanied by the WP.29 cybersecurity regulation²⁵ mentioned earlier. This new regulation takes a huge leap, since there has not yet been any previous need for cybersecurity regulations to be as

23 UNECE, "General questions related to WP.29 and its subsidiary bodies", <https://unece.org/faq>.

24 European Commission, Meeting of the World Forum Advisers Group (E01293) (19 November 2020), <https://circabc.europa.eu/sd/a/873acd81-9545-44f6-be80-15863285f2cd/WFAG%20minutes%2004.11.2020.pdf>.

25 UNECE, "Proposal for a new UN Regulation on uniform provisions concerning the approval of vehicles with regards to cyber security and cyber security management system" (23 June 2020), <https://unece.org/DAM/trans/doc/2020/wp29grva/ECE-TRANS-WP29-2020-079-Revised.pdf>.

detailed. With all the new advanced technologies that enable vehicles to operate autonomously, it is necessary to have strict regulations regarding the security and integrity of such systems.

Current EU regulations

Since practically every EU Member State has ratified the Vienna Convention on Road Traffic, it also has a significant impact on current and future regulations within the EU. As there is no current regulation within the EU regarding road traffic, the Vienna Convention on Road Traffic is deemed to be the leading regulation within the EU, even though it originates from the UNECE.

In April 2021, the European Commission published the long-awaited Proposal for a Regulation on a European approach for Artificial Intelligence (AI Act), which introduces harmonized rules for the development, placement on the market, and use of AI systems in the EU. This regulation based on the risk-based approach, classifies AI systems as a product as well as a safety component of a product in a motor vehicle (which is already subject to EU safety legislation) as high-risk.²⁶ The Regulation was a step in the right direction because the rules for high-risk AI systems deployed in motor vehicles will be laid down within the sector-specific framework, in a manner consistent with AI Regulation, and avoid duplication of governance mechanisms.

Consequently, the draft Regulation doesn't apply directly to motor vehicles. Therefore, the legal requirements for high-risk AI systems used in motor vehicles will be laid down only later when the existing regulatory framework for these products is amended (the Commission will, over time, bring specific rules on AI into the Type Approval legislation/ General Safety Regulation), and after which they will need to reflect the main requirements in the Regulation. When the sectorial legislation is amended, the implementation of new AI requirements should also take into account the development cycle length of automotive products.

The EU's view on liability

As the definition of a driver and vehicle control changes, it is natural that questions surrounding liability arise. Who should be held liable in case of an accident? Should it depend on who is in control of the vehicle at the time of the accident, and, if so, how is it determined whether it was the driver or the driving system that caused the accident?

All of these questions were addressed in the communication from the European Commission to the European Parliament regarding the EU strategy for automated vehicles.²⁷ Liability for motor vehicles is primarily addressed through the Motor

26 European Commission, "Laying down harmonized rules on artificial intelligence (Artificial Intelligence Act) and amending certain union legislative acts", 2021/0106(COD) (21 April 2021), <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52021PC0206>.

27 European Commission, "Communication from the Commission to the European Parliament, the

Insurance Directive²⁸ as well as the Product Liability Directive.²⁹ With regard to the next generation of automated vehicles, the current liability regime seems generally sufficient and balanced.

In broad terms, it can be said that it is the actual circumstances leading up to an accident that are decisive for the attribution of who should be held liable. The driver who is regarded as the cause of an accident is also held liable for the damage through their car insurance.

In light of this, the European Commission recommends that every vehicle equipped with automated driving aids should be equipped with a Data Storage System in order to clarify whether it was the driver or the vehicle's automated system that was in control of the vehicle. If the vehicle's automated system malfunctions in a way that means it can be deemed responsible, the insurer can take legal action against the manufacturer in accordance with the Product Liability Directive. This procedure ensures swift compensation for the victims as well as the possibility for the insurer to be reimbursed by the vehicle manufacturer for its expenditures due to the autonomous system's malfunction.³⁰ The Motor Insurance Directive recently underwent an evaluation, and the directive was deemed satisfactory with regards to autonomous vehicles. In line with the current standards, these will be required to have third-party liability insurance.³¹

Potential issues with the current regulations

Automated and connected vehicles can significantly improve road safety by reducing fatality rates and accidents. Safety systems (some of which are already deployed in cars) can intervene automatically, faster, and more reliably than a human being.

In some sorts of accidents, it is possible that the driver is the victim. Since the current insurance requirements in the EU only require that insurance covers damages that the accident causes to others, a problem may arise in situations where the automated system was driving and caused an accident with no one except the driver harmed or the car damaged. In these situations, if the car owner does not have a more extensive insurance policy, the only possibility for compensation will be through the regulations in the Product Liability Directive,

Council, the European Economic and Social Committee, The Committee of the Regions" (17 May 2018), <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0283&from=sv>.

28 Motor Insurance Directive, the European Parliament and of the Council, "Relating to insurance against civil liability in respect of the use of motor vehicles, and the enforcement of the obligation to insure against such liability" (16 September 2009), <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0103&from=EN>.

29 Product Liability Directive, the Council of the European Union, "On the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products" (25 July 1985), <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31985L0374&from=EN>.

30 European Commission, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, The Committee of the Regions" (17 May 2018), <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0283&from=sv>.

31 European Commission, "Public consultation on REFIT review of Directive 2009/103/EC on motor insurance" (28 July 2017), https://ec.europa.eu/info/consultations/finance-2017-motor-insurance_en.

and the consumer will have to prove that the system was faulty. This burden may be partially lifted if every autonomous vehicle were equipped with a Data Storage System that can at least show that the automated system was driving when the accident occurred. But the consumer will still have to prove that the automated driving system was faulty.

Type approval

The regulation regarding vehicle approval was overhauled in 2018. In order to create more coherence within the EU, the old framework directive was replaced by a new regulation. This was an important step towards harmonization, since every EU Member State now abides by the same exact regulation. The current regulation entered into force as of 1 September 2020. The legal framework for the approval of motor vehicles is now provided by Regulation (EU) 2018/858, which enables new automation technology to be validated under the EU approval framework. This is done through Article 39, wherein manufacturers may be granted exemptions for new technology that may not yet be compliant with current regulatory acts. Vehicle manufacturers could therefore be granted type approval for new driver systems that EU regulators might not have foreseen when establishing current and new regulations.³² The duration of the exemption is limited—under it, the manufacturer has to address questions about why the particular vehicle is incompatible with the requirements and describe the testing results which then prove an equivalent safety standard. Every exemption then needs to undergo individual national safety assessments in order to reach the EU market, as with any other type approved vehicle.³³

Even though this type of exemption paves the way for new technology to enter the market within the EU, it is mainly meant for small-scale production and is not designed for replication across the industry. It will also be quite a resource-heavy tool. As more and more manufacturers develop countless different driving aids and systems, the need for a new type approval procedure will increase. In designing a new type approval procedure, harmonization should be a central consideration, and this could be helped by making an EU-wide type approval standard.

³² Regulation (EU) 2018/858 of the European Parliament and of the Council (30 May 2018), <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R0858&from=SV>.

³³ Connected and Automated Driving, “FAQ”, <https://www.connectedautomateddriving.eu/faq/>.

The introduction of automated vehicles in Europe

Testing on open roads

Access to data is key in the development of automated vehicles, and for data to be gathered, automated vehicles have to travel in live traffic. But the process is slowed down because regulations decide what type of vehicle is allowed on EU roads. The testing of vehicles and prototypes is therefore important in this process.

As earlier mentioned, type approval is regulated partly on a national level, as are testing procedures. Prototypes can be tested on open roads in EU Member States, according to each State's own procedure. This means that testing is regulated by the UNECE as well as by every Member State's own national legislation.³⁴ Testing preconditions vary from country to country, where some have more developed testing procedures for automated vehicles (such as Germany) than others.³⁵ The possibility of large-scale testing across Europe is therefore difficult, since testing licenses are issued by each Member State on its own. Member States do not necessarily highlight the need for the harmonization of cross-border testing, since each wants its own industry to be in the lead of automation.³⁶

Despite these difficulties, testing in Europe is already underway. The above-mentioned L3Pilot, which is co-funded by the Commission, has been testing automated vehicles on levels 3 and 4 in ten different Member States where special permits for open-road testing have been received since 2017. These tests are pursued in different scenarios, such as on uncongested motorways up to 130 km/h, in urban environments at 25–50 km/h, and in parking lots.³⁷

A US autopilot on EU roads?

Going back to the issue of the Palo Alto-based automotive company whose autopilot functions are to a large extent prohibited on EU roads, testing is not possible for the most part. Since October of last year, the company has rolled out a beta version of its Full Self-Driving (FSD) program to a range of customers'

34 Connected and Automated Driving, "Regulations and policies – National Level", <https://www.connectedautomateddriving.eu/regulation-and-policies/national-level/>.

35 Connected and Automated Driving, "Regulations and policies – EU-level", <https://www.connectedautomateddriving.eu/regulation-and-policies/national-level/eu/>.

36 R. Kulmala, J. Jääskeläinen & S. Pakarinen, "The impact of automated transport on the role, operations and costs of road operators and authorities in Finland", Traficom (12 March 2019), https://www.traficom.fi/sites/default/files/media/publication/EU_EIP_Impact_of_Automated_Transport_Finland_Traficom_6_2019.pdf.

37 T. Louw et al. "Assessing user behaviour and acceptance in real-world automated driving: the L3Pilot project approach" (April 2020), https://www.researchgate.net/publication/337032759_Assessing_user_behaviour_and_acceptance_in_real-world_automated_driving_the_L3Pilot_project_approach.

cars; many of these functions are not allowed to be activated on EU roads.³⁸ Even though no harmonized regulatory framework for testing automated vehicles is in place in the US, there are still several states that have issued executive orders in relation to automated vehicles.³⁹ In California, a bill has been issued that promotes the testing of automated vehicles on public roads.⁴⁰ But how could this autopilot function be deployed in Europe?

There are several challenges in this case. Firstly, if the car company wishes to test widely in Europe, they would have to apply for individual test permits from each Member State, though it is uncertain how each permit would be laid out. For a company that already has mass-testing underway in the US, it is uncertain how valuable the data that is derived from Europe would be before testing schemes have been harmonized. Secondly, the autopilot function does not comply with certain regulations, which explains why it has not been activated in Europe. For example, the autopilot function can activate automatic lane-changes, which does not comply with UN Regulation № 79, which requires manual maneuvering under certain conditions. Even with a restricted, EU-approved version of the autopilot, every software update that has an impact on driving functions, which can appear frequently, could possibly need to be type approved. It is clear that today's regulatory framework in Europe does not benefit higher automated driving functions.

EU Member State initiatives

Germany's existing regulations

Germany is one of the forerunners in enabling autonomous driving. In 2017, Germany passed its first law on autonomous driving. This can be seen as a direct response to the possibilities that opened up with the 2016 amendment of the Vienna Convention. The 2017 law sets up rules for automation up to level 3. Under this regulation, the vehicle's driving systems must comply with all traffic rules in the same manner as a physical person would. The driver may do other things when the system is activated but must be able to intervene at all times when the system requires it. Thus, there must still be a driver who is ultimately responsible, and therefore the driving systems may only relieve the driver of their driving duties in certain situations.

38 J. Hyunjoon, "Tesla tells regulator that full self-driving cars may not be achieved by year-end", Reuters (7 May 2021), <https://www.reuters.com/business/autos-transportation/tesla-tells-regulator-that-full-self-driving-cars-may-not-be-achieved-by-year-2021-05-07/>.

39 Connected and Automated Driving, "Testing infrastructure and procedure description", <https://www.connectedautomateddriving.eu/regulation-and-policies/national-level/non-eu/us/>.

40 Senate Bill No. 1298, "Vehicles: autonomous vehicles: safety and performance requirements" (25 September 2012), http://leginfo.ca.gov/pub/11-12/bill/sen/sb_1251-1300/sb_1298_bill_20120925_chaptered.pdf.

Germany's new draft law

In February 2021, the German Federal Ministry of Transport and Digital Infrastructure published a proposal for the approval of a new law regarding fully autonomous vehicles: the Autonomous Driving Act. The draft proposal was passed by the Federal Cabinet on 10 February 2021—an important step in the legislative process. If the law enters into force as planned, it would make Germany one of the first countries in the world to grant fully autonomous (level 4+) vehicles in regular operation in certain predefined operational areas. Even though this draft law no longer requires a driver, some human interaction is still inevitable in order to comply with international regulations. This requirement would be fulfilled through a technical supervisor: a person who has to be able to control the vehicle at least remotely. The technical supervisor is ultimately responsible for the operation of the vehicle and for ensuring that all road traffic laws are followed. As was mentioned earlier, Germany is one of the leading countries regarding autonomous vehicles. In the draft law, the German legislature argued that there is a lack of international harmonization regarding regulations surrounding autonomous vehicles. To wait for such harmonization was not an option, since doing so would risk Germany's leading position in this area. Without regulations that are in step with developments, a huge opportunity would be lost for Germany to strengthen its position at the top even further.⁴¹

The EU's involvement in Germany's legislative process

It is important to keep in mind that this draft law is still subject to several investigations in the legislative process. Since the draft law contains technical regulations, Germany is obliged to undergo a notification procedure, in which the country has to inform the EU Commission prior to the law entering into force, in accordance with Directive (EU) 2015/1535. During this time, the draft enters a three-month standstill period during which it may not be adopted. This means that the EU Commission or other EU Member States may submit a detailed opinion if they consider that the draft creates barriers to the free movement of goods or free information of services or violates EU secondary legislation. If a detailed opinion is submitted, the standstill period is extended by another three months.⁴² Germany submitted the draft in question and the three-month period ended on 10 May 2021, and it has not been subjected to any detailed opinion provided by neither the Commission nor any EU Member.⁴³ This means that the draft law can be adopted on a national level.

41 For the German draft law, see: Federal Ministry of Transport and Digital Infrastructure (28 February 2021), https://www.bmvi.de/SharedDocs/DE/Anlage/Gesetze/Gesetze-19/gesetz-aenderung-strassenverkehrsgesetz-pflichtversicherungsgesetz-autonomes-fahren.pdf?__blob=publicationFile.

42 European Commission, "The notifications procedure", <https://ec.europa.eu/growth/tools-databases/tris/en/about-the-20151535/the-notification-procedure-in-brief1/>.

43 European Commission, "Draft Act amending the Road Traffic Act and the Compulsory Insurance Act – Act on autonomous driving" (9 February 2021), <https://ec.europa.eu/growth/tools-databases/tris/en/search/?trisaction=search.detail&year=2021&num=81>.

Since of 20 May and 28 May, the Bundestag as well as the Bundesrat have passed and approved the draft law. This means that the law will be put into force in a near future, and will make out the first legal framework suited for automated, and even autonomous, driving.⁴⁴

Conclusions

Today, there is a discrepancy between the accelerating pace of technology and the legislative landscape, revealing contradictions that not only are harmful to all invested stakeholders but could also put the legitimacy of the EU as an institution at risk. The EU stands for an open and thriving market that enhances technological developments and social progress. Yet the AV industry is failing to expand here, leaving Europe behind as a market. After reviewing the legal, societal and technical outlines of automated and connected vehicles in the EU, this briefing paper suggests the following measures.

Policy recommendations

- **Increased meeting frequency for the subsidiary body GRVA of WP.29**

The UNECE and its subsidiary bodies must increase their meeting frequency in order to match the pace of development. With meetings mostly occurring only twice a year, development in the area of the regulation will not be able to match developments in technology, thus acting as a bottleneck. GRVA sessions should be held at least quarterly.

- **Strive for global harmonization**

The EU and the UNECE must further work towards harmonization, globally and in the EU, in order to streamline development. If this is not done, more countries will do what Germany is in the process of doing now: establishing their own regulations without waiting for global harmonization. While this is positive in the sense that it forces global bodies like the EU and UNECE to act faster, it may also hamper the work of international harmonization if every country establishes different regulations. Either the EU embraces Germany's draft law or works fast to develop a regulation that can be applied by all Union Members.

- **A type approval system suited for new technology**

The EU must adapt its type approval process to be better suited for autonomous vehicles and new technology. The current system does enable new technologies to be type approved, but, since more and more will be released, we may end up with a system that only works through Article 39 in Regulation (EU) 2018/858, which requires every exemption to undergo individual national safety assessments. Instead, the system should be revised to be more compliant with the fast pace of technological development. Since the EU cannot foresee what technology may be developed, it cannot have a type approval system that mainly focuses on existing technology.

44 GSK Stockmann, "Autonomous driving: From vision to reality – German Autonomous Driving Act comes into force" (8 June 2021), <https://www.gsk.de/en/autonomous-driving-from-vision-to-reality-german-autonomous-driving-act-comes-into-force/#gref>



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