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Legal Aspects of Automated Driving

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4 Careless Automated Driving?

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Abstract: With technology advancing, automated vehicles are getting closer to being deployed on public roads for the general public. Despite all of these technological developments, technology is not infallible. It could happen that a defect in an automated vehicle occurs whilst it is in use on public roads. Such a defect can range from a visible defect like a broken sensor, to an invisible defect such as a software bug. Not all defects will have an important influence on the driving of the vehicle, but some defects could result in dangerous situations on the road. Who should prevent an automated vehicle from driving down public roads with such a safety-critical defect? This chapter will explore with whom this duty of care should rest. The role of the user of the automated vehicle, the owner, the manufacturer and the vehicle authority (approval authority) will be discussed.

4.1 Introduction

Imagine that you ordered an automated vehicle to travel to work. The vehicle pulls up in front of you, ready to bring you to your destination. Before you step in and drive off, is there anything you need to do? Perhaps you have to check if the vehicle is in a good condition, that is has no visible defects. You might be asked to indicate that you accept the vehicle in its current state. Or perhaps you are allowed to just step into the vehicle and drive off, without checking the vehicle is in order. Or should the manufacturer make sure that its vehicle does not drive off when, for instance, a sensor is broken or a software update has not been installed? These questions boil down to one question: with whom should a duty of care rest to prevent an automated vehicle with a safety-critical defect from staying in use?

Such a duty of care can work in different ways: it can prevent behaviour which would violate the duty of care (preventive) or if, nonetheless, the duty of care is violated, it can result in legal consequences (repressive). These consequences could include, for instance, that the withdrawal of the vehicle's approval (through administrative law) or the requirement to pay damages for the harm caused by the violation of that duty of care (compensation through private law). A violation of a duty of care could also be a reason for withdrawing a permission (for instance, a driver's licence) and for criminal prosecution.

A duty of care to prevent an automated vehicle with a safety critical defect from being used is a duty that one of the parties discussed below should have towards (other) road users. After all, it benefits the safety of all road users if the use of an automated vehicle with the safety-critical defect is prevented. Because of this focus on prevention, the role of insurance and tort law, which come into play after a violation of a duty of care, will only be touched upon.

Within this chapter, the term 'automated vehicle' is used to describe a SAE Level 5 vehicle.¹ So, this automated vehicle is able to complete an entire trip without human support. The person that uses the vehicle will be referred to as the 'user' of the vehicle. This user only has to dispatch the vehicle and provide the vehicle with a destination. Once he is in the vehicle and the vehicle drives off, the user can sit back and relax, work, sleep or read etc. The user of the automated vehicle is not

¹ SAE International, *Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles. Standard J3016* (revised June 2018).

necessarily the owner of the vehicle: the ownership might lie with a fleet operator or perhaps even the manufacturer.

A distinction will be made between two different types of defects: visible defects and invisible defects (within this chapter, the term ‘defect’ does not necessarily mean the same as the same term in the EU Product Liability Directive (Directive 85/374/EEC)). A visible defect can be that the automated vehicle’s sensor is visibly broken (for instance, it is dangling by a thread, barely attached to the vehicle anymore, or the sensor has been visibly damaged by road grit). An invisible defect will mostly relate to software problems. An example of an invisible defect is an uninstalled, perhaps safety-critical, software update. If the onboard computer clearly signals to the user of the vehicle that an update has not been installed, the invisible defect becomes a visible defect. There are four actors that can influence whether or not a vehicle with such a defect will stay in use: the user of an automated vehicle, the owner of the automated vehicle (e.g. the fleet operator), the manufacturer of that vehicle, and the vehicle authority that issues the approval for vehicles.

4.2 The User of the Vehicle and his Duty of Care

4.2.1 Renting a Vehicle: An Example

Today, it is already possible to rent a conventional vehicle without needing to go to the rental agency to pick up the vehicle, similar to how in the future an automated vehicle could be rented. Take for instance, Greenwheels, a car rental/car sharing company operating in cities in the Netherlands and Germany.² To hire a car from Greenwheels, the renter has to make a reservation through an application on a smartphone or via the internet for a car that is parked in a convenient location. The renter goes to the car, unlocks it by using his phone or a card and after entering a code into the onboard computer and indicating that he did not find any new damage to the vehicle, the key to the vehicle is unlocked and the renter can drive off.³ As is clearly shown in the instruction video on the company’s website and is clearly stated in the company’s terms and conditions, the renter has to inspect the vehicle before using it.⁴ How far his duty reaches – whether or not he has to look at the engine, for

² Greenwheels, ‘Home’ (*greenwheels.com*, 2018) <www.greenwheels.com/nl/> accessed 18 October 2018.

³ Greenwheels, ‘Home’ (*greenwheels.com*, 2018) <www.greenwheels.com/nl/> accessed 18 October 2018.

⁴ Greenwheels, ‘Algemene Voorwaarden’ (*greenwheels.com*, 2018) <www.greenwheels.com/nl/sites/greenwheels.com.nl/files/content/AV/20180524%20Algemene%20Voorwaarden%20Greenwheels_NL_v1.0.pdf> accessed 18 October 2018, sections 11 and 12.

example – is not specified in the terms and conditions. The renter has a duty of care to inspect the vehicle and report any damage before using the vehicle. If he does not inspect the vehicle and does not report damage to the company, this has legal consequences: if the uninspected vehicle causes damage as a consequence of a defect of the vehicle that should have been discovered upon inspection, the renter can be held liable.⁵ It is also stated in the terms and conditions that the renter should not use the vehicle if he discovers a defect or damage that could cause more damage to the vehicle or could have a negative effect on road safety.⁶ So, for instance, if a wheel was askew under the car (i.e. a visible defect), the renter should have noticed this, he should have reported the defect to the rental company and should, depending on the severity of the defect, not drive the car. If he does not do so and the wheel falls off during the trip, causing an accident, the renter is, given the terms and conditions, liable for that damage.⁷

The user of an automated vehicle finds himself in a similar position to the position of the renter of the conventional vehicle in the example described above. The user of the automated vehicle also rents his vehicle (or a seat in the vehicle, depending on the type of vehicle, this could be more like a bus service) without needing to go to the rental agency to pick the vehicle up. He will only communicate with the rental agency through an application on his phone or the interface inside the vehicle. He might also be confronted with a duty to inspect the vehicle and report any damage or defects, all in conformity with instructions provided by, for instance, the onboard computer of the automated vehicle. Just like the renter of the conventional vehicle, the user of the automated vehicle could be held liable for damage caused by a defective vehicle, if he did not report the damage and did not inspect the vehicle. He could face a liability claim, insofar as the damage is not covered by insurance, by the injured third party, or he could be unable to claim damages from the fleet operator or

⁵ Greenwheels, 'Algemene Voorwaarden' (*greenwheels.com*, 2018) <www.greenwheels.com/nl/sites/greenwheels.com.nl/files/content/AV/20180524%20Algemene%20Voorwaarden%20Greenwheels_NL_v1.0.pdf> accessed 18 October 2018, sections 11 and 12.

⁶ Greenwheels, 'Algemene Voorwaarden' (*greenwheels.com*, 2018) <www.greenwheels.com/nl/sites/greenwheels.com.nl/files/content/AV/20180524%20Algemene%20Voorwaarden%20Greenwheels_NL_v1.0.pdf> accessed 18 October 2018 sections 11 and 12.

⁷ Greenwheels, 'Algemene Voorwaarden' (*greenwheels.com*, 2018) <www.greenwheels.com/nl/sites/greenwheels.com.nl/files/content/AV/20180524%20Algemene%20Voorwaarden%20Greenwheels_NL_v1.0.pdf> accessed 18 October 2018, sections 11 and 12.

manufacturer of the vehicle if he himself got injured. He could also face criminal prosecution for the violation of traffic rules, and he could be confronted with consequences under administrative law (i.e. his driver's licence could get withdrawn, if such a licence is required for using automated vehicles). Unlike the user of the automated vehicle, however, the renter is driving the vehicle himself (or lets someone familiar to him drive the vehicle). The user of the automated vehicle is completely at the mercy of technology that is almost impossible for him to inspect for (invisible) damage or defects. Besides, damage to, or defects of, a conventional vehicle will often be visible, whereas an automated vehicle is more prone to invisible defects such as software failures. This raises the question of whether it is appropriate from the point of view of prevention to put that heavy a burden on the shoulders of the user. Can he even predict the – possibly grave – consequences of his indication that there is no damage to the vehicle and the software is up-to-date?

4.2.2 Duty of Care

In this example, the duty of the user the vehicle before using it, arises out of the contract with the provider of the service through which the user rents his automated vehicle. Besides the duty arising out of the contract, one could also argue that a duty to inspect the vehicle before using it, stems from a general duty of care not to expose other road users to unnecessary risks and harm.⁸ There are several elements to the question of whether or not the user of the automated vehicle should be confronted with this duty to inspect the automated vehicle. These elements will be discussed below, starting with discussing the understanding the user might have of his duty of care.

4.2.3 Consenting to the Current State of the Vehicle

This duty of care can be manifested in, for instance, the actions the user has to undertake before he can drive off with the automated vehicle: the user might have to indicate on the onboard computer that he has inspected the vehicle in conformity with the provided instructions, that there is no defect or damage to the vehicle and that he accepts the vehicle in the state that it is in. Research has shown that, when it comes to terms and conditions and standard-form contracts, consumers generally do not read these conditions well and often accept the conditions without carefully reading them.⁹ Consequently, consumers will not be aware of what they have just

⁸ Cees van Dam, *European Tort Law* (2nd edn, Oxford University Press, 2013).

⁹ See for instance Yannis Bakos, Florencia Margotta-Qurgler, David R Trossen, 'Does Anyone Read the Fine Print? Consumer Attention to Standard-Form Contracts' (2014) 43 *The Journal of Legal Studies* 1-35.

accepted. One study, for instance, showed that consumers asked to sign up to a (non-existent, but participants were unaware of that) social networking service accepted the terms and conditions and privacy policy without much reading: 74% immediately accepted the privacy policy without reading it and 81% of the participants that did read the privacy policy spent less than one minute reading the policy (given the length of the text, the expected reading time was between 29-32 minutes).¹⁰ Only 1.7% of the participants noticed a clause in the terms of service stating that their first-born child must be given up to the social networking service.¹¹ So, minimal time was spent on reading the terms and privacy policy and, consequently, the understanding of what the terms and conditions and the privacy policy meant for the individual, cannot have been high.

To take the example of Greenwheels again: the renter of the car might have been shown the terms and conditions on the onboard computer, but he will probably not have read them carefully enough to understand what he is signing up to when he indicates that he inspected the vehicle. The same goes for the user of the automated vehicle: he might have had to read instructions about the inspection on the onboard computer, indicate on the onboard computer that he has inspected the vehicle and found no damage or defects before driving off, but he will probably not have read the instructions and probably does not understand the consequences of this action. Warnings might also not be effective.¹² This underlines the question of whether or not the user should be confronted with a duty of care to inspect the automated vehicle, even though he might not read the instructions on the inspection and might not understand the – possibly grave – consequences, thereby creating risks that the user could well be unaware of.

4.2.4 Risks Created

The user of the automated vehicle accepts being exposed to risks when he confirms the current state of the vehicle, namely the risks involved in travelling by motor vehicle on public roads. However, the user of the automated vehicle not only exposes

¹⁰ Jonathan A Obar, Anne Oeldorf-Hirsch, 'The Biggest Lie on the Internet: Ignoring the Privacy Policies and Terms of Service Policies of Social Networking Services' (2018) *Information, Communication & Society*, 1-20. See on boilerplate contracts James Gibson, 'Click To Agree' (2013) *Richmond Law Magazine* 16.

¹¹ Jonathan A Obar, Anne Oeldorf-Hirsch, 'The Biggest Lie on the Internet: Ignoring the Privacy Policies and Terms of Service Policies of Social Networking Services' (2018) *Information, Communication & Society*, 1-20.

¹² Sanne B Pape, *Warnings and product liability: Lessons learned from cognitive psychology and ergonomics* (Dissertation, Erasmus University Rotterdam 2011).

himself to risks, but he also consents to exposing other road users to the risks involved in automated driving. After all, if something goes wrong, other road users could get hit and subsequently injured by the automated vehicle the user is travelling in. The user might not be aware of these risks and has very little – if any – influence on these risks.

4.2.5 Severity of the Consequences

An example of a situation where one party accepts the risks for another party, lies back a bit further in time. Nowadays, new heavy goods vehicles registered within the EU need to be fitted with blind spot mirrors (Directive 2003/97/EC) and older heavy goods vehicles need to be retrofitted with those mirrors (Directive 2007/38/EC, this requirement to retrofit older heavy goods vehicle only applies to certain categories of heavy good vehicles registered as of 1 January 2000: art. 2 Directive 2007/38/EC). Before these requirements were set, the dangers of driving without mirrors covering the blind spots of these heavy good vehicles were already known.¹³ If an accident occurred that could have been prevented by installing a blind spot mirror, the driver of the heavy goods vehicle – or, depending on the circumstances, his employer – could face a claim for damages¹⁴ and possibly criminal prosecution,¹⁵ or the withdrawal of his driver's licence. The driver of a heavy-goods vehicle has a duty of care that does not stem from a contract, but from a more general duty not to expose other road users to unnecessary risks and harm.¹⁶ The user who, even though he should have checked the vehicle, drives off with the automated vehicle exposes other road users to risks, just like the truck driver driving without a blind spot mirror. Just like the driver of the heavy goods vehicle, and depending on national law, the user of the automated vehicle can face a claim for damages and criminal prosecution if the automated vehicle causes an accident that could have been prevented if the user had checked the state of the vehicle. There is, however, a considerable difference between the position of the user of the automated vehicle and the driver of the heavy goods vehicle: unlike the driver of the heavy goods vehicle, the user has barely any influence on the driving behaviour of the vehicle. The driver of a heavy goods vehicle will be aware of the absence of the blind spot mirror, can take this into

¹³ See for instance, already from 1981, A Blokpoel, JAG Mulder, 'Het zichtveld van bestuurders van vrachtwagens: Analyse van de problemen betreffende het zichtveld aan de rechterzijde van (rechtsafslaan)de vrachtwagens - consult aan de Rijksdienst voor het Wegverkeer' (1981) <www.swov.nl/sites/default/files/publicaties/rapport/r-81-20.pdf> accessed 24 October 2018.

¹⁴ See for instance Rechtbank Roermond 19 December 1974, ECLI:NL:RROE:1974:AJ4353.

¹⁵ Rechtbank Amsterdam 28 January 2003, ECLI:NL:RBAMS:2003:AF3616.

¹⁶ Cees van Dam, *European Tort Law* (2nd edn, Oxford University Press, 2013).

consideration while driving by being extra cautious or by asking for help in certain situations, whereas the user of the automated vehicle is entirely at the mercy of the defective automated vehicle, as are the other road users. Besides, the absence of a blind spot mirror is a visible problem, whereas the user of the automated vehicle is confronted with much less visible defects, such as problems with the software of the vehicle.

4.2.6 Preliminary Conclusion

Taking all of this into consideration, fundamental objections can be raised against confronting the user of an automated vehicle with a duty to inspect the vehicle and to confirm that he agrees to the consequences – as he might not understand these consequences and creates risks to other road users by doing so. The risk of travelling with a defective vehicle should not rest with the user, as it is very difficult for the user to inspect the vehicle for invisible defects (such as software problems), it can be difficult for users to understand the consequences of using a defective vehicle, and it puts the burden on one person – who might be a child, someone who is illiterate or someone that is just in a hurry and has no time to read instructions or conditions, even though it is in the public interest that a defective automated vehicle does not drive on public roads. It seems more reasonable to put this burden on the party that knows the vehicle better: the owner.

4.3 The Owner of the Vehicle and His Duty of Care

4.3.1 Duty of Care

In the scenario discussed in this chapter, the owner of the automated vehicle is the operator of the fleet who provides a sort of self-driving taxi service. He owns the automated vehicle, and can decide not to offer a vehicle for rent if it is in an unsafe condition. It can be argued that the owner has a duty of care to prevent his automated vehicle from driving when it has a safety-critical defect, based on a general duty not to expose road-users to unnecessary risks or harm.¹⁷

4.3.2 Ability to Prevent the Automated Vehicle From Driving

The owner of the automated vehicle could decide to not rent out a vehicle which has a safety-critical defect, in that way preventing it from driving down public roads. However, it might prove challenging for an owner to monitor the state of his vehicle whilst it is being used by others. The owner would need some sort of reliable wireless system built into the vehicle that immediately alerts the owner in case of a safety-

¹⁷ Cees van Dam, *European Tort Law* (2nd edn, Oxford University Press, 2013).

critical visible or invisible defect. The owner would then have to stop offering that particular vehicle for his taxi service.

4.3.3 Consequences of a Duty for the Owner

If the owner were be confronted with a duty of care to prevent his automated vehicle from driving if the vehicle has a safety-critical defect, the owner would have to take steps to ensure that he is always informed about the state of his vehicle. The owner would have to depend on the information given to him by the system of the automated vehicle, which could well be fallible. If the vehicle has a safety-defect and, because of that defect, causes an accident, the owner could be confronted with legal consequences. For instance, if the owner needs to have a permit to rent the automated vehicle to others, this permit could be withdrawn. Depending on the circumstances, he might also be confronted with a claim for damages (although this risk could well be covered by insurance). Especially given the technical challenges of keeping the owner up to date regarding the state of the vehicle, it seems more obvious to look at the manufacturer or the user of the automated vehicle, who has more direct influence over the vehicle, to prevent it from being used when the vehicle has a safety-critical defect.

4.4 The Manufacturer of the Vehicle and His Duty of Care

4.4.1 Duty of Care

A duty of care for the manufacturer could be based on the general duty of care not to expose road users to unnecessary risks and harm, or on his quality of being a manufacturer.¹⁸ A manufacturer can have a duty of care to prevent damage or injury arising from a defect of its product. Preventing harm caused by a defect can be achieved through installing a fail-safe, similar to, for instance, the fail-safe of traffic lights: if a defect is detected by the malfunction management unit, it will make all of the traffic lights at that intersection blink yellow lights.¹⁹ The manufacturer could prevent any harm arising from a defective automated vehicle by equipping the automated vehicle with such a fail-safe that brings the vehicle to a safe stop or prevents it from driving off if a safety-critical defect has been detected.

¹⁸ Cees van Dam, *European Tort Law* (2nd edn, Oxford University Press, 2013).

¹⁹ Branden Ghena and others, 'Green Lights Forever: Analyzing the Security of Traffic Infrastructure' (Proceedings of the 8th USENIX Workshop on Offensive Technologies (WOOT) 2014) <<https://jhalderm.com/pub/papers/traffic-woot14.pdf>> accessed 24 October 2018.

4.4.2 Fail-safe

The manufacturer of the automated vehicle knows the vehicle better than anyone else. The manufacturer has equipped the vehicle with all sorts of hardware and software, and will therefore be familiar with the vehicle's weaker points. He will also be able – as far as technologically possible – to equip the automated vehicle with a fail-safe: as soon as the automated vehicle detects a safety-critical defect, it could bring itself to a safe stop (or 'minimal risk condition') or will not drive off in the first place.²⁰ The automated vehicle will come to a safe stop or will not drive off if it detects that, for instance, a sensor is broken or an important software update has not been installed, thereby making it unnecessary to require the user to inspect the automated vehicle. So, the manufacturer has great influence over the vehicle and has the opportunity to hinder it from driving off in case of a (visible or invisible) defect.

4.4.3 Consequences of Equipping the Vehicle with a Fail-safe

Just like a duty to inspect the vehicle puts a burden on the user of the vehicle, the requirement to build a fail-safe into the automated vehicle puts a burden on the manufacturer. The manufacturer has to build this fail-safe into the automated vehicle, thereby preventing unnecessary harm. The automated vehicle will have to undergo tests in order to confirm the fail-safe is functioning the way it should. The costs of those tests and the research and development needed to develop a good functioning fail-safe come at the expense of the manufacturer. This is not a disproportionately heavy burden (like the burden of the user discussed above) as the manufacturer sells its automated vehicles and can thereby pass on (part of) the costs to the buyers of these vehicles. The manufacturer reaps the benefits of the sale of the automated vehicle, so the financial burden of the fail-safe should not be insurmountable. Therefore, it is not too much to ask from a manufacturer to invest in a fail-safe. Besides, the manufacturer himself has an interest in developing an automated vehicle that is as safe as possible: accidents with automated vehicles are hardly good publicity.²¹ And if an accident happens due to the absence of a (well

²⁰ SAE International, *Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles. Standard J3016* (revised June 2018); Waymo LLC, 'Waymo Fully Self-Driving Chrysler Pacifica. Emergency Response Guide and Law Enforcement Interaction Protocol' (updated 10 September 10 2018) <https://iatranshumanisme.com/wp-content/uploads/2019/02/waymo_law_enforcement_interaction_protocol_v2.pdf> accessed 24 October 2018.

²¹ Fred Lambert, 'Elon Musk criticizes media on how they report on Tesla crashes' (*electrek.co*, 14 May 2018) <electrek.co/2018/05/14/tesla-crashes-elon-musk-lashes-out-media-report/> accessed 24 October 2018.

functioning) fail-safe, the manufacturer could face liability claims, depending on the circumstances.²² The approval of the vehicle (type) could also be withdrawn (Directive 2007/46/EC). If that is not enough motivation for the manufacturer to voluntarily equip the automated vehicle with a fail-safe, governments could step in.

4.5 The Role of the Vehicle Authority

4.5.1 Protection of Road Users

Governments can, through their vehicle (approval) authority, influence road safety by only approving vehicles for use on public roads if they are sufficiently safe. Given the recitals of the European Directive 2007/46/EC on type-approval, the vehicle or approval authority is in charge of approving vehicles as safe enough for use on public roads, thereby protecting road users from unnecessary harm. By setting standards which need to be fulfilled by vehicles in order to get approval, governments can ensure a certain level of safety on public roads, which, subsequently, is in the public interest. The introduction of the requirement of blind spot mirrors, discussed above, is an example of governments stepping in to set a new (higher) standard, thereby increasing road safety and protecting road users against unnecessary harm.

4.5.2 Requirement to Equip the Automated Vehicle with a Fail-safe

As shown in the example of blind spot mirrors, it is not self-evident that governments will step in and set higher safety standards for vehicles once a safety-critical problem has been identified. Nevertheless, it might be necessary for governments to step in given that a fail-safe can come in different shapes and sizes. A manufacturer might want to keep the costs of a fail-safe as low as possible or only equip its high-end vehicles with a good quality fail-safe for competition reasons or in order to bring more affordable vehicles to the market. A government could find it necessary to set at least a minimum standard for fail-safes, so that every automated vehicle is equipped with a good fail-safe, ensuring road safety.

Within Europe, a minimum standard for fail-safes could be put in place through the European type-approval system: within the EU, a (type of) vehicle will be approved for use on public roads within the EU by the vehicle authority (approval authority) of a Member State on the basis of numerous vehicle requirements (Directive 2007/46/EC. This includes UNECE Regulations to which the Community has acceded,

²² Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products (Directive 85/374/EEC) [1985] OJ L210/29. See also Maurice HM Schellekens 'Self-driving cars and the chilling effect of liability law' (2015) 31(4) Computer Law and Security Review 506, 506-517.

see art. 34, 35). A fail-safe could become part of those vehicle requirements. As a result, only automated vehicles with such a fail-safe could be approved for use on public roads. Currently, the state of California already requires manufacturers wanting to deploy their vehicles post-testing on Californian public roads to indicate on their application for a permit to “(...) describe how the vehicle is designed to react when it is outside of its operational design domain or encounters the commonly-occurring or restricted conditions disclosed on the application. (...)” (13 California Code of Regulations § 228.06 (a)(3)), the reactions of which could include returning to a minimal risk condition .

4.5.3 Consequences of the Requirement for the Position of the Vehicle

Authority

If it is decided that it is necessary to demand a fail-safe for the automated vehicle before a permit to drive on public roads will be granted, there will no longer be a need to burden the user with a duty of care to inspect the vehicle for visible and invisible defects. Besides, all manufacturers will be obliged to build a fail-safe into their automated vehicles, preventing it from becoming an option for only certain (higher priced) vehicles preventing it from becoming a matter of competition between manufacturers. It can also be seen as a step towards the EU’s commitment to reduce road deaths as defective automated vehicles will not be allowed to drive because of the fail-safe, thereby avoiding making victims.²³ Road safety is of public interest, so it can be seen as a task of the government to ensure or improve road safety by making a fail-safe mandatory for automated vehicles. The government (through the vehicle authority) should decide which fail-safe is sufficiently safe and therefore which risks are acceptable from a road safety perspective (similar to the example of blind spot mirrors discussed above). This way, accidents could be prevented. If a defective automated vehicle with a fail-safe that has been approved by the vehicle authority nevertheless causes an accident, the vehicle authority could face liability claims for approving an ineffective fail-safe. This risk of an accident despite a fail-safe has been accepted by the government by setting a minimum standard for fail-safes. What this minimum standard should be is something that has to be decided upon by the governments in consultation with manufacturers, as manufacturers should be able to indicate what is feasible from a technical perspective. Governments will have to weigh the costs (a delay in the introduction of automated vehicles, costs for development and testing of the fail-safe) and benefits

²³ European Commission, ‘Towards a European road safety area: policy orientations on road safety 2011-2020’ COM (2010) 389 final.

(the prevention of accidents, safer roads) of a certain fail-safe against each other. However, the approval of a vehicle with a fail-safe that meets the standards does not necessarily exempt the manufacturer from liability if this vehicle causes an accident. For the sake of brevity, see the EU Product Liability Directive (Directive 85/374/EEC).

4.6 Conclusion

In this chapter, the question of with whom the duty of care to prevent a defective automated vehicle from staying in use should lie was central. The roles of four actors – the user of the automated vehicle, its owner, the manufacturer of that vehicle, and the vehicle authority that approved the vehicle for use on public roads – has been discussed. Given the means and the positions of the actors, and the public interest in road safety, the vehicle authority should require that automated vehicles need to be equipped with a fail-safe that prevents the vehicle from driving when it has a safety-critical (visible or invisible) defect. Governments, through the EU, have the means to require such a fail-safe, thereby preventing road users from being exposed to the risks involved in letting an automated vehicle with a safety-critical defect operate on public roads. Manufacturers of automated vehicles are all confronted with the same requirement of including a fail-safe in their automated vehicles. Which fail-safe is safe enough should be determined by the government in cooperation with these manufacturers. The manufacturers can indicate what is technically and financially feasible, the government can decide on what is desirable from a road safety perspective. The government will have to balance costs and technical feasibility against the public interest of road safety. Because of this public interest in road safety, governments (through the EU, more particular Directive 2007/46/EC on the approval of vehicles, and at an even more international level through UNECE Working Party 29) are the designated actors to ensure that a defective automated vehicle will not stay in use, by requiring automated vehicles to be equipped with a fail-safe.

Epilogue: A Closer Look at the Liability of the Vehicle Authority

The previous chapter consisted of a conference paper for the ITS European Congress 2019. The format prescribed for by the Congress did not leave room for discussing the liability risk of the authority approving an unsafe (type of) vehicle and the developments on the technical requirements for vehicles. There are, however, several noteworthy developments that influence the technical requirements for vehicles as well as developments that influence the liability risks of the vehicle authority.

There have been developments in formulating technical requirements for automated vehicles. On the level of the United Nations, Working Party 29 is responsible for updating UN Regulations annexed to the 1958 Agreement concerning the Adoption of Harmonized Technical United Nations Regulations¹ These UN Regulations form an intricate framework for safeguarding, among other things, road safety through technical requirements. The European Union has acceded to UN Regulations on, for instance, seat belt anchorages, braking and indirect vision devices.² Consequently, the requirements from these UN Regulations need to be fulfilled in order to obtain the EU (type-)approval. Since June 2018, Working Party 29 has a dedicated subsidiary Working Party: the Working Party on Automated/Autonomous and Connected Vehicles or GRVA.³ Advanced Driver Assistance Systems (ADAS) and the safety and security of vehicle automation and connectivity are two of the priorities of this GRVA.⁴ One of the topics that is discussed by the GRVA is the future certification of automated driving systems.⁵

New technical developments have also driven the EU to review the General Safety Regulation.⁶ The European Parliament, Council and Commission have reached a provisional political agreement on the revised General Safety Regulation.⁷

¹ <www.unece.org/trans/main/wp29/introduction.html> accessed 10 September 2019.

² Art. 34, Part I Annex IV, Annex XI Directive 2007/46/EC.

³ <www.unece.org/trans/main/wp29/meeting_docs_grva.html> accessed 10 September 2019.

⁴ <www.unece.org/trans/main/wp29/meeting_docs_grva.html> accessed 10 September 2019.

⁵ See for instance United Nations Economic and Social Council, 'Proposal for the Future Certification of Automated/Autonomous Driving Systems' (19 November 2018) UN Doc ECE/TRANS/WP.29/GRVA/2019/13.

⁶ Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor [2009] OJ L 200/1.

⁷ European Commission Press Release, 'Road safety: Commission welcomes agreement on new EU rules to help save lives' (26 March 2019) <https://europa.eu/rapid/press-release_IP-19-

Consequently, from 2022,⁸ vehicles will have to be equipped with, among other things, driver drowsiness and attention monitoring systems and intelligent speed assistance.⁹ Automated vehicles will have to be equipped with driver readiness monitoring systems, event (accident) data recorders and more.¹⁰ These and more new requirements will form part of the EU (type-)approval.

Recent events have shown that approval authorities can be exposed to liability risks. An approval authority could make a mistake and approve a vehicle that does not meet the standards. Depending on national law, the authority might be liable for subsequent damage. The Dutch approval authority (RDW) has already been criticised for the type-approval of Tesla's Model S with the so-called Autopilot-function for the European market. In an accident in Norway back in 2016, a Tesla with an engaged Autopilot-function rear-ended and severely injured a motorcyclist. This accident raised serious doubt about whether testing of the Autopilot-function sufficiently took into account motorcyclists.¹¹ The Federation of European Motorcyclists' Associations (FEMA), the Koninklijke Nederlandse Motorrijders Vereniging (KNMV) and the Motorrijders Actie Groep Nederland wrote a public letter to the RDW, expressing their concerns regarding the safety of the Autopilot-function and suggesting to the RDW to withdraw the type-approval.¹² The German Bundesanstalt für Straßenwesen,

1793_en.htm> accessed 10 September 2019. See also 'Procedure 2018/0145/COD' <https://eur-lex.europa.eu/procedure/EN/2018_145> accessed 10 September 2019.

⁸ European Commission, 'Safety in the automotive sector'

<https://ec.europa.eu/growth/sectors/automotive/safety_en> accessed 10 September 2019.

⁹ European parliament and the Council, 'Proposal for a Regulation of the European Parliament and of the Council on type-approval requirements for motor vehicles and their trailers, and systems, components and separate technical units intended for such vehicles, as regards their general safety and the protection of vehicle occupants and vulnerable road users, amending Regulation (EU) 2018/... and repealing Regulations (EC) No 78/2009, (EC) No 79/2009 and (EC) No 661/2009' COM (2018) 286 final, art. 6.

¹⁰ European parliament and the Council, 'Proposal for a Regulation of the European Parliament and of the Council on type-approval requirements for motor vehicles and their trailers, and systems, components and separate technical units intended for such vehicles, as regards their general safety and the protection of vehicle occupants and vulnerable road users, amending Regulation (EU) 2018/... and repealing Regulations (EC) No 78/2009, (EC) No 79/2009 and (EC) No 661/2009' COM (2018) 286 final, art. 11.

¹¹ Spiros Tsantilas, 'Motorcycle rear-ending raises questions on Tesla vehicle type approval in Europe' (*New Atlas*, 21 October 2016) <<https://newatlas.com/tesla-autopilot-fema/46045/>> accessed 17 September 2019.

¹² 'Letter from the Federation of European Motorcyclists' Associations (FEMA), Koninklijke Nederlandse Motorrijders Vereniging (KNMV) and Motorrijders Actie Groep (MAG) to the Dutch Vehicle Authority (RDW)' (14 October 2016) <www.fema-online.eu/website/wp-content/uploads/RDW_141016_EN.pdf> accessed 11 April 2017. See art. 30 of Directive 2007/46/EC on the withdrawal of approval.

after extensive testing of the Tesla Model S, even concluded that the vehicle with the Autopilot-function engaged posed considerable danger to traffic (“erheblichen Verkehrsgefährdung”).¹³ The name itself, *Autopilot*, has also come under scrutiny. The German Kraftfahrt-Bundesamt warned owners of vehicles equipped with this Autopilot-function that the function only *assists* the driver and that the driver should therefore always keep his eyes on the road.¹⁴ Consumer organisations in the United States have also expressed their concerns over the name of the assistance system and how the name *Autopilot* could mislead consumers.¹⁵ This is not without reason as the US National Transportation Safety Board found that overreliance on the Autopilot-function contributed to a fatal 2016 Tesla Model S accident in Florida.¹⁶

These recent development illustrate the increased attention for technical requirements specifically for automated vehicles as well as the liability risks the vehicle authority can be exposed to. The liability risks of another important stakeholder, i.e. the producer, are discussed in the next chapter.

¹³ Gerald Traufetter, ‘Tesla-Autopilot. Unfälle? Lebensgefahr? Dem Minister offenbar egal’ *Der Spiegel* (Ausgabe 41/2016. Hamburg, 7 October 2016) <www.spiegel.de/spiegel/tesla-autopilot-alexander-dobrindt-ignoriert-kritisches-gutachten-a-1115692.html> accessed 17 September 2019. See also Nadine Kieboom, ‘RDW wil reactie zelfrijdende auto’s op motorfietsen testen’ (*Zelfrijdend Vervoer*, 17 December 2016) <www.zelfrijdendvervoer.nl/autopilot/2016/12/07/rdw-wil-reactie-zelfrijdende-autos-op-motorfietsen-testen/?utm_source=newsletter&utm_medium=email&utm_campaign=Nieuwsbrief%20week%202016-49> accessed 17 September 2019.

¹⁴ ‘Autopilot. Kraftfahrt-Bundesamt warnt Tesla-Besitzer’ (*Der Spiegel Online*, 14 October 2016) <www.spiegel.de/auto/aktuell/tesla-autopilot-kraftfahrtbundesamt-warnt-tesla-besitzer-a-1116710.html> accessed 17 September 2019.

¹⁵ ‘Letter from the Center For Auto Safety and Consumer Watchdog to the Federal Trade Commission’ (23 May 2018) <www.autosafety.org/wp-content/uploads/2018/05/CAS-and-CW-Letter-to-FTC-on-Tesla-Deceptive-Advertising.pdf> accessed 17 September 2019.

¹⁶ National Transportation Safety Board, ‘Collision Between a Car Operating With Automated Vehicle Control Systems and a Tractor-Semitrailer Truck Near Williston, Florida May 7, 2016. Accident report NTSB/HAR-17/02 PB2017-102600’ (National Transportation Safety Board, 12 September 2017).