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Legal aspects on automated driving

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Automated Driving Applications and Technologies for Intelligent Vehicles

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Table of contents //

List of figures //

List of tables //

1 Introduction

The subproject Response 4 addresses the legal challenges of vehicle automation. The objective is to identify legal barriers which could hinder or substantially delay the introduction of automated vehicles.

1.1 Motivation

Current technology is evolving so quickly that the law is having difficulty keeping up. This often-used phrase seems to be no more than a platitude, yet an ambiguous legal situation could affect the introduction of automated vehicles directly. In recent years, Advanced Driver Assistance Systems (ADAS) have entered the market on a large scale. Automated driving functions have become more sophisticated and complex. Not only OEMs, but politics, too, have recognised the potential of these systems: they could make traffic safer and more efficient and eco-friendly. It is of the utmost importance to accompany this development and to seek timely solutions for any kind of legal barrier which could be an obstacle to development. This task is even more delicate in view of the fact that cars are driven across borders, thereby entering different legal regimes. Some international treaties, like the Vienna Convention on Road Traffic, are designed to facilitate international road traffic.

For this reason, Response 4 working group's objective is to evaluate legal hurdles. With a view to the increasingly complex Driver Assistance Systems, Response 4 has assessed in particular the legal issues which could affect the introduction of Level 3 and 4 (SAE) systems.

In addition to international and European requirements, country-specific norms have also been examined. In this publication, the legal frameworks of France, Germany, Italy, Sweden, the UK and the USA will be considered. The European countries were chosen as representatives of the entire European Economic Area. The USA represents a major market and serves as a standard of comparison. This selection and the co-operation between experts from different disciplines made an interdisciplinary examination possible which includes different perspectives.

The technical development of vehicle automation is in a constant flux and not all laws have been adapted to the new technology. Our goal was to create an overview of the current legal situation in selected countries and to analyse their compatibility with the latest driver assistance systems. If we want to understand the possible future legal obstacles to automated driving, we first have to clarify whether the current laws can be applied or need modification. We created an up-to-date compilation of the relevant laws, which can serve as a basis for further research. Even though we focused on the current legal situation, some of our remarks remain speculative. This is, where follow-up projects can take up and benefit from the work of AdaptIVe.

1.2 Approach

Response 4 is composed of engineers, legal experts and representatives of the automotive industry. In order to harmonise the use of specific terms, the actual investigations are preceded by a chapter concerning system classifications (Sec. 3). A further feature of the system classification is the identification of technical parameters that are relevant for legal assessment. In order to put complex theoretical considerations into a real context, several scenarios have been developed (Sec. 4 and Sec. 5.6.2). The aim was to cover a greater number of possible malfunctions and other problematic areas. Road traffic law and regulatory law (Sec. 5) are not designed for self-driving vehicles. The same applies to the rules of approval (Sec. 6). An important question is whether and to what extent these rules need to be changed or amended. A major part of this report focuses on questions concerning civil liability in various countries (Sec. 7 and 11). To find possible points of friction, the different legal systems have been analysed and compared. Finally, automated vehicles will gather an immense amount of data. As a result, the question of data privacy and data security needs to be addressed as well (Sec. 8).

2 Automated driving is challenging the law

In the near future, the driver of a car will be able to lean back and enjoy the ride while a system is driving for him. Various Driver Assistance Systems already exist, while others are still in the testing stage. The final decision as to which technology will be brought onto the market is significantly influenced by economic factors. In most cases, an analysis of profitability is carried out long before development has even started. But no technology, regardless of its economic viability, will be launched if it is not in line with the applicable law. This important factor is the subject of this report. It is the essential condition for introducing new technologies to the market. Legal uncertainty can spell the end for every critical endeavour.

At various major events dealing with automated driving, legal topics have appeared on the agenda. Automated computer systems take over more driving functions, leaving the human driver with less to do, and raise legal questions that need answering in the process. A starting point to these problems is the Vienna Convention on Road Traffic, an international treaty designed to facilitate international road traffic and increase road safety. It came into force in 1968 and was last modified in 2016 in order to enable Advanced Driver Assistance Systems of higher levels.

Automated driving functions are embedded in a highly complex and widely debated area of law. Road traffic is a cross-border issue requiring standard rules which are applicable in as many countries as possible. In some countries, international treaties (such as the Vienna Convention) must be incorporated into domestic law. In addition, there are European Union rules, some of which do not require an act of transformation. Since international treaties consist of various contracting parties, modification proposals are subject to extensive discussions. Article 8 and Article 13 of the Vienna Convention – the basic objective of which is the harmonisation of traffic law and safety of traffic in general – define essential requirements of the driver. Before last changed in 2016 (the new version came into force on 23 April), Article 8 paragraph 5 read: “Every driver shall at all times be able to control his vehicle” and Article 13 paragraph 1 stated that “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”. This initial position made the introduction of automated vehicles legally impossible, since the human driver – and not a system – had to be in charge at all times. In an effort to legalise new technologies, Article 8 has been changed slightly – with great impact. A newly integrated Article 8 paragraph 5bis now states that a system shall be deemed to be in conformity with Article 8 paragraph 5 and Article 13 paragraph 1 when it is either in conformity with the ECE Rules or can be overridden or switched off by the driver. Further amendments are already being discussed: a proposal not yet adopted by Sweden and Belgium suggests changing

the definition of “driver”. According to this proposal, a driver shall be “any person who drives or a vehicle system which has the full control over the vehicle from departure until arrival…”.[1]

As dictated by the latest version of the Vienna Convention, the legal situation of automated vehicles is now dependant on the ECE (Economic Commission for Europe) Rules. These approval-related rules represent another problematic area. As with the Vienna Convention, changes need to be made in order to legalise automated driving. An example: Under ECE-R79, automated steering systems are permitted only in the lowest speed range (up to 12 km/h) or in manoeuvring situations such as parking. Recently proposed changes suggest a speed limit of 130 km/h and would certainly be a move in the right direction. Nevertheless, these changes would not completely legalise automated vehicles.

The questions above deal with the basic issue as to whether and to what extent automated vehicles can be introduced onto the market. But naturally, secondary and follow-up problems must not be neglected. Every party involved, from the manufacturer to the driver, might be exposed to civil liability. Cases of property damage, bodily injuries or even fatalities might raise the question of responsibility under criminal law. And the changing character of road traffic will lead to modifications in regulatory law. In dealing with liability issues, it will be crucial to prove the occurrence of specific processes within the car. Otherwise, especially when driving a partly automated car (L3 or higher), the driver might be able to pass responsibility for personal failure on to the manufacturer. This could very well lead to a fundamental shift in insurance law.

The collection and storage of a presumably huge amount of data might be a solution, but will also require legal consideration. In addition to the question as to whether data may be collected, the secure handling of this data must be dealt with. The automobile of the future is often referred to as a “data predator“. It is therefore important to determine what data will actually be collected by an automated vehicle for which purpose. Some data will be necessary to operate the system. Other kinds of data will serve completely different objectives, which might include increasing the comfort of vehicle users or pursuing economic goals such as advertising. Every shred of data collected poses the question as to whether the processing or use of this data is legally permissible. Data security must also not be neglected. Whilst data protection and privacy law regulate “whether” data may be collected and used, the goal of data security is to maintain the integrity of the data itself (i.e. prevent it from being tampered with or accessed by unauthorised persons). This therefore includes questions of technical security of data, its transmission routes and shielding against unauthorised access.

[1] *Economic Commission for Europe*, Autonomous Driving – Submitted by the Governments of Belgium and Sweden, Document No. ITS/AD-04-04/Informal document No. 2. See: http://www.unece.org/fileadmin/DAM/trans/doc/2015/wp1/ECE-TRANS-WP1-INT-2 e.pdf

Answering these legal questions will be key to the introduction of automated cars. To find not only national, but internationally supported solutions, legal systems of different origins must be compared. AdaptIVe has assumed the task of undertaking the initial assessment, providing initial proposals for solutions, and developing initial recommendations for the legally compliant, low-risk development of automated vehicle systems as well as the subsequent use of those automated vehicle systems.

3 System Classification

This section is based on the descriptions and classifications of AdaptIVe-Deliverable 2.1 "System classification and glossary". In Deliverable 2.1, starting from the keywords "car", "driver" and "driving environment", additional parameters were included and investigated, which describe the task of driving and the driving environment more extensively and in greater detail. In conducting this analysis, relevant legal parameters were identified and examined. For the legal assessment of automated vehicles, the degree of automation, the shift of tasks from driver to computer, HMI and the driving properties of the vehicle are of particular importance. With regard to "road types", it should be noted that road traffic regulations apply only to public roads, but not to private roads or property.

From a legal point of view, the control of the vehicle is of special interest. A general system of classification includes three categories or levels. The first class comprises systems in which the driver is in control of the vehicle. The systems which exist at a non-automated level are those which warn the driver and provide him with information. He must then decide for himself whether to follow the computer's recommendations. Systems of continuous automation are grouped in class 2. This class includes the various different Levels 1-5 of automation. The third category is for special systems which work in emergency situations.

3.1 Information and warning systems

These systems serve purely to gather information and to pass this information to the driver. They provide the driver with certain kinds of information and warn him in case of danger. When using these functions, the driver is always in command and fully controls the movement of the vehicle. He does not transfer any driving tasks to the computer system. In the system of classification for autonomous driving systems provided by the Society of Automotive Engineers (SAE) (standard J3016, see below), information and warning systems are classified at Level "0", meaning "no automation".

3.2 Systems of continuous automation

The classification system is highly task- and driver-oriented. In a system of legal classification, the actual range of technical functions recedes into the background. To start with, the current technical classifications of SAE/VDA/BAST provide the basis for the system of classification of autonomous systems.

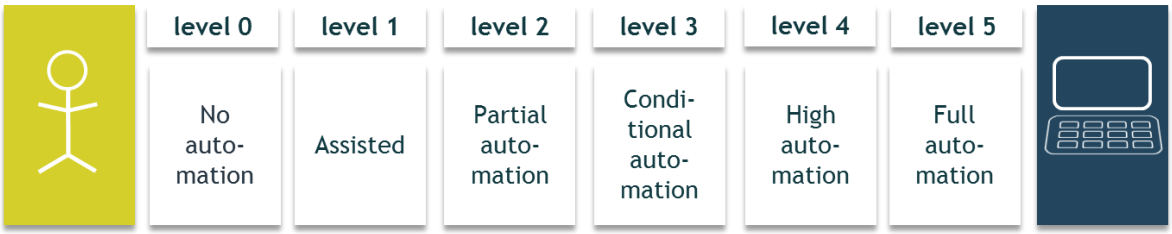

Figure 3.1: SAE document J3016, “Taxonomy and Definitions for Terms Related to On-Road Automated Motor Vehicles”

These classifications correspond to the range of technical functions provided by the individual system. Starting with Level 0, the so-called "driver only" level, there is a gradual increase in the transfer of driving tasks from the human passenger to the computer, to the point where the computer system has complete control of the vehicle. Systems up to Level 2 SAE are already included in the basic versions of many models and do not pose additional challenges for the law. At Level 2 and below, the driver is ultimately responsible for the vehicle. Thus, from a legal perspective, Levels 3 and 4 are of particular interest. With increasing automation, tasks are steadily being moved from the driver to the system. Naturally, the manufacturer can exclude certain kinds of behaviour (e.g. reading while driving) from the intended use of his model. There could be a fundamental shift in responsibility taking place in parallel with automation. It remains to be decided whether this shift will be directly dependent on the SAE level or whether other factors, such as the intended use defined by the vehicle manufacturer, need to be taken into account.

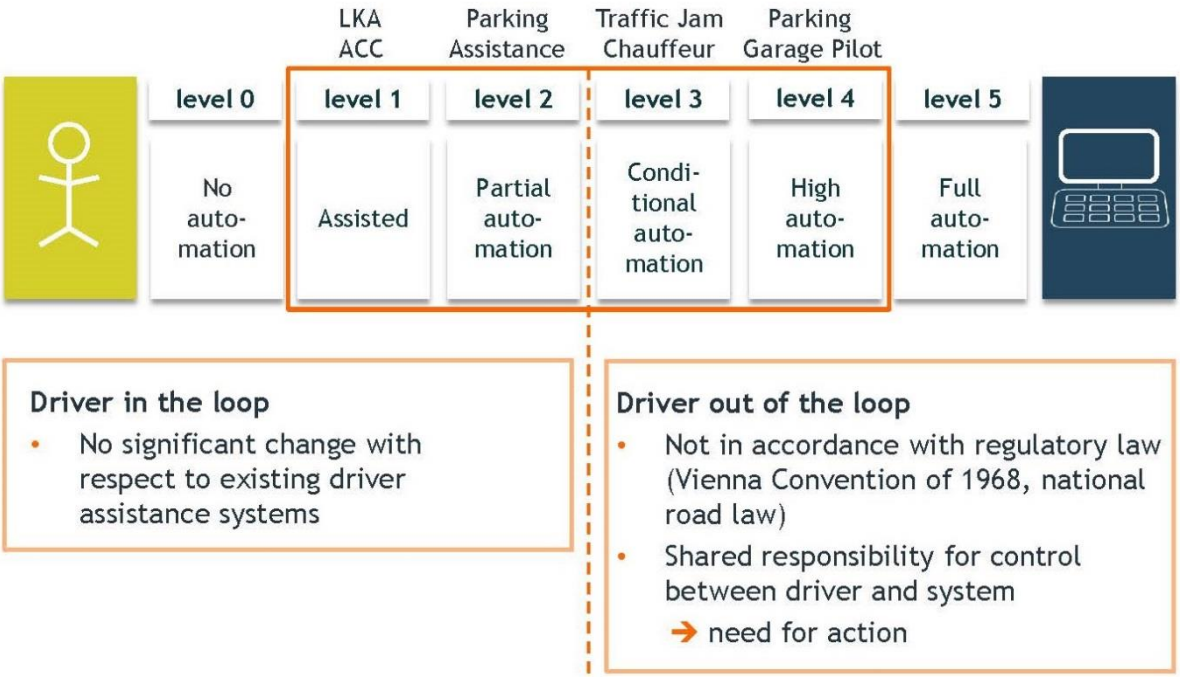

Figure 3.2: SAE document J3016, "Taxonomy and Definitions for Terms Related to On-Road Automated Motor Vehicles"

Level 3 and 4 systems have one thing in common: the driver is relieved of technical control of the vehicle in specific driving situations and the vehicle is then autonomously driven by its computer system. However, the driver takes the position of a "fall-back". Whether and to what extent the driver is or could be absolved of legal responsibility for the operation of the vehicle will be set out in subsequent sections. These two levels of automation are the area upon which Response 4 has focused its research.

3.3 Emergency systems

In addition to systems of continuous automation and information/warning systems, so-called emergency intervention systems must be taken into account. Some of these systems can be classified at Level 5, since they fully control the driving of the vehicle, meaning that the vehicle operates on a driverless basis. This is not the case with an emergency braking system, for example, which just stops the car but does not take over the complete driving task. Accordingly, emergency systems intervene in such a way that in an emergency situation the driver no longer has control over the vehicle and no longer participates actively.

3.4 First Conclusions

The classification puts the technical concepts into a legal context. Complete congruence between technical and legal concepts can hardly be achieved. The technical classifications

demand legal discussions, and determine which systems actually need to be evaluated. A system of legal classification must follow the criteria contained both in applicable legislation and relevant court jurisprudence. Most technical parameters may be taken into consideration, but do not exert a strong influence on the law. The legal standard to be applied is whether approval is possible, together with the question of who is responsible for damages arising from accidents. These issues will be discussed below.

When identifying and analysing the legal issues which arise from vehicle automation, some parameters are particularly important, such as the level of automation, the presence or absence of the driver in the vehicle, cooperation between the driver and the computer system, the transfer of tasks between the driver and the computer system, and the speed of the vehicle.[2] These parameters should be taken into account when developing and evaluating potential scenarios (see Section 4 below).

[2] An ECE (UNECE 79) automated steering system is currently permitted to operate only at a speed of 12 KMH (10 KMH + 20% deviation).

4 Scenarios

4.1 Motivation

In the absence of any court decisions concerning automated vehicles of Level 3 or higher, a set of possible scenarios can help in discussing complex legal issues.

In addition, laws are deliberately worded openly. This widens their scope of application, allowing them to regulate numerous possibly unforeseen situations. The scenarios below are meant to make some of the very abstract legal discussions more “tangible”. They reflect some of the most important legal challenges raised by the introduction of automated vehicles of different automation levels. The scenarios are based on ADAS that are either on the market or will be introduced in the near future. As it has included the latest technical achievements, Response 4’s analyses are very much at the cutting edge. It is worth emphasising that our analysis of concrete legal problems is not only an academic exercise, but a problem analysis which affects public authorities, manufacturers, and users of automated systems.

4.2 Approach

Based on the legal issues identified in the course of this project, a set of scenarios was devised. They have been developed and refined, taking into consideration the relevant parameters of Deliverable 2.1. They focus largely on the areas of road traffic law, technical approval law, tort and product liability law. Different areas of law can also affect one another. These intersections offer numerous starting points for legal analyses.

The scenarios shall reflect a variety of difficult situations, which are potentially critical from a legal point of view. They are put in front of the actual analysis to give a first impression of the problems we dealt with. A country-specific discussion can be found in Section 11.

Table 4.1: Relevant parameters for legal evaluation

	Criteria	Vienna Convention	National Regulatory Law	Homologation -> UNECE	Liability			Data privacy and data security
					Product liability/tort law		Criminal liability	Some special scenarios might be necessary (e.g. for data transmission to OEM, hacking etc.)
					User	OEM		
Classification of Deliverable 2.1 Part A	**Vehicle type**	From legal point of view: no obvious problems						
	Duration	From legal point of view: no obvious problems						
	Automation	x	x	x	x	x	(x)	(x)
	Velocity		x		x	x	(x)	
	Control force	From legal point of view: no obvious problems						
	Time headway			(x)				
	Trigger system/driver	x	x	x	x	x	x	
	Coordination			x	x	x	x	x
	Ability to override (time)	x (particularly Level 3)	x		x	x	x	
	Driver location	x		x (ECE 79)	x	x	x	
	Road type (public/private)	x (adaptability of regulatory law)	x	x (adaptability of regulatory law)				
	Applications Level 3 (for clarification)	x	x	x	x	x	x	x
	Applications Level 4 (for clarification)	x	x	x		x		x

Internal discussions within WP24 drew the conclusion that the following parameters also need to be considered:

- The driver's location (in the case the driver is outside of the vehicle), as this might be interpreted as his no longer being totally in control of his vehicle;
- The automation level: the degree of involvement of the driver in the driving and monitoring task may not be compliant with regulations;
- The speed of the vehicle: the potential non-compliance may be dependent upon the speed of the vehicle (compliant for low speeds such as parking speeds, and non-compliant for higher speeds).

When talking about product liability, the level of automation raises additional questions. This becomes obvious in the Level 3 system definition:

While Level 2 systems require the driver to be attentive and to monitor the driving environment, Level 3 systems allow the driver to turn his attention away from the complete dynamic driving task (in certain domains in which the system is designed to operate, e.g. during a traffic jam on a motorway). The driver's task is to determine when activation of the automated driving system is appropriate and to take over upon request within a limited period of time.

This naturally raises the following questions with respect to product liability:

- What if an incident occurs while the driver was permitted to focus attention on tasks other than driving? Does it depend on the origin of the malfunction?
- What if the driver activated the system when it was not appropriate?
- What if the driver does not take over upon request by the system within the limited period of time?
- What if the system requires the driver to take over within a period of time inferior to this predetermined period of time?
- What if there is a critical situation to be handled, and the system reacts as well as the driver could have?
- What if there is a critical situation to be handled that would cause an accident if the driver were in charge, but the system does not react as well as the driver would have, and as a result, the severity of the accident is greater?
- What if another user is performing a manoeuvre that indirectly induces an accident?
- What if the vehicle "breaks the law" when the driver is not legally required to monitor it?

Table 4.2: Overview of legal aspects and the corresponding scenarios

Concerned Area of Law		Legal Problem
Vienna Convention & National Regulatory Law		**Vienna Convention** Ability to control the vehicle (Art. 8 para. 5bis), to perform all manoeuvres required of him (Art. 13 para. 1 S. 1) **National Regulatory Law :** (German) Regulatory Law addresses human drivers
Homologation ➔ UNECE		Possible conflict with ECE-R79, prohibition of autonomous steering systems. ECE-R79: Autonomous Steering System " means a system that incorporates a function within a complex electronic control system that causes the vehicle to follow a defined path or to alter its path in response to signals initiated and transmitted from off-board the vehicle. The driver will not necessarily be in primary control of the vehicle. Whenever the Automatically Commanded Steering function becomes operational, … the control action shall be automatically disabled if the vehicle speed exceeds the set limit of 10 km/h …
Liability	**Product liability/tort law, OEM**	Vehicle/ADAS is defective. Different "legal" types of product defects possible. For example in Germany: design defects, manufacturing defects, defects in instructing the user.
	Product liability/tort law, USER	Vehicle causes damage. For example in Germany: driver is only liable when he (at least) acts with negligence. The "Halter" (in most cases the owner) is liable under the preconditions set out in StVG (Straßenverkehrsgesetz).
	Criminal liability	Criminal liability in road transport is in most instances restricted to bodily injury, property damage or even death caused by negligence. Issues concerning criminal liability will be handled abstractly.
Data privacy and data security		Processing of personal data is restricted by 95/46/EG. Will be handled abstractly without scenarios like these.

4.3 Relevant Scenarios

In all of the following scenarios it will be assumed that the:

- automated systems have been developed and produced pursuant to the "state of the art" and that any potential remaining risks of the systems are outweighed by their benefits
- driver has followed all operator's manual and in-vehicle instructions and warnings (unless otherwise stated)
- automated vehicle meets all type-approval requirements.

4.3.1 Scenario 1 “technical malfunction”

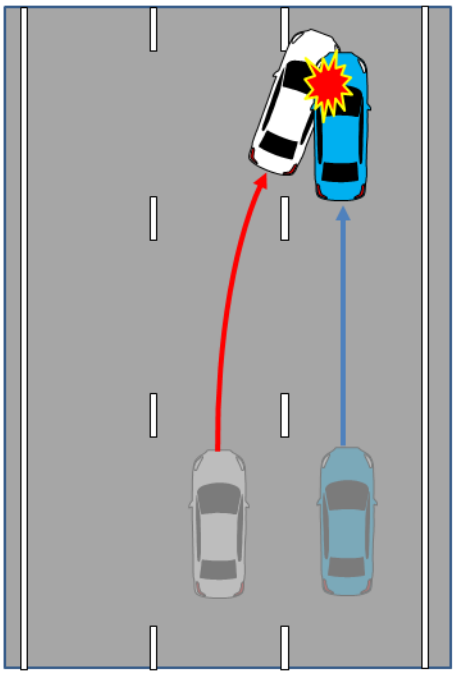

Figure 4.1: Scenario 1 "technical malfunction"

The white vehicle is equipped with a Level 3 system that has been activated by the driver. The vehicle is following its lane. Suddenly the vehicle turns right and crashes into the vehicle driving in the next lane. The driver used the system as per its intended use and pursuant to the owner’s manual instructions. It remains unclear what kind of influence induced the system to change lane without cause and warning.

4.3.2 Scenario 2 “functional/technical limits”

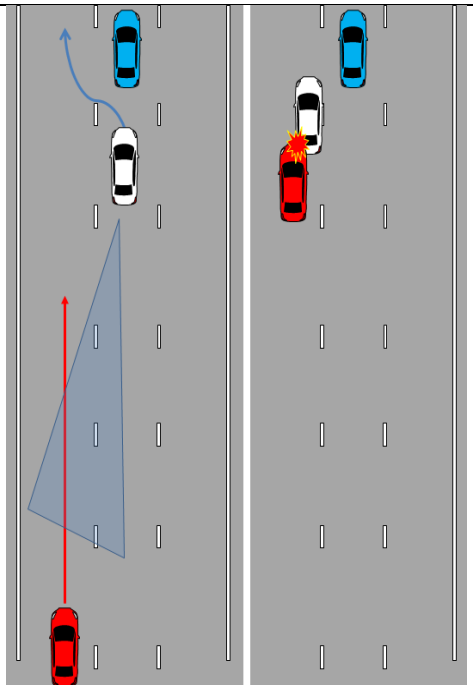

Figure 4.2: Scenario 2 "functional/technical limits”

The white vehicle is equipped with a Level 4 system that has been activated by the driver. According to the owner’s manual, the driver is allowed not to monitor the system, the movement of the vehicle and the traffic conditions on roads like the one he is driving on. At some point, the vehicle decides to overtake a slower vehicle and changes lane to the left, while a third vehicle approaches from behind on this left lane, but at a distance which cannot be detected by the white vehicle’s system in the moment of lane-changing. The speed difference of this third vehicle is so high that it is not able to brake in a way which would avoid a collision and so it crashes into the white vehicle. Technical limits of the sensors of the white vehicle do not allow for the detection of overtaking vehicles from the rear when their distance exceeds a certain value at the moment of lane-changing.

Assumption A: the system reacts as well as an average driver could have.

Assumption B: the system does not react as well as an average driver could have.

4.3.3 Scenario 3 “take over request”

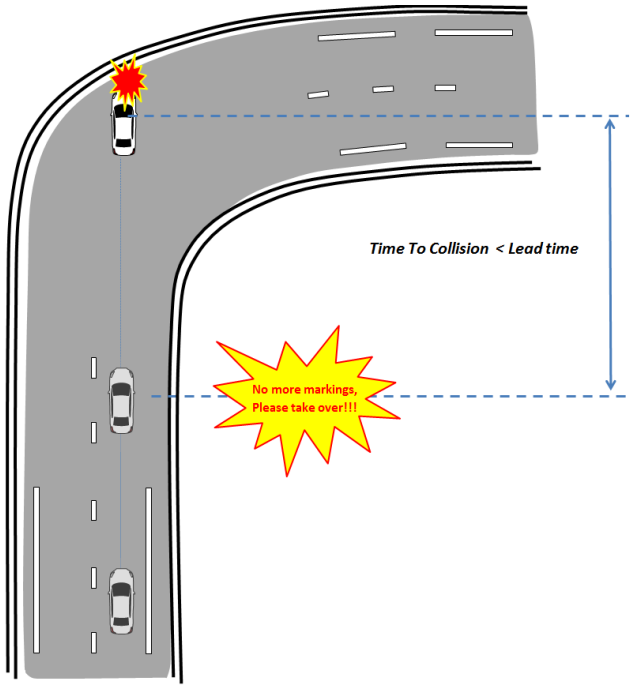

Figure 4.3: Scenario 3 "take over request"

The white vehicle is equipped with a Level 3 system that has been activated by the driver. According to the owner’s manual, the driver is allowed not to constantly monitor the system while driving on roads like the one used in this scenario; the manual only requires him to follow an order of the system to take over and to generally stay attentive the whole time as to unusual events related to the car or the environment. The system detects that lane markings are missing and requests the driver to take over.

Case 1 “request too late, driver reacts immediately, but accident unavoidable”

Case 2 “request in time, driver’s reaction too late to avoid accident”

4.3.4 Scenario 4 “misuse”

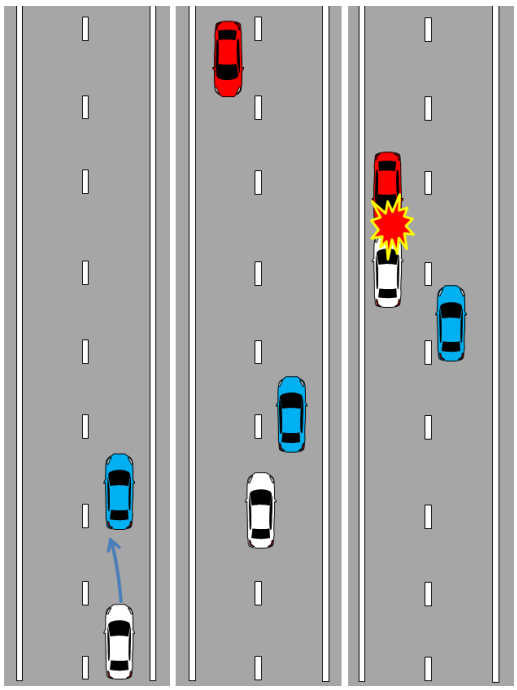

Figure 4.4: Scenario 4 "misuse"

The white vehicle is driving on a two-way road. It is equipped with a Level 3 system, designed to work only on one-way roads. The driver activates the system even though he knows it is inappropriate on a two-way road.

a. The vehicle is not fitted with a device to avoid activation in inappropriate situations.
b. The vehicle is fitted with a device to avoid activation in inappropriate situations, but the device has a functional deficiency.
c. The vehicle is fitted with a device to avoid activation in inappropriate situations, but the device has a functional deficiency. The vehicle only allows activation after request.

As there is a slower vehicle ahead on the road, the system decides to overtake the vehicle. Unfortunately, there is another vehicle approaching on the opposite lane. The driver notices it, but it is too late to avoid the collision.

4.3.5 Scenario 5 "traffic violation"

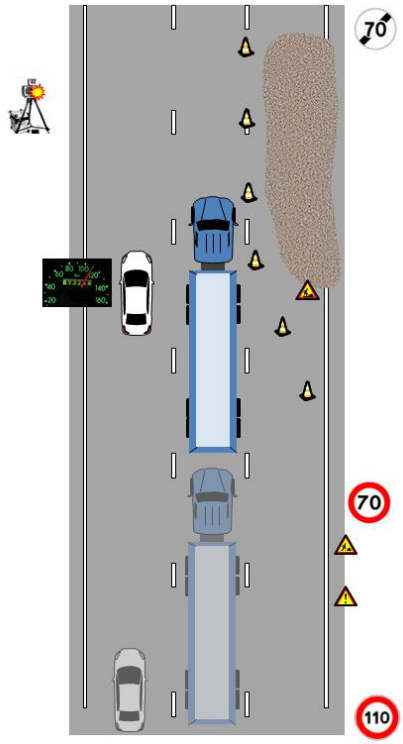

Figure 4.5: Scenario 5 "traffic violation"

The white vehicle is equipped with a Level 4 system that has been activated by the driver. According to the owner's manual, the driver is not required to perform or monitor the driving task at all. The speed limit is 110 kph, but there is a highway works zone with a traffic sign indicating a temporary speed limit of 80 kph, but the sign is hidden by a truck, thus the system with a front camera does not identify the speed limit which it would have identified had the truck not hidden it. Hence, the white vehicle goes on driving at 110 kph. A mobile speed limit radar flashes the vehicle. The driver receives a fine.

5 Road traffic law/regulatory law

5.1 Motivation

Certainly, possible contradictions in various EU Member States' road traffic laws represent barriers that could get in the way of the market introduction of ADAS in the future. However, EU Member States' road traffic laws are interesting. A comparison can be useful to get to know the best way to introduce automated driving.

For the OEMs it is important to know if there are special requirements in different markets. This can lead to a reduction of costs and to a faster introduction of their systems. To get a broad overview of the current situation, the road traffic laws of various EU Member States are described and summarised in this chapter.

Today's legal framework was developed based on the concept that safe driving is a task of the driver only. Consequently, it is likewise a basic legal assumption as well as a requirement that the driver must be able to control his vehicle at all times. With a move to automated driving, the driver might temporarily, under certain conditions, no longer be needed permanently in this role. Contradictions of such a development with the current legal situation need to be identified.

5.2 Approach

The following assessment requires legal research according to national legislation as well as interpretation of international law (for the United Kingdom, Italy, Germany, Sweden and France). The questions are all related to the legal consequences of technically rising degrees of continuous automation.

The main goal of this project is to collect and summarise the important aspects from the legislation of different EU Member States concerning this technology. The secondary objective, from a legal perspective, is to foster mutual understanding and identify the possibly necessary harmonisation within the EU Member States. This objective shall be achieved by a comprehensive review of the current legal framework regarding automated systems. The review shall cover regulatory law (e.g. national road traffic law), the Vienna Convention on Road Traffic, and road traffic liability (of the driver/vehicle owner).

5.3 Legal challenges

In various EU Member States' road traffic laws, some contradictions exist which have not all necessarily been harmonised for the cross-border traffic of automated vehicles. National regulatory law exists with a comparable legal effect in the EU Member States which was taken

into account. All these regulations address the basic idea of permanent controllability by a driver.

In relation to the issue of automated vehicles, every country has its own interpretation of the Vienna Convention (assuming the country is a signatory state in the first place). Often, a law has been adopted in order to ensure that national regulatory law remains in line with the Vienna Convention on Road Traffic. The interpretation at national level in respect to Level 3 Automation appears predominantly homogeneous. In France, legal conflicts of international Road Traffic Conventions do exist related to Levels 3 to 5 in Standard J3016 and other current laws. The conflicts are currently under intensive study and discussion in WP1 (the working party responsible for issues regarding the Vienna Convention on Road Traffic in Geneva). In this regard, official positions are expressed in the minutes of recent meetings, especially in the IWG AD subgroups. In the other countries there is a need for controllability by the driver to realise automated driving with systems of Level 3. Different views exist in respect to Level 4 automation. They result from the wording of the Vienna Convention, which leaves plenty of room for interpretation.

The liability of the driver is an important legal aspect. According to some national laws, strict liability of the vehicle owner (or another legal entity) is already in place in some countries. This might then apply irrespective of automation level. This can facilitate vehicle automation immensely if bases for legal claims exist that cover the operational hazard of a vehicle as such without focussing on the driver.

5.4 International regulatory law

Vienna Convention on Road Traffic

The following chapter deals with the Vienna Convention on Road Traffic of 1968 (abbr. VC), including the latest amendments finally in force by national adoption since 2016, and its impact on driver assistance systems.

Considering behavioural law in terms of road traffic law, a number of EU Member States as well as other signatory states share a treaty called the Vienna Convention on Road Traffic. This may be related to national traffic law at the level of the contracting parties.

ADAS can automate the control and signalling devices of the vehicle or they can warn the driver shortly before or during critical situations by appropriate human-machine interfaces. At the moment, ADAS are still designed in such a way that the driver remains responsible. This is achieved by keeping the driver in the control loop as the person in charge responsible also for overriding any inappropriate control actions taken by the system. This underlying basic idea of driver control remains in line with driver control “at all times”, paragraph 5 of Article 8 VC.

With respect to the compatibility of higher-automated vehicles on present markets, the question has to be answered as to whether higher-automated vehicles are legally compatible with the following provisions of the Vienna Convention in particular:

Article 8 VC (Driver):

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

   […]

4. Every driver of a power-driven vehicle shall possess the knowledge and skill necessary for driving the vehicle; however, this requirement shall not be a bar to driving practice by learner-drivers in conformity with domestic legislation.

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

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.

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.[3]

6. A driver of a vehicle shall at all times minimize any activity other than driving. Domestic legislation should lay down rules on the use of phones by drivers of vehicles. In any case, legislation shall prohibit the use by a driver of a motor vehicle or moped of a hand-held phone while the vehicle is in motion.

Article 13 VC (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. He shall, when adjusting the speed of his vehicle, pay constant regard to the circumstances, in particular the lie of the land, the state of road, the condition and load of his vehicle, the weather conditions and the density of traffic, so as to be able to stop his vehicle within his range of forward vision and short of any

[3] Cf. ECE/TRANS/WP.1/145, p. 9.

reseeable obstruction. He shall slow down and if necessary stop whenever circumstances so require, and particularly when visibility is not good.

[…]

5.5 Different interpretations of international treaties

The following chapter contains an overview of the relevant international treaties on road traffic and the different interpretation in the member states we analysed.

Country	Ratification
7.4.1 France	Vienna Convention & Geneva Convention
7.4.2 Germany	Vienna Convention
7.4.3 Sweden	Vienna Convention & Geneva Convention
7.4.4 UK	Geneva Convention
7.4.5 Italy	Vienna Convention

Country	Interpretation of the Vienna Convention/Geneva Convention
7.4.1 France	As far as the Vienna Convention is concerned, it was signed by France on 8 November 1968 and ratified on 9 December 1971. As an international treaty, it has power of law and must be applied. International Conventions do not require transposition into domestic laws or regulations (Article 55 of the Constitution). Therefore, the Vienna Convention has a direct effect in France. The Vienna Convention does not govern relationships between countries and has the objective of facilitating road traffic throughout the world. It does not require complementary acts to be applied. In other words, when provisions of the Convention are clear and accurate and do not require State intervention, the Vienna Convention can be applied without any transposition act. Consequently: The Highway Code must be compliant with the Vienna Convention provisions, which have a higher value than domestic law. If the French Highway Code is not compliant with Vienna Convention, and especially if it contains provisions that are in contradiction with the Vienna Convention, Vienna Convention provisions prevail over provisions of the Highway Code. However, the French Parliament can make more restrictive provisions than those of the Vienna Convention. To date, there is no contradiction between the Vienna Convention and the Highway Code.

	There is no official interpretation of the French Government regarding the compatibility of highly automated systems with the Vienna Convention. This might change in the near future. Article 8.1 of the Vienna Convention is similar to article R412-6-I of the French Highway Code. Article 8.5 of the Vienna Convention is similar to Article R412-6-II of the French Highway Code. Article 13.1 of the Vienna Convention is similar to Article R413-17 of the French Highway Code. There is no article in the French Highway Code that can be considered comparable to Article 8.5bis of the Vienna Convention. According to our understanding of the Vienna Convention amendment (Article 8.5bis), SAE level systems up to 2 are deemed to be compatible with the Vienna Convention if they are compliant with Article 8.5bis. Driver assistance systems are subject to the type approval procedure. They must be used according to the Highway Code. Again, two articles of the Highway Code are especially important with regard to driver assistance systems: Article R. 413-17 of the Highway Code stipulates (our translation): I. - Maximum speeds authorised by provisions of the current Code, as well as those, reduced, possibly prescribed by the traffic police authorities, must be understood to apply only in optimal traffic conditions: good weather, flowing traffic, well-maintained vehicle. II. – They do not exempt the driver from being permanently in control of speed and regulating speed according to road state, traffic difficulties and predictable obstacles Article R. 412-6 of the Highway Code adds (our translation): I.- Each moving vehicle or moving body of vehicles must have a driver […] II.- Each driver must permanently be in a state and in position to execute conveniently and without any delay all manoeuvres that fall to him/her. […] As well as Article R. 413-17, articles R. 412-6 and following articles of the Highway Code are mainly restatements of provisions of the Vienna Convention. Driving assistance systems must be used according to these articles.
7.4.2 Germany	In 1968, the Federal Republic of Germany signed the Vienna Convention on Road Traffic at the World Conference of the United Nations together with currently 71 other nations. For Germany, the agreement entered into force on 3 August 1979. Thus, the Federal Republic of Germany commits itself in respect to paragraph 1 of Article 3 (a) VC to design its national road traffic regulations (Highway Code) in accordance with the provisions of the Convention. Although the Vienna Convention as an international treaty has no direct legal effect (at least not in Germany), the German legislator has to ensure compatibility between national law and the Convention. In addition, the contracting parties have to ensure that their national

	licensing requirements comply with the provisions of the Convention according to paragraph 2 (a) of Article 3 VC. Among the main purposes of the Convention are facilitating international road traffic, increasing safety on the roads through the adoption of uniform traffic rules and enabling the harmonisation of international and cross-border traffic. As a consequence, the cross-border operation of an automated vehicle is possible only if it complies with the provisions of the Vienna Convention on Road Traffic. The requirement of overriding is technically already fulfilled if the function can at least hypothetically/fictitiously be overridden. This means that the criterion of overriding is considered without any connection to the possibility of the driver to react in a certain situation (e.g. in an emergency braking situation, time can be too short to expect any driver reaction in the first place). While automotive engineering is developing continuously, the Vienna Convention is rarely updated and only on the basis of broad consensus in Working Party 1 (WP1, which meets twice a year). Nevertheless, it must be ensured in the future that the *VC* remains at the level of technical progress. To assure this important provision, some amendments were needed in the *VC*. For this reason, the amendment to paragraph 5 of Article 8 *VC* is implemented by paragraph 5*bis*. The amendment entered into force on 23 March 2016.[4] The new paragraph 5*bis* of Article 8 *VC* defines for any kind of ADAS that the requirements of paragraph 5 of Article 8 and of paragraph 1 of Article 13 of the VC are fulfilled if the ADAS meets the requirements of the 1958 agreement on UN regulations or if the system can be overridden or switched off by the driver.
7.4.3 Sweden	In March 2016, an amendment of the Vienna Convention on Road Traffic regarding driver behaviour entered into force. This international treaty is relevant for automated and autonomous systems because it stipulates the extent to which drivers must be in control of their vehicles. According to this latest amendment, systems are now deemed to be controllable if the driver can switch them off or override them. Future functions for highly automated driving that still require a driver also meet this criterion. Driverless cars, on the other hand, are still not permitted because even the amended treaty stipulates the need for a driver. For this reason a working group within UNECE is elaborating on a further update to the Vienna Convention to enable the use of driverless systems in future. Sweden has chosen to adapt the legislation via what is known as the transformation method, primarily transferring provisions in the Convention to the Swedish Road Traffic Ordinance (1998:1276) in the main. The Vienna Convention on Road Traffic is intended to facilitate international road traffic and increase road safety through rules on traffic. Of interest to autonomous driving is the national interpretation of the following articles:

[4] http://www.unece.org/?id=42459

	Article 8.1 Every moving vehicle or combination of vehicles shall have a driver. Article 8.5.b 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. Article 13.1 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… At national level, the Swedish Road Traffic Ordinance interprets the Vienna Convention on Road Traffic in general and in respect to the above Articles 8.1, 8.5b and 13.1. Article 8 of the Convention on Road Traffic includes requirements stating that every vehicle or vehicle combination must have a driver and that the driver must be capable of controlling his vehicle at all times. There is no corresponding provision in the Swedish Road Traffic Ordinance, but the provisions are based on the notion that there is, in some way, someone driving the vehicle. The Swedish Road Traffic Ordinance demands that road users must take the action required in respect of the circumstances in order to avoid road traffic accidents. It is also stated that vehicles must not be driven by anyone who is unable to drive the vehicle safely on account of illness or fatigue or when under the influence of alcohol or other stimulants or anaesthetic substances. Thus the provisions make demands in respect of the driving of vehicles, and so they have to be understood as meaning that someone is driving the vehicle, and that this person is the one who should take care and be able to accept liability for the propulsion of the vehicle. Essentially, it is also the driver of the vehicle who can be held criminally responsible in accordance with the Swedish Road Traffic Ordinance and the Swedish Road Traffic Offences Act (1951:649). The legislation is based on the fact that there may be someone other than the party actually driving the vehicle who should be considered to be the driver in the legal sense, and that this person does not need to be in the vehicle being driven. This is applicable in the case of driving practice and driving lessons, in accordance with Chapter 4 of the Swedish Driving License Act (1998:488) and Chapter 4 of the Swedish Driving License Ordinance (1998:980), where the person supervising the driving is considered to be the driver.
7.4.4 UK	There is no equivalent provision in UK legislation to Article 8.1 of the Vienna Convention. Therefore, since the treaties do not themselves have the force of law and this provision has not been implemented by domestic legislation, it cannot be invoked in domestic courts. Therefore, Levels 3 to 5 of automation are unaffected by this provision in the Geneva Convention. The provision of Article 8.5 of the Vienna Convention is reflected in various pieces of domestic legislation. Regulation 104 of the Road Vehicles (Construction and Use) Regulations 1986 requires the driver to

	have "*proper control*" of a vehicle, and s41D Road Traffic Act 1988 creates a criminal offence for contravention of this requirement. The Highway Code also currently requires "*drivers*" to stay in control of their vehicle even when using driver assist systems. These provisions in UK legislation, regulation and guidance are incompatible with use of Level 3 to 5 vehicles as these envisage disengagement from the driving task either some or all of the time. In respect to Article 13(1) of the Vienna Convention, Article 10 of the Geneva Convention provides in different terms: *"The driver of a vehicle shall at all times have its speed under control and shall drive in a reasonable and prudent manner. He shall slow down or stop whenever circumstances so require, and particularly when visibility is not good."* This Article is a significant distinction. The Vienna Convention imposes stricter requirements than the Geneva Convention. The control requirements under the Geneva Convention and current English law are not equivalent. The Geneva Convention requirements are vaguer and looser. The Geneva Convention does not expressly define "control" and we are not aware of any English case law defining the term. Article 8 of the Geneva Convention states generally that "drivers shall… be able to control their vehicles". Article 10 specifically requires that the "driver of a vehicle shall at all times have its speed under control" (emphasis added). These are the only specific requirements of driver control under the Geneva Convention, which therefore require that drivers must "be able" to control their vehicles and have the speed of their vehicle "under control". Neither appears to preclude the application of automated systems, provided that these may be ultimately controlled or overridden by the vehicle's driver. Consistent with this, commentators have suggested that "*control as understood by the Geneva Convention is probably satisfied if a human is able to intervene in operation of the vehicle*".[5] Thus, "*control*" in the Geneva Convention can be interpreted to permit the operation of a vehicle that determines its own path and position in the presence of a person who is able to intervene and take over immediate control of the vehicle. As mentioned in paragraph 120 of the Memorandum, Article 10 of the Geneva Convention contrasts with Article 13.1 of the subsequent Vienna Convention, which states that *"[e]very driver of a vehicle shall in all circumstances have his vehicle under control*" (emphasis added). This, on its terms, appears to be a more stringent requirement than simply having to "*be able*" to control the vehicle as required by the Geneva Convention or have "*speed under control*". Mere ability to control the vehicle does not suffice under the Vienna Convention. The driver must have the vehicle (not just its speed) "*under control*", and must do so "*in all circumstances*".

[5] http://www.americanbar.org/content/dam/aba/administrative/science_technology/2016/autonomous_driving_legality.authcheckdam.pdf, page 424.

	Arguably, Level 3 automated vehicles should satisfy the requirements of the Geneva Convention, assuming that the driver will be in a position to take control whenever necessary. Level 4 and Level 5 vehicles, which allow for complete disengagement, would not be allowed under either Convention. While the Geneva Convention has been ratified in the UK and binds the UK as a matter of international law, as a treaty it does not have the force of law as a matter of English law and cannot be invoked in the English courts unless implemented by domestic legislation (see paragraph 113 of the Memorandum).This analysis under the Geneva Convention has little relevance to establishing domestic English law requirements, even though it reflects the UK's treaty obligations.
7.4.5 Italy	In order to clarify the scope of the Vienna Convention in relation to automated vehicles it should be recalled that, for the purpose of allowing the use of advanced automation systems, in 2014 some of the signatory states of the Vienna Convention, including Italy, proposed to amend certain of its provisions. The reason underlying this amendment proposal was that, even if automated systems could be useful for road safety, there were still doubts as to the compatibility of these systems with the regulation currently in force, making appropriate modifications a necessary consequence. At the same time, the principle that inspired this review still recognised that the driver should play a primary role in driving automated vehicles because he should be able to override and/or disable these automation systems, excepting systems (e.g. brake assist) in relation to which a human intervention would not grant greater safety. This led to the adoption of Article 8.5bis of the Vienna Convention, which entered into force in March 2016, according to which: "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*. *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 particular, the clarification request focuses on the meaning to be ascribed to the word "*override*", used in the second part of Article 8.5bis of the Vienna Convention, and on the effects deriving therefrom with respect to the development of automated vehicles. In order to provide the abovementioned clarification, it is worth recalling that the introduction of the new Article 8.5bis of the Vienna Convention was determined by the intention of introducing more and more advanced automated vehicle systems (see paragraphs 246 *et seq.* of the Memorandum).

	As already described in the Memorandum, even though this provision introduced the possibility of adopting more advanced levels of automated systems compared to the past, the guiding principle of the new Article 8.5bis still conferred a primary role on the driver for the driving of automated vehicles, since it ruled that the driver must be able to take over and/or deactivate such automated systems. Without prejudice to the considerations already outlined in the Memorandum, it is now necessary to clarify the meaning of the verb "*override*" used in the context of Article 8.5bis of the Vienna Convention. In this respect, the interpretative criterion set out in Article 12, par. 1, of the preliminary rules of the Italian Civil Code (the so-called "*Preleggi al Codice Civile*") – providing the guidelines to be followed in order to interpret the relevant provisions of law under the Italian legal framework – shall apply. According to such provision, "*when interpreting the law, no meaning can be attributed to the law other than the one made clear by the very meaning of its words [...]*". Accordingly, in order to answer the question at hand, it is appropriate to start from the definitions of the verb "*override*" as provided in the most authoritative English language dictionaries. The verb "*override*" means "[to] *interrupt the action of (an automatic device), typically in order to take manual control*"[6] or "*to stop a process that happens automatically and control it yourself*".[7] Both definitions point to the fact that the verb "*override*" assumes a system, a process or a device that works autonomously and that can be interrupted and/or stopped by a human being, in order to monitor its operation manually. Therefore, any system, process or device that can be "*overriden*" assumes, to some extent, the presence of a human being in a position to be able to decide if and when to interrupt its automatic operation and resume manual control. Thus, the literal meaning of the verb "*override*" refers to the possibility for a human being to carry out an activity on his or her own, by interrupting the system, the process or the device that was automatically carrying it out. In light of the literal interpretation of the term "*override*" highlighted above, it seems possible to argue that, in order to be implemented in a vehicle circulating on public roads, and so to comply with Article 8.5bis of the Vienna Convention, automated systems installed in vehicles must permit the driver to deactivate their operation in order to resume manual control of the automated function. By way of example, on the basis of the description of the functioning of a mobile application for "*automated parking*" provided to us (by means of which the driver can perform a parking manoeuvre by controlling the same from outside the vehicle)[8], such a parking mobile application shall

[6] https://en.oxforddictionaries.com/definition/override.

[7] http://www.oxfordlearnersdictionaries.com/definition/english/override.

[8] Please see the clarification to Question 10 of the Memorandum.

	be deemed to be complying with Article 8.5bis and therefore meet the requirement linked to the term "*override*", provided that the driver of the vehicle is always able, if necessary, to stop the automated parking function and to manually park the vehicle by himself.

Country	Consequences for ADAS of SAE Level 3+ ***Do legal conflicts of international Road Traffic Conventions exist related to Levels 3 to 5 according to SAE Standard J3016 and other current laws/rules?***
7.4.1 France	The question *regarding the legal conflicts of international road traffic conventions related to Levels 3 to 5 in Standard J3016* in France is currently under intensive study at WP1 in Geneva. There are many official national positions expressed in the minutes of the recent meetings, especially the IWG AD subgroups. We refer, therefore, to these extensive debates on: https://www.unece.org/trans/main/welcwp1.html
7.4.2 Germany	As regards fulfilling an international legal framework, the following conflicts arise at higher levels of automation. ADAS up to SAE Level 2 already fully complied with the VC of 1968, because responsibility lies with the driver. Up to and including Level 2, the driver is required to monitor the system, the road and surrounding traffic constantly. These systems leave the driver in a correcting role. When using a system with Level 2 automation, the driver must monitor the system and the driving environment continuously. The driver has to perform the complete driving task but he can be assisted in doing so. For example, informational and warning functions such as a traffic sign recognition do not come into conflict with current law, because they only indirectly influence the driver's movement of the vehicle. The function only provides supplementary information and makes it available to the driver via the man-machine interface. The driver is still responsible; he can use the information as a basis for his control decisions. With the transition from SAE Level 2 (partial automation) to SAE Level 3 (conditional automation) come fundamental changes. At Level 3, the automated system takes over all control-relevant aspects, so that the driver is no longer compelled to monitor his environment and surroundings constantly. At least temporarily, the machine takes control without supervision of the driver. National and international road traffic rules do not yet take this situation into account, since every motor vehicle on the road to date has always been under the control of a human – at the very least through supervision of longitudinal/transverse movement and immediate intervention in case of inappropriate or simply undesired control actions by the vehicle. While in Level 3 the fallback-ready user becomes the driver during fallback (which implies an allocation of tasks between driver and function), Level 4 and Level 5 have no expectation that the user will respond to a request to intervene at all. In both cases, if driving is no

	longer possible, the automated driving system will return to the minimal risk condition if the driver does not respond to a take-over request appropriately. Thus, under all circumstances the system is then capable of returning to the safe state (as a minimal risk condition) by itself, which is an essential part of a driving function independently performed. The Level 5 degree of automation therefore assumes the driver to have been completely replaced, which is generally considered to be beyond the scope of current legal provisions: the system would then be able to perform and complete the task of driving in all use cases that may arise. This obviously has no relation to the duties of a driver today. ADAS that do not require traffic monitoring by the driver (SAE Level 3+) have the effect that no permanent and directly available vehicle control by the driver is needed or necessarily in place. At Level 4 and Level 5, such driver tasks are absent at all times. The character of systems intervening in case of emergency and near-accident situations is quite different from that of the continuously automating systems of Level 2 to Level 5. Although this type of operation takes immediate influence on system control, this operation mechanism has nothing to do with the comfort of the driver. The situation itself is very specific. The accident is extremely near and the driver has lost control or his capacity to act is reduced. Furthermore, the initial situation is that the driver is at least meant to be in control in the first place. In emergency situations, the system will automatically – without any human factor - avoid or at least mitigate the consequences of an upcoming accident. Consequently, this operation mode assumes no distribution of tasks between the driver and the system at all, but intervenes exclusively in cases of emergency. Conclusion As a first conclusion, the amendments to the Vienna Convention were intended for the long-term future with respect to all new ADAS. These ADAS are technically admissible, provided that: 1. they are subject to specific UNECE regulations and meet the requirements stated therein; or 2. if this is not the case, these systems can at least be overridden or switched off by the driver at any time. A consequence of this is the legal admissibility of ADAS of SAE Level 3 and Level 4 according to the legal view taken in Germany.
7.4.3 Sweden	The road transport system is open and complex. Moreover, this is a system which is constantly changing and many external factors/conditions affect the function and safety of the system. No one party can control the whole picture, or the safety of the system. There is a series of models in order to achieve safety, and these are built up so that the components of significance are linked together with requirements for performance and mutual relationships. In this way, safety can only be created if vehicles, roads, speeds and road users all meet requirements at the same time. If the road is safe, the vehicle is safe and the driver remains within the framework for the system, most

	deaths and serious injuries can be avoided. The challenge in this regard is to establish all properties which will eventually generate a safe road transport system, which is also efficient and sustainable in the long term. Thus, safe road traffic can be expressed schematically as a function of a safe road user, a safe road/street, a safe vehicle and a safe speed. It is less likely for a driver managing an approved system in accordance with instructions to be punished for infringements of the law resulting from a vehicle with a high level of automation failing and causing an accident. One issue arising in this regard is whether society nevertheless wants to hold someone else liable for the driving of the vehicle, such as the manufacturer or the owner, particularly when it comes to road traffic accidents resulting in injuries. This is primarily a political issue of a legal-philosophical nature which we cannot and should not decide on as things stand at present. The driver controls the vehicle using different ADAS 3+. Examples of such techniques include: ▫ Lane guidance - support system that alerts and then intervenes by controlling any deviation from the lane; ▫ Automatic braking - warns normally first and then brakes to avoid collision or reduce the impact. By different driver-support technologies that combine increased automated control, the system can soon completely replace the driver (Level 5). The complexity in itself presents a challenge. Issues which have not been discussed to date through the vehicle legislation are becoming more important to safety, such as data management and data analysis, reliability and robustness, as well as communication with the outside (V2X). The legislation needs to relate to this. For Level 3, successful interaction between vehicle and driver is a must.
7.4.4 UK	The Vienna Convention imposes stricter requirements than the Geneva Convention. Arguably, Level 3 automated vehicles should satisfy the requirements of the Geneva Convention, assuming that the driver will be in a position to take control whenever necessary. The UK is a party to the Geneva Convention and therefore bound to it as a matter of international law. Although that treaty may affect the interpretation of domestic legislation, it does not itself have the force of law in the UK. Therefore, any conflicts between international conventions and national law do not create any difficulties for the purposes of national law. At the present time domestic law assumes that every vehicle will have a driver and is not in conflict with that requirement in the Geneva and Vienna Conventions. Accordingly, while domestic law is not in direct conflict with the potential use of automated vehicles in the same way as the Vienna Convention (in that there is no explicit requirement for vehicles to have a driver), the regulatory scheme is at odds with the use of such vehicles insofar as it presumes that vehicles will have a driver. The Road Traffic Act 1988 provides that it is an offence to drive in a manner which is

	below what is expected of a competent and careful driver.[9] In addition, Rules 226 to 237 of the Highway Code contain various requirements for drivers to reduce their speed, increase their stopping distance, use headlights, etc. in response to certain circumstances such as adverse weather conditions. It may be difficult to prosecute a user of an automated car under a driving offence where the user is not technically driving a vehicle. And it would also be difficult to hold a driver accountable for breach of Highway Code if they were relying on automated technology. Therefore, Levels 3 to 5 of automation would be affected. In any event, UK legislation does not directly implement the Geneva Convention. However, there is a strong case that English legislation could be amended to the extent necessary to allow for the use of Level 3 automated vehicles in UK without affecting its treaty obligations under the Geneva Convention.
7.4.5 Italy	In order to describe the consequences of interpreting the word "*override*" on Level 3, 4 and 5 automation systems, it has to be emphasised that the verb under examination assumes that the automated system can be neutralised by the intervention of a human being when required. That being the case, it seems possible to state that: Level 3 automated systems seem to be consistent with the above-mentioned interpretation of the verb "*override*" and of the new Article 8.5bis of the Vienna Convention, since the driver has to maintain constant supervision of the vehicle and thus, on his or her own initiative or at the request of the automated system, he or she should be able to intervene in the functioning of the vehicle in order to resume manual control; Level 4 automated systems, which may be working irrespective of the intervention of the driver in the event of a request from the automated system, seem not to be entirely consistent with Article 8.5bis of the Vienna Convention, since they do not allow the driver to resume the manual control which is assumed and inferred by the interpretation of the term "override"; and Level 5 automated systems, which do not even involve the presence of a driver inside the vehicle, should not be compliant with the requirement underlying the meaning of the term "override", as used by Article 8.5bis of the Vienna Convention.

5.6 National road traffic law and regulatory law

The following text deals with potentially affected regulations concerning different levels of vehicle automation. The question is: to what extent can national law be applied to higher degrees of automation? The text gives a brief overview of national regulatory law. Its purpose is

[9] Road Traffic Act 1988 s 1A states: "*A person who causes serious injury to another person by driving a mechanically propelled vehicle dangerously on a road or other public place is guilty of an offence*." Section 2 states: "*A person who drives a mechanically propelled vehicle dangerously on a road or other public place is guilty of an offence*." Dangerous driving is defined in s 3 as: "*far below what would be expected of a competent and careful driver.*"

to assess which legal effect regulations might have on automation for each country and which basic idea is addressed by these regulations.

5.6.1 Overview of traffic regulations and liability

Country	Traffic regulations
7.4.1 France	There is one main legal instrument to control traffic and use of roads: the so-called Highway Code. This code is composed of three parts: Laws, Regulations, and Orders. It contains general provisions of: 1. Laws a. General provisions (Definitions/Liability/Violations) b. The driver (Training, Licensing/Behaviour) c. The vehicle (Technical provisions/Administrative provisions) d. Road usage 2. Regulations a. General provisions (Definitions/Liability/Violations) b. The driver (Training, Licensing/Behaviour) c. The vehicle (Technical provisions/Administrative provisions) d. Road usage 3. Orders Criminal code, administrative code and civil code also have an impact on traffic and identification of liabilities in case of a violation, especially a road crash. Article R. 412-6 of the Highway Code mentions that (our translation): *I.- Each moving vehicle or moving body of vehicles must have a driver […]* *II.- Each driver must permanently be in a state and in position to execute conveniently and without any delay all manoeuvres that fall to him/her. […]* It does not mention explicitly that the driver is a human being but it is highly implicit (the Vienna Convention stipulates that the driver is a human: see Article 8.4: 3. "Every driver shall possess the necessary physical and mental ability and be in a fit physical and mental condition to drive"). Section II of Article R. 412-6 is, along with Article R-413-17 (see below), and as far as automation is concerned, subject to interpretation and controversy: the driver must control the vehicle at all times, but control is not sufficiently defined in the Code. Case law does not help much here either. It is therefore not clear whether or not the Highway Code must be modified to allow drivers to use highly automated driving systems because, in that case, control would have to be understood as 'supervision' and not direct lateral and longitudinal control as it is implicitly understood now.
7.4.2 Germany	First of all, there are two main legal instruments (laws in place) to control traffic and the use of roads: the "Straßenverkehrsgesetz" (StVG) and the "Straßenverkehrsordnung" (StVO).

<table>
<tr><td></td><td>The German Road Traffic law (StVG) aims to provide traffic safety and to fend off dangers for road users and others. It contains general provisions concerning
• licensing of vehicles and people for traffic
• penalties
• civil liability of vehicle users
• driver/driving qualifications to be met.
Remarkably, the StVG defines two types of liability: liability of the driver and liability of the vehicle owner.</td></tr>
<tr><td>7.4.3 Sweden</td><td>The following table lines up a number of potentially affected regulations concerning different levels of automation:
<table>
<tr><th>Potentially affected regulation</th><th>Type</th><th>Description</th></tr>
<tr><td>Regulations related to the Vienna Convention of 8 November 1968</td><td>International</td><td>The Vienna Convention on traffic context is not one but two conventional bonds. One convention is about road traffic and the other convention is all about traffic signs and signals.</td></tr>
<tr><td>Regulations related to the Geneva Convention on Road Traffic of 1949</td><td>International</td><td>The Geneva Convention aims to promote road safety, and the Vienna and Geneva conventions are similar to each other; however, they are not identical. Approximately 40 countries are connected to both the Geneva Convention and the Vienna Convention, including Sweden, but the United States, for example, are connected to the Geneva Convention but not to the Vienna Convention.</td></tr>
<tr><td>Regulations for approval of vehicles; EU Framework Directive 2007/46/ EC and UNECE regulations (e.g. UN R79)</td><td>International</td><td>The EU determines what requirements a vehicle shall fulfill with the Framework Directive 2007/46/ EC. However, there is some scope for Member States to grant exceptions. EU rules are implemented mainly in the vehicle regulation (2009: 211), and the Swedish Transport Agency has the possibility to decide on exemptions from the requirements by empowerment in Chapter 8. 18 § Vehicle Regulation.
The UNECE agreements today are not fully designed for automated</td></tr>
</table></td></tr>
</table>

			vehicles, but there are international efforts to adapt the rules to new technology. An example is work around UN R79, which is about steering.
	Road Traffic Definitions (2001: 559)	National	Many Swedish laws refer to these definitions in their constitutional text. The definitions in the law are intended to have general application under § 1.
	Traffic Sign Ordinance (2007: 90)	National	The Traffic Sign Ordinance (2007: 90) contains provisions on conditions of traffic and marking on and off the road by including road signs, traffic signals and road markings.
	Road Traffic Ordinance (1998: 1276)	National	Regulations for traffic on and off the road (traffic rules) with drivers of vehicles and other road users in the traffic preface device. There are also government regulations issued under this regulation. The Road Traffic Ordinance is based on the Vienna Convention on Road Traffic.
	The Act (1951: 649) on penalties for certain traffic offences	National	Act (1951: 649) on penalties for certain road traffic offences (Road Traffic Act) regulates certain specific offences. The mildest punishment prescribed is a fine (for example, reckless driving and driving without a license), and the most severe punishment prescribed is imprisonment not exceeding two years (drunk driving).
	Penal Code (1962: 700)	National	Chapter 3 in the Penal Code names crimes that can be encountered in traffic. Some crimes can be committed intentionally, others are unintentional offences.
	Driving Act (1998: 488)	National	The driver's license law (1998: 488) regulates the basis for the right to hold driving licenses and measures against drivers whose driving license is questioned.
	Product Safety Act (2004: 451)	National	Product safety is a matter regulated at EU level by the

		directive 2007/46/ EC. The directive is transposed into Swedish law by the Product Safety Act (2004: 451).

One limitation in current legal interpretation is the question of who is in charge. There are examples in criminal law whereby criminal liability, known as strict liability, can be ascribed to a specific individual entirely irrespective of intent or negligence. One example of this is when the publisher of a journal is considered liable for everything published. For such liability, the legislature has to expressly state this. There should be situations in which it is particularly important from a public standpoint to be able to single out a person as being criminally liable in any one situation.

As aforementioned, it is less likely for a driver managing an approved system in accordance with instructions to be punished for infringements of the law resulting from a vehicle with a high level of automation failing and causing an accident. If society wants to hold someone else liable is a political question which should not be decided here.

Current Swedish legislation provides scope for test operations in real traffic using vehicles with a higher degree of automation. The road traffic legislation does not present an obstacle, and if the vehicles fail to meet the technical requirements, the Swedish Transport Agency has the opportunity to grant exceptions for this enterprise.

For a self-driving vehicle to be able to drive and the driver to be able to devote himself at the same time to things other than the task of monitoring or driving, stringent demands are made on the vehicle's ability to read the infrastructure, road signs, instructions and the road users on or adjacent to the road. This in turn leads to the infrastructure, road signs and instructions having to be in sufficiently good condition for self-driving vehicles to be capable of reading the information, processing it and then making the right decisions. If it were necessary for special demands to be placed on the Swedish Transport Administration, the municipalities and the owners of individual roads, stating that certain roads for autonomous driving had to be of a certain design or equipped in a certain way, the Swedish Transport Agency could probably issue more detailed regulations on this. For the foreseeable future, roads and infrastructure will look the same as they do at present. It will probably not be possible to implement any extensive changes to the road network; the technical equipment, its design and solutions in cars must be adapted to the infrastructure available.

The Swedish Road Traffic Ordinance (1998:1276) includes provisions for on-road and off-road traffic. In Sweden, requirements for the driving of vehicles and other road traffic rules can be found in the Swedish Road Traffic Ordinance and regulations issued pursuant to this.

The ordinance includes provisions with specific demands on drivers, indicating how vehicles may or may not be driven in certain situations, and also provisions which can be described as general duty of care. Examples of specific requirements include requirements indicating which lane is to be used, requirements stating that vehicles must not be driven under certain conditions and that the driver must indicate when changing lanes. Examples

	of general duty of care include general requirements defined for the driver concerning adaptation of speed and driving style. The ordinance also includes authorisations for municipalities and administration authorities to issue regulations with special road traffic rules. The ordinance also includes authorisation to issue regulations concerning exceptions to the ordinance, as well as liability provisions. Special road traffic rules for a specific road or section of road, or for all roads within a certain area or for an area or track off-road are issued via local traffic regulations. Special road traffic rules via local traffic regulations must normally be marked out. Chapter 10(1) of the Swedish Road Traffic Ordinance states that special road traffic rules may be issued via local traffic regulations in respect of matters such as speed limits, prohibition of stopping and parking vehicles, a specific area being used for lanes for public transport, restriction to smaller widths, etc. Chapter 10(2) states that certain regulations with special road traffic rules may relate to 1. a specific group of road users, 2. a specific vehicle type or specific vehicle types, or 3. vehicles with loads of a specific nature. Essentially, it can be stated that the municipalities issue regulations within densely populated areas, while the county administrative boards issue regulations outside such areas. The criminal law framework with regard to traffic law can be said to consist of three categories of regulations. Category 1/ The first category identifies the driver as the one who bears criminal responsibility. An example of this is § 3 of Penal Code which states that the driver can be convicted of driving without a license if he or she drives a vehicle intentionally without being entitled to do so. Category 2/ The next category is neutral in the sense that the rule applies to a more indeterminate group of users. An example of this is § 1 in Penal Code which states that a road driver can be convicted of reckless driving if he or she defects to a significant extent in the care and caution necessary in the given circumstances. Category 3/ The final category identifies the car owners criminally responsible. An example of this is Chapter 14. § 11 of the Road Traffic Ordinance, where the vehicle owner has a criminal-legal responsibility to ensure that the vehicle is not used in violation of certain provisions. Category two and three are technology-neutral, in the sense that the rules can be applied regardless of the degree of automation of the vehicle. Category one, which identifies the driver as responsible, is more difficult to reconcile with an autonomous vehicle on Level 4 and 5.
7.4.4 UK	The main regulatory framework applicable to automated vehicles in the UK consists of primary legislation, regulation and codes. The main sources are as follows. Key Primary Legislation: The main primary (i.e. Parliament-made) legislation regulating road traffic is:

	(a) the Road Traffic Act 1988, which provides for road safety (including criminal offences), the construction and use of vehicles, licensing requirements, and compulsory third party insurance; (b) the Road Traffic Offenders Act 1988, which provides for trial procedure and punishment of road traffic offenders (these two Acts consolidated earlier legislation); (c) the Road Traffic Regulation Act 1984, which provides for such specific matters as parking, traffic signs, speed limits, and for the imposition and enforcement of fines issued for breach of those provisions.
7.4.5 Italy	Vehicle traffic is regulated by a variety of sources of law at both national and European level. Of particular importance, as regards national law, is the "Road Traffic Code", which regulates both the typology of vehicles that may circulate on Italian public roads and the licenses required to drive vehicles, as well as the rules of conduct to be complied with when driving and the sanctions applying in case of their breach. Laws and regulations do not currently contain any provision expressly related to the different levels of vehicle automation. They still seem to assume that vehicle driving shall always be entrusted to the attention and responsibility of a human person (the driver). In particular, the Road Traffic Code is based on the assumption that there shall always be a close connection between the human being (the driver) and the vehicle: in this sense one can read, among others, the combined provisions of Articles 46 and 141 of the Road Traffic Code, from which it stems that (i) the vehicle must always be driven by a human person, and (ii) the driver must always be in full and permanent control of the vehicle. Ultimately, to date, the Road Traffic Code requires that a vehicle must be driven by a person in a position to be able to control what happens to the vehicle and the surrounding environment. In order to allow the use and circulation of automated vehicles on public roads in Italy, in the first place the provisions of the Road Traffic Code that prescribe behaviours that are not consistent with the use of such new technologies should be amended, in whole or in part (depending on the level of automation to be introduced). The key regulations in the area of civil liability deriving from road accidents are the Road Traffic Code and Legislative Decree No. 209/2005 ("Codice delle Assicurazioni Private", hereinafter also referred to as the "Code of Private Insurance").

Country	Liability
7.4.1 France	Liability of the user At this time, the French Highway Code considers that the driver is always responsible for all infractions to the law. Injuries caused with a car can be sanctioned by the Code with a criminal sanction for the driver, even if the result of the loss of control has not appeared voluntary.

	Even if the accident results from a defect of the car, the driver will not be exonerated, by reference to Article R 412-6 of the Highway Code. The owner is presumed to be responsible in case of breach of traffic law. If he was not the driver when the breach occurred, he generally has to prove that he was not driving the car and to prove the identity of the right driver at the moment of the infraction, even by denunciation. At this time, all breaches of traffic law are presumed to have been committed by the owner of the car, who generally receives the fine and has to pay if the infraction was registered by an automatic system (for speed limits). But if the police stop the vehicle and draw up an official report establishing an infraction by the driver, the user will be directly responsible for the infraction, even if he is not the owner of the car, unless the driver manages to prove that the delegated driving system was activated at the moment of the infraction. The responsibility of the driver will probably increase in case of establishment of driving under the influence of drugs or alcohol if the car is a Level 3 SAE vehicle. But we do not know if this principle will still apply to a Level 4 SAE vehicle, which is supposed to take control of the vehicle instead of the driver, if necessary. Perhaps the manufacturer will still be required to prevent driving under the influence of alcohol or drugs by controlling the state of health of the driver before and during the circulation of the car.
7.4.2 Germany	Liability of the vehicle keeper The German Road Traffic Act allocates the responsibility for the "operational risk" of an automobile to the keeper of a vehicle. In contrast to fault-based liabilities, the keeper's liability is brought about merely by bringing a danger into traffic (as brought about by every motor vehicle). The underlying legal basis for the vehicle keeper's liability lies in the fact that a risk, the motor vehicle, is brought into traffic. The vehicle keeper is the one who uses the vehicle for his own account and reaps the benefits of its use. He has the power to decide for which purpose, at what time and by whom the vehicle may be used. Since this liability is not fault-based it belongs to the provisions of 'strict liability'. This situation is not changed by the operation of automatic systems in motor vehicles and can still be applied to establish the liability of the vehicle keeper for the operational risk. However, this also means that the operational risk of the vehicle shifts from human control to control by the automated driving system. In sum, no change arises. Depending on the safety-performance of automated driving systems, there might even be an overall decrease of the operational risk. This results from the fact that machine control might well perform better than human drivers do today. But in the case of higher degrees of automation (Level 3 and Level 4), the vehicle keeper will encounter difficulties providing evidence in case the machine causes damage. This raises the question as to how to handle this situation for higher degrees of automation. German Civil Code (BGB)* *Section 823* *Liability in damages*

	A person who, intentionally or negligently, unlawfully injures the life, body, health, freedom, property or another right of another person is liable to make compensation to the other party for the damage arising from this. Insurance Act When using a motor vehicle on all kinds of roads, the need for a compulsory insurance needs to be taken into account. This results from § 1 Pflichtversicherungsgesetz and § 115 Versicherungsvertragsgesetz. Therein, the possibility of a direct claim against the liable party's insurance is made mandatory. In this way it is ensured that all persons damaged in a road accident receive monetary compensation. The operational hazard of ADAS is therefore included in today's insurance coverage. It must also be borne in mind that liability claims – with regard to the broad definition of the keeper's liability compared to the rather restrictive product liability - still leave room for an internal balance between the insurance of the keeper and the manufacturer by means of regress claims. Liability of the driver In addition to the keeper of a vehicle, the driver is liable in case of damage, comparable in effect with the provisions of the German Civil Code. In cases of high or full automation it may occur that in this automated situation, which does not require monitoring by the driver, the assumption of fault against the driver may not always be appropriate. The concept of fault-based liability in cases of automation at Levels 3 and 4 discriminates the human passenger compared to the systems producer and would thus be unjust. On the other hand, the driver is aware of the risk involved in participating in traffic. When the driving task during a journey is shared by a human driver and an automated system (in Level 3) it should be taken into consideration whether the driver or the system was executing the driving task immediately prior to the accident. The prima facie evidence is to the detriment of the performance which occurred last. This concept could compensate the introduced risk of the human and the manufacturer. A consequence of this liability regime would be the introduction of data storage devices, which create further challenges. Considering national Road Traffic Regulations (StVO), a number of EU Member States share a common heritage, with the Vienna Convention on Road Traffic at the international level. This international treaty inter alia covers regulatory law. According to the provisions of the Vienna Convention accepted by the contracting parties, national law shall not contradict the Vienna Convention on Road Traffic. This obligation results from Article 3 paragraph 1 (a) of the Vienna Convention: "Contracting Parties shall take appropriate measures to ensure that the rules of the road in force in their territories conform in substance to the provisions of Chapter II of this Convention." In consequence, the Member States' national Road Traffic Codes mostly reflect rules of the Vienna Convention on Road Traffic.

	The primary goal of the German Road Traffic Regulations (StVO) is to maintain order and safety in public road transport. Therefore, the *StVO* includes the general rules and interdictions which help to reduce typical and abstract traffic dangers. Within the general instructions and interdictions, there is no regulation that deals specifically with automated driving functions. The German Road Traffic Code obliges the driver to control his vehicle (which is explicitly to be found in various paragraphs of the German Road Traffic Code, e.g. most obviously in Sec. 3 para. 1 sentence 1 German StVO. Continuously automating applications of Level 2 (according to the definition of continuous automation in table 2) still require the driver to monitor the roadway constantly. The driver is required to be prepared to override the function at all times (e.g. when reaching system boundaries or in case of defect). In this case, no contradiction is evident between Level 2 and regulations of German Road Traffic Code: the driver still remains in a superior role and must be considered in charge of vehicle guidance on the whole. The issues are completely different in cases of the continuous automation degrees in Levels 3 and 4. The question is, when and under what circumstances and to what extent the driver is allowed to abandon the task of traffic monitoring (in Level 3 for a period of time only). In consequence, the vehicle would be controlled by a highly or fully automated system (i.e. a machine); there is at least an immensely reduced amount of human involvement in driving. This does not deny the fact that the human driver may still be required to pay sufficient attention to be able to react to significant signs of defect, etc. The overall reduction of involvement raises the question as to whether automated systems at Level 3 and higher run contrary to the rules of regulatory/behavioural law. Whilst in highly automated phases, the vehicle is in fact controlled by a machine, driver-oriented regulatory provisions would not be considered binding for machine control. Hence, at present no legal provisions are in place that would rule automated vehicle guidance by an independent machine. This does not necessarily lead to the conclusion that higher-automated levels of continuous automation are not allowed on public roads. But a substantial inconsistency must be acknowledged: in order to allow for actual compatibility of automated vehicles in “mixed traffic” (i.e. automated and driver-controlled vehicles interacting on the same stretch of roadway), rules are needed that bind both drivers and automated vehicles to the same basic rules. Furthermore, there might be a need to acknowledge the substantial changes that come about with the introduction of independently machine-driven vehicles into everyday traffic. This might lead to a need for regulation in itself. And how automation up to Level 4 should be included in regulations on machine guidance is just one further important issue. In general, it can be stated that the entire German Road Traffic law (StVG) and regulations (StVO) assume the presence of a human driver in/on each vehicle. Although there is no written legal definition of the driver, the German Road Traffic law would presume that a human driver controls the vehicle. For example, paragraph 1 of Article 2 StVG reads: *“Whoever controls a motor vehicle on public roads, …*"). When it comes to highly

	automated driving (SAE Level 4) there will no longer be a human driver in the classical role in terms of human-machine interaction. The same is the case with Level 3 during the automated phase. This is not necessarily to be understood as a contradiction to German Road Traffic Law, since it has always been possible for drivers to execute secondary tasks, as long as this can be considered safe behaviour in the respective traffic situation.
7.4.3 Sweden	One prerequisite for allocating liability in accordance with the Swedish Road Traffic Ordinance and the Swedish Road Traffic Offences Act is whether the driver is deliberately or negligently breaching the provisions of the Swedish Road Traffic Ordinance. The rules specifying liability for crimes indicate a number of specific demands on the person seen to be the offender; this person has to have a specific quality or a certain task to perform. This is also true of the road traffic legislation. The following rules on liability are examples of this: • The Swedish Road Traffic Offences Act, Section 1 (negligence in traffic) requires the offender to be a "road user", • Sections 3–4 of the same Act (driving without a license and drunk driving) state that the offender is the person "driving" a vehicle, • Chapter 4(3–6) of the Swedish Road Traffic Ordinance indicates that the offender is the "driver", and • Chapter 9(5) of the Ordinance (2004:865) on driving and rest times, tachographs, etc. indicates that the offender is the "driver". Other rules on liability in the same ordinance state that liability rests with a "member of the vehicle crew". In current road traffic legislation, the driver is often the person designated as the offender. The courts, which normally consider issues relating to criminal liability, have to assess whether a specific individual can be regarded as a driver. One reasonable assumption is that the assessment will require, as a minimum, that the person in question should have been able to influence or intervene in the motion of the vehicle. If this is not the case, this person cannot be convicted of a crime. However, for people to rely on the vehicle's systems and hand over control to these, one basic prerequisite should be that they are approved for such use. To be convicted of a crime, the offence also has to have been committed deliberately or negligently. Nowadays, the definition of a crime indicates directly whether negligence is sufficient to indicate liability. In traffic situations, statutory provisions such as the Penal Code can also be applied, in addition to the rules on liability in the road traffic legislation. One example which can be cited is Chapter 3(7–8) of the Penal Code, which relates to guilt when it comes to causing injury or the death of another person. These rules state that anyone who causes injury to or the death of another person on account of negligence can be convicted. The term "offender" in this respect is not attributable to the person having a specific property, such as being the driver of a vehicle. Instead, the requirement is for someone to have been negligent in certain respects, for this person to have done – or failed to have done – something which involved a clear deviation from the desirable action. Furthermore, for criminal liability

	there has to have been a clear link between this negligence (the action) and the effect. There are already technical aids which largely automate certain elements of driving. Anti-lock brakes, electronic stability control and traction control and advanced cruise control are all examples of technical aids of this kind. These systems influence and, to an extent, take over the driver's options for influencing how the vehicle is driven without having been deemed to alter responsibility when it comes to following the rules and criteria for criminal liability. If these systems stop working while driving and the vehicle consequently causes an accident or breaches a road traffic rule, the question is whether the driver can be considered to have acted negligently. Only the courts are able to determine the extent of the driver's liability and duty of care. There is a lot to indicate that with a higher level of automation, more instances will be beyond the control of the responsible driver, which in turn means that drivers will be found guilty of negligence in fewer instances than is currently the case, provided that the driver manages the vehicle systems in accordance with the instructions and that these systems are approved.
7.4.4 UK	Under English law, liability can be established under civil or criminal law. There is no strict liability under the civil law regime in the UK in the event of a road traffic accident. Owners and drivers may be found to be liable under the tort of breach of statutory duty. However, most usually, liability is determined under the tort of negligence and driver, owner and manufacturer are all potentially liable if it can be established that any of them acted negligently. In addition, where more than one person is found to be liable, liability is reduced due to contributory negligence. As mentioned, liability for the use of vehicles may be civil or criminal in nature. The liability of a driver or owner to pay a penalty to the State for a criminal offence does not reduce or affect their liability to pay compensation to another person who has suffered loss or damage as a result of their actions. Criminal offences are stipulated by statute whereas civil liability is largely governed by judge-made common law. In general, the two schemes operate independently of each other, although breach of a statutory provision may be prima facie evidence of negligence on the part of the party in default. In general, there is no strict liability for road traffic accidents in the UK. Owners and drivers of vehicles may be liable under the common law torts of breach of statutory duty and negligence.[10] The latter of these is by far the most common. In the UK, liability for vehicle use is focussed on the driver rather than the owner. However, the owner is subject to certain duties and may face liability in certain circumstances.

10 It is also possible to bring an action for public or private nuisance (despite any provision in the legislation: Road Traffic (Consequential Provisions) Act 1988 s 7) for example where an unreasonable obstruction is caused, or where a vehicle of unreasonable size or character is used which causes injury, danger or substantial obstruction: see for example *A-G v Gastonia Coaches Ltd* [1977] RTR 219; *Jacobs v London County Council* [1950] AC 361, 375.

Liability in Negligence

Liability for traffic accidents is generally determined in accordance with the ordinary principles of negligence at common law. In every action for negligence it is necessary to show that (i) the defendant owed a duty to the claimant, (ii) the defendant breached that duty and (iii) the defendant's breach of duty caused the claimant to suffer recoverable damage. In negligence there is no strict liability but it is necessary to demonstrate that the defendant failed to act with reasonable care. The tort of negligence is governed by judge-made common law principles rather than by particular statutes or regulations passed by parliament.

The burden of proving that a defendant's acts were negligent lies on the claimant. If it is impossible to say on the evidence presented whether a particular act was negligent, the court may dismiss a claim in negligence on the basis that the burden of proof has not been discharged.

The Secretary of State for Transport produces detailed directions for the guidance of road users known as the "**Highway Code**". Although that Code is not a piece of legislation with any force of its own, under s 38(7) of the Road Traffic Act 1988 "*a failure on the part of a person to observe a provision of the Highway Code … may in any proceedings … be relied upon by any party to the proceedings as tending to establish or negative any liability which is in question in those proceedings*". Courts have had regard to the Code in assessing whether a driver is negligent.[11] In *Goad v Butcher*, Jackson LJ (in the Court of Appeal) stated:[12]

> *A breach of the Highway Code does not give rise to a presumption of negligence or constitute a breach of statutory duty. It is, however, a relevant circumstance, which the court should take into account when determining whether the driver was negligent.*

However, where the conditions or circumstances are unusual such that the Highway Code does not provide for them, "*the provisions of the Highway Code should not be applied literally*".

The Highway Code does not expressly contemplate the possibility of highly or fully automated vehicles. However, it contains the following provisions that may create difficulties in circumstances where the driver is not in control of the vehicle and monitoring the road.

Rule 150 requires drivers to exercise control:

> *There is a danger of driver distraction being caused by in-vehicle systems such as satellite navigation systems, congestion warning systems, PCs, multi-media, etc. You MUST exercise proper control of your vehicle at all times. Do not rely on driver assistance systems such as cruise control or lane departure warnings. They are available to assist but you should not reduce your concentration levels.*

The Government has foreshadowed that it proposes to update Rule 150 to explain automated systems and remote control parking and how they are used appropriately, and to ensure that the systems are used responsibly and not beyond the purpose and design of the technology.[13] The rule will be further expanded to provide fuller advice for drivers of automated vehicles once

	automated systems are developed to allow the driver to divert their attention from driving.[14] In addition: (a) Rule 160 requires drivers to drive with both hands on the wheel.[15] (b) Rule 144 provides that drivers must not drive without due care and attention or without reasonable consideration for other road users. (c) Rule 146 provides that drivers must adapt their driving to the appropriate type and condition of road they are on, including being prepared for unexpected or difficult situations. (d) Rule 148 provides that drivers should avoid distractions when driving. There are no proposals at this stage to relax the restrictions in the Highway Code on distractions, such as watching TV or eating or drinking.[16] The Government, however, is monitoring the development of technology and has indicated that it will respond as and when new systems come to the market.[17] Rule 126 provides that the driver should allow at least a two-second gap between vehicles.[18] The driver of a vehicle may be negligent if he drives too close to the vehicle in front and cannot pull up in time when the vehicle ahead brakes suddenly.[19] There is a proposal to relax this rule where the automated technology automatically maintains a safe, but shorter, gap (i.e. because of faster reaction time).[20] Ultimately, each factual situation will be analysed on its own facts and as a matter of common sense, and the Highway Code cannot be seen as a set of hard and fast rules. We expect the Highway Code to be updated to take account of advances in automated technology. Otherwise, the courts are likely to be less guided in determining liability by provisions of the Highway Code that are plainly not designed for the type of vehicle and use under consideration.
7.4.5 Italy	In order to introduce levels of automation higher than Level 2 (from Level 3 onwards), which require a driver intervention only in overriding the automated drive, it should be necessary to amend, first of all, Article 141 of the Road Traffic Code, which states: "*1. **It is the duty of the driver** to control the speed of the vehicle so that,*

11 See for example *Boyle v Commissioner of Police of the Metropolis* [2013] EWHC 395, [16]-[17].

12 *Goad v Butcher* [2011] EWCA Civ 158, [20]; see also *Powell v Phillips* [1972] 3 All ER 864.

13 UK Government, Department of Transport, *The Pathway to Driverless Cars: Proposals to support advanced drivers assistance systems and automated vehicle technology* (July 2016) ("**July 2016 Consultation**"), [3.4]. See at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/536365/driverless-cars-proposals-for-adas-and_avts.pdf.

14 July 2016 Consultation, [3.5].

15 "*Once moving, you should drive with both hands on the wheel where possible. This will help you to remain in full control of the vehicle at all times*".

16 July 2016 Consultation, [3.13].

17 July 2016 Consultation, [3.16].

18 Highway Code, Rule 126.

19 *Thompson v Spedding* [1973] RTR 312.

20 July 2016 Consultation, [3.12].

	considering its characteristics, state and load, as well as the characteristics of the road and traffic conditions, and other circumstances of any kind whatsoever, any possible dangers to the safety of persons and objects and any other cause of disorder for the traffic are avoided. 2. ***The driver must always maintain control of his vehicle and be able to make all the necessary manoeuvres in safe conditions, especially by stopping the vehicle in a timely manner within the limits of his line of sight and in front of any foreseeable obstacle.*** *[…]*". As a consequence, based on the literal (as well as systematic) interpretation of applicable provisions of Italian law, vehicles must compulsorily be driven by a human person in order to be lawfully used on public roads. This is also confirmed by the liability regime applying to road traffic (on which see the considerations outlined under Question 3 below) which provides that any damages potentially caused by the movement of the vehicle primarily fall within the sphere of liability of the driver.

5.6.2 Scenarios concerning the Vienna Convention (1968) and national regulatory law

The questions raised in the context of regulatory law differ from the issues discussed with regard to liability. An examination by means of scenarios has proven to be a helpful tool. However, the scenarios developed earlier (see Section 4) do not help at this point. For that reason, another set so scenarios has been developed. In this chapter, they will be introduced and dealt with.

5.6.2.1 Scenario: Level 3

The vehicle is driving on a road for which Highway Chauffeur has been intended by the OEM. The function has been triggered by the driver. This is a Level 3 function that intends the driver not to monitor the vehicle all the time.

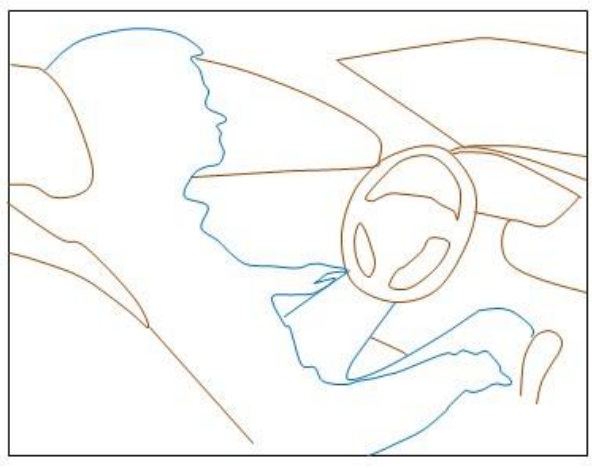

Figure 5.1: Vienna Convention: Scenario Level 3 - Case 1

Description: Case 1

The driver does pay attention to the driving environment, but does not have his/her hands on the steering wheel.

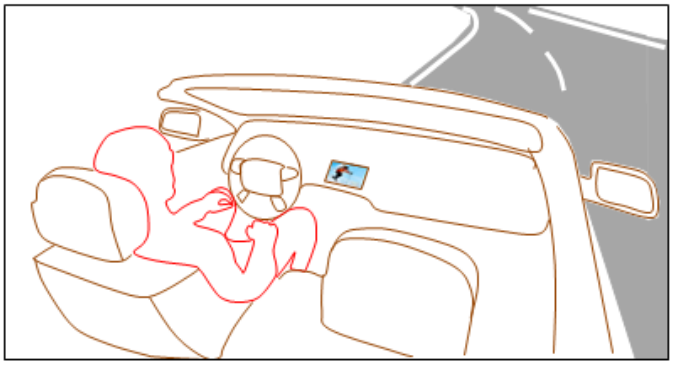

Figure 5.2: Vienna Convention: Scenario Level 3 - Case 2

Description: Case 2

The driver is watching a movie on a vehicle's integrated device. In addition, he/she does not have his/her hands on the steering wheel. He/she is not required to monitor the environment permanently.

5.6.2.2 Scenario: Level 4

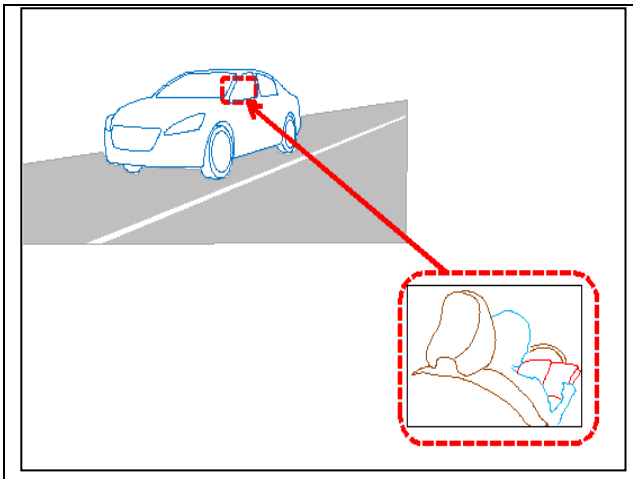

Figure 5.3: Vienna Convention: Scenario Level 4

Description:

The vehicle is driving on a road for which Highway Pilot is intended by the OEM. This is a Level 4 function that allows the driver not to monitor the vehicle at all. The driver is taking this opportunity to read a book or watch a movie.

5.6.2.3 Scenario: "Driver outside the vehicle"

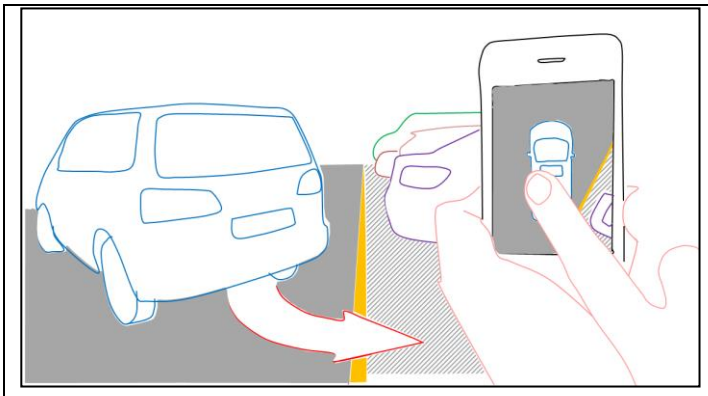

Figure 5.4: Vienna Convention - Driver outside the vehicle

Description:

The "driver" of the vehicle is outside the vehicle, and monitors the vehicle with his/her smartphone. He/she is able to stop the manoeuvre if ever there is a need to (safety emergency) by using a "dead man" function on the smartphone.

5.6.2.4 Legal evaluation

Country	Scenario 7.6.2.1. Case 1	Scenario 7.6.2.1. Case 2
7.4.1 France	The AD system is presented as an SAE Level 3 system but is used as an SAE 2 system because the driver is monitoring and screening the driving environment. There is no indication in the Highway Code that the driver shall have his/her hands on the steering wheel. The situation also seems to be compliant with Article R. 412-6-1-II of the Highway Code (see below), Article 417-13 (see below) and other articles if the system obeys the rules and if the driver can take over if the system does not obey the rules.	Article R412-6-2 of the Highway Code mentions that (our translation) 'Placing a functioning device with a screen which is not a driving assistance or a navigation system in the field of vision of the driver of a moving vehicle is prohibited'. This Article is obviously written for a removable device. It is unclear whether it could also be applied to integrated devices. As France has not yet interpreted the amendment 8.5bis of the Vienna Convention, it is still not clear whether this situation could be compliant with the Highway Code. However, Article R412-6-1-II of the Highway Code demands that '*Each driver must permanently be in a state and in position to execute conveniently and without any delay all manoeuvres that fall to him/her. […]* (our translation). In the scenario case, 'permanently' and 'without any delay' do not seem to be fulfilled.

7.4.2 Germany	The Highway Chauffeur as an ADAS of SAE Level 3 is activated on the highway. According to the definition of SAE Level 3, the driver would not have to observe the driving environment, but in this case he does it anyway. As long as the Highway Chauffeur complies with the technical requirements of the UNECE regulations, or if this is not the case, the Highway Chauffeur can at least be overridden by the driver at any time, there is no conflict with regulatory law. Presently, according to UNECE regulations, the Highway Chauffeur would provide automation beyond the limit of 10 km/h regulated in UN-R79. All in all, Case 1 complies with national law but is an automating function beyond the current limit of UN-R79.	Case 2 is similar to Case 1. The only difference is that the driver does not pay attention to the driving environment and that he watches a movie. As long as the aforementioned requirements (esp. overrideability) are met, there is no contradiction between the technical design and the behavioural rules of the Vienna Convention. Consequently, it is – as it is even today - possible to turn away from the task of driving as long as this remains safe. As a result, Case 2 includes no discrepancy with international regulatory law but is an automating function beyond the current limit of UN-R79 and is possibly not intended by current national regulatory law.
7.4.3 Sweden		Article 8 of the Convention on Road Traffic includes requirements stating that the driver must be capable of controlling his vehicle at all times. There is no corresponding provision in the Swedish Road Traffic Ordinance, but the provisions are based on the notion that there is, in some way, someone driving the vehicle.
7.4.4 UK	Rule 160 of the Highway Code provides the following: “Once moving, you should drive with both hands on the wheel where possible. This will help you remain in full control of the vehicle at all times.” The Highway Code is not legally binding, although non-compliance with the Highway Code may be relied on as a factor to establish driver liability. On negligence principles, we would not expect that a driver would incur liability for driving without having his	There is no distinction made between different levels of automation for compliance with this rule.

	hands on the steering wheel if the car was designed to be used safely this way, regardless of any contrary provisions of the Highway Code. Highway Code Rule 160 provides that the driver should drive with both hands on the wheel "*where possible*". In the case of remote control parking it would be impossible to be outside of the vehicle and have both hands on the wheel. Therefore, such technology arguably does not fall foul of this provision in the Highway Code.	
7.4.5 Italy	The Road Traffic Code does not explicitly state that the driver must keep both his/her hands on the steering wheel. The first provision acquiring relevance in this respect is represented by Article 141 of the Road Traffic Code, concerning the vehicle's speed, which states that: "*the driver must always maintain control of his vehicle and be able to make all the necessary manoeuvres in safe conditions, especially by stopping the vehicle in a timely manner within the limits of his line of sight and in front of any foreseeable obstacle*". The second provision is Article 173, para. 2, which provides that "the driver may not use mobile devices or acoustic headphones when the vehicle is moving, except for drivers of military vehicles or vehicles used by the bodies referred to under Article 138, para. 11 and the police. The use of devices with speakerphones or earphones is allowed, provided that the driver has adequate auditive capabilities from both ears which do not require the use	Italian legislation does not make any difference in terms of rules of conduct due to the adoption of automation systems, neither in general nor in relation to the positioning of hands on the steering wheel.

	of hands for their functioning" (emphasis added). Based on the joint interpretation of these two articles, it is possible to conclude that the driver shall always have his hands free and use them for the operation of the vehicle in order to keep it under full control.	

Country	Scenario 7.6.2.2. Level 4	Scenario 7.6.2.3.
7.4.2 Germany	The Highway Pilot in this scenario is an SAE Level 4 ADAS. The driver reads a book. According to the technical definition of the SAE Level 4 applied, he is allowed to do so. As long as the aforementioned requirements are met, there is not any contradiction between the technical design and the behavioural rules of the Vienna Convention. Consequently, it is – as it is even today - possible to execute this as a secondary task. As a result, this case includes no discrepancy with international regulatory law but is an automating function beyond the current limit of UN-R79 and is possibly not intended by current national regulatory law.	In this scenario, the driver is outside of his vehicle. He navigates his car into a parking lot via his smartphone. He is in close distance to his vehicle. Because of the "dead man" function and the permanent monitoring of his vehicle, there is no contradiction to German regulatory law, as in paragraph 1 of article 3 *StVO: "Whoever drives a vehicle may drive only as fast as to ensure that the car is permanently under control."* and in paragraph 1 of article 1 *StVO: "The use of the road requires constant caution and mutual consideration."* In this case there is no legal problem regarding German law at all.
7.4.4 UK	The legislation in the UK has contemplated that there will be a driver operating the vehicle and it is anticipated that it will be amended to provide for the possibility of highly automated vehicles. In other circumstances, not every person seated at the wheel of a moving vehicle has been classed as a "*driver*" for the purposes of English law. Level 3 and 4 vehicles will be marketed as allowing the driver to	Regulation 104 of the Road Vehicles (Construction and Use) Regulations 1986 states that the driver must be in proper control of the vehicle with a full view of the road and any traffic ahead.[23] Remote-controlled parking allows for the driver to exit the vehicle and command it to drive itself through the use of a smart device such as a mobile phone. The Government's stated view is that since the remote parking

[23] The Road Vehicles (Construction and Use) Regulations 1986, reg 104: *"No person shall drive, or cause or permit any other person to drive, a motor vehicle on a road if he is in such a position that he cannot have proper control of the vehicle or have a full view of the road and traffic ahead."*

	disengage from the driving task. This is because they are "*not being driven in the currently assumed sense.*"[21] As a result there will need to be a review of the legislation to allocate civil and criminal responsibility between the driver, owner and manufacturer when the vehicle is in autonomous mode.[22] As far as civil liability for negligence is concerned, the current position may subsist in which the courts assess whether, in each case, the driver, owner or manufacturer breached its standard of care.	technologies which are close to being marketed require that the driver remain in the loop and engaged in the driving task, there is no need for an amendment to this regulation. Although not strictly necessary, the Government in its July 2016 Consultation recommends a clarification to Regulation 104 to state that the driver will remain in compliance with this regulation even if he is not in his driver seat, so long as he can control the vehicle through a hand-held device.[24] However, Regulation 104 plainly does not allow for the disengagement of the driver that is contemplated by higher levels of automation (i.e. Levels 3 to 4).
7.4.5 Italy	Indeed, full and high automation systems, and in particular those described in Levels 4 and 5 of the J3016 Standard – assuming their use will be permitted under applicable Italian rules – would not require the "driver" to always be in full control of the road and traffic conditions, notwithstanding the fact that they would allow the driver to resume the vehicle's control. However, based on an assessment of the conflicting interests, including those of other road users and general traffic safety, it seems possible to argue that the abovementioned provision would not require the driver to satisfy an excessive and disproportionate burden of proof. In line with the current framework, the driver may be able to demonstrate that the accident was caused by the automation system – being the owner of the vehicle responsible for the control and maintenance of its functionality – and that he could not	The Road Traffic Code does not define the notion of "driver". Article 46, para. 1, instead gives a definition of "vehicle" allowed to circulate on public roads, stating that "*for the purpose of this code, 'vehicles' means machines of any kind whatsoever which circulate on roads and are driven by a human person*". There is no explicit rule stating that the vehicle must be controlled from the "inside" of the same.

21 February 2015 Report, [5.20].

22 February 2015 Report, [5.9].

24 July 2016 Consultation, [3.22].

	prevent the occurrence of the damages.	
7.4.1 France	As France has not yet interpreted the amendment 8.5bis of the Vienna Convention, it is still not clear whether this situation could be compliant with the Highway Code. However, Article R412-6-1-II of the Highway Code demands that '*Each driver must permanently be in a state and in position to execute conveniently and without any delay all manoeuvres that fall to him/her. […]* '(our translation). In the scenario case, 'permanently' and 'without any delay' do not seem to be fulfilled.	It is still unclear whether this is compatible with the Highway Code. There is nothing in this Highway Code (nor in the Vienna Convention) mentioning explicitly that the driver must be in the vehicle. But there are implicit insights that he/she should be. We can consider that the case where the driver is outside the vehicle has not been treated by law. Case law must be investigated in detail, but we have not found any cases so far where a person outside the vehicle has been considered as a driver if he had a remote control.
7.4.3 Sweden	The Swedish Road Traffic Ordinance demands that road users must take the action required in respect of the circumstances in order to avoid road traffic accidents. It also states that vehicles must not be driven by anyone who is unable to drive the vehicle safely on account of illness or fatigue or when under the influence of alcohol or other stimulants or anaesthetic substances. Thus, the provisions make demands in respect of the driving of vehicles, and so they have to be understood as meaning that someone is driving the vehicle, and that this person is the one who should take care and be able to accept liability for the propulsion of the vehicle. Essentially, it is also the driver of the vehicle who can be held criminally responsible in accordance with the Swedish Road Traffic Ordinance and the Swedish Road Traffic Offences Act (1951:649).	The legislation is based on the fact that there may be someone other than the party actually driving the vehicle who should be considered to be the driver in the legal sense, and that this person does not need to be in the vehicle being driven.

6 Rules of approval

6.1 Motivation

In order to ensure the safety of motor vehicles, technical requirements are imposed on their design. However, it is no longer left to individual states to set the minimum requirements for vehicle technology. Rather, the approval of vehicle types is harmonised internationally. On the level of the European Union, EU directives have been proposed by the European Commission in Brussels that set the legal rules for approval. Most of all, the basis lies in the framework directive 2007/46/EG for motor vehicles (as well as 2002/24/EG and 2003/37/EG for two- and three-wheeled vehicles and vehicles for agricultural or forestry use). These directives are transposed into national legislation within the EU Member States. The United Nations Regulations (UN), created by the United Nations Economic Commission for Europe (UNECE) are referenced in Annexes IV and XI and come into play as EU vehicle type-approval requirements as far as referenced. In the EU, additionally, a link to UN Global Technical Regulations (GTR) is in place. These regulations are being developed at the international level by the "World Forum for Harmonization of Vehicle Regulations" (WP.29) at UNECE, based in Geneva.

The UN Regulations (formally known as UNECE regulations) consist of a set of internationally harmonised and uniform technical prescriptions for wheeled vehicles, equipment and parts which can be fitted and/or used on wheeled vehicles. Conditions for reciprocal recognition of approvals granted on the basis of these descriptions are also contained.
Complying with the UN requirements contributes to higher product safety and a minimisation of product liability risks. The UN Regulations are the basis for the approval of motor vehicles and parts as well as equipment. The contracting parties of the UNECE group guarantee each other mutual recognition of the approvals.

UNECE's major aim is to promote pan-European economic integration. UNECE includes 56 member states in Europe, North America and Asia. In 1958, the “Agreement on the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions” (formally: Agreement Concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts) was reached. The aim was to ensure safety standards that were cross-border, uniform and binding for the automotive industry, which was beginning to become globalised.

Overall, there are currently 138 UN Regulations. They include their own scope in respect to different vehicles, equipment and vehicle parts or separate systems and their technical aspects. Furthermore, they describe specific and detailed technical requirements.

A necessary requirement for an ECE approval is the proof of "Conformity of Production". Therefore, manufacturers commit themselves to keeping vehicles in the manufacturing process in accordance with an approved type.

If type approval is granted by one contracting party, the ECE type approval is reciprocally recognised by all other contractual states or parties.

6.2 Approach

In a globalised world it would not make any sense to regulate the rules of approval on a national or local level. Since the 1950s there have been attempts to lay down the rules of approval on a higher level. To avoid redundancy, the current rules of approval are only analysed to reveal any contradictions to the market introduction of possible automated systems. It has to be stated that there is a lot of work ongoing regarding further amendments of the rules of approval. For this reason, what follows can only be a small and temporary outline of the current legal situation.

6.3 Legal framework for rules of approval

6.3.1 Relevant technical regulations for the approval of automated driving functions

Advanced driver assistance systems have a complex electronic system that is integrated into the vehicle so that safety concerns of a vehicle might be affected. New technical systems make it necessary to review and adjust the present legal framework. Especially with systems that automate the task of driving, it is necessary to determine whether the corresponding technical requirements remain appropriate and sufficient, since the current legal framework assumes that a human is the driver of the vehicle.

In addition to the technological development, there is also the need for a parallel development of national and international legal frameworks to keep pace with technical innovations.

Obviously, there are two main degrees of freedom of movement while driving a vehicle, the longitudinal and lateral control of the vehicle. These are exercised by accelerating/braking and by steering. With regard to the automation of driving tasks and related technical requirements, a closer look must therefore be taken at the regulations of braking (UN R13; braking system) and steering (UN-R 79; steering system). In addition, automated driving influences UN-R 48, in which lighting equipment is regulated.

When considering the potential need for a revision of existing technical regulations, what catches the eye first of all are provisions that prohibit the approval of automated driving functions. If these barriers were removed, automated driving systems could be type-approved. This, however, would mean that technology could be type-approved without minimum

requirements in terms of safety for automated driving. Therefore, a type approval can be granted only after the set of minimum requirements has been prepared and implemented into the regulations (in case technical requirements are met).

- UN-R79 Steering system: Uniform provisions concerning the approval of vehicles with regard to steering equipment

The UN-R79 "Uniform provisions concerning the approval of vehicles with regard to steering equipment" already refers to a classification of the steering system depending on the division of work between the human driver and the automated steering system.

Even the introductory text to UN-R79 mentions advanced driving assistance systems and reasons for the inclusion:

> "Advancing technology, coupled with the wish to improve occupant safety by elimination of the mechanical steering column, and the production advantages associated with easier transfer of the steering control between left and right hand drive vehicles, has led to a review of the traditional approach and the Regulation is now amended to take account of the new technologies. Accordingly it will now be possible to have steering systems in which there is not any positive mechanical connection between the steering control and the road wheels.
>
> Systems whereby the driver remains in primary control of the vehicle but may be helped by the steering system being influenced by signals initiated on-board the vehicle are defined as "Advanced Driver Assistance Steering Systems". Such Systems can incorporate an "Automatically Commanded Steering Function", for example, using passive infrastructure features to assist the driver in keeping the vehicle on an ideal path (Lane Guidance, Lane Keeping or Heading Control), to assist the driver in manoeuvring the vehicle at low speed in confined spaces or to assist the driver in coming to rest at a pre-defined point (Bus Stop Guidance). Advanced Driver Assistance Steering Systems can also incorporate a "Corrective Steering Function" that, for example, warns the driver of any deviation from the chosen lane (Lane Departure Warning), corrects the steering angle to prevent departure from the chosen lane (Lane Departure Avoidance) or corrects the steering angle of one or more wheels to improve the vehicle's dynamic behaviour or stability.
>
> *In the case of any Advanced Driver Assistance Steering System, the driver can, at all times, choose to override the assistance function by deliberate action, for example, to avoid an unforeseen object in the road.* (emphasis added)
>
> It is anticipated that future technology will also allow steering to be influenced or controlled by sensors and signals generated either on or off-board the vehicle. This has led to several concerns regarding responsibility for the primary control of the vehicle and the absence of any internationally agreed data transmission protocols with respect to off-board or external control of steering. Therefore, the Regulation does not permit the general approval of systems that

incorporate functions by which the steering can be controlled by external signals, for example, transmitted from roadside beacons or active features embedded into the road surface. Such systems, which do not require the presence of a driver, have been defined as "Autonomous Steering Systems".”[25]

However, the classifications of the steering systems are **not** consistent with the known levels of automation. The current definitions of UN-R79 state that:

2.3.3. "Autonomous Steering System" means a system that incorporates a function within a complex electronic control system that causes the vehicle to follow a defined path or to alter its path in response to signals initiated and transmitted from off-board the vehicle. The driver will not necessarily be in primary control of the vehicle.

2.3.4. "Advanced Driver Assistance Steering System" means a system, additional to the main steering system, that provides assistance to the driver in steering the vehicle but in which the driver remains at all times in primary control of the vehicle. It comprises one or both of the following functions:

2.3.4.1. "Automatically commanded steering function" means the function within a complex electronic control system where actuation of the steering system can result from automatic evaluation of signals initiated on-board the vehicle, possibly in conjunction with passive infrastructure features, to generate continuous control action in order to assist the driver in following a particular path, in low speed manoeuvring or parking operations.

2.3.4.2. "Corrective steering function" means the discontinuous control function within a complex electronic control system whereby, for a limited duration, changes to the steering angle of one or more wheels may result from the automatic evaluation of signals initiated on-board the vehicle, in order to maintain the basic desired path of the vehicle or to influence the vehicle’s dynamic behaviour.

Systems that do not themselves positively actuate the steering system but that, possibly in conjunction with passive infrastructure features, simply warn the driver of a deviation from the ideal path of the vehicle, or of an unseen hazard, by means of a tactile warning transmitted through the steering control, are also considered to be corrective steering.

Besides manual steering there are:

- The "Autonomous Steering System": it describes a control of the steering based on signals and information that are coming from the outside of the vehicle.

[25] http://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/r079r2e.doc

- The "Automatically commanded steering function": the steering is done continuously automatically on the basis of the vehicle's own sensors and possibly additional passive infrastructure elements to follow a certain path.
- The "Corrective steering function": wherein the steering angle is corrected intermittently or discontinuously and in each case briefly automatically to follow the desired path or to influence the driving dynamics.

Advanced driving assistance systems must be designed so that they do not restrict the basic steering function in its performance. In addition, the driver must be able to override the advanced driving assistance system at any time:

5.1.6. Advanced driver assistance steering systems shall only be approved in accordance with this Regulation where the function does not cause any deterioration in the performance of the basic steering system. In addition they shall be designed such that the driver may, at any time and by deliberate action, override the function.

"Corrective Steering" is allowed. In contrast, "Autonomous Steering" is prohibited. UN-R79 describes "Autonomous Steering" as being outside its scope. The situation is different concerning "Automatically Commanded steering". The latter is very limited and allowed only at low speeds for steering manoeuvres up to 10 km/h:

5.1.6.1. Whenever the Automatically Commanded Steering function becomes operational, this shall be indicated to the driver and the control action shall be automatically disabled if the vehicle speed exceeds the set limit of 10 km/h by more than 20 per cent or the signals to be evaluated are no longer being received. Any termination of control shall produce a short but distinctive driver warning by a visual signal and either an acoustic signal or by imposing a tactile warning signal on the steering control.

For enabling automated driving it is necessary that the limitation on automatic steering to max. 10 km/h is repealed and possibly replaced by a new limit or other reasonable restrictions addressing safety concerns.

An informal working group on ACSF (Automatically Commanded Steering Function) has been set up within the so-called GRRF (Working Group on brakes and running gear of the UNECE WP.29).[26]

Even the elimination of the 10 km/h limit would already allow a vehicle's lateral movement in a continuously automated way. In this case, automated steering would be approvable from a technical point of view.

[26] http://www.unece.org/trans/main/wp29/wp29wgs/wp29grrf/grrf81.html
http://www.unece.org/fileadmin/DAM/trans/doc/2016/wp29grrf/GRRF-81-32e.pdf

In addition, one must consider under which further conditions and with which requirements automated steering systems should be allowed. Probably the biggest need for change is in respect of UN-R79. UN-R79 must be changed regardless of level of automation. However, there might be further requirements for automated steering depending on the level of automation.

6.3.2 The following aspects and prerequisites play a role when setting requirements:

- First, under the premise that the driver still has the duty to continuously monitor the driving task, requirements for automated steering will be developed.
- The basic principles of switching off and overriding the system must be maintained.
- Automated steering should be at least as safe as manual steering.
- Requirements for the safe operation of the automated function must be developed; this includes the definition of conditions under which the automated steering function may be activated.
- Precautionary measures for the event of a fault and provisions on functional safety must be defined. Here, Annex 6 of UN-R79 serves as a basis:

5.1.10. Control systems

The requirements of Annex 6 shall be applied to the safety aspects of electronic vehicle control systems that provide or form part of the control transmission of the steering function including advanced driver assistance steering systems. However, systems or functions, that use the steering system as the means of achieving a higher level objective, are subject to Annex 6 only insofar as they have a direct effect on the steering system. If such systems are provided, they shall not be deactivated during type approval testing of the steering system.

(i) Annex 6

(ii) SPECIAL REQUIREMENTS TO BE APPLIED TO THE SAFETY ASPECTS OF COMPLEX ELECTRONIC VEHICLE CONTROL SYSTEMS

1. GENERAL

This annex defines the special requirements for documentation, fault strategy and verification with respect to the safety aspects of Complex Electronic Vehicle Control Systems (paragraph 2.3. below) as far as this Regulation is concerned.

This annex may also be called, by special paragraphs in this Regulation, for safety related functions which are controlled by electronic system(s).

> This annex does not specify the performance criteria for "The System" but covers the methodology applied to the design process and the information which must be disclosed to the technical service, for type approval purposes.
>
> This information shall show that "The System" respects, under normal and fault conditions, all the appropriate performance requirements specified elsewhere in this Regulation....

Annotation:

For SAE Level 3 and higher levels of automation, where it is assumed that the driver is no longer available at any time as a fallback, it has to be considered whether additional redundancy for the steering system must be provided in order to prevent cases of technical defects. As a result the steering function will still run automatically and safely.

- Requirements for periodic roadworthiness tests must be developed.
- The transition from automated steering back to manual steering must be designed in a safe way.

Furthermore, requirements for the design of the human-machine interaction have to be clear with respect to the control, indication and warning concept:

- Displaying errors
- The takeover request to the driver to steer manually when reaching system limits
- Ensuring that the driver is always aware of the current system status
- There must be a strategy as to how to proceed in the case when the driver does not take control over steering although he has been prompted to do so.

For automated driving functions, there is obviously the need to consider human performance, because the driving task should be based on the division of work between driver and vehicle. So far, the role of human beings (drivers) applying automated mode is to constantly monitor the system. However, drivers quickly reach their limits here: low demand may cause situations of too little workload of the driver so that attention and vigilance suffers. Furthermore, it is quite conceivable that the automated feature works so perfectly that it encourages the driver to turn away from the driving task.

The aforementioned aspects must not be neglected in the design of the requirements for automatic steering.

To address the problem, different approaches are conceivable.

One could ensure that transverse and longitudinal movement cannot be automated simultaneously to keep the driver involved in the driving task. This means that automated

steering would not be allowed to include ACC (Adaptive Cruise Control) or cruise control. However, this would make all automation levels higher than SAE Level 1 impossible.

It seems to make sense to ensure that the driver always retains a certain level of vigilance and attention. Here, a system for driver state detection can be useful to warn the driver or return manual steering when attention drops. But even in the event that a driver state detection fails and incorrectly assumes attention, strategies need to be defined to ensure traffic safety.

Moreover, as with any, even manual, drive, there is the risk of sudden and unexpected critical events. This may be an accident ahead, crossing animals or persons that appear suddenly on the road.

On the one hand, the attentive driver can respond to such a situation adequately even when in automated steering mode, so that he can handle the situation by a manual intervention. To assume human abilities to act accordingly seems risky. To a certain extent, technical measures are required to secure the use of automated steering. Previously known and state-of-the-art are automatic emergency braking systems, which automatically initiate temporary interventions in accident-prone situations in order to avoid a collision with an obstacle (object, vehicle, animal or human) or to mitigate damages. Requirements for such systems already exist in UN-R131 for heavy goods vehicles and buses. For passenger cars, such requirements would have to be conceived. It is questionable if UN-R79, which actually describes the steering system, is the right place for an extension. It would also be possible to integrate new requirements into UN-R13 (braking system) or to create a new regulation.

Ultimately, one could also concentrate all these aspects in a new regulation under a heading like "automated driving functions".

- UN-R13/H Braking system: *Uniform provisions concerning the approval of vehicles of categories M, N and O with regard to braking / Uniform provisions concerning the approval of passenger cars with regard to braking*

UN-R13 (“Uniform provisions concerning the approval of vehicles of categories M, N and O with regard to braking“) regulates the requirements for the braking systems of buses, heavy goods vehicles and trailers. UN-R13-H (“Uniform provisions concerning the approval of passenger cars with regard to braking”) sets out requirements for the braking systems of cars.

Neither in UN-R13 nor in UN-R13-H is there a prohibition of longitudinal movement being controlled automatically. "Automatically commanded braking" means that the deceleration is automatically initiated on the basis of in-vehicle information:

2.29. *"Automatically* commanded *braking" means a function within a complex electronic control system where actuation of the braking system(s) or brakes of certain axles is made for the purpose*

of generating vehicle retardation with or without a direct action of the driver, resulting from the automatic evaluation of on-board initiated information.

2.30. "*Selective braking*" means a function within a complex electronic control system where actuation of individual brakes is made by automatic means in which vehicle retardation is secondary to vehicle behaviour modification.

(In UN-R13-H, these are Articles 2.20 and 2.21)

Similar to UN-R79, there are already requirements for the functional safety of complex electronic systems that make use of the braking system and/or automatically engage the brakes:

5.1.5. The requirements of Annex 18 shall be applied to the safety aspects of all complex electronic vehicle cossntrol systems which provide or form part of the control transmission of the braking function included those which utilize the braking system(s) for automatically commanded braking or selective braking.

However, systems or functions, which use the braking system as the means of achieving a higher level objective, are subject to Annex 18 only insofar as they have a direct effect on the braking system. If such systems are provided, they shall not be deactivated during type approval testing of the braking system.

The above-mentioned Annex 18 of UN-R13 ("Special requirements to be applied to the safety aspects of complex electronic vehicle control systems") is similar to Annex 6 of UN-R79 (and is identical to Annex 8 of UN-R13-H).

In case of higher levels of automation, which do not necessarily involve the driver as a fallback solution, it must be examined whether additional requirements have to be taken to ensure the required redundancy of the braking system.

Related to the section on the steering system, UN-R13 or 13-H might need to be extended for the possible requirement of equipping automated vehicles with automated emergency braking systems to cover unexpected critical situations adequately. Heavy goods vehicles and buses could rely on the existing requirements in UN-R131. These requirements would have to be created for cars, as well.

Because of the complexity of automated driving itself and the possibility of a temporary absence of a human driver, it is indeed possible that a separate definition/regulation for automated braking systems might be passed.

- UN-R48 Lighting: *Uniform provisions concerning the approval of vehicles with regard to the installation of lighting and light-signaling devices*

Automated driving also means that more operations than braking and steering are performed by the vehicle itself. Thus, lighting is also an important issue to look at. Principally, the operation

of lighting equipment such as direction indicators, brake lights, hazard warning lights and dipped-beam/main-beam headlamps must be mentioned. The installation of lighting equipment and its activation is regulated in UN-R48 (“Uniform provisions concerning the approval of vehicles with regard to the installation of lighting and light-signaling devices”). Since lighting is an essential safety element on the vehicle and false signaling to other road users can be misleading and is thus very critical, vehicle lighting is regulated in detail. All lighting equipment must be explicitly admitted (installed and used).

Currently, the automated activation of these lights is allowed in the following cases:

- Main-beam headlamp

6.1.7.2. The control of the main-beam headlamps may be automatic regarding their activation and deactivation, the control signals being produced by a sensor system which is capable of detecting and reacting to each of the following inputs:

(a) Ambient lighting conditions;

(b) The light emitted by the front lighting devices and front light-signaling devices of oncoming vehicles;

(c) The light emitted by the rear light-signaling devices of preceding vehicles. Additional sensor functions to improve performance are allowed...

6.1.9.3. Automatic activation and deactivation of the main-beam headlamps:

6.1.9.3.1. The sensor system used to control the automatic activation and deactivation of the main-beam headlamps, as described in paragraph 6.1.7.1., shall comply with the following requirements:

6.1.9.3.1.1. The boundaries of the minimum fields in which the sensor is able to detect light emitted from other vehicles defined in paragraph 6.1.7.1. above are defined by the angles indicated below.

6.1.9.3.1.1.1. Horizontal angles: 15° to the left and 15° to the right.

Vertical angles:

Upward angle	5°		
Mounting height of the sensor (centre of sensor aperture above the ground)	Less than 2 m	Between 1.5 m and 2.5 m	Greater than 2.0 m
Downward angle	2°	2° to 5°	5°

These angles are measured from the centre of the sensor aperture relative to a horizontal straight line through its centre and parallel to the longitudinal median plane of the vehicle.

6.1.9.3.1.2. The sensor system shall be able to detect on a straight level road:

(a) An oncoming power driven vehicle at a distance extending to at least 400 m;

(b) A preceding power driven vehicle or a vehicle-trailers combination at a distance extending to at least 100 m;

(c) An oncoming bicycle at a distance extending to at least 75 m, its illumination represented by a white lamp with a luminous intensity of 150 cd with a light emitting area of 10 $cm^2 \pm 3$ cm^2 and a height above a ground of 0.8 m.

To verify compliance with (a) and (b) above, the oncoming and preceding power driven vehicle (or vehicle-trailer combination) shall have position lamps (if applicable) and dipped-beam headlamps switched ON.

6.1.9.3.2. The transition from main-beam to dipped-beam and vice versa according to the conditions indicated in paragraph 6.1.7.1. above may be performed automatically and shall not cause discomfort, distraction or glare.

6.1.9.3.3. The overall performance of the automatic control shall be verified by:

6.1.9.3.3.1. Means of simulation or other means of verification accepted by the Type Approval Authority, as provided by the applicant.

6.1.9.3.3.2. A test drive according to paragraph 1 in Annex 12. The performance of the automatic control shall be documented and checked against the applicant's description. Any obvious malfunctioning shall be contested (e. g. excessive angular movement or flicker).

6.1.9.3.4. The control of the main-beam headlamps may be such that the main-beam headlamps are switched ON automatically only when:

(a) No vehicles, as mentioned in paragraph 6.1.7.1. above, are detected within the fields and distances according to paragraphs 6.1.9.3.1.1. and 6.1.9.3.1.2.; and

(b) The detected ambient lighting levels are as prescribed in paragraph 6.1.9.3.5. below.

6.1.9.3.5. In the case where main-beam headlamps are switched ON automatically, they shall be switched OFF automatically when oncoming or preceding vehicles, as mentioned in paragraph 6.1.7.1. above, are detected within the fields and distances according to paragraphs 6.1.9.3.1.1. and 6.1.9.3.1.2.

Moreover, they shall be switched OFF automatically when the illuminance produced by ambient lighting conditions exceeds 7000 lx.

Compliance with with this requirement shall be demonstrated by the applicant, using simulation or other means of verification accepted by the Type Approval Authority. If necessary the illuminance shall be measured on a horizontal surface, with a cosine corrected sensor on the same height as the mounting position of the sensor on the vehicle. This may be demonstrated by the manufacturer by sufficient documentation or by other means accepted by the Type Approval Authority.

- Dipped-beam headlamps

6.2.7.5. Dipped-beam headlamps may be switched ON or OFF automatically. However, it shall be always possible to switch these dipped-beam headlamps ON and OFF manually.

6.2.7.6. If daytime running lamps are present and operate according to paragraph 6.19., either

6.2.7.6.1. The dipped-beam headlamps shall be switched ON and OFF automatically relative to the ambient light conditions (e.g. switch ON during night-time driving conditions, tunnels, etc.) according to the requirements of Annex 13; or

6.2.7.6.2. Daytime running lamps operate in conjunction with the lamps listed in paragraph 5.11. where, as a minimum requirement, at least the rear position lamps shall be activated; or

6.2.7.6.3. Distinctive means are provided to inform the driver that the headlamps, position lamps and if so equipped end outline marker lamps and side marker lamps are not illuminated....

6.2.7.7. Without prejudice to paragraph 6.2.7.6.1., the dipped-beam headlamps may switch ON and OFF automatically relative to other factors such as time or ambient conditions (e.g. time of the day, vehicle location, rain, fog, etc.).

- Hazard warning signal (only in case of collision or after the de-activation of the emergency stop signal):

6.6.7.2. The hazard warning signal may be activated automatically in the event of a vehicle being involved in a collision or after the de-activation of the emergency stop signal, as specified in paragraph 6.23. below. In such cases, it may be turned "off" manually.

- Stop lamps (dependant on the regulations of UN-R13 / UN-R13-H)

6.7.7.1. All stop lamps shall light up simultaneously when the braking system provides the relevant signal defined in Regulations Nos. 13 and 13-H.

- Daytime running lamps

6.19.7.1. The daytime running lamps shall be switched ON automatically when the device which starts and/or stops the engine (propulsion system) is set in a position which makes it possible for the engine (propulsion system) to operate.

- Cornering lamp

6.20.7.1. The cornering lamp on one side of the vehicle may only be switched ON automatically when the direction-indicators on the same side of the vehicle are switched ON and/or when the steering angle is changed from the straight-ahead position towards the same side of the vehicle.

The cornering lamp shall be switched OFF automatically when the direction-indicator is switched OFF and/or the steering angle has returned in the straight-ahead position.

- Adaptive front lighting system

6.22. Adaptive front lighting system (AFS) (Regulation No. 123)...

- Emergency stop signal

6.23.7.3. The emergency stop signal shall be activated and deactivated automatically.

6.23.7.3.1. The emergency stop signal shall be activated only when the vehicle speed is above 50 km/h and the braking system is providing the emergency braking logic signal defined in Regulations Nos. 13 and 13-H.

6.23.7.3.2. The emergency stop signal shall be automatically deactivated if the emergency braking logic signal as defined in Regulations Nos. 13 and 13-H is no longer provided or if the hazard warning signal is activated.

- Rear-end collision alert signal

6.25.7.3. The rear-end collision alert signal shall be activated and deactivated automatically.

6.25.7.4. The rear-end collision alert signal shall not be activated if the direction indicator lamps, the hazard warning signal or the emergency stop signal is activated.

6.25.7.5. The rear-end collision alert signal may only be activated under the following conditions:

Vr	*activation*
Vr > 30 km/h	TTC ≤ 1.4
Vr ≤ 30 km/h	TTC ≤ 1.4 / 30 ×Vr

"Vr (Relative Speed)": means the difference in speed between a vehicle with rear-end collision alert signal and a following vehicle in the same lane.

"TTC (Time to collision)": means the estimated time for a vehicle with rear-end collision alert signal and a following vehicle to collide assuming the relative speed at the time of estimation remains constant.

6.25.7.6. The activation period of the rear-end collision alert signal shall be not more than 3 seconds.

As described above, for many of the lamps defined in UN-R48, auto-activation is already in place. In particular, for automated driving two more applications must be added:

Firstly, the automated switch-on of the hazard warning lights would be required, not only in case of a collision or an emergency brake, but also in a generally risky situation, namely when a human driver would also activate a hazard warning due to the criticality of the situation.

Secondly, the automated switch-on of the direction indicator lamps has to be allowed. This is particularly important for doing automated lane change manoeuvres, parking manoeuvres or turning manoeuvres.

6.4 Implementation in national approval law

6.4.1 EC type approval

On the European level – beside the exception of the implementation of type approval directives – there is no general necessity for Member States to implement the rules of approval into national law.

All European requirements for EC type approval are defined in the following three major general directives:

- 2007/46/EC - Passenger cars, commercial vehicles, buses
- Regulation (EU) No 168/2013 replacing 2002/24/EC -. Two- and three-wheel vehicles, light quadricycles
- Regulation (EU) No 167/2013 replacing 2003/37/EC -. Agricultural and forestry tractors.

Among these general directives are a large number of further regulations and specific directives, which deal with such topics as special safety and environmental requirements.

Regulations and amendments to regulations which are annexed to the Vienna Convention on Road Traffic (1968) as an attachment can be accepted by both the European Community and the Member States.[27]

As far as the proposals adopted by the European Community are concerned (regulations and changes of regulations), no additional legal act is required to adopt them into national law.[28] In these cases, the amendments already enter into force through a notice in the relevant national gazette.

[27] 97/836/EC: Council Decision of 27 November 1997 with a view to accession by the European Community to the Agreement of the United Nations Economic Commission for Europe 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 ('Revised 1958 Agreement'), Official Journal L 346 , 17/12/1997 P. 0078.

[28] in accordance with Article 300 paragraph 7 of the Treaty of 2 October 1997 in conjunction with Article 1, paragraph 4 (with new regulations) and Article 1, paragraph 7 (with existing rules) of the revised 1958.

6.5 Scenarios concerning homologation (UNECE Rules)

The following text describes the legal challenges of several scenarios with the UNECE regulations.

6.5.1 Scenario: “Driver outside of the vehicle”

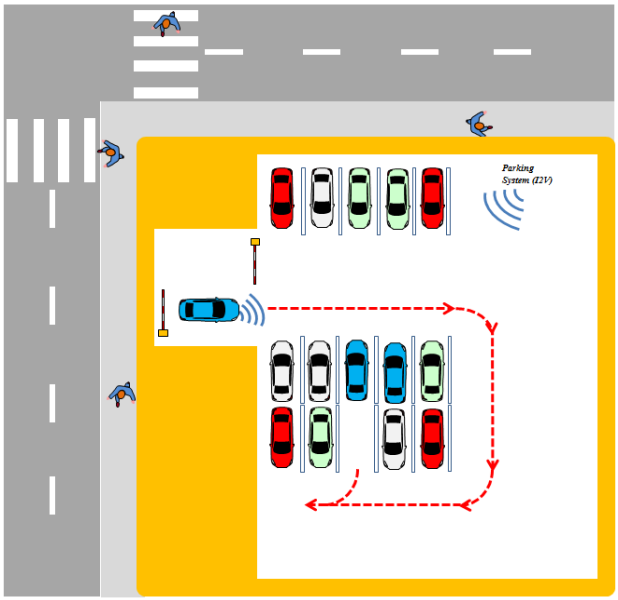

Figure 6.1: Scenario concerning UNECE Regulation – Driver outside the vehicle

Description:

The driver leaves his vehicle at the entrance of a parking lot, and is not monitoring the manoeuvre. The parking lot is not accessible to people.

The vehicle is connected to the parking system. The parking system knows, thanks to appropriate sensors, which parking slots are free. The parking system locates the vehicle precisely (both position and orientation of the vehicle). Then it gives the vehicle the trajectory to follow and constantly feedbacks the vehicle with its current position in order for the vehicle to follow the trajectory.

6.5.1.1 Scenario: "Driver in the driver's seat"

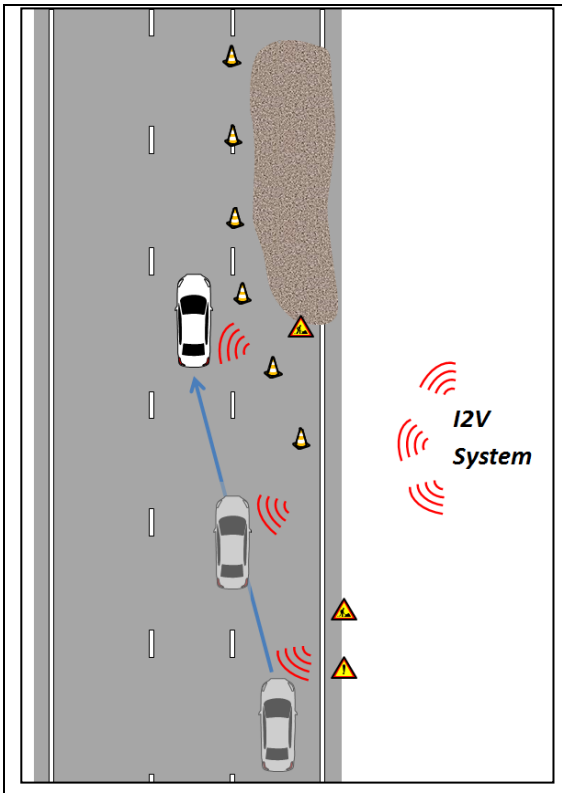

Figure 6.2: Scenario concerning UNECE Regulation – Driver in the driver's seat

Description:

The vehicle is connected to an infrastructure system (I2V) that informs the vehicle about works currently being carried out in the third lane. The steering system of the vehicle is using this information to change lane. Hence, the function steers the vehicle by using off-board information.

Case 1:

The driver is engaged and monitors the driving environment and is ready to intervene immediately when needed (Level 2 function).

Case 2:

The driver turns his attention away from the driving task as long as the vehicle does not request him to take over.

6.5.2 Legal evaluation

UNECE	Scenario 6.5.1.1 Case 1	Scenario 6.5.1.1 Case 2
	Scenario Case 1 is based on an SAE Level 2 function. Once again, the affected UNECE Regulations have to be analysed. Besides UN-R79 ("*Uniform provisions concerning the approval of vehicles with regard to steering equipment")* and UN-R13-H ("Uniform provisions concerning the approval of passenger cars with regard to braking"), UN-R48 ("Uniform provisions concerning the approval of vehicles with regard to the installation of lighting and light-signaling devices") are of particular interest.	The affected UNECE regulations in Case 2 are the same. The difference is now that the function is at SAE Level 3 or 4. There is no discrepancy in legal judgement as far as UN regulations are concerned. Whereas in Case 1, the driver is obliged to observe the function by definition of SAE Level 2 at all times, this technical requirement would no longer be necessary in case of SAE Level 3 and 4. But this difference has no effect as far as UNECE regulations are

	With regard to UN-R79, the function steers the vehicle autonomously on the basis of off-board information to change the lane because of a construction zone in the current lane. This autonomous steering is prohibited.[29] No paragraph about the automated switch-on of the direction indicator lamps is to be found in UN-R48, but in case of an automated lane change the direction indicator lamps would have to be switched on. For this reason, a change of UN-R48 is considered necessary.	concerned. By now, Case 2 does not comply with current UNECE regulations either.

[29] Cf. UN-R79, Paragraph 2.3.3.

7 Civil liability

7.1 Motivation

Automated driving has become one of the mega trends in the automotive industry. With the increase in the level of automation, the number of available automated manoeuvres will grow constantly. Especially for Level 3 systems and above (Level 3+), where it is foreseen that the driver is may turn his attention away from the driving task and does not need to monitor each and every manoeuvre the automated systems execute, the question of liability – if it remains unsolved – will become a serious hindrance to market introduction.

Even if vehicle automation might have the potential to reduce the number of critical situations and resulting accidents, it is foreseeable that situations or accidents will happen for which someone has to be declared liable. The question as to whether this will be the vehicle driver, the vehicle owner, the manufacturer, the supplier of the automation system or someone else remains to be solved in the future, as such systems are not yet available on the European market. Consequently, no court decisions exist yet to serve as a basis for a legal assessment.

In order, on the one hand, to support the development process of automated driving functions and, on the other hand, to increase the number of customers and societal acceptance of them, a common understanding of a possible jurisdiction with regard to product liability is important. Manufacturers and suppliers need to understand the possible drawbacks of bringing vehicles or systems of Level 3+ to the market in order not to jeopardise the potential that automated driving will offer for driving comfort and safety. Societal acceptance of automated driving is a prerequisite to deploying such technology. Wide acceptance by customers and society cannot be expected as long as it is unclear to whom responsibility and liability will be ascribed. Therefore, the process of ascribing liability needs to be clear.

7.2 Approach

As stated above, there clearly does not yet exist any court decision for automated vehicles or systems of Level 3 or above. Therefore, a set of possible scenarios (see Chapter 4) has been developed which will serve as examples for assessing the legal situation under current law. The assessment is located in Chapter 11 (Annex: Product Liability).

The scenarios have been developed mainly by following naturally-raised questions about vehicle automation and product liability, such as:

- What if something happens when the driver was allowed to turn his attention away? Does it depend on the origin of the malfunction?
- What if the driver activates the system when it is not appropriate?

- What if the driver does not take over upon request within the limited period of time?
- What if the system requires the driver to take over within a period of time shorter than the predetermined period of time?
- What if there is a critical situation to be handled, and the system reacts as well as the driver could have?
- What if there is a critical situation to be handled that would have caused an accident if the driver had been in charge, but the system does not react as well as the driver would have, leading to greater severity of the accident?
- What if another user performs a manoeuvre that indirectly induces an accident?
- What if the vehicle “breaks the law” when the driver is not required to monitor the environment?

The assessment begins with some general findings summarising the impact of the European product liability directive 85/374/EEC and continues with a review of the transformation of that directive into national law for the countries of France, Germany, Italy, Sweden and the United Kingdom.

The country-specific assessment (in Chapter 11) of the scenarios will focus on product liability law, tort law, warranty and some other laws (e.g. traffic law, criminal law) as appropriate for the driver, the owner or the manufacturer. In addition (also in Chapter 11), a general analysis of insurance law will be given for the above-named countries. The move of the results of the assessment and analysis of insurance law to a separate annex became necessary when the difficulty of the task became obvious - a simple collection of answers in tabular form turned out not to be adequate.

Since the automotive industry is offering more and more global products, an overview of the regulatory activity will be given for the major market of the United States before concluding generally.

7.3 General regulation under Directive 85/374/EEC

The purpose of the Directive was to approximate the laws of the Member States concerning the liability of the producer for damage caused by the defectiveness of his products. There was a risk that existing divergences might distort competition and affect the movement of goods within the common market and entail a differing degree of protection of the consumer against damage caused by a defective product to his health or property.

The target was a liability without fault on the part of the producer, but this shall apply only to movables which have been industrially produced. Thus, the producer shall be liable for damage

caused by a defect in his product, and ‘product’ means all movables even if incorporated into another movable or into an immovable, and also includes electricity.

The protection of the consumer requires that all producers involved in the production process should be made liable, in so far as their finished product, component part or any raw material supplied by them was defective. For the same reason, liability should extend to importers of products into the Community and to persons who present themselves as producers by affixing their name, trade mark or other distinguishing feature or who supply a product the producer of which cannot be identified. Therefore, 'Producer' means the manufacturer of a finished product, the producer of any raw material or the manufacturer of a component part and any person who, by putting his name, trade mark or other distinguishing feature on the product presents himself as its producer. Without prejudice to the liability of the producer, any person who imports into the Community a product for sale, hire, leasing or any form of distribution in the course of his business shall be deemed to be a producer within the meaning of this Directive and shall be responsible as a producer. Where the producer of the product cannot be identified, each supplier of the product shall be treated as its producer unless he informs the injured person, within a reasonable time, of the identity of the producer or of the person who supplied him with the product. The same shall apply, in the case of an imported product, if this product does not indicate the identity of the importer referred to in paragraph 2, even if the name of the producer is indicated.

To protect the physical well-being and property of the consumer, the defectiveness of the product should be determined by reference not to its fitness for use but to the lack of the safety which the public at large is entitled to expect. The safety is assessed by excluding any misuse of the product that cannot be reasonably foreseen under the circumstances. A product is defective when it does not provide the safety which a person is entitled to expect, taking all circumstances into account, including (1) the presentation of the product, (2) the use to which it could reasonably be expected that the product would be put, (3) the time when the product was put into circulation. A product shall not be considered defective for the sole reason that a better product is subsequently put into circulation.

The injured person shall be required to prove the damage, the defect and the causal relationship between defect and damage. A fair apportionment of risk between the injured person and the producer implies that the producer should be able to free himself from liability if he furnishes proof as to the existence of certain exonerating circumstances.

The producer shall not be liable as a result of this Directive if he proves (1) that he did not put the product into circulation; or (2) that, having regard to the circumstances, it is probable that the defect which caused the damage did not exist at the time when the product was put into circulation by him or that this defect came into being afterwards; or (3) that the product was

neither manufactured by him for sale or any form of distribution for economic purpose nor manufactured or distributed by him in the course of his business; or (4) that the defect is due to compliance of the product with mandatory regulations issued by the public authorities; or (5) that the state of scientific and technical knowledge at the time when he put the product into circulation was not such as to enable the existence of the defect to be discovered [but each Member State may by way of derogation maintain or provide in this legislation that the producer shall be liable even if he proves that the state of scientific and technical knowledge at the time when he put the product into circulation was not such as to enable the existence of a defect to be discovered – this has to be communicated to the Commission who inform the other Member States]; or (6) in the case of a manufacturer of a component, that the defect is attributable to the design of the product in which the component has been fitted or to the instructions given by the manufacturer of the product.

The protection of the consumer requires that the liability of the producer remains unaffected by acts or omissions of other persons having contributed to cause the damage. However, the contributory negligence of the injured person may be taken into account to reduce or disallow such liability.

Furthermore, compensation is required for death and personal injury as well as compensation for damage to property. The latter should nevertheless be limited to goods for private use or consumption and be subject to a deduction of a lower threshold of a fixed amount in order to avoid litigation in an excessive number of cases. Thus, ‘damage’ means (1) damage caused by death or by personal injuries; (2) damage to, or destruction of, any item of property other than the defective product itself, with a lower threshold of 500 EUR, provided that the item of property (a) is of a type ordinarily intended for private use or consumption, and (b) was used by the injured person mainly for his own private use or consumption.

Any Member State may provide that a producer's total liability for damage resulting from a death or personal injury and caused by identical items with the same defect shall be limited to an amount which may not be less than 70 million EUR.

This Directive should not prejudice compensation for pain and suffering and other non-material damages payable, where appropriate, under the law applicable to the case.

A uniform period of limitation for the bringing of action for compensation is in the interests both of the injured person and of the producer.

Liability should expire after a reasonable length of time, without prejudice to claims pending at law due to products age in the course of time, higher safety standards and the state of science and technology progresses. Therefore, it would not be reasonable to make the producer liable for an unlimited period for the defectiveness of his product. So Member States shall provide in

their legislation that the rights conferred upon the injured person pursuant to this Directive shall be extinguished upon the expiry of a period of 10 years from the date on which the producer put into circulation the actual product which caused the damage, unless the injured person has in the meantime instituted proceedings against the producer.

To achieve effective protection of consumers, no contractual derogation should be permitted as regards the liability of the producer in relation to the injured person.

Insofar as an injured party may have under the legal systems of the Member States a claim for damages based on grounds of contractual liability or on grounds of non-contractual liability other than that provided for in this Directive and in so far as these provisions also serve to attain the objective of effective protection of consumers, they should remain unaffected by this Directive.

This European directive is not automatically legally binding in each Member State, but had to be implemented into national law. For five European countries, the date and title of implementation into national law will be given in the following.

7.4 Implementation in national law

7.4.1 France

In France, Directive 85/374/EEC has been transposed by the 19 May 1998 Law n°98-389 in the Civil Code, under 18 articles (1386-1 to 1386-18) before the Title IV bis “Liability for defective products” and immediately after the Title IV of the Civil Code dedicated to “Engagements which take form without agreement” (including Tort Law). It has been modified by a 9 December 2004 Law.

It came into effect on 21 May 1998 and faithfully reflects the spirit of Directive 85/374/EEC.

All these provisions have been included in a recent 10 February 2016 ordinance n°2016-131, which reformed the general contract law, and became Articles 1245 to 1245-17 of Civil Code, above a chapter II “Liability defective products”, taking place immediately after a chapter 1 “Extra-contractual liability in general”. This reform came into force in October 2016, after having being ratified.

7.4.2 Germany

The German Product Liability Act came into effect on 15 December 1989. The liability of the producers pursuant to this Act may not be excluded or limited in advance. Any agreements to the contrary shall be null and void. Basically, Directive 85/374/EEC was implemented into German law with all regulations described under section 9.3. However, some provisions should be highlighted or explained in particular.

7.4.3 Sweden

Directive 85/374/EEC is transposed into Swedish law by Product Liability Act (1992: 18). Claims under this Act are paid for personal injury as product-caused due to a safety flaw. Compensation can also be claimed for some property damage (§ 1). A product that has been inserted into another property is in a legal sense still a product for itself. If damage has occurred due to a defect in a product which constitutes a component of another product, the two products have caused the injury (§ 2). Compensation obligation exists regardless of any or no negligence (strict liability) with the following restrictions. A product is defective if the product is not as safe as can be reasonably expected. The safety shall be assessed taking into account how the product can be expected to be used and how it is marketed, as well as with respect to the operating instructions, time when the product was put into circulation and other circumstances (§ 3).

7.4.4 United Kingdom

Directive 85/374/EEC was implemented in the UK by way of Part I of the Consumer Protection Act 1987, which entered into force on 1 March 1988.[30] It applies to products supplied to consumers after this date. It imposes a strict liability regime for defective products in the UK. It does not, though, affect the ability of a claimant to make a product liability claim under the other causes of action which were already available to consumers before the Consumer Protection Act 1987, such as in contract and tort.[31]

These alternative regimes, however, present difficulties that may not apply to claims under the Consumer Protection Act 1987. With respect to claims in contract, for example, a claim can typically only be brought by a party to the contract. This makes it difficult or impossible for third parties who suffer damage from a defective product to bring a claim.[32] Regarding claims in tort, the claimant has to prove negligence on the part of the defendant which, depending on the circumstances, may be challenging or impossible.[33]

The Consumer Protection Act 1987, on the other hand, creates a regime of strict liability to the extent that it removes the need to prove negligence or actual fault, as required to make out a negligence claim.[34] Under this Act an injured party may take action against a vehicle (or vehicle

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30 The UK was the first Member State to implement the Directive. See Christopher Johnston, *A personal (and selective) introduction to product liability law*, Journal of Personal Injury Law 2012, p.2.

31 See below at 11.4.1.2 and 11.4.2 for more details.

32 See para below.

33 Benjamin Sale of Goods 9th Edition para 14-094: "*the need to prove negligence constituted an unacceptable barrier to recovery*".

34 Thomas Samuels, *Product Liability: Overview*, Westlaw, para 11.

component) manufacturer (or importer, distributer etc.) that supplied a defective product without having to prove actual fault by the manufacturer, etc.[35]

7.4.5 Italy

The product liability regime set forth under Directive 85/374/EEC (the "Directive") has been implemented in Italy through Presidential Decree No. 224 of 24 May 1988, whose provisions were repealed in 2005 and transposed into Articles 114 to 127 of Legislative Decree No. 206 of 9 September 2005 ("Codice del Consumo", hereinafter referred to as the "Consumer Code").

As a general remark, it is worth mentioning that the Consumer Code provides for a wide array of principles and rules governing the relationships between business undertakings and consumers. These rules are aimed at providing the consumer with a high degree of protection against a number of risks, directly or indirectly connected with the purchase of products intended for private use. In particular, in addition to the rules on product liability mentioned above, the Consumer Code contains additional provisions concerning, inter alia, the commercial behaviours of the sellers/producers vis-à-vis the consumers, mandatory contractual provisions to be included in the agreements executed with the latter, safety of products and product warranties and guarantees.

7.5 United States of America

Much has been stated about the U.S. being at an advanced stage compared to Europe from a regulatory perspective with respect to automated driving. As a matter of fact, a uniform legal framework covering all aspects of autonomous vehicles (admission to public road traffic, safety standards, liability rules, insurance matters) does not exist in the U.S. either. However, there is an increasing amount of regulatory activity by States, and the Federal legislators have been expanding rules activity primarily with respect to safety standards.

7.5.1 Federal Regulatory Activities

In the U.S. legal system, traditionally the division of regulatory responsibility for motor vehicle operation between Federal and State authorities has been fairly clear. States have responsibility for vehicle licensing and registration, traffic laws and enforcement, and motor vehicle insurance and liability regimes, while NHTSA regulates motor vehicle performance each state owns and the rights of way for roads within its respective territory. Nevertheless, under the Supremacy Clause of the United States Constitution, the U.S. Congress could enact national legislation that regulates certain aspects of autonomous vehicles on a uniform national basis, excluding state

35 Liability is established for producers and importers under s2 Consumer Protection Act 1987.

and local laws. Absent such legislation, there is currently no competency by the federal government to regulate all aspects of autonomous driving vehicle performance.

The National Traffic and Motor Vehicle Safety Act of 1966 ("Safety Act") is the basis for further U.S. federal regulations with respect to automotive safety. It requires the Secretary of Transportation to establish safety standards for motor vehicles, and the Secretary of Transportation delegated this authority to the National Highway Traffic Safety Administration (NHTSA), which has released more than 60 Federal Motor Vehicle Safety Standards ("FMVSSs") binding as minimum safety standards on all manufacturers and importers of motor vehicles and motor vehicle equipment for use in public road traffic.

NHTSA has not established any FMVSSs specific for autonomous vehicles yet. However, while leaving safety-related regulations on autonomous vehicles up to the States for the time being, NHTSA did provide regulatory guidance to the States by making certain recommendations for their rulemaking, including a recommendation that States avoid attempting to regulate vehicle performance. The guidance is based on NHTSA's respective research projects on safety standards of autonomous vehicles, also including vehicle-to-vehicle communications and software security, which have been in progress for several years.

7.5.1.1 The 2013 NHTSA Preliminary Statement of Policy Concerning Automated Vehicles

In 2013, NHTSA issued a Preliminary Statement of Policy Concerning Automated Vehicles ("Preliminary Statement").[36] It suggested common definitions of automation levels, outlined the research program by NHTSA and its focus, and provided recommendations to states for regulations on testing autonomous vehicles on public roadways.

The NHTSA definitions differ slightly from those released by SAE in January 2014 and comprise five automation levels:

Level 0—No Automation

Level 1—Function-specific Automation

Level 2—Combined Function Automation

Level 3—Limited Self-Driving Automation

Level 4—Full Self-Driving Automation [Driverless]

[36] http://orfe.princeton.edu/~alaink/SmartDrivingCars/Automated_Vehicles_Policy.pdf

Following the Preliminary Statement, federal and state regulators generally refer to the NHTSA taxonomy of automation levels, while vehicle manufacturers and suppliers mostly use the SAE categories, as they are more common with the categories also adopted in Europe.

At the time when the Preliminary Statement was released, Nevada, California and Florida had already enacted legislation permitting operation of self-driving vehicles under certain conditions. The NHTSA stated its view that "confusion or disarray on the safety issues would be a significant impediment to the development of these technologies". At the same time, NHTSA explicitly expressed its concerns about permitting operation of self-driving vehicles (Levels 3 and 4 in the NHTSA taxonomy) on public roadways for any purposes other than testing, given that setting technical performance requirements for these categories of automations was still premature.

NHTSA provided a set of preliminary principles on how states should frame the testing of self-driving vehicles on public roadways, e.g.

- require a properly licensed driver be seated in the driver's seat and ready to take control of the vehicle;
- take steps to minimize the risks to other road users, such as through manufacturer certification of a certain mileage of prior testing without incidents, and limiting testing to conditions suitable for the capabilities of the tested vehicles (such as limiting testing to limit access highways or light traffic / low speed areas);
- establish reporting requirements to monitor the performance of self-driving technology during testing;
- ensure that the transition from self-driving mode to driver control is "safe, simple, and timely;"
- test vehicles to be capable of detecting, recording, and informing the driver of malfunctions of the automated technologies;
- ensure that installation and operation of any self-driving vehicle technologies does not disable any federally required safety features or systems;
- require self-driving test vehicles to record information about the status of the automated control technologies in the event of a crash or other safety event.

7.5.1.2 The 2016 Update on the Preliminary Statement

Realizing that the development of driving automation has made rapid progress particularly with respect to Level 3 and 4 systems, the NHTSA recognized that the 2013 Preliminary Statement needed to be updated. Therefore, in January 2016, the Department of Transportation and NHTSA jointly released a statement entitled "DOT/NHTSA Policy Statement Concerning Automated Vehicles" as an update to the 2013 Preliminary Statement.[37]

This Updated Statement announced that NHTSA will propose best-practices to industry on establishing principles of safe operation for fully autonomous (i.e. NHTSA Level 4) vehicles

[37] http://www.nhtsa.gov/staticfiles/rulemaking/pdf/Autonomous-Vehicles-Policy-Update-2016.pdf

within six months. It further announced that NHTSA, also within six months, will "work with states to craft and propose model policy guidance that helps policymakers address issues in both testing and the wider operational deployment of vehicles at advanced stages of automation and offers a nationally consistent approach".

In order to facilitate development activities, the Updated Statement further encourages manufacturers to seek NHTSA's authority to exempt limited numbers of vehicles for testing purposes from compliance with FMVSS, in order to permit the operation of field test fleets that can demonstrate the safety benefits of autonomous vehicles. NHTSA also noted that its existing exemption authority will be reviewed, as it may be insufficient to effectively serve this purpose.

7.5.1.3 Review of Federal Motor Vehicle Safety Standards

As a part of the research activities triggered by NHTSA, in March 2016 the John A. Volpe National Transportation Systems Center belonging to the U.S. Department of Transportation published a preliminary report titled "Review of Federal Motor Vehicle Safety Standards (FMVSS) for Automated Vehicles - Identifying potential barriers and challenges for the certification of automated vehicles using existing FMVSS".[38]

The research team performed two reviews of the FMVSS, i.e. (1) to identify explicit and implicit references to a human driver and (2) to assess whether and to what extent the FMVSS might make it difficult for manufacturers to certify the compliance of an automated vehicle, particularly for higher levels of automation as well as new vehicle concepts and designs.

The report points out the driver definition in FMVSS § 571.3 ("Driver means the occupant of the motor vehicle seated immediately behind the steering control system") and concludes that most references to a driver do not preclude certifying a vehicle even with advanced automated capabilities if the vehicle still reserves a seating position for a human driver, and the human driver is actually able to drive the vehicle.

The research team found that only a few FMVSS standards present challenges for certifying vehicles with automated capabilities but still retaining the overall design, seating arrangement, and human-machine interfaces of a conventional passenger car. However, it sees a major need for regulatory review and action with respect to future vehicles with new designs, control interfaces, and other characteristics going along with automation systems, as well as possibly new safety issues which such new designs may create.

It is interesting to note that, while the Volpe Report was still being elaborated, NHTSA responded to an inquiry by Google with respect to the interpretation of certain FMVSS requirements referring to the "driver" or "operator" of a motor vehicle. The NHTSA letter dated

[38] http://ntl.bts.gov/lib/57000/57000/57076/Review_FMVSS_AV_Scan.pdf

February 4, 2016[39] refers to Google's concept of a Level 4[40] self-driving vehicle without a steering wheel and pedals. NHTSA notes that it is ready to consider Google's self-driving system to be "the driver" rather than any of the vehicle occupants. However, for a number of FMVSS, it would nevertheless be difficult to certify that the self-driving system meets the respective standard as it was tailored to be applicable for a human driver (e.g. the requirement under FMVSS No 108 to have telltales visible to the driver for activation of turn signals and headlights). The agency announced that it would evaluate the need for regulatory action and recommended that Google apply for exemptions for the time being.

7.5.2 State Legislation

Nevada's regulatory activities were quickly followed by California[41] and Florida[42] in 2012, as well as Michigan[43] and District of Columbia[44] in 2013. Still today, these states remain the ones with the most developed legal framework for autonomous driving, whereas enacted legislation available in four other states is more programmatic in nature.

More states will certainly follow: The number of states with legislation on autonomous vehicles introduced into the legislative process increased to sixteen in 2015, from twelve in 2014, nine in 2013 and six in 2012.[45] However, in some instances the regulatory initiatives did not result in consensus in the regulatory process and failed eventually. At the same time, laws and regulations in states with enacted legislation are experiencing continuous review and amendments.

[39] See http://isearch.nhtsa.gov

[40] Pursuant to NHTSA classification

[41] Senate Bill No. 1298 Chapter 570

[42] Florida Statutes, Chapter 316

[43] Michigan Senate Bill 0995 Public Act 332 of 2016; the legislation reverses Senate Bill 0169 Public Act 231 of 2013

[44] D.C. Code § 50-2351-2354

[45] Updated surveys: Gabriel Weiner and Bryant Walker Smith, Automated Driving: Legislative and Regulatory Action, cyberlaw.stanford.edu/wiki/index.php/Automated_Driving:_Legislative_and_Regulatory_Action; http://www.ncsl.org/research/transportation/autonomous-vehicles-legislation.aspx#Enacted Autonomous Vehicle Legislation

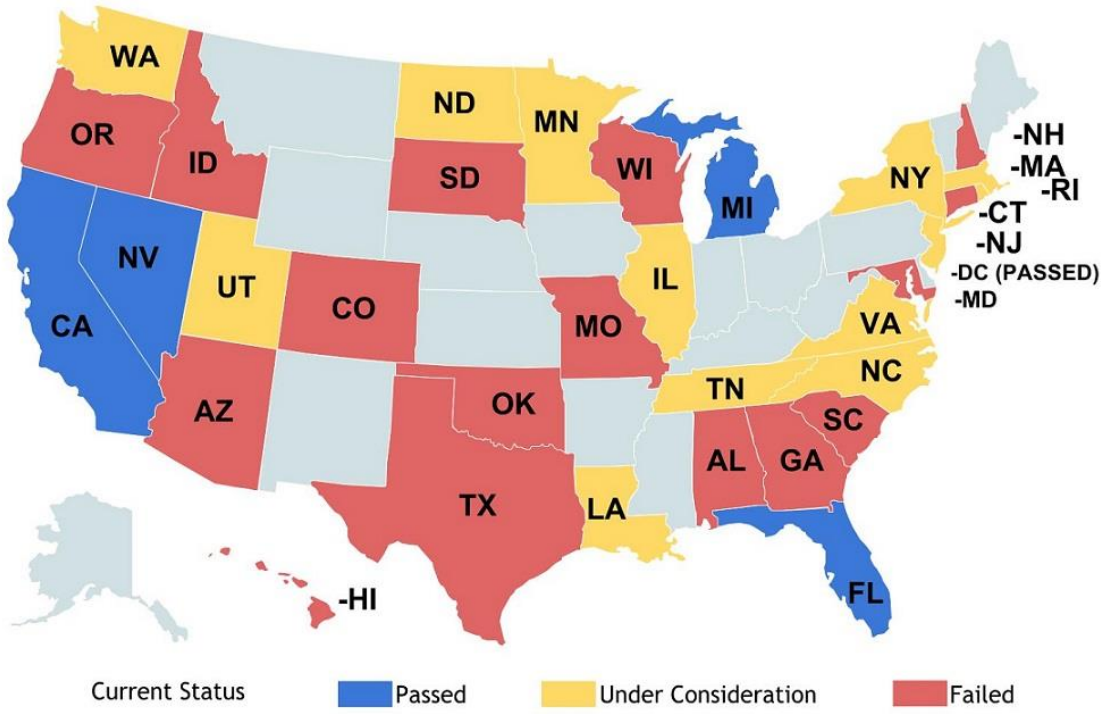

Figure 7.1: Legislative and Regulatory Action with regard to automated driving:

Source: Gabriel Weiner and Bryant Walker Smith, Automated Driving: Legislative and Regulatory Action, cyberlaw.stanford.edu/wiki/index.php/Automated_Driving:_Legislative_and_Regulatory_Action; status 1 June 2016

The subsequent paragraphs highlight some key regulatory elements in the states with enacted autonomous vehicle legislation as well as their differences.

a. Definition of Autonomous Vehicle

State laws already in effect typically begin with a definition of “autonomous technology” and/or “autonomous vehicle”. The ability of a vehicle to drive itself without the active intervention of a human operator is a defining element in all enacted state laws on autonomous vehicles, i.e. NHTSA Level 2 (or lower) technologies are outside the scope of these laws. Nevada's law, for example, explicitly stipulates that “the term does not include an active safety system or a system for driver assistance, including, without limitation, a system to provide electronic blind spot detection, crash avoidance, emergency braking, parking assistance, adaptive cruise control, lane keeping assistance, lane departure warning, or traffic jam and queuing assistance, unless any such system, alone or in combination with any other system, enables the vehicle on which

the system is installed to be driven without the active control or monitoring of a human operator."[46]

b. Driver Requirements

Most laws explicitly define the person who engages the autonomous technology as the "operator" of the vehicle, regardless if such person is present inside of the vehicle.[47] Operating an autonomous vehicle generally requires a valid driver's license. An additional so-called "G endorsement" on the driver's license is mandatory in Nevada, and an autonomous vehicle operator certificate is required in California for any operation of autonomous vehicles.[48]

c. Special Safety Requirements for Autonomous Vehicles

Nevada and California require a certificate of compliance issued by the manufacturer of an autonomous vehicle or a licensed certification facility[49] to be provided for autonomous vehicles offered for sale. Among a few others, certification items include the presence of an event data recorder, a technical failure alerting system, an emergency stopping system and a visual indicator of autonomous mode activation inside the vehicle.[50]

In addition to (self-) certification, California requires manufacturers and upfitters to file an application for 'General Operation of Autonomous Vehicles on Public Roads' for which proof of testing on public roads must be presented.[51] In D.C., the conversion of vehicles to autonomous vehicles is limited to model years 2009 or later or vehicles built within 4 years of conversion, whichever vehicle is newer.

d. Data Recording and Reporting Requirements

California has the most elaborate provisions on data recording and reporting. In addition to the requirement of having an event data recorder in the vehicle, manufacturers must report crashes involving automated vehicles to the Department of Motor Vehicles (DMV) within 10 days.[52] Such incidents are published by the DMV on a web page.[53] Manufacturers must also submit an annual report to the DMV on the number and circumstances of autonomous mode disengagement events, i.e. any self-deactivation of the autonomous mode due to a failure detected or due to

[46] Nevada NRS 482A.025

[47] Nevada NAC 482A.020, Fla. Stat. § 316.85, Michigan Senate Bill 0169 Public Act 231 of 2013, sections 35a and 36

[48] Nevada NAC 482A.110

[49] Nevada only

[50] Nevada NAC 482A.190; California Vehicle Code § 3875 (b) (2)

[51] California Vehicle Code § 38750 (c) (1)

[52] 13 California Code of Regulations (CCR) § 227.44

[53] https://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/autonomousveh_ol316

deactivation by the test driver in order to maintain safe operation of the vehicle by taking over manual control.[54]

e. Insurance Requirements

California, Nevada, and Florida have insurance requirements specific for the operation of autonomous vehicles. Manufacturers must have a $5 million insurance policy or proof of self-insurance, a $5 million surety bond, or make a $5 million deposit with the respective DMV, in order to cover possible liabilities for damage caused by autonomous vehicles.[55] Michigan and D.C. do not have a minimum insurance level requirement beyond the requirement generally applicable for other vehicles, however proof of insurance must be provided prior to testing in Michigan.[56]

f. Liability Provisions

Provisions on liability can be found in the laws of states such as Nevada or Florida.[57] While wordings vary, all these provisions state the principle that the manufacturer of a vehicle that has been converted into an autonomous vehicle by a third party cannot be held liable for damages caused by such conversion – a rather plausible distinction between the liability spheres of vehicle manufacturers and autonomous technology converters, albeit irrelevant for OEM autonomous technology. The rather relevant and interesting distinction, i.e. the distinction between liability spheres of an autonomous vehicle manufacturer (product liability) and the operator of such vehicle (behavioral liability) has not been addressed by legislation yet.

Needless to say that there is no established case law answering such questions either, as presence of autonomous vehicles in U.S. public road traffic has been sparse so far. The first accident caused by an autonomous vehicle in public traffic was reported on February 14, 2015, when a Lexus RX450h with a Google autonomous driving system laterally hit a bus when trying to avoid a collision with an obstacle on the lane it was travelling on in Mountain View/CA. As there were no injuries and Google reportedly admitted “some liability”,[58] this has apparently not been followed by litigation. On May 7, a Tesla test vehicle with autonomous system caused the first fatal crash involving such technology. The car crashed into the trailer of a truck turning left from the opposite lane, and the system failed to brake.[59] The driver, who was allegedly watching a movie despite his responsibility to monitor the system, was killed. There is currently no information on the claims situation and with respect to possible settlements or litigation.

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[54] 13 CCR § 227.46

[55] California Vehicle Code § 3875(b)(3) ; Nevada NRS 482A.060; Fla. Stat. § 316.86

[56] Michigan Senate Bill 0169 Public Act 231 of 2013, section 665

[57] Nevada NRS 482A.090; Fla. Stat. § 316.86.

[58] http://www.reuters.com/article/us-google-selfdrivingcar-idUSKCN0W22DG

[59] http://www.nytimes.com/interactive/2016/07/01/business/inside-tesla-accident.html

g. Use of Mobile Telecommunications Devices

One key selling point of automated driving systems is the ability of the driver/operator to participate in certain other activities while on board. On the other hand, automation levels will not exceed Level 3 (in NHTSA terms) for a considerable period going forward, i.e. they will require the driver/operator to be available for occasional control and to take on the driving task if required. Whether this is compatible with handheld communications devices is subject to discussions.

In this respect, it is important to note that bans on the use of handheld communication devices are usually limited to texting (i.e. entering characters for the purposes of non-voice communication) only under most U.S. state laws, which means that using handheld devices for making voice calls is permitted anyway without a hands-free device.

However, among the states with enacted autonomous vehicle legislation, California,[60] Michigan[61] and D.C.[62] do have a general ban on handheld use without a hands-free device, and laws in these states do not privilege operators of vehicles running in autonomous mode with respect to this ban. Respective exemptions exist in Nevada[63] and Florida[64] only. Under the laws of both, the prohibition of texting does not apply to operators of autonomous vehicles in autonomous mode, which means that they are free to use mobile devices for texting during travel in these particular U.S. states.

h. Prerequisites for Testing Operations

California's and Nevada's regulations require the testing entity to obtain a testing permit, which is valid for one year and may be renewed. Testing entities applying for a permit in Nevada must present proof that the vehicle has been driven in autonomous mode for at least 10,000 miles and provide a detailed description of the autonomous vehicle as well as a safety plan. In Nevada, permits have to be applied for on public roads in six "geographic categories" and five "environmental types".[65] There are no geographical limits for testing in California, Florida, D.C. and Michigan.

Washington D.C.'s regulations, for example, specifically require a "driver" to be seated in the driver's seat, monitoring the safe operation of the autonomous vehicle and capable of taking over immediate manual control of the autonomous vehicle in the event of an autonomous

[60] California Vehicle Code § 23123.5

[61] Michigan Senate Bill 0169 Public Act 231 of 2013, section 602b

[62] D.C. Code § 50-1731.04

[63] NRS 484B.165

[64] Fla. Stat. § 316.305 (3) (b) 7.

[65] "Nevada Autonomous Vehicle Testing License", by Nevada DMV, http://www.dmvnv.com/pdfforms/obl326.pdf

technology failure or other emergency.[66] Other states do not have a "driver" requirement, but the presence of individuals inside the vehicle ready to reassume control is still mandatory during autonomous operation,[67] although such individuals do not need to be identical with the "operator". Nevertheless, Nevada requires even 2 persons to be on board during testing operations, and although they need not be the actual "operators" of the autonomous vehicle, they need to hold a driver license.[68]

7.5.3 Summary

While four U.S. states and District of Columbia have legislation in place explicitly addressing autonomous driving, respective laws do not yet exist in the great majority of states, and many states have not initiated legislative action either. The enacted laws focus on some – certainly very important – aspects, but are still in the stage of evolution as well. Concerns are expressed about the pace of legislative activities not keeping up with progress in technology, as well as about state laws potentially resulting in a patchwork of different laws and regulations. As an important step to address the latter, the industry and other stakeholders are waiting for the NHTSA to release its guidelines announced in the 2016 Update on the Preliminary Statement. That release, originally announced for July 2016, is reported to be potentially delayed due to the investigation of the fatal incident involving a Tesla vehicle with autonomous technology.[69]

7.6 Conclusions

Liability in Europe

The European Union's Directive 85/374/EEC states in Article 1: "The producer shall be liable for damage caused by a defect in his product." Besides that, the Directive defines terms, excludes special cases and has two monetary indications. Cases on product liability will be tried in national courts and national law applies. Only in the year 1999 the Directive was amended with changes to the definition of "movables".

A wealth of successive studies has been produced in the last 30 years on this Directive and a thorough evaluation is planned for completion in June 2017 as part of the request in Article 21 to report every five years on the application. The evaluation will include reflections on robotics, autonomous and artificial intelligence systems.

The overview on product liability given by partners from five countries was made necessary by the main topic of AdaptIVe, to develop automated driving functions and to address hindrances to

[66] D.C. Code § 50–2352

[67] Michigan Senate Bill 0169 Public Act 231 of 2013, section 665 (2) (b)

[68] Nevada NAC 482A.130

[69] http://www.detroitnews.com/story/business/autos/2016/06/30/tesla-model-crash/86570186/; http://www.latimes.com/business/autos/la-fi-self-driving-rules-20160819-snap-story.html

market introduction. Deployment of advanced technology also needs accepted legal standards, and these standards need a thorough discussion with a view on real prototypes to evolve to a useful system of checks and balances. The advantage of sharing the discussion inside a research project is the more direct contact between development, testing and legal expertise.

In a historical context, this overview might be a “last intake of breath” before moving to a wider (and even more complex) view on liability, one that includes special topics from automation, robotics, connectivity and the Internet of Things. This overview will remain valid, though, as the topics added will not change the ground on which the Directive stands. It is expected that a data storage device will be a requirement for a vehicle with autonomous driving capabilities. The device will store information about the state of the operator (driver, system, request for takeover) and data that should allow the reconstruction of a possible incident. There are still many issues with this device that need to be solved.

Under the current legislation in the relevant European countries of this project, autonomous driving, in particular using a Level 4 and Level 5 system, is not yet allowed (except for Sweden, where test experiments with self-driving vehicles on the road will be allowed from 1 May 2017). Amendments to the law are necessary to allow this. In Germany, for example, there are currently discussions about a draft for amendments of the Road Traffic Act. Therefore, a final legal assessment with regard to the scenarios is only possible when such amendments have finally been implemented into the relevant law. For this reason, no relevant court decision can be discussed within this project.

Nevertheless, the legal assessment was made under the assumption that the relevant law already allows the use of a Level 3 and Level 4 system. Furthermore, the current legislation was taken into account as well as existing experience with the existing law and case law.

Please see Chapter 11 (Annex: Product Liability) below for details of the legal assessment with regard to the five scenarios for each of the relevant European countries.

Please note that all of the relevant European countries have implemented Directive 85/374/EEC into national law. Slight differences (which are within the general regulation, see 7.3) are discussed in the following.

Liability limit for liability resulting from death / personal injury

In most of the relevant European countries, the manufacturer’s total liability for damage resulting from death or personal injury is unlimited. Only in Germany will there be a limitation to an amount of EUR 85 million. Besides that, German traffic law provides strict liability for the registered keeper of the vehicle, which seems to be unique in the relevant European countries. There is a limitation of liability for damages resulting from death or personal injury too. The maximum amount for compensation will be EUR 5,000,000.00 in case of death or bodily injury

and EUR 1,000,000.00 in case of property damage. Please see Chapter 11 (Annex Product Liability) for further details.

Deductible of the injured party for damages to property

In all of the European countries, the injured party has to pay a deductible for damages to property. The amount varies for each country. The injured party shall pay a deductible for damages to property up to an amount of EUR 500 in France, EUR 500 in Germany, SEK 3,500 in Sweden, EUR 387 in Italy and GBP 275 in the UK.

The limitation period

In all of the relevant European countries, there will be a limitation period for claims under product liability law. After the limitation period, the damage is time-barred and a claim cannot be enforced anymore (if the manufacturer [as the defendant] refers to the limitation period).

In France, this will be three years from the day the injured party knew or should have known the damage, the defect and the identity of the manufacturer.

In Germany, this will be three years from the day on which the party entitled to damages became aware, or should reasonably have become aware, of the damage, the defect and the identity of the party liable to pay damages.

In cases where negotiations on the compensation for damage to be paid are pending between the party liable to pay damages and the party entitled to damages, the limitation period shall be suspended until the continuation of the negotiations is refused. In all other respects, the provisions of the German Civil Code on limitation shall apply mutatis mutandis (as is appropriate and applicable).

In Sweden, this will be three years from the time when the injured party became aware or should have become aware that a claim may be brought.

In Italy, this will be three years running from (a) the day on which the injured person became aware, or should have become aware, of damage suffered, the defect and the identity of the manufacturer; or (b) in case of aggravation of the damages, the day on which the injured person became aware, or should reasonably have become aware, of a damage significant enough to start judicial proceedings.

In the UK, this will be three years from the accrual (start) of the cause of action or (if later) from the date the claimant became aware of the damage.

Expiration period for claims

Apart from the limitation period, in all of the relevant European countries the manufacturer's liability shall expire 10 years after circulating the product which caused the damage, in any case.

However, this shall not apply if the injured party has instituted proceedings against the manufacturer in the meantime. Furthermore, at least in France and Germany, this shall not apply to claims that have been declared final and absolute or to claims based on other enforceable documents, or to claims which are the subject of an out-of-court settlement or were recognised by means of a contractual declaration.

Outlook with regard to manufacturer's liability in Europe

In the future, the main problem for an injured person could be to prove someone's liability (the driver or the autonomous driving system = manufacturer) in case of an accident which occurred while using an autonomous driving system. Under product liability law, the injured person has to prove the damage, the defect and the causal relationship between defect and damage. If the driver is allowed not to monitor the driving task at all times while using an autonomous driving system, the "vehicle" may cause the accident. In such cases, it could be difficult to still hold the driver liable for the accident. From one point of view, a general shift from driver's liability to manufacturer's liability in case of an accident while using an autonomous driving system could be the consequence. For the injured person it would be easier to identify against whom they might have a claim. The manufacturer then has to exonerate himself by proving that the autonomous driving system did not cause the accident. As a result, the manufacturer could be involved (and maybe liable under product liability law) in more cases of an accident than is the case today.

Another consequence of the shift of liability could be a change in German strict liability for the registered keeper of the vehicle in the case where the "vehicle" might have caused the accident. Maybe in the future, there will be a "second reason" why the registered keeper will not be automatically liable in the case of an accident (today this is only the case in the event of "force majeure").

United States

In the United States, autonomous driving is already allowed in a few states, at least for testing purposes. However, there is no uniform legal framework covering all aspects of autonomous driving. Consequently, there is no competency or authority by the federal government to regulate all aspects of autonomous driving at the moment. Therefore, each State needs regulatory activities of its own. Furthermore, the National Highway Traffic Safety Administration (NHTSA) usually establishes safety standards for motor vehicles. These safety standards are

binding as minimum safety standards on all manufacturers and importers of motor vehicles. The NHTSA has already made a statement with regard to autonomous driving which requests that such standards be taken into consideration by manufacturers and importers of motor vehicles.

A legal assessment concerning manufacturer's/importer's liability has to be made "state by state" for each individual case.

Insurance law

Another interesting aspect to take into consideration is insurance law. The permission to use autonomous driving systems will have an impact on insurance law and so, indirectly, on manufacturer's product liability.

From the insurers' point of view, autonomous driving will affect many different aspects, e.g. liability, coverage, data collection, misuse or manipulation of data, and cyberattacks. Therefore, coverage by insurance seems to be especially necessary for the manufacturer, the driver, the registered keeper and software providers.

It is unclear whether autonomous driving will result in higher costs for the insurer. For example, it could be more difficult for a claimant to prove someone's liability for an accident due to the use of an autonomous driving system. Consequently, it could be necessary to ask for several expert's opinions, which of course will increase litigation costs. An alternative could be a change in the right of recourse. Maybe the insurer could plan to take recourse from the manufacturer in general if an autonomous driving system was in use. Therefore, a shift from third party insurance towards manufacturer's product liability could be under discussion.

However, no change is expected in the system that the injured party can claim directly against the insurer, even if an autonomous driving system was in use. Rather, details of liability will be clarified on the "second level" (insurer vs. manufacturer) and there will be more actions for recourse than there are today.

Please see Chapter 11 (Annex: Product Liability) for an overview of the current insurance law of the relevant European countries.

8 Data and legal consequences

8.1 Introduction

Like all connected objects, automated vehicles are likely to collect and process data for their operation and the services they provide. As regulatory changes are currently being discussed by the main stakeholders, these vehicles may also be equipped with a data recorder, i.e. a system intended to store relevant data in case of an accident or a road event.

These data are likely to be related to a physical person and therefore fall within the scope of personal data regulation. In Europe, the legal framework ensuring personal data protection has recently evolved with the adoption of the General Regulation on personal data protection in April 2016.

In this report, we focus specifically on the privacy issues raised by data recorders installed in automated private vehicles, excluding public transport. In particular, we intend to determine what obligations the automated private vehicles equipped with data recorders must fulfil in order to comply with the legal requirements on personal data protection.

To this end, we first present the main provisions defined by the General Regulation on personal data protection, in section 8.2. These provisions are general (they do not concern only automated vehicles) and shall apply whenever personal data are collected and processed in the European Union or by a company established in the European Union.

After recalling these general principles and requirements, in the following chapter 8.3. we analyse how they apply specifically to the personal data collected and stored by automated private vehicles equipped with data recorders. Though any connected vehicle raises data protection issues, this study deals more precisely with the specific questions raised by data recorders installed in automated private cars, such as the nature of the data stored as well as the modalities and purposes of the storage. Thus, we shall evaluate how the general privacy measures set by the new European Regulation on personal data protection should apply to these questions.

8.2 General Data Protection Regulation

After over four years of discussion, the new EU data protection framework has finally been adopted. The **General Regulation on personal data protection**[70] (hereinafter referred to as the

[70] *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.*

Regulation) will replace the current Directive (Directive 95/46/EC[71]) and will be directly applicable in all Member States without the need for implementing national legislation.

The Regulation intends to answer the new challenges generated by the increased amount of data processed and exchanged during the last decade. Personal data have acquired a huge market value and are now crucial to many business models in the digital market. The Regulation aims to adapt EU law to these societal and technological evolutions and to harmonise regulations between the various Member States. It pursues a double goal of strengthening European citizens' right to privacy while ensuring the competitiveness of European companies on the international market.

The Regulation was adopted on 14 April 2016 by the European Parliament and will come into force on **25 May 2018**. Companies will therefore have two years to prepare for its obligations. This section emphasises some of the highlights in the Regulation.

8.2.1 Definitions

FIRST, WE SHALL DEFINE THE MAIN TERMS AND NOTIONS USED BY THE REGULATION.

THE CONCEPT OF PERSONAL DATA

The concept of 'data' has no legal definition. The Regulation is intended to protect a special category of data – 'personal data' – which presents specific risks in terms of privacy breaches and safety.

'Personal data' is defined in Article 4(1):

"'Personal data' means any information relating to an **identified** or **identifiable** natural person, called 'data subject'. This data subject is one who can be identified, **directly** or **indirectly**, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person."

Therefore, in our understanding:

- 'any information': the Regulation opts for a broad understanding of the concept, which applies regardless of the form taken by the data, the technology used to convey it, its reliability or its objectivity;

71 Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data.

- ‘relating to a natural person’: the protection afforded applies to natural persons, whatever their nationality or place of residence. The Regulation does not cover the processing of personal data which concern legal persons (recital 14), nor deceased persons (recital 27);
- ‘identified or identifiable’, ‘directly or indirectly’: the protection concerns all identifying information, either directly or indirectly, i.e. by overlapping with other data. Identification is an indefinite concept in law. The Regulation does not expressly define the term but circumscribes it by conducting the enumeration of possible identifiers.

SENSITIVE_DATA

The Regulation provides for enhanced protection for special categories of personal data that may result in a discrimination risk, called ‘sensitive data’, such as data revealing ethnic origin, political opinions, religious or philosophical beliefs (article 9).

‘Data concerning health’ (health data) are also considered as sensitive data. Besides, welfare data that measure the human body features may also be considered as health data according to the WP29[72].

PROCESSING, CONTROLLER AND PROCESSOR

The Regulation also provides an extensive definition of the concept of ‘processing’, which applies **from the collection of the data to their destruction** (article 4(2)):

‘Processing’ means any operation or set of operations which is performed on personal data or on sets of personal data, whether or not by automated means, such as collection, recording, organisation, structuring, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, restriction, erasure or destruction.

Two categories of persons are identified as the ones responsible for processing these data.

The ‘controller’ refers to the natural or legal person, public authority, agency or other body which, alone or jointly with others, **determines the purposes and means of the processing** of personal data (article 4(7));

while the ‘processor’ refers to a natural or legal person, public authority, agency or other body which **processes personal data on behalf of the controller** (article 4(8)).

PERSONAL DATA GENERATED BY THE AUTONOMOUS VEHICLE

[72] *The Article 29 Working Party (WP29) is the European authority in charge of personal data protection issues.*

The autonomous vehicle requires the processing of a certain amount of personal data:[73]

- as an **automated** vehicle (operating data, HMI data, etc.)

Examples: geolocation data, IP address, camera data if filming persons (pedestrians, other drivers, etc.) and allowing their recognition.

Besides, some data (e.g. eye-tracking, detector of signs of sleepiness) can be considered as health or biometric data subject to a reinforced protection regime.

- as a **registered** vehicle (Event Data Recorder data)

Some data (e.g. speed violations) constitute criminal offences violation data whose processing may only be carried out under the control of the public authority (article 10).

- as a connected object

The autonomous vehicle might be a connected object that processes and generates personal data.

There is no standard legal definition of the concept of 'connected object'. It generally refers to any object capable of capturing information about its environment and transmitting it to a processing system.

It includes objects directly connected to the Internet, the M2M (machine-to-machine), i.e. communication between machines and access to the information system without human intervention via Bluetooth, RFID, etc., as well as communicating terminals (smartphones, tablets).

Thus, connected objects imply the processing of a wide range of personal data:

- Data **generated automatically by the device**, based on the characteristics determined by the manufacturer (geolocation data, IP address, etc.);

- Data **generated by the user through the application** (name, email address, preferences, habits of consumption, list of contacts, photos, ...);

- Data **generated by the application** (browsing history, behaviour and profiling data calculated from previous data).

[73] We could also differentiate between 'offline' and 'online' cars in order to identify in either case who is the controller. Nevertheless, in both cases, even if the data is not transmitted and stays in the car, it shall be considered as processed personal data regarding the extensive definition of 'processing' which includes recording, storage and use of data, whether or not by automated means.

EXTENDED TERRITORIAL SCOPE

Article 3 provides that the Regulation applies to the processing of personal data in the context of the activities of an establishment in the Union, **regardless of whether the processing takes place in the Union or not**.

It also specifies that the Regulation applies to the processing of personal data of subjects who are in the Union by a controller or processor not established in the Union, as long as the processing activities are related to the offering of goods or services in the Union, or to the monitoring of the behaviour of the subject if this behaviour takes place within the Union.

This means in practice that a company outside the European Union which is targeting consumers in the European Union will be subject to the Regulation.

8.2.2 Main principles

The Regulation lays out essential principles that shall govern the collection and the processing of personal data.

CONSENT

The Regulation strengthens the requirement to obtain the consent of the person before collecting or processing his/her data.[74]

*'Consent' is defined as 'any **freely given, specific, informed and unambiguous indication** of the data subject's wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her' (Article 1(11)).*

Consent can be given by a written statement, including by electronic means, or an oral statement. Recital 32 specifies that this could include ticking a box when visiting an Internet website, choosing technical settings for information society services or another statement or conduct which clearly indicates in this context the data subject's acceptance of the proposed processing of his or her personal data. Silence, pre-ticked boxes or inactivity should not therefore constitute consent.

Consent covers all processing activities carried out for the same purpose. When the processing has multiple purposes, consent should be given for all of them. **Consent must be as easy to withdraw as to give**. It must be 'explicit' for sensitive data. The data controller is required to be able to demonstrate that consent was given.

[74] Data processing with regard to connected objects can also be on the legal basis of fulfilling an obligation which arises out of a contract. The Regulation does not set the frame for a mandatory contract. Therefore, as contracts depend on the willingness of the parties, we did not consider this option in this study.

Recital 33 gives specific indications regarding personal data processing for **scientific research purposes**. Indeed, it is often not possible to fully identify the purposes of these processings. Therefore, *'data subjects should be allowed to give their consent to certain areas of scientific research when in keeping with **recognised ethical standards** for scientific research'*. Data subjects should have the opportunity to give their consent *'only to certain areas of research or parts of research projects to the extent allowed by the intended purpose'*.

In addition to obtaining consent, article 6 of the Regulation also provides that the collection and processing of data is lawful if it is necessary for compliance with a **legal obligation** to the controller.

PRINCIPLE OF PROPORTIONALITY

The Regulation requires that the **specific purposes** for which personal data are processed be explicit, legitimate and determined at the time of the collection of the personal data. The personal data collected have to be relevant and **limited to what is necessary for the purposes** for which they are processed. This involves, in particular, ensuring that the **period** for which the personal data are stored is **limited to a strict minimum**.

Personal data should be processed only if the purpose of the processing could not reasonably be fulfilled by other means. In order to ensure that the personal data are not kept longer than necessary, time limits should be established by the controller for erasure or for a periodic review.

Example: Automated cars

"(…) It is a data protection principle that when personal data is collected for one or more purposes it should not be further processed in a way that is incompatible with the original purposes. This does not prohibit processing for a different purpose or restrict 'raw data' for use in analytics. A key factor in deciding whether a new purpose is incompatible with the original purpose is whether it is fair. Fairness will consider factors such as the effects on the privacy of individuals (e.g. specific and targeted decisions about identified persons) and whether an individual has a reasonable expectation that their personal data will be used in the new way. So in the example of the driverless cars, raw data can be used to analyse where the most accidents take place and how future accidents could be avoided. It can also be used to analyse traffic flows in order to reduce traffic jams."[75]

The European Commission, in accordance with the Regulation, suggests the criterion of '**fairness**' to determine if two purposes are sufficiently close to be encompassed within a single consent act. The controller then has to consider, among other things, whether the person could

[75] European Commission, Fact Sheet, 21 December 2015

expect that his/her data would be used in the new way, and if there could be potential effects on his/her privacy.

PRINCIPLE OF TRANSPARENCY

In order for the person to consent freely, transparent information relating to the processing of his/her data must be provided.

The principle of transparency requires that any information relating to the processing of those personal data be **easily accessible and easy to understand**, and that clear and plain language be used.

In the case of connected objects, the Article 29 WP29 recommends summarised information, with a link to a more detailed Privacy Policy.

8.2.3 The strengthened rights of data subjects

The Regulation intends to bolster the rights of the data subjects by reinforcing their existing rights and creating new ones.

THE RIGHT TO INFORMATION

Every data subject has a right to require information about data being processed about him/her. The Regulation provides that it should be transparent to the persons concerned that their personal data are collected and to what extent these data will be processed.

The information required is listed in Article 13. It includes the identity of the controller, the purposes of the processing, the recipients of the data, the potential transfers to a third country, the period for which the data will be stored, or if that is not possible, the criteria used to determine that period. A reminder of the person's rights must also be provided, notably the right to lodge a complaint with a supervisory authority.

THE RIGHT OF ACCESS

The data subjects have the right to obtain from the controller confirmation as to whether or not personal data are being processed, and, where that is the case, access to these personal data.

THE RIGHT TO RECTIFICATION

The data subjects have the right to obtain without undue delay the rectification of inaccurate personal data concerning them. They also have the right to have incomplete personal data completed.

THE RIGHT TO OBJECT

The data subjects have a right to object at any time to the processing of their personal data, on grounds relating to their particular situation.

In particular, they have a right to object to processing for direct marketing purposes, including profiling.[76]

THE RIGHT TO ERASURE (OR 'RIGHT TO BE FORGOTTEN')

The right to erasure echoes the Court of Justice of the European Union decision in the Google v. Spain case. It allows individuals to require the data controller to erase their personal data in certain situations, such as those where they withdraw consent and no other legal ground for processing applies.

Nevertheless, the right to erasure is not absolute. It has to be weighed against another fundamental right, the right to freedom of expression and information.

THE RIGHT TO DATA PORTABILITY

The data subjects have the right to transfer their personal data to another data controller. They can ask to receive back these data in a structured and commonly used format so that the transfer can be easily processed.

8.2.4 New requirements for the companies

The legislators intend that companies become key actors in the data protection process, and to this end reinforce the requirements they will have to comply with. The Regulation creates a new status of data processors, who will have direct obligations. Besides, most of the new requirements also apply to suppliers.

ACCOUNTABILITY

The controller is required to implement appropriate technical and organisational measures to ensure and to be able to demonstrate that processing is performed in accordance with the Regulation. These measures must be reviewed and updated where necessary.

This new principle of 'responsibility' also makes it mandatory for the data controller to **document** each internal measure taken to ensure the compliance with the requirements set by

[76] 'Profiling' is defined as 'any form of automated processing of personal data consisting of the use of personal data to evaluate certain personal aspects relating to a natural person, in particular to analyse or predict aspects concerning that natural person's performance at work, economic situation, health, personal preferences, interests, reliability, behaviour, location or movements' (article 4(4)).

the Regulation. Therefore, each controller must maintain a record of the processing activities under his/her responsibility. Article 30 provides a list of information to be registered.

DATA PROTECTION IMPACT ASSESSMENT

One of the main innovations of the Regulation is to replace the current procedures based on prior administrative formalities towards the supervisory authorities by a risk analysis system performed internally. Indeed, when a type of processing is likely to result in a high risk to the rights and freedoms of the persons, the controller has to carry out an **assessment of the impact** of the envisaged processing operations on the protection of personal data. This impact assessment must be realized prior to the processing.

The Regulation provides that controllers consult the supervisory authority **prior to processing** if it appears that the impact assessment indicates that the processing would result in a **high risk** in the absence of measures taken to mitigate the risk.

National supervisory authorities may provide guidelines to frame this privacy impact assessment. For example, in France, the CNIL recommended a four-step approach:[77]

- Investigation of the context: delimitate and describe the planned processing and its purposes.

- Investigation of the measures: identify the existing or planned measures taken, be they juridical or technical (information, period of storage, security measures, supports…).

- Investigation of the risks: evaluate the risks so that they can be treated in a proportionate way (risk sources, gravity, likelihood…).

- Validation (or not) of the modalities planned to respect the legal requirements.

BINDING CORPORATE RULES

Binding corporate rules (BCR) are personal data protection **policies** taken by large groups for **data transfers outside the European Union**. The BCR must be **legally binding** and be enforced by every member of the group of undertakings or enterprises engaged in a joint economic activity. They must expressly confer enforceable rights on data subjects.

The BCR must be approved by the supervisory authorities. This method of compliance tends to be increasingly popular for intra-group transfers.

[77] *CNIL, "Le guide PIA, la méthode : comment mener une EIVP, un PIA" (June 2015). The recommendations of CNIL are equivalent to the WP29 PIA guidelines: "Guidelines on Data Protection Impact Assessment (DPIA) and determining whether processing is "likely to result in a high risk" for the purposes of Regulation 2016/679", 17/EN WP248, 4 April 2017.*

DATA PROTECTION OFFICERS

Data controllers and processors must designate a Data Protection Officer (DPO) as part of their accountability program in cases where:[78]

- processing is carried out by a public authority;

- sensitive data are processed;

- processing takes place on a large scale.

The DPO must be designated on the basis of his/her professional qualities and, in particular, specialised knowledge of the law and practice in data protection. The DPO may be employed or under a service contract. A group of undertakings may designate a single DPO.

The DPO has an **independent** position regarding the hierarchy. He/she shall not receive any instructions regarding the exercise of his/her tasks. He/she shall not be dismissed or penalised by the controller or the processor for performing his/her tasks, and shall directly report to the highest management level of the controller or the processor.

Article 39 provides a minimum list of tasks assigned to the DPO. He/she must, among other duties, inform and advise the controllers on their obligations, monitor compliance with the Regulation, provide advice regarding the data protection impact assessment and cooperate with the supervisory authorities.

PRIVACY-BY-DESIGN

Data controllers must implement **appropriate technical and organisational measures**, such as pseudonymisation, designed to implement data-protection principles, such as **data minimisation**, in an effective manner. The objective is to integrate the necessary safeguards into the processing in order to meet the requirements of the Regulation and protect the rights of the data subjects.

Data controllers must also ensure that, **by default**, only personal data which are **necessary** for each specific purpose of the processing are processed.

An approved certification mechanism may be used as an element to demonstrate compliance with the requirements.

Example: On-line services.

[78] *Cf. Article 37 for more details.*

The privacy-by-design principle requires that the products and services offered are programmed by default with the most protective security parameters. A positive action from the user is needed if he/she wants to lower the privacy settings.

SECURITY MEASURES

A level of security appropriate to the risk must be ensured by various measures including:

- the pseudonymisation and encryption of personal data,

- measures to ensure the confidentiality, integrity, availability and resilience of processing systems and services,

- the ability to restore the availability and access to personal data in a timely manner in the event of a physical or technical incident,

- a process for regularly testing, assessing and evaluating the effectiveness of these security measures.

PSEUDONYMISATION

The Regulation enhances the implementation of technical measures of protection such as encryption (*i.e.* the encoding of information so that it can only be accessed by authorised persons) and dis-identification, in particular pseudonymisation.[79]

Pseudonymisation is defined in Article 4(5):

'Pseudonymisation' means the processing of personal data in such a manner that the **personal data can no longer be attributed to a specific data subject** without the use of additional information, provided that such additional information is kept separately and is subject to technical and organisational measures to ensure that the personal data are not attributed to an identified or identifiable natural person.

Pseudonymisation is defined as a treatment of personal data that disguises the identity of the person without making it disappear. The information for identifying the person is replaced by fake IDs. Pseudonymisation can be achieved by various methods. It requires compliance with two conditions: a separate conservation of the re-identification keys (*i.e.* the 'additional information' for assigning the personal data to a subject) as well as technical and organisational measures to prevent re-identification.

[79] *Note that, contrary to 'pseudonymised data', 'anonymised data' no longer permit identifying a person and cannot be considered personal data. Therefore, they fall out of the scope of the Regulation.*

OBLIGATIONS IN CASE OF A DATA BREACH

In case of a data breach, the controller has a double obligation with regard to both the supervisory authority and the data subject.

8.2.4.1.1 NOTIFICATION TO THE SUPERVISORY AUTHORITY

In the case of a personal data breach, the controller must without undue delay and, where feasible, not later than 72 hours after having become aware of it, notify the personal data breach to the competent supervisory authority, unless the personal data breach is unlikely to result in a risk to the rights and freedoms of natural persons.

8.2.4.1.2 COMMUNICATION TO THE DATA SUBJECT

When the personal data breach is likely to result in a high risk to the rights and freedoms of the individuals, the controller must communicate the personal data breach to the data subject without undue delay.

8.2.5 The new role of supervisory authorities

The Regulation redefines the role of supervisory authorities, which will now mainly oversee the implementation of the riskiest processing. It also reinforces their sanctioning powers.

CODES OF CONDUCT AND CERTIFICATION

The member states and the supervisory authorities shall encourage the drawing up of **codes of conduct** intended to contribute to the **proper application of the Regulation**. Associations and other bodies representing categories of controllers or processors may prepare codes of conduct, or amend or extend such codes.

They shall also encourage, in particular at Union level, the establishment of data protection **certification mechanisms** and data protection seals and marks, for the purpose of demonstrating compliance with the Regulation of personal data processing operations. The specific needs of micro, small and medium-sized enterprises have to be taken into account.

Accredited bodies shall carry out the monitoring of compliance with the codes of conduct, as well as issue and renew certification.[80]

ONE-STOP-SHOP

The 'One-Stop-Shop' is one of the key changes introduced by the Regulation. It means that a company which is established in many EU countries will only have to deal with one lead supervisory authority where it has its main establishment, called **Lead Authority**.

[80] *For further information regarding the accredited bodies designation process and functions, cf. Article 43.*

In order to enable individuals to have their cases dealt with locally, the Regulation contains a detailed regime with a Lead Authority and Concerned Authorities working together, that allows for local and urgent cases to be handled appropriately.

INCREASED FINES

The Regulation increases the sanctioning powers of the supervisory authorities, in particular by increasing the amount of the fines they are allowed to prescribe as penalties for violations of the Regulation. It enables them to impose fines for some infringements of up to the higher of **4% of annual worldwide turnover** and EUR **20 million**. This concerns, for example, breaches of requirements related to international transfers or of the basic principles for processing, such as conditions for consent.

EUROPEAN DATA PROTECTION BOARD

The Regulation creates a new independent authority, the European Data Protection Board, which will replace the current Article 29 Working Party (WP29). Its obligations include issuing opinions and guidance, ensuring consistent application of the Regulation and reporting to the Commission.

8.2.6 Processing of personal data relating to crimes

The Regulation does not change the current rules regarding personal data linked to criminal offences or convictions. It establishes that processing of personal data related to criminal convictions and offences shall be carried out **only under the control of official authority** or when the processing is authorised by Union or Member State law, providing for appropriate safeguards for the rights and freedoms of data subjects.

Besides, any comprehensive register of criminal convictions shall be kept only under the control of official authority.

8.2.7 Conclusion

The General Regulation on data protection shall apply from 25 May 2018 onwards. The Regulation is intended to frame the processing of so-called personal data, i.e. data allowing the direct or indirect identification of a person. Automated vehicles are likely to process a certain amount of personal data and shall therefore comply with the principles and requirements set by the Regulation. In particular, the data collected must be proportionate to the purposes announced and be processed safely. Moreover, the consent of the driver shall be obtained before processing his/her data, after he/she has received proper and transparent information (unless the data collection is imposed by law).

In the next section, we will analyse how these privacy measures apply specifically to the data collected and stored by data recorders that could equip automated private vehicles.

8.3 Illustration: Data recorded by automated vehicles

The term Event Data Recorder (EDR) designates a function or a system embedded in a vehicle the purpose of which is to record data linked to the vehicle or the driving, either continuously or during an event, for example a road crash.

Historically, the first EDRs were used in the aviation industry in the late 1950s. In 1958, in the United States, the Federal Aviation Act and corresponding regulations issued by the Civil Aeronautics Administration (the predecessor of the Federal Aviation Administration) made the use of 'flight data recorders' mandatory for commercial aircraft. The use of EDRs was then required in commercial marine vehicles (regulation issued by National Transportation Safety Board (NTSB) in 1976) and, later on, on heavy rail transportation (regulation issued by the Federal Railroad Administration in 1995).[81]

Although the use of EDRs in automobiles and light trucks is currently voluntary in most countries, some vehicle manufacturers, such as General Motors and Ford, have already installed EDRs in many of their newer models.[82]

In Europe, while different types of data recorders are subject to regulation or standardisation processes, this report focuses on a particular type of EDR specific to autonomous vehicles, frequently referred to as DSSA (Data Storage System for ACSF (Automatically Commanded Steering Function)).

An amendment to regulation ECE R79[83] regarding ACSF (including, for some of them, a DSSA) is currently being discussed in Geneva (WP29). Like all data recorders, DSSA might raise several privacy concerns regarding the nature of the data recorded, as well as their conditions of collection, storage and access. As presented in the first section, the recent adoption of the General Data Protection Regulation will have a substantial influence on these issues.

Recording data can be justified

- by law: currently, for example, there is international discussion concerning the amendment of 'the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be fitted and/or be used on Wheeled Vehicles and the Conditions for

[81] Gabriel Nowacki, Anna Niedzicka, Cezary Krysiuk, 'The Use of Event Data Recorder (EDR) - Black Box', Research Journal, Volume 8, No. 21, March 2014, pp. 62–72.

[82] Kowalick T.M., Protects the security, integrity and authenticity of vehicle crash data, Georgetown University Law Center 600 New Jersey Ave NW, Washington, D.C. 2011.

[83] Regulation No. 79 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of vehicles with regard to steering equipment.

Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions".[84] This amendment, introducing ACSF, may also introduce a standard for data recorders and data to be recorded. This international agreement will establish technical standards for vehicle homologation.

- by contract: manufacturers and drivers can agree by contract to the collection and recording of some data in compliance with national and international legislation about data privacy.

In case of conflict between two international laws (between ECE R79 and the European General Data Protection Regulation, for example), judges would only have the right to "*define, in accordance with the principles of customary law relating to the combination of international conventions, the respective modalities of application of the international standards under discussion in accordance with their stipulations, so as to ensure their conciliation*".[85]

In this report, we analyse how the new legal framework on data protection (cf. infra) will specifically apply to the parameters collected by a DSSA. For this purpose, we distinguish between mandatory data whose collection shall be required by the upcoming regulation on DSSA ('regulatory data') and data likely to be collected in addition to mandatory data ('non-regulatory data').

After recalling the current legal framework surrounding DSSA, we examine the nature of the data recorded by these systems and confront it with the provisions of the new European Regulation on personal data protection.

8.3.1 Glossary

To begin with, we intend to define more accurately the different types of data recorders currently discussed in regulatory or technical circles. We shall distinguish mainly between:

- Standard data recorders assigned to store data related to accidents or road events in any kind of private car, often called 'Crash Data Recorders' (CDRs) or 'Event Data Recorders' (EDRs); hereinafter referred to as ***EDRs***.
- Specific data recorders assigned to store data in automated vehicles, called by diverse denominations depending on the context: ADDR (Autonomous Driving Data Recorder), EDR-AD (Event Data Recorder for Automated Driving) and more frequently DSSA (Data Storage System for ACSF); hereinafter referred to as ***DSSA***.

[84] ECE/TRANS/WP.29/343, also called CEE-ONU R79

[85] CE, Assemblée, 23 décembre 2011, M. P., n°303678

8.3.2 Regulatory Environment

8.3.2.1 In the United States of America

At the federal level, the National Highway Traffic Safety Administration (NHTSA) began regulating EDR in 2006. Thus, the US Federal Code (Federal Code 49 Part 563) provides for a set of requirements regarding the collection, the storage and the physical accessibility of the data recorded by an EDR system if installed in a vehicle, regardless of whether it is a device or a function. However, the installation of EDRs is not mandatory under 49 CFR Part 563.

The purpose of this regulation is to help ensure the availability of data valuable for effective crash investigations and for analysis of safety equipment performance (advanced restraint systems). These data shall help provide a better understanding of the circumstances in which crashes and injuries occur and lead to safer vehicle designs.[86]

On the other hand, in 2016 NHTSA released guidelines regarding automated vehicles[87] in which it advocates enhanced data collection tools in automated vehicles (we highlight):

> ”Automated vehicles will access and generate large amounts of data about the nearby roadway environment and roadway users (e.g., other motorists, bicyclists, and pedestrians), and use those data to make judgments and execute safety decisions. When crashes or near crashes occur, the **best source of information** for learning the underlying causes will be **the vehicle itself**—if the vehicle retains the data and a record of relevant decisions it made.
>
> To that end, NHTSA believes **enhanced event data recorders** would be useful to allow the Agency to **reconstruct the circumstances of crashes** and to gain an understanding of how a vehicle involved in a crash or incident sensed and responded to its driving environment immediately before and during the crash or near crash. Such data could provide insight to the answers to such crash-reconstruction-related questions as whether there were other roadway users nearby shortly before the

[86] 49 CFR Part 563.2 - Purpose.

[87] NHTSA, Federal Automated Vehicles Policy, September 2016 (these guidelines are advisory and have no coercive value), https://www.google.fr/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwiMg6yzyo3SAhUJOBQKHXxcAbsQFgghMAA&url=https%3A%2F%2Fone.nhtsa.gov%2Fnhtsa%2Fav%2Fpdf%2FFederal_Automated_Vehicles_Policy.pdf&usg=AFQjCNElDZ3Yn0Au29Aa3wZKeikbv8ot6Q&sig2=FAXyFj9CAgsM_jPPyKRSzw&cad=rja

> crash or incident and whether the vehicle correctly and timely identified the other users and anticipated their speed and trajectories[88]."

These guidelines add that:

> "…Manufacturers and other entities should collect, store and analyze data regarding **positive outcomes** in addition to the type of reporting conditions listed above (event, incident, and crash data). Positive outcomes are events in which the **HAV system correctly detects a safety-relevant situation, and successfully avoids an incident** (e.g., "near misses" and edge cases)."

In other words, NHTSA emphatically encourages the introduction of data recorders for automated driving, in case of crashes, but not only for this purpose.

8.3.2.2 In the European Union

In Europe, there is no regulation on EDR or equivalent at this time (except a regulation on digital tachographs, mandatory for all relevant vehicles manufactured after 1 August 2005).

However, during the last decade, a strong demand for making EDR compulsory in all private cars has been raised in the European Parliament and is being widely discussed by the diverse stakeholders.

In 2010, the European Commission identified the data recorder as a promising tool to get a better understanding of the mechanisms of accidents.

In 2014, the Transport Research Laboratory published a Cost Benefit Assessment of the installation of EDRs in the European Union.[89]

This study concludes that EDR can improve accident knowledge and drivers' behaviour if the drivers are aware that their vehicle is equipped with it. It also asserts that these systems imply the potential generation of personal data. The legal data protection issues raised by EDRs are assessed as follows (we highlight):

> "Legal advice on the application of European Directive 95/46/EC and the legal situation in six European countries found that:

[88] NHTSA, op. cit., p.80.

[89] Study on the benefits resulting from the installation of Event Data Recorders, Study Reference: MOVE/C4/SER/2013-200/SI2.663647

> • Ownership[90] of EDR data was not defined, although the vehicle owner would be likely to be considered the data owner: clarification of ownership would be beneficial to the access and management of EDR data.
>
> • Access to the EDR data was possible by any party able to access the EDR port. Further controls in this area would be technically possible and could be desirable to **control access and prevent data modification or deletion**. Stakeholders felt that this should be **left to the manufacturer** and should **not impede access to the data for legitimate uses**.
>
> • EDR data, by itself, does not constitute personal data. Thus, any party can use anonymized EDR data. Should **the party accessing the data be in the possession of other data that renders the EDR data personal by linking it to an individual**, the nationally enforced provisions of Directive 95/46/EC apply, which comprise adequate processes and controls to protect personal data.
>
> • All countries highlighted a degree of uncertainty surrounding the collection and use of EDR data and recommended that, although adequate legal frameworks exist once ownership and access are defined, specific conventions would be helpful to define these fundamental aspects."

According to this study, the questions of who can access the data and how this access can be effected appear as one of the main concerns raised by EDRs. The study recommends that this issue be dealt with through 'specific conventions'.

Personal data issues have also been discussed in the current proposal for a regulation on mandatory Crash Event Data Recorders for M1/N1 vehicles, based on harmonisation with US law.

In the following chapters, we intend to answer these legal issues in the specific case of DSSA.

8.3.3 Recorded Data

On the basis of the various existing propositions of definitions, a DSSA appears as a function or a device which records vehicle driving parameters during automated driving sequences and during

[90] Under European regulation, personal data are not subject to a right of ownership or property right. Therefore, it seems inaccurate to refer to 'data ownership' in the case of personal data processing. To be treated properly, the question should instead be formulated in terms of access to the data.

transition phases (from manual to automated driving or vice-versa) in the event of a road accident detected by the activation of one or more sensors or processors within the vehicle.

In its guidelines, the NHTSA suggests that relevant data of a data recorder could also be collected and stored in other circumstances than crashes, such as road incidents and other kinds of events involving, for example, 'fatalities and personal injuries'. Besides this, the NHTSA also recommends the collection of data regarding *positive outcomes* in addition to the event, incident and crash data, positive outcomes being defined as 'events in which the [automated] system correctly detects a safety-relevant situation and successfully avoids an incident'.[91]

Thus, a certain number of parameters are to be collected in compliance with the objective assigned to the data collection and storage. Such an objective can be, for instance, to determine *who* is in charge of the driving when the event occurred (the 'human' driver – physical person – or the system) and possibly provide further explanation on the context, in particular clarify *why* the driver or the system is in charge of the driving at this precise moment (e.g., response to a takeover request).

According to this definition, two main categories of data or parameters might be collected by a DSSA to fulfill its function:

- Parameters regarding the **driver's actions** (such as his/her action on the steering wheel, on pedals, etc.)
- Parameters regarding the **vehicle and system's operation** (such as Minimal Risk Manoeuvre, etc.) and **messages sent to the driver** (such as request of activation of automated driving function, takeover request, etc.).
- These data might be recorded and stored independently from other EDR data (vehicle speed, safety belt status, airbag status, etc.).

The 'personal' nature of DSSA data

As exposed previously, according to the General Regulation on personal data protection (Art. 4), any information that allows the identification of a person directly or indirectly shall be considered as personal data.

Although no single one of them is directly identifying, the data collected and stored by DSSA shall be considered as **personal data** since they can be linked to the person concerned by overlapping with other information, detained either by the data controller or by any other recipient (usually the VIN).

[91] NHTSA, op. cit., p.17-18.

Hence, unless the data collected are anonymised,[92] DSSA systems in private automated cars shall comply with the General Regulation provisions.

Special categories of data

Among the data listed above, some are likely to fall within the categories of personal data subject to specific legal regimes, as described in the first section of this study.

Though it seems unlikely that a DSSA should need to collect *sensitive data* to achieve its purposes, we shall recall that data which measure human body features (e.g. data from drowsiness sensors and algorithms) may be considered as sensitive data, more specifically health data, and therefore require enhanced protection. By principle, the processing of these data is prohibited unless the consent of the person is 'explicit' and at least one of the conditions listed in article 9 of the General Regulation on personal data protection is fulfilled.

Moreover, if a DSSA collects *data related to criminal offences*, such as the *speed* of the vehicle or the safety belt status, then, as set by the Regulation (Art. 10), the processing of these data shall only be carried out under the control of official authority, or if authorised by the Union or a Member State. Subsequently, information about vehicle speed can only be collected if this parameter is part of the regulatory data collected by DSSA.

In addition, let us consider the case in which EDRs and DSSAs record *visual data*.[93] Cameras filming either the environment or inside the car could be seen as a complementary way to achieve the DSSA objectives concerning accident investigation. Camera data raise great privacy concerns as they may allow direct identification of the persons present in the car environment (pedestrians, other drivers, etc.). It is therefore crucial to ensure that the potential gains regarding the aim pursued are proportionate to the risks involved regarding personal data protection, and that the system fully complies with the requirements of the General Regulation on data protection.

8.3.4 Requirements for the collection and storage of DSSA data

DSSA shall fulfill the legal requirements and principles listed above.

According to the General Regulation on data protection, the following criteria shall be examined to assess the compliance of data collected with the regulatory provisions:

[92] In some cases, for example when data are intended for use by police or public authorities in case of court investigations on responsibility, this information cannot by definition remain anonymous.

[93] See for example CLEPA, Discussion Paper on Event Data Recorders for Automated Driving (EDR/AD), 30 September 2016.

THE PURPOSES

The purpose(s) of the collection shall be explicit, legitimate and determined at the time of the collection of the data.

As explained above, several purposes are generally provided to justify the need for data collection in automated vehicles, for example:

- determination of *who* was driving in case of an accident;
- evaluation of system operation;
- reconstruction of a crash;
- assessment of the usage of the system by the driver.

These purposes are highlighted, for instance, in the NHTSA guidelines: the collection of event, incident and crash data is necessary ”for the purposes of recording the occurrence of malfunctions, degradations or failures in a way that can be used to establish the cause of any of such issues” (p.17).

Although there is no legal definition of the notion of ‘legitimacy’, the purposes listed above tend to ameliorate user safety and are therefore commonly considered legitimate by the various stakeholders.

While the upcoming legislation might provide legitimate purpose for the collection and storage of regulatory data, the data controllers – above all, the car manufacturers – shall consider appropriately regarding the determination and the legitimacy of the purposes invoked to justify the collection of non-regulatory data.

This issue shall be discussed with the Data Protection Officer. If in doubt, and in accordance with the Privacy Impact Assessment procedure, the latter shall refer to the supervisory authorities before the data collection is launched.

In any case, the purposes of the ADDR non-regulatory data storage should be mentioned in a specific contractual clause.

The limitation of the period and amount of data stored

The data collected shall be relevant and **limited** to what is necessary for the purpose(s). The period of storage shall be strictly limited.

In case of DSSA, this principle of minimisation means limiting

- the list of parameters collected,

- the recording duration (before and after the event),

- the data retention period.

These questions have been discussed in several working groups by the main stakeholders and should be subject to regulatory provisions.

The safety measures

Technical and organisational measures shall be taken to guarantee data **safety**.

They might be subject to a standardisation process. In the absence of such a standard, general provisions of the Regulation shall be followed, in particular privacy-by-design requirements.

The recipients

The **recipient**(s) of the data shall be clearly identified. The data subject must be informed of their identity.

The General Regulation on data protection defines the 'recipient' as 'a natural or legal person, public authority, agency or another body, to which the personal data are disclosed, whether a third party or not' (Art. 4(9)).

The Regulation specifies that 'public authorities which may receive personal data in the framework of a particular inquiry in accordance with Union or Member State law shall not be regarded as recipients; the processing of those data by those public authorities shall be in compliance with the applicable data protection rules according to the purposes of the processing'.

In order to meet the specific purposes outlined above, the data collected by DSSA might be accessible to authorised recipients or users. These users (e.g. judicial and law-enforcement officials) should be designated by regulatory provisions in order to guarantee the lawfulness of their processing of the data (Art. 6).

By contrast, the other recipients not designated by law (e.g. OEM's, insurers, researchers, etc.) will have to obtain the consent of the person concerned before accessing the data.

The way of accessing the data (through ADDR port, virtual access, etc.) should be strictly secured, so that only the physical or legal persons allowed to by law or consent can receive the information.

The consent

Regulation might provide a list of mandatory DSSA data. In case of non-regulatory data, the **consent** of the person shall be obtained after he/she was provided transparent information. The consent is granted for the specified purposes of the processing and can be withdrawn at any time.

When purchasing his/her vehicle, the buyer shall be provided clear information on the data processed by the DSSA, their recipients and his/her rights regarding these data, e.g. through operating instructions (*cf*. the mandatory information above).

Since the driver of a vehicle may change prior to each use of the car, it has been suggested that the consent declaration of the driver (in contrast to the consent declaration of the vehicle owner obtained when purchasing the vehicle) should be obtained prior to each use of the car.[94]

The modalities of this specific consent declaration for the non-owner drivers as well as its documentation will have to be further investigated.

The question of how the consent is obtained and who delivers the required information also appears problematic in case of car rental between individuals or when the person is purchasing a second-hand car from an individual.

8.3.5 Conclusion

Data recorders for automated vehicles, often referred to as DSSA in the current status of modification of the regulation ECE R79, are systems assigned to the collection and storage of data relevant to the understanding of road events, incidents or crashes involving automated cars in automotive mode. The data should, for example, help in determining who was driving (the physical person or the system) when the event occurred and in which context. But there are other possible purposes of such data collection. Obviously, these data can be related to the user of the car and shall therefore be considered as personal data subject to privacy regulation.

In Europe, the Regulation on personal data protection applicable from May 2018 provides a new regulatory framework with which DSSA will have to comply. In particular, the Regulation does not allow the collection of sensitive data such as health data unless the consent of the person concerned is “explicit”. Moreover, data relating to criminal offences such as vehicle speed may only be collected under control of public authorities.

In addition, the Regulation sets conditions and requirements framing the collection, storage and processing of personal data. In particular, DSSA shall observe several limits regarding the period of storage, the amount of data stored and their relevancy, who can access these data and how. In addition, the purposes for which these data are stored have to be ‘legitimate’ and clearly determined before the collection.

In case of non-regulatory data, the consent of the person concerned is necessary for collecting and storing his/her data. The person shall be given clear and transparent information before consenting.

[94] CLEPA, op. cit.

9 Conclusions

The following subchapters shortly summarise the chapters above (chapters 5-8). They contain the important findings without going into detail.

9.1 Regulatory law and rules of approval

The main goal of this study on legal aspects within AdaptIVe was to collect and summarise the important aspects of legislation for different EU member states. This objective was to be achieved by a comprehensive review of the current legal framework regarding automated systems. The review covers regulatory law (e.g. national road traffic law), the Vienna Convention on Road Traffic, and road traffic liability (of the driver/vehicle owner).

The EU Member States have the vision of a widespread application of automated driving to improve road safety and address inefficiency in traffic flow. There is a need to develop new and integrated automated functions to improve traffic safety by minimising the effects of human errors. The general objective is to develop new functionalities. In legal terms, the question was raised as to whether legislation is keeping pace with these technological advancements. Today's legal framework was developed based on the concept that safe driving is a task of the driver only. Consequently, it is likewise a basic legal assumption as well as a requirement that the driver must be able to control his vehicle at all times. With a move toward automated driving, the driver might temporarily, under certain conditions, no longer be needed permanently in this role.

Every Member State uses legal regulations as guiding principles in respect to driver assistance and partially automated systems. Nearly all of these regulations address the basic idea of permanent controllability. No issue seems to lie in the current laws up to Level 2 of Standard J3016. However, in some countries there is a conflict in current regulatory law, liability law, and the Vienna Convention on Road Traffic to be expected with higher degrees of automation. This conflict is due to the fact that the law indicates the driver as the responsible party for the operation of the vehicle; however, with higher automated systems, the driver is removed from this task. There is, in some way related to the Vienna Convention, in general and in respect to Article 8.1 and 8.5 (a), (b), a different interpretation on a national level.

Autonomous driving is a clear example of the complexity presented by the development of a component in the road traffic system, in this instance the vehicle. The technology cannot be developed in isolation as it will have a major impact on the road traffic system and needs to interact with humans, vehicles, infrastructure and society in order to have the maximum impact. Moreover, the technology is developing rapidly and many different stakeholders are involved in or affected by the development. This complexity means that it is impossible to predict development and steer it in detail.

Compliance with the international position does not necessarily entail compliance with domestic legislation. In the end, the national legal implementation is the only decisive factor. International treaties like the Vienna Convention and the Geneva Convention play a rather subordinate role in the national and international realisation of automated driving functions.

Germany	**Interpretation of VC and its consequences for ADAS L 3+**	ADAS are technically admissible, provided that: 1. they are subject to specific UNECE regulations and meet the requirements stated therein; or 2. If this is not the case, these systems can at least be overridden or switched off by the driver at any time. A consequence of this is the legal admissibility of ADAS of SAE Level 3 and Level 4 according to the legal view taken in Germany.
Germany	**In how far national law can be applied to higher degrees of automation**	In general, it can be stated that the entire German Road Traffic law (StVG) and regulations (StVO) assume the presence of a human driver in/on each vehicle.
UK	**Interpretation of GV and its consequences for ADAS L 3**	Level 3 vehicles which allow for drivers to intervene in driving when notified and require the driver to "be able" to take control are allowed under Article 10 of the Geneva Convention; Level 4 and Level 5 vehicles, which allow for complete disengagement, would not be allowed under either Convention. It seems that the level of control necessary to be classed as a driver in English law is relatively low and may include the operators of automated vehicles. Although it should be noted that whether a person is to be considered driving a car is "inevitably one of extent and degree". Nonetheless, it is likely that a user of an automated vehicle will be considered to be "in a substantial sense controlling the movement and direction of the car" even when the car is being operated in automated mode. This at least may be found to be the case for Level 3 vehicles which anticipate the presence of a driver able to intervene at any time. As for Level 4 automated vehicles, it is possible that the individual responsible for activating the automated mode of the vehicle may still be considered the driver. On the other hand, it is difficult to see how a Level 5 vehicle, which allows for fully automated use, can be said to have a driver at all, under the current definition of the term "driver". The status of users of highly automated cars is, however, currently untested in the English courts, so the status of

		operation of various levels of automated vehicle as "drivers" is currently unclear.
UK	**In how far national law can be applied to higher degrees of automation**	Compliance with the international position does not necessarily entail compliance with domestic legislation. Compliance with an international treaty is not sufficient (or even directly relevant) for compliance with the domestic legal requirements on legal persons in England. Regardless of whether the obligations under the international treaty have been met, it is the domestic requirements, whether stricter or not (and only those requirements) with which road users must comply. As stated in the Memorandum, Level 3 – Level 5 automation is not currently compatible with English law.[95] Regulation 104 of the Road Vehicles (Construction and Use) Regulations 1986 requires the driver to have "*proper control*" of a vehicle and s 41D Road Traffic Act 1988 creates a criminal offence for contravention of this requirement. The Road Vehicle (Construction and Use) Regulations 104 (driver in proper control of the vehicle) would likely also be contravened by Level 3 – Level 5 of automation.[96] Furthermore, the Highway Code states that: *"You MUST exercise proper control of your vehicle at all times. Do not rely on driver assistance systems such as cruise control or lane departure warnings."* Although not technically a piece of legislation with any force of its own, non-compliance with it may be relied on as a factor to establish driver liability pursuant to s 38(7) of the Road Traffic Act 1988.[97] Thus, although not clearly defined under English law, it seems clear that control requires actual engagement by the driver at all times: driver assistance systems may be used, but they cannot be relied upon. The driver must monitor the vehicle's movement and be ready to intervene without independent notification at any time. This seems incompatible with use of any L3 – L5 vehicles, which envisage disengagement from the driving task either some or all of the time. The above summary refers to English law. In this regard, criterion of control under the Geneva Convention has no direct application under English domestic law and so is not directly relevant to this question. The Convention currently appears (arguably) to allow for L3. The Government's recent Position Paper on driverless cars indicates that the Government wants the UK to be at the forefront of automated vehicle technology.[98]

[95] See paragraph 117 of the Memorandum.

[96] UK Government, Department of Transport, The Pathway to Driverless Cars: A detailed review of regulations for automated vehicle technologies (February 2015) ("February 2015 Report"), paragraph 16.30.

[97] See paragraphs 90 and 156 of the Memorandum.

[98] February 2015 Report

		The Government has stated that it is "*vital for the UK to be able to provide the capability for the testing of the full range of technologies necessary to succeed in this market*"[99] and to "*identify opportunities to secure future competitive advantage*".[100] It is notable that the Government's February 2015 Report states that *"[t]he Vienna Convention is not considered an obstacle in the UK."* The Geneva Convention, though, is not mentioned in the report, which discusses the regulatory and legislative issues for the introduction of automated cars in the UK. It therefore seems that the Government also does not consider the Geneva Convention an obstacle. The Government therefore regards itself as free to implement through Parliament legislation to allow for automated cars. In this regard, even if the UK Government were wrong to conclude that its treaty obligations permit amendment to domestic law to allow for greater testing and use of automated vehicle technology, this would not affect any application of the domestic law in fact implemented, as explained in the answer to Question 4 above.
Italy	**Interpretation of VC and its consequences for ADAS L 3**	Level 3 vehicles might be in line with Article 8.5bis of the Vienna Convention, since the driver shall remain in control of the vehicle and, upon request of the automated system, intervene and oversteer it; and with respect to Level 4 vehicles, one might say that it is in line with the Vienna Convention, since it allows the use of automation systems that, if built in compliance with certain technical requirements, can be used on public roads even if they do not require any human intervention at all. On this point, however, some doubts arise since some of the automation systems that fall into Level 4 could function in such a way that the driver him-/herself cannot intervene in the vehicle's movement.
Italy	**In how far national law can be applied to higher degrees of automation**	Some of the authors that commented on this Article noted that under article 8.5bis (i) all systems that are built in accordance with the indications included in ECE or other international regulations can be used in vehicles, even if they cannot be overridden; (ii) systems that are not built in accordance with these regulations can be used in vehicles only if they can be overridden. Italy has not modified its regulatory framework in order to implement Article 8.5bis, although the Italian government promoted such amendment and subscribed to the Amsterdam Declaration. It should be recalled that the Italian Senate is currently working on a draft law to empower the government to adopt an

[99] A call for evidence on the UK testing ecosystem for connected and autonomous vehicles (26 May 2016), p. 6.

[100] Ibid. p.7.

		amendment of the Road Traffic Code (also) in accordance with the new provisions of the Vienna Convention.
France	**Interpretation of VC and its consequences for ADAS L 3**	To date, there is no official interpretation of the French Government regarding the compatibility of highly automated systems with the Vienna Convention. This might change in the near future. - Article 8.1 of the Vienna Convention is similar to article R412-6-1 of the French Highway Code. - Article 8.5 of the Vienna Convention is similar to Article R412-6-2 of the French Highway Code. - Article 13-1 of the Vienna Convention is similar to Article R417-13 of the French Highway Code. There is no article in the French Highway Code that can be considered comparable to Article 8.5bis of the Vienna Convention. According to the authors' understanding of the Vienna Convention amendment (Article 8.5bis), SAE Level systems up to 2 are deemed to be compatible with the Vienna Convention if they are compliant with Article 8.5bis. Given that technical regulations are in place, SAE Levels 1-2 systems are compatible with the Vienna Convention because the driver is, at any time and immediately, in control of the vehicle: he can deactivate the system and monitors the environment, which is compliant with Articles 8.6 and 13 of the Vienna Convention. As for SAE Levels 3 and above, the system is not considered as a human driver. Moreover, it is unclear that the driver is in control of the vehicle at any time and immediately. Finally, side tasks, which must be minimised, are definitively permitted in SAE Levels 3 and above. Consequently, regarding SAE Levels 1-2, there is no doubt that they are compatible with the Vienna Convention. As for SAE Levels 3-4-5 and above, this is unclear and is still debated in UNO-ECE-WP1.

9.2 Civil liability

With the increase in the level of automation, the number of available automated manoeuvres will constantly grow. Especially for Level 3 systems and above (Level 3+), where it is foreseen that the driver may turn his attention away from the driving task and does not need to monitor each and every manoeuvre the automated system executes, an overview of product liability was made necessary by the main goal of AdaptIVe, which is to develop automated driving functions and to address hindrances to market introduction. In the absence of any court decisions for automated vehicles or systems of Level 3 or above, a set of possible scenarios has been deployed. The legal assessment was made under the assumption that the relevant law already

allows the use of a Level 3 and Level 4 system. Furthermore, the current legislation was taken into account as well as existing experience with the existing law and case law.

All countries assessed in this study have implemented the Product Liability Directive 85/374/EEC into national law. The purpose of the Directive was an approximation of the laws of the Member States concerning the liability of the producer for damage caused by the defectiveness of his products. In most of the relevant European countries, manufacturers' total liability for damage resulting from death or personal injury is unlimited. Only in Germany will there be a limitation to an amount of EUR 85 million. Besides that, German traffic law provides strict liability for the registered keeper of a vehicle, which seems to be unique in the relevant European countries. There is a limitation of liability for damages resulting from death or personal injury, too. The maximum amount for compensation will be EUR 5,000,000.00 in case of death or bodily injury and EUR 1,000,000.00 in case of property damage. All countries considered stipulate a deductible of injured parties for damages to property and a limitation period for claims under product liability law. Only the designated amount and the statuary onset of the time of limitation differ slightly.

If an accident occurs while using an automated driving system, the crucial issue might be the question of liability. Either the driver or the system and thus the manufacturer could be responsible. Under product liability law, the injured person has to prove the damage, the defect and the causal relationship between defect and damage. If the driver is to be allowed to turn his attention to other activities than driving, the responsibility could lie exclusively with "the vehicle". In this case, the driver cannot be held liable. The consequence could be a shift in liability from driver to manufacturer. The manufacturer then has to exonerate himself and prove that the driving system did not cause the accident. Consequently, manufacturers could be involved (and ultimately be liable) in many more cases than they are today. Unlike Europe, the United States of America have no uniform legal framework covering all aspects of automated driving. Some states already allow fully automated driving, at least for testing purposes, while others don't. Therefore, a legal assessment concerning liability has to be made "state by state".

Another aspect, which might indirectly affect product liability, is the impact of automated driving on insurance law. For reasons such as liability, data collection, misuse or manipulation of data, and cyberattacks, coverage by insurance seems to be necessary in particular for the manufacturer, the driver, the registered keeper and the software providers. It is unclear whether autonomous driving will result in higher costs for the insurer. Especially the identification of the responsible party could push up the costs for litigation. An alternative could be a change in the right of recourse. Conceivably, the insurer could plan to take recourse from the manufacturer in general, if an autonomous driving system was in use. Therefore, a shift from third-party insurance towards manufacturer's product liability could be under discussion. Even if

an automated driving system was in use, the injured party will still be able to claim directly against the insurer.

9.3 Data privacy

Questions regarding data privacy and data security are directly linked to liability issues. Automated vehicles are likely to collect a substantial amount of data. These data can be related to a physical person and are therefore within the scope of personal data regulation. This report focuses specifically on the privacy issues raised by data recorders installed in automated private vehicles, excluding public transport. The new EU data protection framework was adopted on 14 April 2016: the General Regulation on Personal Data Protection (Regulation 2016/679) will replace the current Directive (95/46/EC) on 25 May 2018. The new Regulation is intended to protect “personal data”, meaning information relating to an identified or identifiable natural person. For example, data collected by a vehicle while carrying out its actual driving tasks can then be combined with other information, such as the current location of the car. The same applies to all kinds of information which enable an unambiguous identification. A spatial restriction does not exist in the territorial scope of this regulation as Article 3 GDPR stipulates that the rules are applicable irrespective of the place of processing if the collecting body is located in the EU.

Automated vehicles are likely to process a certain amount of personal data and shall therefore comply with the principles and requirements set by the Regulation. In particular, the data collected have to be proportionate to the purposes announced and safely processed. Also, the principle of consent is highlighted. The consent of the driver shall be obtained before processing any personal data and after proper and transparent information has been given (unless the data collection is imposed by law). The consenting person must be able to understand the implications of his/her decision, meaning he/she must be able to foresee what will ultimately happen with his/her data. It is also necessary to ensure an adequate level of data protection. This may include, for example, measures for the pseudonymisation or the encryption of personal data.

Of particular interest, not only for insurance companies, are the data recorded shortly before, during or immediately after accidents. These data enable the reconstruction and analysis of an accident, making it easier to identify the responsible party. So-called Event Data Recorders (EDR) are systems embedded in a vehicle in order to record the relevant data. The analysis in this report focussed on a particular type of EDR made especially for automated vehicles, which are referred to as Data Storage Systems for ACSF (Automatically Commanded Steering Function), in short DSSA, and how the new legal framework on data protection will apply to the parameters collected by DSSA. These will primarily consist of information regarding the driver’s actions (such as interaction with the driving wheel or the pedals) and the system’s operations (such as

special manoeuvres or signals for the driver). This information will be crucial in order to determine who was driving in case of an accident.

DSSA will have to comply with the new regulatory framework, applicable in May 2018. In particular, the Regulation does not allow the collection of sensitive data such as health data unless the consent of the person concerned is “explicit”. Moreover, data relating to criminal offences such as vehicle speed can only be collected under the control of public authorities. In addition, the Regulation sets conditions and requirements framing the collection, storage and processing of personal data. In particular, DSSA shall observe several limits regarding the period of storage, the amount of data stored and their relevancy, who can access these data and how. Furthermore, the purposes for which these data are stored must be ‘legitimate’ and clearly determined before their collection.

10 Extended Context of AdaptIVe

In this context, AdaptIVe, and in particular Response 4, are not the only projects assessing the legal issues or contributing to the debate. AdaptIVe is one project in a wide range of European, international and national research networks and governmental institutions the research results of which should be taken into account, as reflected here:

Figure 10.1: AdaptIVe radar

In particular, in our research on the current “state-of-the-art“ of knowledge in the areas under study, we have made use of the following published research. We have peered the publications and, if available, exploited the legal arguments of these research projects:

Table 10.1: Overview of research activities

Projects	Legal aspects	Countries	Links
InteractIVe	Yes	Europe	http://www.interactive-ip.eu/index.dhtml/docs/interactIVe-SP7-20110802v12-DL-D7.3-Legal_Aspects.pdf
SARTRE	Yes	UK, Spain, Germany, Sweden (Europe)	http://www.sartre-project.eu/en/publications/Documents/SARTRE_5_003_PU.pdf
COMPANION	Yes	Europe	http://www.companion-project.eu/

Projects	Legal aspects	Countries	Links
			http://www.companion-project.eu/wp-content/uploads/COMPANION-D2.2-Current-state-of-the-EU-legislation.pdf
Citymobil2 (WP26)	Yes	Europe	http://www.citymobil2.eu/en/ http://www.citymobil2.eu/en/upload/Deliverables/PU/CM2-D26.1.pdf http://www.citymobil2.eu/en/upload/Deliverables/PU/CM2-D26.2%20Legal%20concerns%20v1.0.pdf
DRIVE Me (Volvo)	No	Sweden	https://www.media.volvocars.com/global/en-gb/media/pressreleases/136182/volvo-car-group-initiates-world-unique-swedish-pilot-project-with-self-driving-cars-on-public-roads
HF Auto	Yes	Netherlands/Europe	http://hf-auto.eu/ http://hf-auto.eu/?research=work-package-5
NL DAVI	Tbc.	Netherlands	http://davi.connekt.nl/
4.10 FR ABV	Yes	France	http://www.pole-moveo.org/wp-content/uploads/2014/09/ABV-A.pdf http://arxiv.org/ftp/arxiv/papers/1212/1212.4804.pdf (Point 4. Societal aspect)
i-Game	No	Europe	http://www.gcdc.net/images/i-GAME-Factsheet-5.pdf
AutoNet2030	No	Europe	http://www.autonet2030.eu/
Response 3	No	Europe	http://www.acea.be/uploads/publications/20090831_Code_of_Practice_ADAS.pdf
Path	Yes	California (USA)	http://www.path.berkeley.edu/ http://www.path.berkeley.edu/sites/default/files/publications/PRR-2007-14.pdf
HAVEit	No	Europe	http://www.haveit-eu.org/displayITM1.asp?ITMID=6&LANG=EN
V-Charge	No	Europe	http://www.v-charge.eu/
DRIVE C2X	Only: “Legal issues need to be clarified”	Europe	http://www.drive-c2x.eu/project http://www.drive-c2x.eu/tl_files/publications/Deliverables%20and%20abstracts/DRIVE%20C2X_D11%206_Final%20report%20%28full%20version%29.pdf
CAR2CAR Communication Consortium	No	Europe	https://www.car-2-car.org/index.php?id=5
EUCAR	No	Europe	http://www.eucar.be/about-eucar/mission/
iMobility Forum	Yes	Europe	http://www.imobilitysupport.eu/ http://www.imobilitysupport.eu/imobility-forum/objectives#issues

Projects	Legal aspects	Countries	Links
			http://www.imobilitysupport.eu/library/imobility-forum/working-groups/active/legal-issues http://www.imobilitysupport.eu/library/imobility-forum/working-groups/active/legal-issues/reports-5/2269-imf-li-wg-privacy-and-data-protection-june-2013/file
simTD	Yes	Germany	http://www.simtd.de/index.dhtml/object.media/deDE/8100/CS/-/backup_publications/Projektergebnisse/simTD-TP5-Abschlussbericht_Teil_B-5_Rechtliche_Rahmenbedingungen_V10.pdf
SAFESPOT	Yes	Europe	http://www.safespot-eu.org/ http://www.safespot-eu.org/deliverables.html (SP 6 BLADE - Business models, legal aspects, and deployment)
Amsterdam Group	No	Netherlands	https://amsterdamgroup.mett.nl/default.aspx
Compass4D		Europe	
EVITA	Yes	Europe	http://www.evita-project.org/index.html

Furthermore, the results of the following working groups were included in the assessment.

Table 10.2: Overview of research projects of organisations

Organisation	Legal aspects	Countries	Links
VRA	Yes	Europe, USA, Japan	http://vra-net.eu/ http://vra-net.eu/wp-content/uploads/2015/04/VRA_20140930_WP3_D3.2.1-Regulatory-needs-Draft-1-v12.pdf
ISO	No	international	http://www.iso.org/iso/home/about.htm
NHTSA	Yes	USA	http://www.nhtsa.gov/ http://www.nhtsa.gov/Laws+&+Regulations/Traffic+Safety+Legislative+Fact+Sheets
EU US JPN ITS Cooperation	Tbc.	Europe, USA, Japan	http://www.its.dot.gov/connected_vehicle/international_research.htm

Response 4 is building on previously obtained research results, maintaining contact with representatives of the individual projects, and is taking the knowledge and expertise obtained by those research groups into account in the conduct of its own research. The main criterion used by AdaptIVe-Response 4 to restrict the scope of the research conducted has been to partly

tailor its focus to a holistic assessment of automation Levels 3 and 4. By especially directing the project‘s orientation towards the real core problems, the project is at the cutting edge of research in respect to both the current state of technology and the law. Furthermore, this research will provide impetus for amending the law to bring all other levels of automation within the scope of the law. In moving from Level 2 to Level 3, and then again when moving to Level 4, there are, in practical terms, fundamental changes in who is responsible for the vehicle. The driver increasingly relinquishes control of the vehicle, which is then assumed by the automated computer system. This is the only research project examining the legal issues from this perspective.

11 Annex: Product Liability

AdaptIVe subproject RESPONSE 4's goals regarding this deliverable have been to provide an overview on product liability and to discuss practical examples in its scenario analyses. It was concluded that the overview, however, as well as the practical examples, showed that product liability was very complex and not well suited for presentation in a tabular results section. It was decided, therefore, to divide the results into a small overview (see Chapter 9) and a full annex. This annex is subdivided into sections covering five countries (France, Germany, Sweden, UK, and Italy). Each section is then divided into a discussion of product liability law in the respective country, followed by an examination of the scenarios. Where it is of special interest, the liability of registered keepers is discussed. A section on insurance law closes each national section. The results discussed cannot be applied one to one to real cases. Rather they reflect expert opinion on the current state of product liability law. Needless to say, changes are definitely expected within the coming years addressing the difficulties of recording as well as analysing liability issues from driving data.

The focus of the national sections vary somewhat as this has been determined by the authors, taking into account their countries' interests and their own expertise. It is, to the best of our knowledge, the first time that research of this kind has been undertaken.

11.1 France

11.1.1 The main principles of France's transposition of Directive 85/374/EEC into national law

11.1.1.1 Defect of a Product

A product:

- is defective when it does not offer the reasonable safety which could be expected of it.
- cannot be considered defective only because another, more sophisticated product, has subsequently been placed on the market.

In assessing the safety of a product, all relevant circumstances must be taken into account; For example, advertising of the product, the safety which could be reasonably expected of it, the date of being brought on the market, etc. This list is not exhaustive: the courts examine and take into account all the information presented by the parties. In the case of an allegation of defects in a motor vehicle, an expert's report will generally be ordered and taken into consideration.

11.1.1.2 The term "producer" means:

- a manufacturer, acting professionally, of an entire product, a raw material, or a component.
- every person acting professionally, if he puts his name, brand or distinctive sign onto a product; or if he imports a product into the EU to sell it, rent it, or distribute it under any other form.
- a manufacturer supplier/subcontractor: but in case of damage caused by a defective product incorporated into another product, the producer of the component and those realizing its incorporation are co-responsible.

11.1.1.3 The plaintiff:

- has to prove a safety defect, injury or damage, and the causal link between the safety defect and the injury or damage suffered.
- has three years from the day on which he knew or should have known about the damage, the defect and the identity of the producer to claim compensation from the court.

11.1.1.4 Liability of the Producer

- The producer is liable, under the liability regime for defective products, simply by having put dangerous products onto the market, regardless of whether the defect can be attributed to intent or negligence:
  - for damage caused by his defective product, even if there is no contract between him and the victim, and even if the product was made in accordance with standards, technical rules or had received an administrative authorization.
  - during a period of 10 years from the date the product has been put on the market. Liability is extended where during this same period the victim already commenced legal action. Under Article 2226 Civil Code, a personal injury claim under the EU defective product liability regime commenced either by a direct or indirect victim, is limited to a period of ten years since the consolidation of the initial or aggravated damage.
- Unless the producer can prove:
  - that he did not put the product into circulation;
  - that the product was not intended to be sold or put into circulation;
  - certain exonerating circumstances, for example the fact that the defect did not exist when the product was put into circulation and that the defect appeared later; or fault or

negligence of the user who received complete instructions on limitations on the use of the product from the producer but did not take reasonable care or did not heed the respective warnings;

- that the state of scientific and technical knowledge at the time when the product was put into circulation did not enable the existence of the defect to be discovered;
- that the defect is due to conformity of the product with mandatory rules of a statutory or regulatory nature.

11.1.1.5 Producer liability can be reduced or eliminated:

- in a sales agreement, where exclusion clauses or clauses limiting liability for property damage are deemed to be valid between persons acting as professionals. But clauses to exclude or reduce liability for defective products are forbidden and deemed to be void, in respect of personal injuries, regardless of the status of the victim (even if the victim was either acting as a consumer or using the product while engaged in professional activities);
- if damage is caused by a defect together with the fault of the victim or the fault of a person for whom the victim is responsible (but the producer's liability is not reduced if a third party contributed to the damage);
- if the producer of a component can prove that the defect is due to the design of the product in which the component was incorporated, but not to his component, or due to (bad) instructions given to the producer of the product by the producer of the component.If the injured person (or his representative) can prove that the manufacturer is liable, the manufacturer is required to pay compensation to the following extent :
    - In France, every registered motor vehicle has had to be covered by an insurance policy since the enactment of a statute to that effect in 1958. The payment of compensation to traffic accident victims is facilitated by a statute enacted on 5th February 1985 (the so-called Robert BADINTER law).
    - Thus, in the event of a serious traffic accident, as supposed in scenario 1, the vehicle insurance covering the automated car (being "objectively responsible" for causing the accident, considering the sudden breakdown and collision as the apparent result of a loss of vehicle control) will pay compensation for property damage and personal injuries sustained by the direct or indirect victims of the two cars concerned, as well as for the repair of these two cars (or payment of the market value of vehicles, if the repair cost exceeds the value of those vehicles, taking in consideration the age and mileage of each car).

- Under the French tort law regime, if an accident causes damage to third parties, the insurance company can only rely on exclusion of liability clauses under Articles R 111-10 and R 211-11 of the Insurance Code. For instance, it would be possible for an insurance company to refuse to pay compensation because of a failure to comply with transportation safety obligations.
- But in the principle, these exclusions cannot be relied on to exclude the payment of compensation to traffic accident victims, so under Article R211-13 of the Insurance Code, the insurance company is required to compensate them for damage incurred.
- Therefore, in France, there are compensation scales for calculating compensation for damage, varying according to the type of damage, the age of the victim, and prejudice to the victim in the labour market or in education, for instance.

These scales, called *Dintilhac*, are available at:

http://social-sante.gouv.fr/ministere/acteurs/partenaires/article/nomenclature-des-postes-de-prejudices-rapport-de-m-dintilhac

The results of a calculation of compensation based on these scales are then submitted to expert medical practitioners for evaluation (according to the nature and extent of the damage).

Frames of reference decided by Courts of Appeal are used to assess the compensation allocated for each type of damage.

- In cases of accidents, regardless of liability considerations, the French Social Security System can disburse death and disability benefits, and then recover the amounts paid from the responsible party.
- There is no ceiling on compensation for personal injury or damage to health.
- In cases of property damage, the injured party is required to pay a contribution (deductible) of 500 Euros himself. Regarding this limitation on compensation, there has been some disagreement about its application.
- Furthermore, there is a limitation period in the French defective product liability regime, as mentioned above. A claim under the French defective product liability regime expires ten years from the time when the producer put the product into circulation which caused the damage. This shall not apply if court proceedings have already been commenced on that date.
- This shall also not apply to claims that have been declared final and absolute or to claims based on other enforceable documents. The same shall apply to claims that are the subject of out-of-court settlements or were recognised by means of a contractual declaration.

- In addition, the French Civil Code contains provisions on tort liability (Article 1240 *et seq.*). Pursuant to these articles, a person who, intentionally or negligently, unlawfully injures the life, body, health, freedom, property or another right of another person, is liable to make compensation to the other party for the damage arising from his actions.

There are some significant differences between the French regimes for tort liability and defective product liability:

- In tort law, there is no self-participation for property damage: the entire loss is compensated;
- Tort law is also applicable to vehicles which are used for commercial purposes;
- Tort law is fault-based (or negligence-based), and fault has to be proved (but sometimes, the courts lessen the burden of proof for victims or their representatives).
- Extra-contractual liability may also be a possible when the victim is the owner of the car, because currently the BADINTER Law regime does not apply to them.

Concerning extra-contractual liability, changes were expected after the 2016 reform of Book III of the French Civil Code (contracts) update. The Project of Reform Bill on Civil Liability is still ongoing (the last draft was presented on 13 March, 2017 by Jean-Jacques Urvoas, Minister of Justice in the previous government, following a public consultation (undertaken between April and July 2016). The principal changes would be as follows:

- Only a serious fault committed by the victim of an injury could reduce his right to compensation;
- The same rules would be applied to all the victims who would benefit from the same regime of compensation for injuries;
- The distinction between contractual liability and extra-contractual liability is removed;
- The same rules should be applied to judicial decisions, to administrative rulings, and to transaction protocols between victims and the persons responsible for the damage;
- A no limitative damages nomenclature, a case law data base and a compensation framework are expected;
- The treatment of drivers, who are the victims of accidents, should be improved. Only their inexcusable fault (but not necessarily the only cause of the accident) could reduce or exclude their compensation.

Moreover, it would be possible to compensate victims who are not consumers, without the necessity of proving fault or serious negligence by the seller.

11.1.2 Potential laws affected

The potential laws affected in this context are the following:

- The French Civil Code: In respect of tort law, the French reform of contract law may have possible effects which could extend the specific protections granted to consumers to all parties to a contract, i.e. provisions in respect of extra-contractual liability in general;
- Provisions on personal data protection (in the Consumer Code, the Criminal Code, the Civil Code);
- The French Highway Code: the potential introduction of a specific training requirement prior to authorization to drive an automated vehicle similar to that of motorcycle driving licences; potential addition of a specific test, years after obtaining the driver licence, to test the ability and physical aptitude of the driver, in order to limit the risks of accident. This could be added to Article R 226-1 of the French Highway Code;
- The French Criminal Code (Articles 222-19-1, 222-19, 222-20 and 222-20-1, for example);
- The French Insurance Code.

11.1.3 Scenarios

For every scenario, we shall consider the following different factual situations:

1. at the time of the accident, the automated car was driven by somebody in good health;
2. at the time of the accident, the automated car was driven by someone who was ill or under the influence of alcohol or drugs;
3. the driver was the owner of the automated vehicle or an occasional driver (the vehicle could have been let, rented);
4. this accident has caused personal injury (to a passenger or/and the person inside the second car) and/or property damage (only to the automated car and the second car involved in the accident);
5. the automated car was relatively new (less than two years old), without any unnecessary mechanical modifications;
6. the accident involved an “old” automated car, which was no longer covered by a contractual warranty (in principle, this contractual warranty is equivalent in duration to the statutory warranty available to protect consumers) between two and ten years after first sale;

7. the accident occurs in an automated car over 10 years old;
8. the automated car has been sold only once;
9. the automated vehicle is a second-hand car resold by a private individual or by a professional seller. This latter is or is not an authorized distributor of the vehicle manufacturer.
10. some electronic vehicle data (codes defects/warning alerts transmitted to the driver) should be registered in the electronic systems of the automated car before the accident and should be accessible to the police and/or an expert instructed by the court and shared with the owner or his representative, the manufacturer or his representative, and other actors if they are involved in judicial proceedings to find the reasons for the accident.

We will not analyse the different scenarios under current French law, as level 3 SAE automated vehicles and level 4 SAE automated vehicles are not yet authorized for use on public roads in France. The recent amendment of the Vienna Convention on Road Traffic (of March, 23rd 2016) does not permit Level 3 and 4 SAE either. So, in order to examine the relevant scenarios, we have had to assume that it is possible to sell and use automated vehicles at level 3 SAE or higher.

As explained above, on the basis of the 5th February 1985 law (the so-called Robert BADINTER law), in cases of serious traffic accidents, as reflected in the first four scenarios, the insurer of the automated car (being "objectively responsible" for causing the accident, for example, the sudden breakdown and collision of the vehicle were apparently the result of loss of control of the vehicle) will pay compensation for (i) property damage (ii) personal injuries sustained by the direct or indirect victims of the two cars concerned, and (iii) the repair of the vehicle (or payment of the market value of the vehicle, if the repair cost exceeds the value of the vehicle, taking into consideration the age and mileage on the car).

The insurance company paying the compensation will then require the insuree to sign a subrogation agreement assigning his claims to the insurance company. The insurance company will then make a claim against the person responsible for the traffic accident in order to recover compensation already paid out.

We assume for now that all driving data recorded by the vehicle data recording system of an automated car prior to the accident are not available for examination, except in the context of court proceedings (on the basis of a police order or court order). Considering that the data could contribute to identifying breaches of the highway code, it will be necessary for the data to be examined in the forensic context (and this is quite a big change, because where it is possible, an assessment of the vehicle by a jointly appointed expert is preferred in order to keep the

accident confidential and in order to negotiate a transaction protocol on good terms (for both parties).

11.1.3.1 Scenario 1

In order to examine this scenario, we assume that it is possible to sell and use automated vehicles at level 3 SAE on public roads, based on the principle of automated driving. This assumes robust computer systems which inform the driver in critical situations so that he has time to retake control of the vehicle.

11.1.3.1.1 Liability of the manufacturer

11.1.3.1.1.1 Product liability law

We are informed that the accident was caused by a failure of the car and that at no time was the driver informed by the system to retake control of the car.

It seems circumstances to the effect that the driver is the owner or an occasional driver, that he is in good health or ill, or under the influence of alcohol or drugs are irrelevant here, because we understand that the accident occurred so suddenly and could not have been prevented by the driver, even if he had wanted to prevent it.

- If the car is a new one, without any modifications prior to the accident, the driver will not be responsible for the accident, because the system did not ask him to retake control of the vehicle. The accident could be considered as resulting from a failure of the product. The manufacturer will be responsible, based on the French transposition of Directive 85/374/EEC.
- If the automated vehicle is quite old, or a second hand vehicle: it could be more difficult to prove the liability of the manufacturer under the defective products liability regime because the vehicle could have been repaired or modified incorrectly, or because it could still be under the seller's contractual warranty (and liability). If the seller wants to avoid liability, he would need to prove that the serious defect existed since the first sale and also that he did all reasonably necessary professional checks of this second hand vehicle in order to make sure that it was safe prior to resale. This is more difficult with an old car or a second hand car.
- If the car is more than ten years old, the liability of the manufacturer is excluded under the French defective products liability regime (strict liability), unless a fault was committed (Articles 1245-15 and 1245-17 of Civil Code). It could be the case that the defect is well known to the manufacturer as he organized a recall campaign (but did not recall the car involved in the accident because the manufacturer did not take appropriate measures to execute the recall campaign correctly) or because he chose to ignore the defect, considering the risks too low. It is important to note that it cannot be completely excluded that there will be an evolution of the law over time in ways unfavourable to manufacturers.

Moreover, if the vehicle is not a new one at the time of the accident, we can imagine that different modifications could have been made on it by one or more different repairers. Since, the repairs could be the origin of the failure causing the accident, it would be interesting to examine the repairs in order to determine whether these interventions were made at high standards, in accordance with relevant technical advisories on the professional repair of the vehicle. But unfortunately, as the manufacturer is not a party to the contract between the professional repairer and the owner of the vehicle, the producer will not be allowed to rely on the argument that the failure of professional repairers to comply with their performance obligations was a cause of the accident, even if the producer is convinced that the repairers were responsible (Article 1245-13 Civil Code, stipulates that producers cannot be exonerated because of contributions by third parties to accidents). The only one who could use this argument would be the owner of the automated vehicle or his insurance company. The only exception is that the producer could rely on an expert's report on repairs of the vehicle.

11.1.3.1.1.2 Tort law

If compensation under the French defective products liability regime is considered to be inadequate, it will also be possible for the victim to sue for compensation for pecuniary losses, and pain and suffering, in tort law, arguing the fault or serious negligence of the manufacturer, but this is probably much more difficult to prove.

Getting sufficient proof would require intensive investigation, and would probably be very difficult if the case was an isolated incident. However, it cannot be totally excluded that the court would request the manufacturer to provide information and could ask him to prove that he took all appropriate measures to avoid such an accident.

(Moreover, please note that regardless of whether court proceedings are pending, the authority in charge of issuing technical approval certificates for cars (who would be informed of the accident by the media) or the competent agency (D.G.C.C.R.F for accident victim claims) could ask the manufacturer to explain how the accident happened, whether it was an isolated incident, and if not, whether appropriate measures had been taken or would be taken to quickly commence a recall campaign to prevent further incidents. Furthermore, the agency could force the manufacturer to organize a recall campaign or indeed to recall all affected vehicles, if necessary).

We will not consider here that victims (or their representatives) could sue repairers for negligence or failure to perform their contractual obligations, under Article 1231-1 of Civil Code, in order to obtain compensation for failure to correctly execute their obligations. This kind of legal action is not considered here because the cause of action is not tort but rather breach of contract.

For the same reason, we will not consider the possibility for the owner of the car to sue the seller or/and the manufacturer for serious latent defects in contract, because compensation is not available for collateral damage (property damage and/or personal injury), except for compensation for the damage caused to the vehicle.

11.1.3.1.1.3 Guarantee / warranty

Even if the accident is caused by a defect in the car, a law suit based (i) on a contractual warranty, (ii) on a legal guarantee in case of non-conformity (Articles L217-1 to L217-16, L232-2 and L241-5 of the Consumer Code), or (iii) on a legal warranty involving latent defects (Article 1641 to 1649 of the Civil code), will not be appropriate and efficient; as a matter of fact, the specific regime of liability for defective products must be used where the claim is for compensation for collateral damage by victims or their representatives. The diagram of this scenario clearly shows that property damage has been caused by the collision with the other vehicle.

The French product liability regime has allowed contractual limitation of liability in business to business transactions (but not in business to consumer transactions), but it is not clear that this will continue to be the case after the 2016 reform of the French Civil Code in respect of contracts, which could allow the courts to consider imbalances of power between the parties or to reject obligations imposed by pre-formulated standard contracts.

11.1.3.1.1.4 Other laws (e. g. traffic law, criminal law)

The manufacturer could be held liable for having intentionally put onto the market an excessively dangerous car, having known the risks before it decided to put the vehicle into circulation; or knowing the risks after it was brought onto the market because several serious accidents transpired, without having commenced a recall campaign or withdrawn the product from sale.

Of course, it could be difficult to prove that the manufacturer intended to breach safety norms or that he intended not to prevent significant safety risks he (or his engineers) could not lawfully ignore.

In this regard, it is important to keep in mind that the procedure for obtaining technical approval presumes conformity with safety standards only where the manufacturer has taken all the appropriate measures to prevent safety risks. If a manufacturer has voluntary avoided some tests or the application of certain standards (even those the professional is not usually required to respect), he would be at fault.

If the manufacturer did not prevent risks he should not have ignored, that could constitute serious negligence or fault which could incur civil and criminal liability:

- -Legal persons can incur criminal liability :

- for actions committed by their agents and servants (subparagraph 2 of Article 121-3, Article 221-7 and Article 221-21 of the Criminal Code), or
- for deliberately endangering other persons (subparagraph 2 of Article 121-3 of the Criminal Code).

- Natural persons, in their professional activities, can incur criminal liability either as direct or indirect perpetrators for involuntary manslaughter or unintentional injury resulting from carelessness, recklessness, inattention or for breach of a safety and care duties imposed by law (Directive 2001/95/EC and Directive 2007/46/EC). Any minor infraction is enough to incur criminal liability as a direct perpetrator.
  - direct perpetrators of involuntary manslaughter or unintentional injury: these persons contribute directly to the injury by deliberate offense of a particular duty of care and safety required by law, by reference to the offense of deliberately endangering another person) (Directive 2001/95/EC and Directive 2007/46/EC). Any minor infraction is sufficient to incur liability as a direct perpetrator.

11.1.3.1.2 Liability of the user

At the present time, the driver remains responsible for his vehicle as he still has to stay “in the loop“, and consequently he is not allowed to occupy himself with tasks other than driving. He should at least keep his eyes on the road.

So, overall, it would be possible to sell level 3 SAE cars while providing the driver with a high level of information regarding restrictions on how the vehicle may be used, together with a disclaimer, informing the driver that he would drive this car at his own risk, from the moment he turned the ignition key to start the vehicle. But according to our understanding of level 3 SAE automated cars, such limits on use would dissuade customers from buying those cars. Moreover, courts might hold that consumers are not able to appreciate all the consequences of the agreement to remain in control of the vehicle and could take into account all the circumstances of the accident as well. Courts would probably investigate the safety of all the systems in the car involved to avoid repetition of such an accident, as described in scenario 1.

11.1.3.1.2.1 Tort law

In this first scenario, we do not think the driver should be liable in tort. As the system did not alert him of an imminent danger, we do not believe that the driver could be considered at fault or liable for serious negligence.

11.1.3.1.2.2 Traffic law

At this time, the French Highway Code considers the driver to always be responsible for all infractions of the law. Injuries caused by a car which violates the Code can lead to criminal

liability for the driver, even if the damage caused by loss of control of the vehicle does not appear to be intended.

Even if the accident was caused by a defect in the car, under Article R 412-6 of the Highway Code, the driver will not avoid liability.

11.1.3.1.2.3 Other laws (e. g. criminal law)

Even if the driver is not held responsible for the failure of his vehicle, he can incur criminal liability for causing injuries, i.e. causing unintentional death or bodily harm under Article 222-19 and Article 222-19 -1 of the Criminal Code.

We would expect that a driver would avoid liability if it appeared that the accident was caused by a technical malfunction the driver could not anticipate and avoid, especially if he was in good health before the accident. It will probably be necessary to amend these articles of the Criminal Code, as they may not make very good sense in the context of driving a level 3 SAE vehicle, taking into account the factual impossibility of retaking control of the vehicle from the computer system, because (i) the system did not ask the driver to retake control over driving, or (ii) asked him, but with insufficient time to react effectively to the technical malfunction which subsequently caused the accident.

However, we cannot assert that the decision of the Courts would be the same if the driver was under the influence of alcohol or drugs just before the accident. Indeed, prudence might dictate that he should not drive when intoxicated or under the influence of drugs.

11.1.3.2 Scenario 2

11.1.3.2.1 Liability of the manufacturer

11.1.3.2.1.1 Product liability law

In this scenario, we assume that the vehicle is equipped with a level 4 SAE automated driving system, which has been correctly operated by the driver. The driver does not have to constantly monitor the system during driving tasks. We understand that the vehicle is not technically able to prevent the accident, because of its technical limits and because of the extreme high speed of the third vehicle.

11.1.3.2.1.1.1. Under assumption A, the system reacts as well as an average driver could react.

We suppose that the legitimate expectation of a driver of a level 4 automated vehicle (and the courts' expectation, too) is to drive a safer vehicle than an SAE level 0, 1, 2 or 3 vehicle. This means that the car is able to scan and analyse all traffic conditions in the environment. It is also able to determine if it is possible to change lanes without danger or risks to its passengers and other road users. This reflects the principle that at SAE level 4, the driver's attention in driving the vehicle is not required.

The details of the problem in this scenario are that “technical limits of the sensors of the white vehicle do not allow for the detection of overtaking vehicles from the rear when their distance exceeds a certain value at the moment of lane changing”. This limitation is not acceptable.

Given these facts, it is not certain that the court will exonerate the driver. It is unclear whether it will consider the manufacturer’s design of the car to be adequate, taking into account the existing state of the art.

The courts might hold that the manufacturer should have taken in account the different interactions of a vehicle of SAE level 4 with other vehicles on the road, particularly during the period in which both automated vehicles and human driven vehicles will be on the road at the same time. The court might hold that the systems of a level 4 SAE vehicle should be able to cope with driver error in ordinary vehicles, even if the the other vehicles are not driving in compliance with the law (for example, the excessively high speed of the third vehicle mentioned in this second scenario).

Indeed, this would be even more relevant under assumption B (the system does not react as well as an average driver would react).

- If the car is new, without any modifications prior to the accident, the accident could be deemed to have been caused by a failure of the product. The manufacturer will be responsible, based on the French transposition of Directive 85/374/EEC.
- The circumstances that (i) the driver is the owner or an occasional driver, (ii) that he is in good health or ill, or (iii) under the influence of alcohol or drugs, are irrelevant here, because the accident occurred so suddenly and was caused by a failure that the driver could not have prevented, even if he had wanted to prevent it.
- If repairs or modifications had been made on the car before the accident and are possibly connected with the failure, it would be interesting to investigate and control whether these repairs had been made in accordance with standards and technical instructions specially written for the professional repair of the vehicle. The manufacturer could seek to be exonerated under Article 1240 of the Civil Code, arguing that the accident resulted from mistakes in the professional repair of the vehicle. Nevertheless Article 1245-13 of the Civil Code does not allow the producer to be exonerated because of contributions by third parties to an accident. Thus the manufacturer will not be able to rely on the argument that the professional repairer did not fulfil his performance obligations. Such a line of argumentation can only be used by the client and has the consequence of reversing the burden of proof onto the professional repairer (Article 1231-1 of the Civil Code).
- If the automated vehicle is an old vehicle or a second hand vehicle, it could be more difficult to prove liability of the manufacturer under the defective products liability regime, because

the vehicle could have been subject to many repairs, potentially done incorrectly. If the seller wanted to avoid liability, he would need to prove that the serious defect had existed since the first sale. He would also have to prove that he conducted all professional checks necessary to ensure that this second hand vehicle was safe before selling it. This is probably more difficult for an old car or for a second hand car.

- If the car is more than ten years old, the manufacturer cannot incur liability under the French defective products liability regime, except where he committed serious negligence comparable to a fault (Articles 1245-15 and 1245-17 of the Civil Code),. For instance, the manufacturer could be declared responsible for fault if the failure is a very well-known problem in the relevant car model (i) which was subject to a recall campaign (but the car non treated, as the manufacturer did not take all appropriate measures to carry out the recall campaign in a correct or reasonable way) or (ii) which the manufacturer has chosen to ignore, wrongly estimating the risks to be low.

11.1.3.2.1.2 Tort law

If the compensation under the French defective products liability regime is considered too low by the victim, it is possible for the victim to obtain additional compensation for pecuniary loss, pain and suffering based on fault (Articles 1240, 1245-15 and 1245-17 of the Civil Code) or based on serious negligence by the manufacturer, which is usually difficult to prove.

Getting sufficient proof would require intensive investigation, and would probably be very difficult if the case was an isolated incident. It cannot be totally excluded that the court would request the manufacturer to provide information and could ask him to prove that he took all appropriate measures to avoid such an accident.

(Please note that regardless of pending court proceedings, the authority in charge of issuing technical approval certificates for cars (who would be informed by the media of the accident) or the competent agency ("*Direction Générale de la Concurrence de la Consommation et de la Répression des Fraudes*", abbreviated "D.G.C.C.R.F" which usually investigates consumer claims) could ask the manufacturer to explain (i) how this accident happened, (ii) if this accident could reoccur, (iii) and if it was not an isolated case whether appropriate measures had been taken or would be taken to quickly commence a recall campaign to prevent further incidents. Furthermore, the agency could force the manufacturer to organize a recall campaign or indeed to recall all affected vehicles, if necessary).

We will not consider here that victims (or their representatives) could sue the repairers for negligence or failure to perform their contractual obligations, under Article 1231-1 of Civil Code, in order to obtain compensation for failure to correctly execute their obligations. This kind of legal action is not considered here because the cause of action is not in tort but rather breach of contract.

For the same reason, we will not consider the possibility for the owner of the car to sue the seller or/and the manufacturer for serious latent defects in contract, because compensation is not available for collateral damage (property damage and/or personal injury), except for compensation for the damage caused to the vehicle.

Moreover, if injuries or death were caused to the driver of the "white" car, the manufacturer could not seek to reduce his liability for defects in his vehicle, by alleging fault of the driver of the third vehicle (contribution to the accident). Article 1245-13 of the Civil Code does not allow the manufacturer to reduce his liability in such a case.

11.1.3.2.1.3 Guarantee / warranty

Even if the accident is caused by a defect in the car, a law suit based (i) on a contractual warranty, (ii) on a legal guarantee in case of non-conformity (Articles L217-1 to L217-16, L232-2 and L241-5 of the Consumer Code), or (iii) on a legal warranty involving latent defects (Article 1641 to 1649 of the Civil code), will not be appropriate and efficient; as a matter of fact, the specific defective products liability regime must be used where the claim is for compensation for collateral damage by victims or their representatives. The diagram of this scenario clearly shows there is property damage caused by the collision with the other vehicle.

The defective products liability regime is specifically adapted to allow compensation for collateral damage (property damage and personal injury) for victims or their representatives, so that this regime would be preferred in order to obtain compensation from the producer/ manufacturer.

By the way, it is noteworthy that the French product liability regime has allowed contractual limitation of liability in business to business transactions (but not in business to consumer transactions), but it is not clear that this will continue to be the case after the 2016 reform of the French Civil Code in respect of contracts, which could allow the courts to consider imbalances of power between the parties or to reject obligations imposed by pre-formulated standard contracts.

11.1.3.2.1.4 Other laws (e.g. traffic law, criminal law)

The manufacturer could be held liable for having intentionally put onto the market an excessively dangerous car, ignoring some relevant risks, for example the one exposed in scenario 2, before it decided to put the vehicle into circulation, because of a desire to be the first one to bring such a car onto the market, or knowing the risks, because several serious accidents transpired, without having reacted or deciding to commence a recall campaign or withdrawing the product from sale.

Of course, it could be difficult to prove that the manufacturer intended to breach safety norms or that he intended not to prevent significant safety risks he (or his engineers) could not lawfully ignore.

But we cannot totally exclude this possibility.

In this regard, it is important to keep in mind that the procedure for obtaining technical approval confirms conformity with safety standards only where the manufacturer has taken all the appropriate measures to prevent safety risks. If a manufacturer has voluntarily avoided the application of standards or some tests (even those he is not usually required to respect), he would be at fault.

In the introduction of this chapter, it has been said that the state of the art of technology needs to be taken in account. It is uncertain that this will suffice to avoid liability as the specific expectation exists that all road users should be ensured of safety at level 4 SAE. It may be relevant that automated car systems should be powerful enough to collect all relevant information, not only on their very near environment, but also to be able to estimate the risks of changing lanes, by taking into account the speed of other vehicles on the road.

If the courts hold that these risks are ones that the manufacturer should have reasonably prevented and could not ignore, then his failings in respect of these risks could constitute serious negligence or fault of the manufacturer which would incur civil and criminal liability:

- Legal persons can incur criminal liability for actions committed by their agents and servants (subparagraph 2 of Article 121-3, Article 221-7 and Article 221-21 of the Criminal Code). They can also incur criminal liability for deliberately endangering other persons (subparagraph 2 of Article 121-3 of the Criminal Code),

11.1.3.2.2 Natural persons,

in their professional activities, can incur criminal liability as well , as direct or indirect perpetrators for involuntary manslaughter or unintentional injury resulting from carelessness, recklessness, inattention or for breach of a safety and care duties imposed by law (Directive 2001/95/EC and Directive 2007/46/EC). Any minor infraction is enough to incur criminal liability as a direct perpetrator.

11.1.3.2.3 Liability of the user

11.1.3.2.3.1 Tort law

We assume that the car had a serious defect so that the driver of a level 4 vehicle would not incur liability.

11.1.3.2.3.2 Traffic law

Taking in account assumptions A or B, as in the case of driving at SAE level 0, 1, 2 or 3 vehicles, the driver of the white car will incur liability, because the accident was caused by the unlawful driving behaviour of the third vehicle, which was obliged to respect the speed limit and brake sufficiently to avoid a collision with the white car.

But the result should clearly not have occurred in a level 4 SAE vehicle, which should have avoided the accident.

11.1.3.2.3.3 Other law (e.g. criminal law)

A driver in good health could possibly avoid criminal liability based on Article 222-19-1 of the Criminal Code (which sanctions imprudent or negligent drivers responsible for causing injuries or death) because all circumstances surrounding the facts would be examined. We suppose that in such a case, the driver of a level 4 vehicle would not be required to constantly monitor his vehicle. He could be busy with ancillary tasks but would not incur criminal liability, because the system should have been sufficiently robust to cope with the unexpected approach of the third vehicle.

However, we cannot be certain that the Court would come to the same decision if the driver was under the influence of alcohol or drugs just before the accident. Indeed, prudence might dictate not driving at all when under the influence of alcohol or drugs.

11.1.3.3 Scenario 3

11.1.3.3.1 Liability of the manufacturer

11.1.3.3.1.1 Product liability law

The manufacturer would probably incur liability in variation 1, because a certain level of safety could be expected for the driver, even when using a level 3 SAE vehicle. That would require from the manufacturer that he provide a vehicle with a reasonable minimum reaction time so the driver could regain control of his vehicle.

The outcome could be different in variation 2 of scenario 3, if the driver was very well informed (by the seller/ operating instructions describing the limits of the system given to the user, including notice that the capacities of the car should not be overestimated). In this situation, the driver could be held liable for the accident and for the relevant damage.

- In variation A, if the car is new, without any modifications prior to the accident, the driver is not responsible for the accident, because he has not been asked by the system retake control of driving the vehicle in a safe situation. The accident could be deemed to have been caused by a failure of the product which the manufacturer will be responsible for, in application of the French transposition of Directive 85/374/EEC.

- The circumstances that (i) the driver is the owner or an occasional driver, (ii) that he is in good health or ill, or (iii) under the influence of alcohol or drugs, are irrelevant in variation A, because the accident occurs so suddenly and because of the particular failure. The driver could not have prevented the accident, even if he would have wanted to prevent it. Of course, the situation looks very different in variation B of the scenario, if the driver is the owner and under the influence of alcohol or drugs, because Article 1245-12 of the Civil Code would allow the producer/manufacturer to reduce or avoid liability taking into account all the circumstances, i.e. when damage is caused by a defective product together with the fault of the driver. The court could hold the manufacturer only partly liable for the accident.
- The decision of the court could be different if the driver was not the owner of the vehicle and if the alert he received from the vehicle was not sufficiently clear for an occasional driver to react in time (for example, a driver of a rented car). We would assume that an occasional (new) user would not take the time (or would not have sufficient time) to properly study the operating instructions, and that the alert given by the vehicle would not be easily understood.
- Moreover, we have to consider the fact that sometimes an occasional driver will not be able to consult the operating instructions before using a vehicle because the instruction manual will not have been left inside the car by the car rental agency.
- If a level 4 SAE vehicle was an old car or a second hand vehicle, it could be more difficult to prove that the manufacturer was liable under the defective products liability regime because the vehicle might have been repaired many times and possibly wrongly.
- If the car is more than ten years old, the liability of the manufacturer would be time-barred under the French defective products liability regime, except where he committed a fault (misdeed) (Articles 1245-15 and 1245-17 of the Civil Code). This could happen if the problem/failure was well known to the manufacturer as he had repaired vehicles under a recall campaign (but not the car involved in this accident, because the manufacturer did not take appropriate measures to execute the recall campaign correctly or reasonably) or because he chose to ignore the problem, estimating the risks to be very low. We cannot completely exclude that the law will evolve in the future in ways unfavourable to the producer.

11.1.3.3.1.2 Tort law

If compensation under the French defective products liability regime was estimated to be too low, the victim could sue in tort for pecuniary losses, pain and suffering, based either on fault (Articles 1240, 1245-15 and 1245-17 of the Civil Code), or on serious negligence of the manufacturer, which is usually difficult to prove.

Getting sufficient proof would require intensive investigation, and would probably be very difficult if the case was an isolated incident. It cannot be totally excluded that the court would request the manufacturer to provide information and could ask him to prove that he took all appropriate measures to avoid such an accident.

(Please note that regardless of pending court proceedings, the authority in charge of issuing technical approval certificates for cars (who would be informed via the media) or the competent agency ("D.G.C.C.R.F" which usually investigates victim claims) could ask the manufacturer to explain how this accident happened and why appropriates measure had not already been taken to avoid this risk. Furthermore, the agency could force the manufacturer to organize a recall campaign or indeed to withdraw the affected vehicle from the market, if necessary).

We will not consider here that victims (or their representatives) could sue the repairers for negligence or failure to perform their contractual obligations, under Article 1231-1 of Civil Code, in order to obtain compensation for failure to correctly execute their obligations. This kind of legal action is not considered here because the cause of action is not in tort but rather breach of contract.

For the same reason, we will not consider the possibility for the owner of the car to sue the seller or/and the manufacturer for serious latent defects in contract, because compensation is not available for collateral damage (property damage and/or personal injury).

11.1.3.3.1.3 Guarantee / warranty

If the accident was not the result of a defect in the car but, but rather resulted from misuse (which seems to be the case in variation 2 of this scenario), it will be impossible to get a compensation for collateral damage suffered based on a contractual warranty, a legal guarantee for non-conformity or the legal warranty involving latent defects (Articles 1641 to 1649 of the Civil Code).

If, on the contrary, the accident has resulted from a defect in the car (which seems to be the case in variation 1 of this scenario), it would not be appropriate to base the claim on legal non conformity with the contract of sale (Articles L217-1 to L217-16, L232-2 and L241-5 of the Consumer Code) or on the legal warranty involving latent defects (Article 1641 to 1649 of the Civil Code), because this would only cover damage to the car. The defective products liability regime is specifically adapted to collateral damage (property damage and personal injuries) for victims or their representatives, so that this regime would be preferred in order to get compensation from the producer/ manufacturer.

The French product liability regime has allowed contractual limitation of liability in business to business transactions (but not in business to consumer transactions), but it is not clear that this will continue to be the case after the 2016 reform of the French Civil Code in respect of

contracts, which could allow the courts to consider imbalances of power between the parties or to reject obligations imposed by pre-formulated standard contracts.

In addition, various different modifications could have been made on the car, above all if it is an old vehicle or a second hand vehicle. If the car has been repaired professionally before the accident for problems related to the failure causing the accident, it would be possible to check the repairs to see if they been made in accordance with appropriate standards and technical warnings written for that purpose.

If an accident occurred a very short time period of time after repairs had been made by a professional repairer, this repairer could be required by the victim or his representative to prove that the accident did not result from his intervention (the burden of proof being upon the professional repairer, under Article 1231-1 of the Civil Code).

11.1.3.3.1.4 Other laws (e. g. traffic law, criminal law)

In variation 1, we cannot totally exclude manufacturer's liability. He should be held liable if:

- He intentionally put a dangerous vehicle onto the market, ignoring some relevant risks, such as the one raised in this scenario. If that is so, he would have had such knowledge prior to putting the product into circulation.
- He was aware of the risks because he had knowledge of several serious accidents, but he did not react, i.e. he did not decide that it was necessary to commence a recall campaign or a preventive withdrawal of the product from the market.

Of course, it could be difficult to prove the intention of the manufacturer to breach safety norms or to avoid preventing unreasonable safety risks that he (or his engineers) should not ignore.

In this regard, it is important to keep in mind that the procedure for obtaining technical approval presumes conformity with safety standards only where the manufacturer has taken all the appropriate measures to prevent safety risks and did not commit a fault by voluntarily avoiding certain tests or the application of appropriate standards (even those he does not need to respect usually). The state of the art of technology would have been taken into account, as mentioned in the introduction of this chapter.

If the manufacturer did not reasonably prevent risks he should not have ignored, that could constitute serious negligence or fault which could incur civil and criminal liability:

- Legal persons can incur criminal liability for actions committed by their agents and servants (subparagraph 2 of Article 121-3, Article 221-7 and Article 221-21 of the Criminal Code). They can also incur criminal liability for deliberately endangering other persons (subparagraph 2 of Article 121-3 of the Criminal Code),

- Natural persons, in their professional activities, can incur criminal liability as well, as direct or indirect perpetrators for involuntary manslaughter or unintentional injury resulting from carelessness, recklessness, inattention or for breach of a safety and care duties imposed by law (Directive 2001/95/EC and Directive 2007/46/EC). Any minor infraction is enough to incur criminal liability as a direct perpetrator.

11.1.3.3.2 Liability of the user

11.1.3.3.2.1 Tort law

In variation 1, we cannot totally exclude that the court will limit or exclude liability of the manufacturer under Article 1245-12 of the Civil Code on the basis of the fact the user was driving under the influence of alcohol or drugs.

11.1.3.3.2.2 Traffic law

In the second variation, it seems that the driver should be recognized as having breached the rules in the French Highway Code that require the driver to have control of his vehicle in all circumstances. That should not change in respect of the level 3 vehicle concerned, provided that the car's computer system would have permitted him to react in sufficient time and that the user had been correctly informed of the limits of what the commuter vehicle system was able to cope with.

11.1.3.3.2.3 Other laws (e. g. criminal law)

In variation 1, the fact that the user was driving under the influence of alcohol or drugs would be taken into consideration in criminal proceedings if the accident involved the injury of another user of the road (though this is not clear from the diagram).

11.1.3.4 Scenario 4

11.1.3.4.1 Liability of the manufacturer

Despite the fact that the vehicle in this scenario is a level 3 SAE vehicle, we believe that such an accident should not have occurred.

We believe that the standards in the computer technology should prevent such serious misuse. For instance, the systems with which the car is equipped should recognize the different types of roads on which the vehicle is used (from road makings, traffic signs, etc.). The system should have automatically prevented the computer system from driving the vehicle when it sensed that there was two-way traffic on the road. It should have signalled this by giving a specific audio alert to the driver, informing him that automated driving was not possible any longer and requested him to take over the driving task from the computer system.

Moreover, it is possible that the car would have noticed an anomaly (i.e the direction and distance of the car approaching in the opposing lane, when overtaking the previous vehicle).

If so, it ought to have braked the vehicle automatically to help the driver to stop the manoeuvre, and then to allow the vehicle to be steered into the right lane.

11.1.3.4.1.1 Scenario 4 situation A

11.1.3.4.1.1.1. Product liability law

The car should be considered insufficiently safe, due to the expectations everybody would place on such a vehicle. A minimum safety requirement would probably be for the vehicle to give the user audio and visual alerts or warnings to avoid the accident.

Of course, we assume the court will closely examine the date of production and date of putting the car onto the market in order to assess the seriousness of the failure.

The fact that in situation A, the only information given to the driver (*whoever he is*) on how to use the car properly was in the vehicle's operating instructions, assuming that he would have respect the Highway Code, the circumstances will not be favourable to the manufacturer.

Furthermore, we are not sure that although the driver would have been very well informed by the seller of recommendations for the appropriate use of the car, and the limits of the computer system, which would have been clearly explained before the sale of the vehicle, as well as in the manual of instructions, that the manufacturer will be able to avoid liability.

We are not sure that under the circumstances, whether the driver is the owner or an occasional driver would be viewed differently by a court.

Of course, we maintain that driving this car will not be at all safe for the occasional driver.

This takes account of the fact that in such cases (car rentals, for example), the user will not take the time (nor have sufficient time) to properly study the operating instructions, or may even not be able to consult the instruction manual as it will not have been left inside the car by the car rental agency.

The fact that the vehicle is not fitted with a device to prevent activation of the automated driving system in inappropriate situations (as in situation A of scenario 4) could be considered by a court to be a failure of the manufacturer to honour his professional obligations. It would have been reasonable for the manufacturer to have anticipated this situation, by placing specific alerts and warnings directly into the car (perhaps as stickers on the dash board) in plain sight for drivers who are not the owners.

Furthermore, we cannot imagine that owners will be responsible for not having given an occasional driver the same level of information that they would have received from the seller prior to purchase.

If the driver was under the influence of medicine, alcohol or drugs when the accident occurred, a strict interpretation of Article 1245-12 of the Civil Code by the court would allow it to reduce the liability of the producer/manufacturer. But that is not certain, as discussed above.

If modifications have been made on the car (the vehicle could have been repaired before the accident in some way which might have contributed to the accident), that will not affect the court's decision in situation (a), because the accident will be deemed to have been caused by a safety defect, independently of the repairs.

If the automated vehicle is a very old second hand vehicle, it could be more difficult to prove the liability of the manufacturer under the defective products liability regime, because of the evolution of standards. If the minimum standards at the moment when the car was put into circulation did not require (i) a safeguard device to prevent activation of the automated driving system on two way roads, (ii) as a minimum that the vehicle gave specific audio alerts and warnings to the driver, so that he could avoid such dangerous misuse of the vehicle.

If the car is more than ten years old, the manufacturer could not be held liable under the French defective products liability regime, except where the manufacturer committed a fault (Articles 1245-15 and 1245-17 of the Civil Code), or the failure is considered by the courts as serious negligence, owing to the safety expectations everybody would have had for level 3 SAE cars, even at that time.

It could still be the case if the failure is well known as a problem which the manufacturer had repaired under a recall campaign (but not this respective vehicle, because the manufacturer did not take appropriate measures to execute the recall campaign correctly or in a reasonable way). Alternatively, the manufacturer may have chosen to ignore the problem, thinking the risks too low. Notice that we cannot exclude an evolution of the law, in the direction of increasing vehicle safety, which might be less favourable to producers.

11.1.3.4.1.1.2. Tort law

If compensation under the French defective products liability regime was estimated to be too low, the victim could sue in tort for pecuniary losses, pain and suffering, based either on fault (Articles 1240, 1245-15 and 1245-17 of the Civil Code), or on serious negligence of the manufacturer, which is usually difficult to prove.

This would require investigations, more or less intensive, depending on the standards required and on how manufacturer dealt with the defect after-sale. Perhaps, it would be relatively difficult for the court to order such an investigation where there was an isolated accident, or if

standards at the moment the car was brought into circulation were not particularly strict, but we cannot totally exclude that the court would request the manufacturer to provide information and could ask him to prove that he took all appropriate measures to avoid such an accident.

(Please note that regardless of pending court proceedings, the authority in charge of issuing technical approval certificates for cars (which would be informed by media coverage or victims of similar accidents) or the competent agency (D.G.C.C.R.F for victim claims) could ask the manufacturer to explain how this accident happened and why any appropriate measures had not been already taken to avoid this risk. Furthermore, the agency could force the manufacturer to organize a recall campaign or indeed to recall all affected vehicles, if necessary).

We will not consider here that victims (or their representatives) could sue the repairers for negligence or failure to perform their contractual obligations, under Article 1231-1 of Civil Code, in order to obtain compensation for failure to correctly execute their contractual obligations. The cause of action is not in tort but rather breach of contract.

Similarly, we will not consider the possibility for the owner of the car to sue the seller or/and the manufacturer for serious latent defects in contract, because compensation is not available for collateral damage (property damage and/or personal injury).

11.1.3.4.1.1.3. Guarantee / warranty

Assuming the accident did not result from a defect in the car but from misuse, it would be impossible for the injured driver to get compensation for collateral damage suffered based on a contractual warranty, a legal guarantee for non-conformity or a legal warranty involving latent defects (Article 1641 to 1649 of the Civil code). This is because these liability regimes do not compensate collateral damage. They would only compensate damage to the car due to a defect.

The French product liability regime has allowed contractual limitation of liability in business to business transactions (but not in business to consumer transactions), but it is not clear that this will continue to be the case after the 2016 reform of the French Civil Code in respect of contracts, which could allow the courts to consider imbalances of power between the parties or to reject obligations imposed by pre-formulated standard contracts.

11.1.3.4.1.1.4. Other laws (e. g. traffic law, criminal law)

Of course, it could be difficult to prove the intention of the manufacturer to breach safety norms or to avoid preventing safety risks that he (or his engineers) could not reasonably ignore.

In this regard, it is important to keep in mind that the procedure for obtaining technical approval presumes conformity (and safety) only where the manufacturer has taken all the appropriate measures to prevent safety risks, and did not commit a fault by avoiding certain tests or the application of standards, even those he did not previously need to respect (example: standards of cyber-security with internet connected cars).

But if the manufacturer did not prevent risks he could not reasonably have ignored, this could constitute serious negligence or fault of the manufacturer which could incur civil and criminal liability:

- **Legal persons can incur criminal liability for actions committed by their agents and servants** (subparagraph 2 of Article 121-3, Article 221-7 and Article 221-21 of the Criminal Code). **They can also incur criminal liability for deliberately endangering other persons** (subparagraph 2 of Article 121-3 of the Criminal Code),
- **Natural persons, in their professional activities, can incur criminal liability as well**, as direct or indirect perpetrators for involuntary manslaughter or unintentional injury resulting from carelessness, recklessness, inattention or for breach of a safety and care duties imposed by law (Directive 2001/95/EC and Directive 2007/46/EC). Any minor infraction is enough to incur liability as a direct perpetrator.

11.1.3.4.1.2 Scenario 4 situation B

In situation A, the car should have been fitted with a device to protect occasional drivers of the car (and so any driver in fact) in order to prevent such an accident.

In situation B, this device had been installed to prevent activation of the computer system in inappropriate situations, but the device has a functional deficiency.

The suitability of the device to prevent the danger represented by this misuse will be assessed by the courts (i) by comparison with standards existing at the moment of the car being put into circulation, and (ii) the impossibility that a professional car maker could ignore this kind of possible misuse.

If the device was considered as sufficiently effective, the dysfunction will exonerate the driver and the manufacturer will incur liability on the basis of article 1245 *et seq.* Civil Code.

If the device was not considered effective, this could be held to be serious negligence or a fault on the part of the manufacturer, who could incur civil liability, even if the accident occurred more than 10 years after the first sale of the vehicle (based on tort law, or criminal law, if all criteria are met).

All the other conclusions developed for this situation also apply to situation B.

11.1.3.4.1.3 Scenario 4 situation C

We are informed that the vehicle is fitted with a device to avoid activation in inappropriate situations, but the device has a functional deficiency. The vehicle only allows activation after request.

- We imagine that these conditions of use are important and acceptable for a level 3 SAE car, when there is no a dysfunction.
- But in this scenario, all the circumstances will be attentively examined, particularly the robustness of the vehicle systems to avoid such an accident.

11.1.3.4.1.3.1. Liability of the manufacturer

11.1.3.4.1.3.1.1. Product Liability Law

If the car has been recently registered, and is one of the first automated cars, technically similar to other automated cars of competing brands (in compliance with standards required for level 3 SAE cars) and without any modifications prior to the accident, we suppose court decisions will vary. They will depend on the habits that drivers will have with such cars. The courts will take into consideration all the circumstances, including the date the car was put onto the market in order to decide who is liable for the accident.

Indeed, because of the nature of the failure of the system in this scenario, the court will probably consider the manufacturer responsible (without fault) because the safety of the car was not adequate, and there exists no alternative explanation of the defect than an inherent technical defect of the original system of the car.

The court will hold that the accident resulted from failures of the product and the manufacturer, in application of the French transposition of Directive 85/374/EEC (Article 1245 *et seq*. of the Civil Code).

If the automated vehicle is an older one or a second hand vehicle, it could be more difficult to prove the liability of the manufacturer under the defective products liability regime because the vehicle could have been repaired many times, and possibly wrongly, as discussed in the previous scenario.

But with an old car (under 10 years old), the date the car model was put onto the market will need to be taken into consideration. For instance, if there are already a lot of similar automated vehicles which had previously received technical approval, it could be difficult for the producer to defend itself in proceedings for a fatal accident if all the other cars of the same model did not have accidents similar to the one described in scenario 4 C.

If the car is more than ten years old, liability of the manufacturer should not be possible under the French defective products liability regime, unless the manufacturer has committed a fault (Articles 1245-15 and 1245-17 of the Civil Code). This could be the case if a defect was well known to the manufacturer as a problem that he had repaired under a recall campaign (but vehicle involved was not repaired because the manufacturer did not take appropriate measures

to properly execute the recall campaign). Alternatively, the manufacturer may have chosen to ignore the problem, estimating the risks involved as low.

Please note that we cannot exclude the evolution of the law, in order to improve vehicle safety, in ways less favourable to producers. If the car is quite old or a second hand car, the victim would have to prove that a serious defect in the vehicle, which existed since it was first brought onto the market, was the cause of the accident and the damage. That would not necessarily be easy to prove, above all, if the car had been repaired several times, or if low quality spare parts had been used as replacements for the original parts, or where the repairs had not been made in conformity with manufacturer's recommendations and standards.

Still, considering the age of the car, the manufacturer could try to avoid liability, arguing that he was not responsible for bad repairs.

But as already explained, not being a third party to a contract between the professional repairer and the owner of the vehicle, and in application of Article 1245-13 of the Civil Code, which does not allow producers to avoid liability because of the participation of third parties to an accident, the manufacturer could probably only argue that the original product did not cause the accident. The manufacturer would only be able to request the technical expert instructed to investigate the accident. The expert could require the repairer to prove that he worked in compliance with the standards and recommendations of the manufacturer.

The circumstances that the driver is the owner or an occasional driver, or that he is in good health or ill, or under the influence of alcohol or drugs could possibly be examined by the court, where it was argued that both the manufacturer and the driver were liable, but it is unclear how the court would view such an argument.

11.1.3.4.1.3.1.2. Tort law

If compensation under the French defective products liability regime was estimated to be too low, the victim could sue in tort for pecuniary losses, pain and suffering, based either on fault or on serious negligence of the manufacturer, which is usually difficult to prove.

Getting sufficient proof would require intensive investigation, and would probably be very difficult if the case was an isolated incident. It cannot be totally excluded that the court would request the manufacturer to prove that he took all appropriate measures to avoid such an accident.

(Please note that regardless of pending court proceedings, the authority in charge of issuing technical approval certificates for cars (who would be informed by media coverage) or the competent agency ("D.G.C.C.R.F" which usually investigates victim claims) could ask the manufacturer to explain how this accident happened and if it was not an isolated case, why appropriate measures had not already been taken to avoid this risk. Furthermore, the

manufacturer could be forced to launch a recall campaign, or withdraw the affected vehicle from the market, if necessary).

We will not consider here that victims (or their representatives) could sue the repairers for negligence or failure to perform their contractual obligations, under Article 1231-1 of Civil Code, in order to obtain compensation for failure to correctly execute their obligations. This kind of legal action is not considered here because the cause of action is not in tort but rather breach of contract.

Similarly, we will not consider the possibility for the owner of the car to sue the seller or/and the manufacturer for serious latent defects in contract, because compensation is not available for collateral damage (property damage and/or personal injury), except for compensation for the damage caused to the vehicle.

11.1.3.4.1.3.1.3. Guarantee / warranty

It is not appropriate to claim on a contractual warranty or legal guarantee in case of non-conformity (Articles L217-1 to L217-16, L232-2 and L241-5 of the French Consumer Code), or a legal warranty involving latent defects (Article 1641 to 1649 of the French Civil code), because the defective products liability regime is preferred because it is able to provide compensation to victims or their representatives in cases of collateral damage.

The French defective product liability regime has allowed contractual limitation of liability in business to business transactions (but not in business to consumer transactions), but it is not clear that this will continue to be the case after the 2016 reform of the French Civil Code in respect of contracts, which could allow the courts to consider imbalances of power between the parties or to reject obligations imposed by pre-formulated standard contracts.

11.1.3.4.1.3.1.4. Other laws (e. g. traffic law, criminal law)

The manufacturer should be liable for having intentionally put a much too dangerous car onto the market having knowledge of the risks when he decided to put the product into circulation, or despite discovering the risks after putting it into circulation (several serious accidents appeared), without having reacted with a recall campaign or even a preventive withdrawal of the product from the market, if necessary.

Of course, it could be difficult to prove the intention of the manufacturer to breach safety norms or to avoid preventing unreasonable safety risks he (or his engineers) could not ignore.

In this regard, it is important to keep in mind that the procedure for obtaining technical approval confirms conformity with safety standards only where the manufacturer has taken all the appropriate measures to prevent safety failures and did not commit a fault by voluntarily avoiding the application of standards or the conduct of tests (even those he is not usually required to respect).

If the manufacturer did not prevent reasonable risks he should have known about, this could constitute serious negligence or a fault which could incur civil and criminal liability:

- Legal persons can incur criminal liability for actions committed by their agents and servants (subparagraph 2 of Article 121-3, Article 221-7 and Article 221-21 of the Criminal Code). They can also incur criminal liability for deliberately endangering other persons (subparagraph 2 of Article 121-3 of the Criminal Code).
- Natural persons, in their professional activities, can incur criminal liability as well, as direct or indirect perpetrators for involuntary manslaughter or unintentional injury resulting from carelessness, recklessness, inattention or for breach of a safety and care duties imposed by law (Directive 2001/95/EC and Directive 2007/46/EC). Any minor infraction is enough to incur criminal liability as a direct perpetrator.

11.1.3.4.1.3.2. Liability of the driver:

The court will likely hold the driver or owner as negligent because he ignored the users' manual, which highlights the limits of using a vehicle equipped with an SAE level 3 system. The instructions, together with the Highway Code, make it clear that the driver must stay "in the loop" and concentrate on the road in all circumstances. Thus, the driver involved in the accident would like incur liability and the manufacturer would likely either partially or completely avoid liability. We note that this analysis is speculative and should not be relied upon;

Alternatively, the court might take into account the fact that the computer system was inadequate because it did not correctly alert the driver to retake control of the vehicle or inform the driver that traffic was travelling in the wrong direction. In particular, if this car is not the owner's first level 3 SAE system car or if many level 3 SAE system cars had received technical approval and had been in use on public roads over the course of several years, the court would be more severe with the manufacturer, demanding him to provide a higher level of safety in this car.

The circumstances that the driver is the owner or not of the vehicle, that he is either in good health or ill or under the influence of alcohol or drugs, could be regarded in various ways and could possibly influence the court's decision on manufacturer's liability, but might not.

11.1.3.5 Scenario 5

11.1.3.5.1 Liability of the manufacturer

In this last scenario, we assume that in a level 4 SAE vehicle, the system should inform the driver well in advance of changes in driving conditions which could have serious consequences for the safety of personnel working on a motorway. The system should not only be equipped to recognise traffic signs, but it should also have specifically adapted systems that make audio

alerts based on satellite or motorway radio information…. We can also imagine a sharing of information of that type, either car to car, or truck to car when many connected vehicles are on the road.

11.1.3.5.1.1 Product liability law

If there is an accident caused by a failure of the system to see a traffic sign, we consider that the manufacturer could be liable because of the specific safety expectations that everybody should have on this type of vehicle (our analysis of scenario 2 assumption B is applicable to scenario 5).

11.1.3.5.1.2 Tort law

If there is an accident and people are injured because of the failure of the system, the court, the authority in charge of issuing technical approval certificates to cars (informed by the media for instance) or the competent agency ("*Direction Générale de la Concurrence de la Consommation et de la Répression des Fraudes*", abbreviated "D.G.C.C.R.F" which usually investigates consumer claims) could ask the manufacturer to certify that the accident was an isolated case and to prove that appropriate measures have been taken or would be taken very soon, to prevent a recurrence. The producer could even been forced to a commence recall campaign. In the case of an old car and if the accident occurred immediately after the car had been repaired, we cannot exclude that the driver could seek to hold the repairer liable in negligence for failure to perform his obligations under Article 1231-1 of the Civil Code, as mentioned above. This would be the case if the manufacturer's systems for recognizing speed limits signs did work properly prior to the repair.

11.1.3.5.1.3 Guarantee / warranty

We consider that the owner of a new level 4 vehicle, who is in in a perfect state of health could probably sue the seller or the manufacturer for serious a latent defect in the car because he would have a legitimate expectation that a level 4 SAE vehicle would perform effectively in traffic and because of the risk of being injured that would arise from an accident caused by such a failure.

If the driver is a consumer, he will be able sue under Articles L 217-1 *et seq.* of the Consumer Code, and the burden of proof will be reversed against the defendant.

If the court holds that this problem is a very serious one, considering the high level of automation of the car, the plaintiff could get the contract of the sale rescinded as well as damages.

If the owner is not a consumer, he will have to prove that the vehicle is defective under Article 1641 *et seq.* of the Civil Code (he will have to use this argument 2 years after having "known"

this failure and only during 5 years after the sale). He could get the same judgment as noted above.

In the case of a second hand car, at this time, we are not sure whether an action by the purchaser against the seller for a serious latent defect would be successful. It could very problematic if a technical examination required the dismantling of the car. But that does not mean that French jurisprudence will not change in the future and that the courts will not require more thorough controls before putting automated vehicles onto the market.

11.1.3.5.1.4 Other laws (e. g. traffic law, criminal law)

If the result of scenario 5 is only a monetary fine, plus several points on the driver's driving license, we don't think that at this time the manufacturer would incur liability either under the traffic law or under the criminal law because the driver is responsible for the way he drives. He must respect the traffic law, taking in account the general guidelines in Article R 412-6 of the Highway Code.

But we cannot exclude that the driver might get his fine set aside, or indeed incur no liability, based on the fact (with proof) that the automated driving system was activated when the traffic law infraction occurred.

On the other hand, even if the scenario seems to reject this possible option, if excessive speed caused an accident with injuries that the driver would not have been able to avoid, because of the sudden change of situation (speed limits signs alerting the driver of road works), we wonder if the driver should not be able avoid liability for causing unintentional death or bodily harm under Articles 222-19 and 222-19-1 of the Criminal Code, because of the car's high level automated driving together with the specific expectation that the vehicle would drive safely. Perhaps the manufacturer would incur liability for not preventing the risks his level SAE 4 vehicle would create by not coping with situations in which speed limit signs were hidden by a truck. It will be difficult for the manufacturer to pretend that he not to know.

The manufacturer could risk liability for endangering life by serious negligence or fault, taking in account the high level of driving automation of the vehicle, despite having received technical approval or compliance with standards.

If he did not prevent reasonable risks he could not have ignored, this could constitute serious negligence or fault by the manufacturer which could incur civil and criminal liability:

- Legal persons can incur criminal liability for actions committed by their agents and servants (subparagraph 2 of Article 121-3, Article 221-7 and Article 221-21 of the Criminal Code) and for the offence of deliberately endangering another person (subparagraph 2 of Article 121-3 of the Criminal Code), and

- Natural persons, in their professional activities, can incur criminal liability as well, as direct or indirect perpetrators for involuntary manslaughter or unintentional injury resulting from carelessness, recklessness, inattention or for breach of a safety and care duties imposed by law (Directive 2001/95/EC and Directive 2007/46/EC). Any minor infraction is enough to incur criminal liability as a direct perpetrator.

11.1.3.5.2 Liability of the user

11.1.3.5.2.1 Tort law

In a situation in which an accident with personal injuries occurs because of excessively high speed resulting from the impossibility of taking into account a speed limit sign hidden behind a truck, especially if the driver was in good health for driving (not ill, not drunk, not under the influence of drugs), we do not think the driver could be held liable on the basis of tort law provisions.

But it could be different if he was under the influence of drug, alcohol or medicines incompatible with driving. Even if the use of some substance would not change anything compared to the previous situation, we would expect that his insurance company could use this information in order to avoid paying compensation for the accident.

11.1.3.5.2.2 Traffic law

At this time, the owners of vehicles are presumed to be responsible for breaches of traffic law. If the owner was not the driver when the breach occurred, he generally has to prove that he was not driving the car and to prove the identity of the person driving the vehicle at the moment of the infraction. This means he will have to report all the elements of the breach, including the name of the true driver to the police in order to exonerate himself.

11.1.3.5.2.3 Other laws (e. g. criminal law)

If the result of the situation described in scenario 5 is just a monetary fine, the owner of the car will be the presumed driver and will be liable to pay the fine and to loose several points on his driving licence.

Nevertheless, if the owner can prove that he was not driving the car at the relevant time or that the automated system was activated, he could avoid liability.

11.1.4 Liability of the registered keeper / owner

11.1.4.1 Tort law

In case of an accident causing injuries, the driver of a level 4 SAE vehicle's responsibility is generally established, based on his duty to take the control of the car when the systems informs

him to do so, and to keep control of the car in certain situations the automated car is not able to cope with, if he is informed in sufficient time.

We suppose the first owner (at least) will be aware of the limits of the system. But it is not certain that this applies to a second hand car owner, or an occasional user, who could not get the same level of information, and could ignore the specificities and limits of the car (except if there is standard of information to be provided by professional sellers both to the purchasers of new cars and second hand cars).

We are not sure the owner would be held liable by the court if he had not been correctly informed about the limits of the vehicle, but perhaps that would be the case for rental agencies or for companies which provide vehicles to their employees.

11.1.4.2 Traffic law

At this time, all the traffic infractions are presumed committed by the owner of the car who generally receives the fine demand and has to pay, for example where the infraction was recorded by an automatic traffic monitoring device or system (for example, for breaching speed limits).

But if the police stop the vehicle and draw up an official report establishing who was the driver, that person will be directly declared responsible for the infraction, even if he is not the owner of the car, unless possibly where the driver manages to prove that the automated driving system was activated at the time of the infraction.

The liability of the driver will probably increase where driving under the influence of drugs or alcohol is established, if the car is a level 3 SAE vehicle. But this approach may not apply to level 4 SAE vehicles, which are supposed to take the control of the vehicle instead of the driver, if necessary. Perhaps, the manufacturer will still have to prevent driving under influence of alcohol or drugs, by monitoring the driver's physical state before and during operation of the vehicle.

11.1.4.3 Other laws (e. g. criminal law)

Even if the driver (not necessarily the owner of the vehicle) is not liable for vehicle failures, he can still incur criminal liability for injuries that caused unintentional death or bodily harm under Article 222-19 and Article 222-19 -1 of the Criminal Code.

But we suppose drivers will not incur criminal liability if it appears that a technical malfunction, which the driver could not have known about and avoided (at level 4 SAE), caused the accident, particularly if the driver was in good health before the accident. Where a technical malfunction was putatively the cause of the problem, as in this case, the court would probably attentively

examine the time given to the driver to react in good conditions, if required to do so, in this level 3 SAE vehicle. The court would probably also take into account the issue of the factual impossibility of retaking control of the vehicle from the computer system. It would want to determine whether the driver was asked or not was asked to retake control with insufficient time to permit the action from being completed.

However, we cannot assert that the decision of the Court would be the same if the driver was under the influence of alcohol or drugs just before the accident. Indeed, prudence might dictate not driving under the influence of alcohol or drugs.

11.1.5 Insurance law (overview)

There follows a summary from the insurers' point of view regarding automated vehicles. The main idea is that insurers are interested in the possibility of making manufacturers automatically liable for accidents.

11.1.5.1.1 A shift toward manufacturers' liability:

Regarding liability arising from the use of automated vehicles, the main question is to establish who will be liable. The choice is between the "driver", the manufacturer and other parties (owner, network operator, etc.). Most insurers agree that there will be a huge impact on the traditional automobile insurance sector (decrease in premiums) and, at the same time, there will be more claims involving manufacturers' product liability insurance.

11.1.5.1.2 The Data question

When discussing liability, it is also necessary to consider the question of the investigation of claims to determine how accidents occur. In other words, the issue of access to data must at some point be settled. Indeed, it will be necessary to know the precise circumstances (including the mode of automated operation activated), the existence or not of a defect, and faults in the system.

We expect that insurers will want to have easier access to personal data than is the case today, in order to be able to identify those responsible and thus ask for reimbursement for the sums paid to victims from the person responsible (or the insurer) for the accident.

11.1.5.1.3 The existing legal framework

The European Directive on Liability for Defective Products should be applied without modifications.

- The working axes for manufacturers, having an impact on insurance, relate to:
  - The quantification of the risk (typology, frequency and severity of accidents);

- The evolution of the insurance model: be open to proposals by insurers and / or by the legislature.

11.1.6 Conclusions

On the basis of the 5 scenarios analysed above, we suppose that manufacturers will develop and bring into circulation automated vehicles with sufficiently high levels of technology in order to limit safety risks for passengers of these vehicles and for other road users, taking in account the strong demand for safety by customers and also by government authorities.

11.1.6.1.1.1 Concerning Level 3 SAE automated vehicles:

There will be strong safety expectations on manufacturers. They will be required to equip level 3 SAE automated vehicles with robust electronic systems, including sufficiently strong ground recognition apparatus, to efficiently provide the driver (the owner or the occasional user) with high quality information to prevent collisions. Manufacturers should be interested in integrating such systems into their vehicles in order both to limit media risks that could have negative consequences for their reputation as well as to avoid civil or/and criminal liability based on product liability rules, serious negligence or fault.

For instance, if a change of the road infrastructure disturbs the proper functioning of the automated system, the system in a level 3 SAE vehicle could be designed to alert the driver in sufficient time before an impact, in appropriate conditions, in order to permit him to react and retake the control of the car.

In our view, the courts' expectation is likely to be that this is an essential requirement for automated driving systems. If that were so, judgments on the liability of manufacturers who had failed to include such capabilities could be quite severe.

Moreover, considering the absence of a reaction by the driver, which could be a reasonably foreseeable effect caused by automated driving of the vehicle, we suppose that the courts will require automated systems at level 3 SAE to brake if the driver doesn't react following an alert, in order to avoid a collision. The vehicle should also brake when sufficient time is not available so that it is not possible for the driver to react by braking.

The car also should be designed to prevent misuse of the automated system, for example on a road which is inappropriate for its use. It should not be possible to activate the system, when it does not recognize that the road is suitable to permit automated driving. The system should provide adequate information to users in such situations.

11.1.6.1.1.2 Regarding Level 4 SAE automated vehicles:

We assume that safety expectations for such vehicles will be higher:

Such vehicles will probably have to be equipped with strong systems for detecting the immediate and distant environment of the vehicle, situational changes (for instance, signing for changes in the speed limit), regardless of whether obstacles mask these changes (like the truck obstructing the vehicle's view of the speed limit sign in scenario 5).

Such vehicles should probably also be able to assess the speed of other vehicles, both in front of and behind them, in order to ensure that overtaking other vehicles is safe.

All in all, level 4 SAE vehicles need to be able to process and react to large quantities of information concurrently. Information will come to the vehicle through on-board systems as well as from other sources of information, such as other automated vehicles or various connected services relayed by cloud.

Lastly, such vehicles will need to react independently, i.e by themselves, when the driver is not be able to do. That includes not only braking, but manoeuvring the vehicle in a way to ensure safety, in conditions that will still have to be defined (including ethical considerations).

11.2 Germany

11.2.1 Main principles of the German transposition of Directive 85/374/EEC

The German Product Liability Act came into effect on 15th December 1989. The liability of producers pursuant to this Act may not be excluded or limited in advance. Any agreements to the contrary shall be null and void.

Basically, Directive 85/374/EEC implemented into German law all regulations described under section 9.3. But some provisions will be highlighted or explained in this section.

The injured person bears the burden of proving the defect, damage and the causal relationship between the defect and damage. In cases of exonerating circumstances, the manufacturer bears the burden of proving their existence.

Those exonerating circumstances are as follows (Article 1, paras. 2 and 3 Product Liability Act):

(2) The producer's liability obligation is excluded if

1. He did not put the product into circulation;

2. Under the circumstances it is probable that the defect which caused the damage did not exist at the time when the producer put the product into circulation;

3. The product was neither manufactured by him for sale or any other form of distribution for economic purposes nor manufactured or distributed by him in the course of his business;

4. The defect is due to compliance of the product with mandatory regulations at the time when the producer put the product into circulation or;

5. The state of scientific and technical knowledge at the time when the producer put the product into circulation was not such as to enable the defect to be discovered.

(3) The obligation to pay damages of the producer of a component part is also excluded if the defect is attributable to the design of the product in which the component has been fitted or to the instructions given by the manufacturer of the product. The first sentence shall apply to the producer of a raw material mutatis mutandis

If the injured person can prove manufacturer´s liability, the manufacturer has to pay compensation to the following extent:

In the case of death, compensation shall be made by reimbursing the costs of medical care as well as the costs incurred by the pecuniary prejudice sustained by the deceased party as a result of the suspension or reduction of his earning capacity or the resultant increase in his needs for the duration of his illness or incapacity. Furthermore, the party liable to pay damages shall reimburse the deceased’s funeral costs to the party who is responsible for defraying these expenses.

If, at the time of the injury, the deceased party maintained a relationship with a third party by virtue of which he was or would be liable to come under a legal obligation to financially support this third party, and if the third party was deprived of the right to maintenance as a result of the death, the party liable to pay damages shall indemnify the third party, guaranteeing maintenance to the extent to which the deceased party would have been liable for the length of the lifespan he would probably have had to pay. Liability for damages shall also be enforced if, at the time of injury, the third party had been conceived but not yet born.

In the case of injury to a person's body or damage to his health, compensation shall be made by reimbursing the costs of treatment as well as the costs incurred by the pecuniary prejudice sustained by the injured party as a result of the temporary or permanent suspension or reduction

of his earning capacity or the resultant increase in his needs. Reasonable financial compensation can also be claimed when the damage is not of a pecuniary nature.

Compensation on account of the suspension or reduction of earning capacity and on account of increased need on the part of the injured party, as well as the compensation to be afforded third parties in cases of death as mentioned above, shall be paid in the future by means of an annuity.

It should be noted that under the German Product Liability Act there is a maximum amount of compensation for personal injury. If personal injuries have been caused by a product or by identical products with the same defect, the party liable to pay damages shall be liable only up to a maximum amount of 85 million Euros. Should the combined compensation to be paid to several injured parties exceed this maximum amount, then the individual compensation paid to each party shall be reduced pro-rata to the maximum total given.

In the case of damage to property, damage up to an amount of 500 Euros need not be covered by the liable party (i.e. there is a 500 Euros self-participation).

The German Product Liability Act contains a limitation period of three years from the day on which the party entitled to damages became aware, or should reasonably have become aware, of the damage, the defect and the identity of the party liable to pay damages applicable to the claim. In the event that negotiations on compensation for damages to be paid are pending between the party liable to pay damages and the party entitled to receive damages, the limitation period shall be suspended until negotiations are discontinued by a party. In all other respects, the provisions of the German Civil Code on limitation shall apply mutatis mutandis.

Furthermore, there is an expiration period in the German Product Liability Act. A claim under the Product Liability Act shall expire ten years from the time when the producer put into circulation the product which caused the damage. This shall not apply if a legal dispute or summary proceedings are pending on a claim.

This shall also not apply to claims that have been declared final and absolute or to claims based on other enforceable documents. The same shall apply to claims that are the subject of out-of-court settlements or were recognised by means of contractual declarations.

In addition, the German Civil Code contains provisions in tort law (Article 823, para. 1 of German Civil Code). Pursuant to this article, a person who, intentionally or negligently, unlawfully injures the life, body, health, freedom, property or another right of another person, is liable to make compensation to the other party for the damage arising from his actions.

There are some significant differences between German tort law and the provisions of the German Product Liability Act:

- - There is no maximum amount of compensation in tort;
- - There is no self-participation in cases of damage to property in tort;
- - Tort law is also applicable to vehicles which are used for commercial purposes;
- - Tort law is fault-based (but fault will be presumed and the manufacturer would need to rebut the presumption to avoid liability).

11.2.2 Potential laws affected

The potential laws affected in this context are the following: Product Liability Act, German Civil Code, Road Regulation (StVO), Road Traffic Act (StVG), German Criminal Code.

11.2.3 Scenarios

We assume in all scenarios that the particular driver of the vehicle is the owner of the vehicle, and at the same time its purchaser, who paid for it in full (i.e. no loan or leasing). He uses the vehicle only for private purposes. We also assume that there are no exonerating circumstances so that liability of the manufacturer is not excluded.

With respect to potential liability under a manufacturer´s warranty, the following shall apply:

Most manufacturers grant a manufacturer´s warranty to their customers. The warranty period varies between two and seven years (depending on the manufacturer), starting with the registration date of the vehicle. Any liability under a manufacturer´s warranty often requires a material defect or defect in production.

We assume in all scenarios that the accident is within the period of the manufacturer´s warranty and that such a warranty requires a material defect or defect in production.

11.2.3.1 Scenario 1 "technical malfunction"

The driver´s behaviour in this scenario is inconceivable under current German legislation due to the fact that German legislation requires that the driver shall at all times be able to control his vehicle. As a consequence, the driver has to monitor the driving task constantly (even when using driver assistance systems) to fulfil this requirement.

Under current German legislation, the driver in this scenario will be liable on the facts, because he should have realized that the vehicle steered for no reason to the right and he should have taken necessary action. There is no doubt that this "non-reaction" is negligent and correspondingly incurs liability.

But in the scenario description, as it was given, the driver is allowed to not monitor the dynamic driving task (level 3) and we have to assume that the driver determined correctly that activation of the automated driving system was appropriate.

If the scenario as described actually transpired in the future, we would predict that if the law is actually changed, the number of persons liable would not decrease, but driver´s liability would ”be shifted“ to another person (likely to the manufacturer).

11.2.3.1.1 Liability of the manufacturer

We have to consider potential manufacturer´s liability with respect to the blue vehicle and the white vehicle.

11.2.3.1.1.1 Product liability law

11.2.3.1.1.1.1. Blue vehicle

The manufacturer will be liable under the Product Liability Act because the accident was caused by a defect. It does not matter which type of product defect exists (construction fault, or a faulty instruction or why there was no request to the driver to take over). The essential information is that a defective product caused the damage.

The manufacturer has to pay compensation to the driver of the vehicle for property damage and (possibly) for bodily injury or (in the ”worst case“) for causing death. Concerning property damage, the driver has to pay an amount up to 500 Euros himself.

11.2.3.1.1.1.2. White vehicle:

In this case, too, the manufacturer will be liable under the Product Liability Act for bodily harm or death of the driver due to the defect.

There could also be liability for property damage. The question is whether damage was caused to an item of property other than the defective product.

From our point of view, the situation is similar to the case of ”faulty instructions“ or a so-called ”spreading defect“ (”Weiterfresserschaden“). For a final clarification there is not enough information about the failure and a possible predictability for the manufacturer and a corresponding obligation to give adequate instructions to the customer. However, under tort law the manufacturer will incur liability so that we can leave this question open.

11.2.3.1.1.2 Tort law

11.2.3.1.1.2.1. a) Blue Vehicle:

The manufacturer will be liable in tort law, too, because the accident was caused by a defect and the driver´s property was damaged. Potentially the driver may have been injured or killed.

The manufacturer will be presumed to be at fault (so that to avoid liability, the manufacturer must rebut the presumption).

The manufacturer has to pay compensation to the driver of the vehicle for property damage and (possibly) for bodily injury or (in the ”worst case“) for death. There is no limitation on the amount of compensation and no self-participation of the driver regarding damaged property.

11.2.3.1.1.2.2. b) White vehicle:

In this case the manufacturer will be liable in tort law, too, for bodily injury or death of the driver due to the defect. Liability for property damage could also be incurred. The question arises in tort law, too, whether damage was caused to an item of property other than the defective product. For an item to be considered a separate part under German tort law, it is sufficient if the faulty part is independently functional from the remaining product (so-called ”spreading defect“ [„Weiterfresserschaden“]). If the faulty part is independently functional then the manufacturer will be liable for damage to the driver’s property.

11.2.3.1.1.3 Guarantee / warranty:

In this scenario a system failure is presumed. This is why the manufacturer will in principle be liable under such a warranty.

The legal consequences depend on what the manufacturer included in his warranty. In most cases, the manufacturer will only repair or replace the faulty part and all other claims are excluded (e. g. claims for [consequential] damages, price reduction, withdrawal, etc.). However, in such cases some courts have granted the injured party compensation for harm caused.

11.2.3.1.1.4 Other laws (e. g. traffic law, criminal law)

Criminal law:

There is no information in the scenario description as to whether either of the drivers was injured or killed. But if we assume that, we will also assume in this scenario that the manufacturer was not previously aware of the defect (so that this is the first case) and that it was not foreseeable. Therefore it seems to be unlikely that the manufacturer (in particular, the executive director) would incur criminal liability. But this position could change in the future. Under current German legislation, the driver would incur criminal liability in such a case. But given the scenario description, the driver would not incur liability. So the consequence would be a decrease in the number persons incurring criminal liability (in this scenario).

It is hard to imagine from a German legal perspective that the law will actually change in this direction (we would not assume a decrease in the number of persons incurring liability). So we might speculate that there will be a shift in liability from the driver to another person (likely the manufacturer) to close this gap (which arises from level 3 systems which allow the driver to not

monitor the driving task all the time). But for such a result, a change in law would be necessary because under current legislation there is no automatic transfer of liability. So this might mean additional risks in the future for manufacturers under the criminal law.

11.2.3.1.2 Liability of the user

The driver was not obligated to monitor the driving task according to the scenario description (under current German legislation the driver would be responsible for monitoring driving). But from our point of view, this would only work if another person bore this liability in lieu of the driver.

Apart from that, we have to consider both that the system did not request the driver to take over driving and that a level 3-system will only be deactivated after requesting the driver to take over driving with sufficient lead time. Therefore the driver was not informed that something unusual was about to happen within a short period of time and he should perhaps take over the driving. According to the scenario description, the driver was justified in trusting that the system would function correctly.

11.2.3.1.2.1 Tort law

The driver would not be liable under tort law, because he would not have acted unlawfully according to the scenario description.

11.2.3.1.2.2 Traffic law

In this scenario the driver will incur no liability under Road Traffic Act (Article 18) because the accident was not caused by a fault of the driver. Therefore the driver´s behaviour does not constitute a regulatory offence under Road Regulation, either.

11.2.3.1.2.3 Other laws (e. g. criminal law)

Moreover the driver does not incur criminal liability in this scenario. The accident was caused by a failure of the vehicle, not by a fault of the driver.

11.2.3.2 Scenario 2 "functional/technical limits"

11.2.3.2.1 Liability of the manufacturer

11.2.3.2.1.1 Product liability law

11.2.3.2.1.1.1. Assumption A:

11.2.3.2.1.1.1.1. Red vehicle:

The manufacturer will incur liability under product liability law. The question is which safety expectations other drivers could have, in particular, what expectations the driver of the red vehicle could have.

Under German product liability law, a product has a defect when it does not provide the safety, which one is entitled to expect, taking all circumstances into account, in particular its presentation, the use to which it could reasonably be expected it would be put to, and the time when it was put into circulation.

The general safety expectation with regard to a vehicle with an automated driving system will be compliance with the traffic law. Therefore, the safety expectation is that the white vehicle will not change lanes in this situation, especially on this straight road. Furthermore, an average driver would not have changed lanes in this situation (when the distance was insufficient to avoid a collision with a vehicle approaching from behind). Therefore, the technical limits of the sensors will be seen as defective, if they cannot detect vehicles approaching from the rear when their distance is still sufficient to avoid a collision, especially if the vehicle is approaching from behind at high speed.

The manufacturer will be required pay compensation to the driver of the red vehicle for property damage (less 500 Euros self-participation) and, if relevant, for bodily injury or death (the “worst case”).

Safety expectations could be different, of course, if the trajectory of the road was curved.

11.2.3.2.1.1.2. White vehicle:

The manufacturer will be liable here for bodily injury or death. However, he will not be liable for property damage, because there is no damage to any item of property other than the defective product.

11.2.3.2.1.1.2. Assumption B:

11.2.3.2.1.1.2.1. Red vehicle:

For assumption B. the same applies as in assumption A.

If the manufacturer incurs liability when the system reacts as well as an average driver, then the same would apply a fortiori if the system does not react as well as an average driver.

11.2.3.2.1.1.2.2. White vehicle:

For assumption B the same applies as in assumption A.

11.2.3.2.1.2 Tort law

11.2.3.2.1.2.1. Assumption A:

11.2.3.2.1.2.1.1. Red vehicle:

The manufacturer will also be a liable in tort law. From our point of view, the technical limits of the sensors are a construction flaw (at least with regard to a straight lane). This flaw causes the

accident and red vehicle's driver suffers damage because of this flaw. The manufacturer will be presumed to be at fault, so he will have to rebut the presumption to exonerate himself.

Consequently, if he cannot exonerate himself, the manufacturer will be liable to pay compensation to the red vehicle's driver for property damage, and, if relevant, for bodily injury or death (the "worst case").

11.2.3.2.1.2.1.2. White vehicle:

The manufacturer will be liable under tort law for the white vehicle, too. If we assume that the technical limits of the sensors constitute a construction defect and this defect causes the accident, the white vehicle's driver will suffer damage because of this defect. The manufacturer will be presumed to be at fault, so he will need to try to exonerate himself, if possible.

Consequently, if the manufacturer cannot exonerate himself, he will be required to pay compensation to the white vehicle's driver for property damage, and, if relevant, for bodily injury or death (the "worst case").

11.2.3.2.1.2.2. Assumption B:

11.2.3.2.1.2.2.1. Red vehicle:

For assumption B the same applies as in assumption A.

11.2.3.2.1.2.2.2. White vehicle:

For assumption B the same applies as in assumption A.

11.2.3.2.1.3 Guarantee / warranty

For both assumptions:

11.2.3.2.1.3.1. Red vehicle:

Manufacturer´s guarantees / warranties relating to the white vehicle do not cover the red vehicle.

11.2.3.2.1.3.2. White vehicle:

There is no liability under a guarantee / warranty. The sensor worked correctly within its technical limits. Consequently, there is no material defect or defect of manufacturing. Although the construction itself does not seem to be very good, the construction is usually not the subject of a manufacturer´s guarantee / warranty.

11.2.3.2.1.4 Other laws (e. g. traffic law, criminal law)

Under current legislation, no other laws are affected.

11.2.3.2.2 Liability of the user

11.2.3.2.2.1 Assumption A:

11.2.3.2.2.1.1. Red vehicle:

11.2.3.2.2.1.1.1. Tort law

Contributory negligence of the driver is possible, but in this scenario, there is too little information for an exact assessment. In accident cases, this has to be reviewed on a case-by-case basis.

11.2.3.2.2.1.1.2. Traffic law

The risk of operating this vehicle has to be considered. The driver can be liable for that risk if, at the same time, he is the owner of the vehicle.

Furthermore, contributory negligence is possible, for example, if the speed of the vehicle exceeded 130 km/h. However, the scenario does not contain enough detailed information to assess this issue.

11.2.3.2.2.1.1.3. Other laws (e. g. criminal law)

Depending on the red vehicle's speed, its driver´s behaviour could incur criminal liability (for negligent bodily injury), but we do not have detailed information to assess that.

11.2.3.2.2.1.2. White vehicle:

11.2.3.2.2.1.2.1. Tort law

The driver was allowed to use the system. He did not need to monitor either the system, the movement of the vehicle or traffic conditions. According to the scenario, the driver behaved correctly and no one can reproach him for the system´s decision to overtake the slower vehicle.

11.2.3.2.2.1.2.2. Traffic law

As the driver was allowed to use the system and was not required to monitor either the system, the movement of the vehicle or the traffic conditions, no fault can be imputed to the driver with respect to the accident. Therefore, he is not liable for the accident (except where he also is the owner of the vehicle).

11.2.3.2.2.1.2.3. Other laws (e. g. criminal law)

There is no criminal offence (for negligent bodily injury), because driver´s behaviour was not a negligent act.

11.2.3.2.2.2 Assumption B:

11.2.3.2.2.2.1. Red vehicle:

11.2.3.2.2.2.1.1. Tort law

Contributory negligence of the driver is possible, but in the scenario there is too little information for an exact assessment. In cases of accidents, this has to be reviewed on a case-by-case basis.

11.2.3.2.2.2.1.2. Traffic law

The risk of operating this vehicle has to be considered. The driver can be liable for that risk if, at the same time, he is the owner of the vehicle.

Furthermore, contributory negligence is possible, for example if the vehicle exceeded the speed of 130 km/h. However, we do not have detailed information in the scenario for further assessment.

11.2.3.2.2.2.1.3. Other laws (e. g. criminal law)

Depending on the speed at which the vehicle drove, red vehicle's driver could incur criminal liability (for negligent bodily injury), but we do not have enough detailed information to assess that.

11.2.3.2.2.2.2. White vehicle:

11.2.3.2.2.2.2.1. Tort law

The driver was allowed to use the system and was not required to monitor either the system, the movement of the vehicle or traffic conditions. Therefore, the user behaved correctly and the driver cannot be reproached for system´s decision to overtake the slower vehicle.

Of course, one could debate how the driver should have reacted to the system´s decision to overtake the slower vehicle, or whether he could have foreseen that the system´s decision would cause an accident. However, according to the scenario´s description, the driver was under no obligation to do so.

11.2.3.2.2.2.2.2. Traffic law

As the driver was allowed to use the system, and was not required to monitor either the system, the movement of the vehicle, or traffic conditions, no fault can be imputed to the driver with respect to the accident. Therefore, he is not liable for the accident (except where at the same time, he is the owner of the vehicle).

Of course, in respect of German traffic law, one could debate whether the driver would have had to react to the system´s decision to overtake a slower vehicle, if he could have foreseen that the system´s decision would cause an accident.

11.2.3.2.2.2.3. Other laws

No other laws are affected.

11.2.3.3 Scenario 3 "take over request"

For clarification: Our understanding of variation 2 is that the accident would not have occurred if the driver had reacted quickly enough (but he did not react quickly – he failed to react in due time).

11.2.3.3.1 Liability of the manufacturer

11.2.3.3.1.1 Product liability law

11.2.3.3.1.1.1. Variation 1:

In this case, manufacturer will be liable under product liability law for the driver's bodily injury and, if relevant, death. We do not have any information in the scenario on damage to any items of property other than the defective product. If they exist, manufacturer will be liable for that property damage (less 500 Euros which the injured party is required to pay himself), but the manufacturer will not be required to pay compensation for the defective vehicle itself.

The safety expectation is that the system will make requests in good time so that the driver can take control of the vehicle in due time in order to avoid accidents.

When the system´s request to take over is too late, so that an accident cannot be avoided, the system does not provide the safety, which one is entitled to expect of it. This constitutes a product flaw.

11.2.3.3.1.1.2. Variation 2:

There is no manufacturer´s liability under product liability law. The system works correctly and made its request in good time, but the driver reacted too slowly. Therefore, the accident was not caused by a product fault.

11.2.3.3.1.2 Tort law

11.2.3.3.1.2.1. Variation 1:

The manufacturer will be liable under tort law, too, for bodily injury and, if relevant, for death and property damage (to the white vehicle itself). A manufacturer´s fault will be presumed, so that manufacturer will need to rebut that presumption in order to exonerate himself, if possible.

11.2.3.3.1.2.2. Variation 2:

For the same reasons, the manufacturer will incur no liability under tort law. The accident was caused solely by the actions of the driver. The manufacturer is not responsible for the slow reaction of the driver.

11.2.3.3.1.3 Guarantee / warranty

11.2.3.3.1.3.1. Variation 1:

The manufacturer would probably be liable under its guarantee / warranty, if the system requests that the driver take control too late due to a material defect or a defect in manufacturing. In such a case, the owner will be able to make a claim for the repair or replacement of the faulty part and probably for the repair of the damaged vehicle.

11.2.3.3.1.3.2. Variation 2:

In this case, the manufacturer is not liable under contractual guarantees or warranties. The accident was not caused by a material defect or defect in manufacturing. The manufacturer is not responsible for the late reaction of the driver.

11.2.3.3.1.4 Other laws (e. g. traffic law, criminal law)

In both variations no other laws are affected

11.2.3.3.2 Liability of the user

11.2.3.3.2.1 Tort law

11.2.3.3.2.1.1. Variation 1:

Following the scenario´s description, the driver will not be liable under tort law.

According to the scenario´s description, the driver is not required to constantly monitor the system while driving on roads like the one used in the scenario. In particular, he may turn his attention away completely from the dynamic driving task. When the system requested him to take over driving the vehicle, the driver reacted immediately, but the request was too late. Therefore, the driver could not avoid the accident; he is blameless.

However, we are afraid that the driver will remain liable in law under this scenario.

The driver has to provide “fallback performance”, whenever the system requests him to take over the driving task because road conditions have changed and are unsuitable for use of the automated system. From today´s legal perspective, we could imagine that increased safety standards will apply to level 3 system users because they have to provide fallback performance as necessary. Consequently, the driver has to direct his attention to the driving task, and otherwise he can only attend to secondary tasks which require very little of his attention. A driver who uses a level 3 system cannot place complete trust in system´s functionality under all circumstances because there are limits to that functionality. It is for this reason that we are afraid that the law (or judges) will not exempt drivers from liability; drivers will continue to have certain monitoring obligations while the system is driving the vehicle.

It is possible that drivers will have to anticipate some situations and take over driving (even before the system requests them to take over), because drivers know that they cannot completely trust the system (and therefore cannot wait to see whether the system's request for them to take over is timely or not).

These problems can only be avoided, if manufacturers are liable and drivers cannot to any extent be held liable in such cases.

11.2.3.3.2.1.2. Variation 2:

If the driver failed to react in due time, this could be negligent (this depends on the reasons why he was not able to react in due time). Negligence will be presumed, and the driver will need to rebut the presumption to exonerate himself.

Absent that rebuttal, the driver would incur civil liability in tort law for bodily injury, or if relevant, for causing death and property damage.

11.2.3.3.2.2 Traffic law

11.2.3.3.2.2.1. Variation 1:

For traffic law the same applies as for tort law. Following the scenario´s description, the user incurs no liability under traffic law as he was not at fault (except where, at the same time, he was the owner of the vehicle).

Nevertheless, we would foresee similar discussions being possible about increased safety standards for drivers (including liability) as discussed above under "tort law".

11.2.3.3.2.2.2. Variation 2:

If the driver failed to react in due time, this could held to be negligent under the traffic law, too (depending on the reasons why he was not able to react in due time). Negligence will be presumed, and the driver will need to rebut the presumption to exonerate himself.

If held to be negligent, the driver would be liable under traffic law for bodily injury, if relevant, for death and property damage. It should be noted that the scenario contains information that other persons were injured or that other property was damaged.

11.2.3.3.2.3 Other laws (e. g. criminal law)

11.2.3.3.2.3.1. Variation 1:

Following scenario´s description, no other laws are affected.

11.2.3.3.2.3.2. Variation 2:

No other laws are affected, except where the driver injured someone during the accident (but there is no information in the scenario to that effect). The driver could incur criminal liability (for negligent bodily injury).

11.2.3.4 Scenario 4 "misuse", liability of the manufacturer

11.2.3.4.1 Liability of the manufacturer

11.2.3.4.1.1 Product liability law

11.2.3.4.1.1.1. Variation A:

There will be no liability under product liability law. The accident was not caused by a defect, but rather through the incorrect activation of the system by the driver. The driver activated the system even though he knew that it was inappropriate for use on a two way road. Consequently, the manufacturer will incur no liability under product liability law.

11.2.3.4.1.1.2. Variation B:

For variation B the same applies as in variation A.

11.2.3.4.1.1.3. Variation C:

For variation C the same applies as in variation A.

11.2.3.4.1.2 Tort law

11.2.3.4.1.2.1. Variation A:

No liability will arise under tort law. The accident is not caused by a defect, but though the incorrect activation of the system by the driver. The driver activated the system even though he knew it was inappropriate on a two way road. Consequently, the manufacturer incurs no liability under tort law.

11.2.3.4.1.2.2. Variation B:

For variation B the same applies as in variation A.

11.2.3.4.1.2.3. Variation C:

For variation C the same applies as in variation A.

11.2.3.4.1.3 Guarantee / warranty

11.2.3.4.1.3.1. Variation A:

The manufacturer has no liability under contractual guarantees or warranties. There is no material defect or defect in manufacturing which caused the damage.

11.2.3.4.1.3.2. Variation B:

There will be liability under the guarantee / warranty. The owner (warrantee) can make a claim for repair or replacement of the faulty device so that it works correctly and avoids activation in inappropriate situations.

11.2.3.4.1.3.3. Variation C:

There will be liability here under the guarantee / warranty, too. The owner (warrantee) can make a claim for repair or replacement of the faulty device so that it works correctly and allows activation only in appropriate situations after request.

11.2.3.4.1.4 Other laws (e. g. traffic law, criminal law)

In all three variations no other laws are affected.

11.2.3.4.2 Liability of the user

11.2.3.4.2.1 Red vehicle (Variations A / B / C):

11.2.3.4.2.1.1. Tort law

The driver is not liable under tort law. He does not cause the accident.

11.2.3.4.2.1.2. Traffic law

Consequently, the driver is not liable under traffic law, either.

11.2.3.4.2.1.3. Other laws (e. g. criminal law)

No other laws are affected.

11.2.3.4.2.2 White vehicle:

11.2.3.4.2.2.1. Tort law

11.2.3.4.2.2.1.1. Variation A:

For level 3 systems, the driver´s task is amongst other things to determine when activation of the automated driving system is appropriate. In this scenario, the driver activated the system even though he knew that it was inappropriate to activate the system for operation on a two way road. Therefore, the driver´s behaviour was at the very least negligent (if not grossly negligent) and caused the accident. The driver would be liable for the damage caused through the inappropriate activation of the system.

11.2.3.4.2.2.1.2. Variation B:

The same applies in variation B. The inappropriate activation of the system caused the damage, not the malfunction of the system. The driver knew that the activation was inappropriate in the relevant situation. Therefore, the driver could not rely on the system not reacting. The

malfunction of the system was not causal for the damage. The driver will be liable for the damage caused through the inappropriate activation of the system.

The situation (and legal result) would be different if the system was automatically activated (which is not the case in this scenario).

11.2.3.4.2.2.1.3. Variation C:

The explanations in variation A and variation B apply also in variation C. The inappropriate activation of the system caused the damage, not a malfunction of the system. The driver knew that activation of the system was inappropriate in the relevant situation. Therefore, the driver could not rely on the system's reaction, which mistakenly allowed activation of the system. The malfunction of the system was not causal for the damage. The driver will be liable for damage caused through the inappropriate activation of the system.

11.2.3.4.2.2.2. Traffic law

11.2.3.4.2.2.2.1. Variation A:

The driver will be liable under Road Traffic Act (Article 18). An accident occurred during operation of the vehicle. This accident was caused by negligent behaviour of the driver. He knew that activation was inappropriate on a two-way road, but nevertheless he activated the system.

11.2.3.4.2.2.2.2. Variation B:

For variation B the same applies as in variation A.

11.2.3.4.2.2.2.3. Variation C:

For variation C the same applies as in variation A.

11.2.3.4.2.2.3. Other laws (e. g. criminal law)

11.2.3.4.2.2.3.1. Variation A:

If the driver of the white vehicle injured the driver of the red vehicle as a result of the accident, the driver of the white vehicle would incur criminal liability (for negligent bodily injury).

11.2.3.4.2.2.3.2. Variation B:

For variation B the same applies as in variation A.

11.2.3.4.2.2.3.3. Variation C:

For variation C the same applies as in variation A.

11.2.3.5 Scenario 5 "traffic violation"

11.2.3.5.1 Liability of the manufacturer

11.2.3.5.1.1 Product liability law

The system worked correctly, but could not read the road traffic sign because a truck hid it from view. This is not a fault of the system. Physical laws caused this situation. The manufacturer would not be liable for this situation under product liability law. Additionally one needs to take into consideration that the monetary fine the driver received is only (minor) pecuniary damage. Product liability law does not cover such damage at all.

11.2.3.5.1.2 Tort law

There is no defect in the system. Consequently, the manufacturer would not be liable under tort law. Additionally, one needs to take into consideration that the fine the driver received is only (minor) pecuniary damage. Tort law does not cover such damage at all.

11.2.3.5.1.3 Guarantee / warranty

There is no defect in the system, especially no defect in material or workmanship. Therefore, the manufacturer would not be liable under a guarantee.

11.2.3.5.1.4 Other laws (e. g. traffic law, criminal law)

No other laws are affected.

11.2.3.5.2 Liability of the user

11.2.3.5.2.1 Tort law

The driver has committed no tortious actions. Therefore, he is not liable under tort law.

11.2.3.5.2.2 Traffic law

A traffic sign is an administrative act, which applies from the moment of its installation. In principle, a traffic sign has to be installed in accordance with the “visibility principle”, meaning that a driver is able to recognize what it says quickly in passing. Traffic signs express their legal effect towards every road user, no matter whether the road user actually sees the traffic sign or not.

However, for a fine to be lawful (here for exceeding the speed limit) it is necessary that the driver actually sees the traffic sign. Due to the laws of physics, neither a computer system nor a driver could see the traffic sign in the situation described in the scenario. Therefore, the driver would not be liable for exceeding the speed limit. Thus, the driver would need to legally challenge the fine.

11.2.3.5.2.3 Other laws (e. g. criminal law)

No other laws are affected.

11.2.4 Liability of the registered keeper / owner

The registered keeper / owner can be held partially liable for an accident and its consequences, even if he was not the driver who caused the accident. The registered keeper is the one who uses the vehicle for his own purposes (he usually covers the costs of the vehicle; he is able to do what he wants with the car, including deciding about reasons for trips, the destination of trips and the times of trips). The registered keeper and the person, who is actually registered in the registration papers of the vehicle, need not to be identical. Furthermore, the ownership of the vehicle is not a relevant criterion for assessing the capacity of a person as the registered keeper. A usufructuary can also be the registered keeper, if he has the power of disposal.

a. tort law

The registered keeper can be liable under tort law (Article 823 para. 1 of German Civil Code), if he intentionally or negligently (unlawfully) injures in particular the life, body, health or property of another person. He will be liable to make compensation to the other party for the damage arising from his acts, except where he can exonerate himself. This depends on the circumstances of the individual case.

b. traffic law

In accordance with Article 7 of Road Traffic Act, the registered keeper will be liable within the framework of strict liability. This strict liability is the price that must be paid for the permitted “creation” of a source of danger.

Details of the obligation to pay compensation for death and bodily injury are regulated in Article 10 and Article 11 of Road Traffic Act. Article 12 defines the maximum amounts of compensation (EUR 5,000,000.00 in case of death or bodily injury and EUR 1,000,000.00 in case of property damage).

The registered keeper shall not be liable only in cases of force majeure. Under the Road Traffic Act, force majeure is defined as an external event introduced from the outside by elemental forces or by actions of third parties that is unforeseeable by human judgement and experience, cannot be prevented or rendered harmless with economically bearable means even with the utmost care that can be reasonably expected according to the circumstances, and cannot be expected because of its frequency.

Therefore, in most cases the registered keeper of a vehicle will be liable for the consequences of an accident. However, due to the fact that there is an obligation to have third party insurance for a vehicle, as a rule the registered keeper will be covered by the insurance.

If two vehicles cause an accident, the registered keepers involved will be liable proportionally to the injured (third) party (in accordance with Article 17 of Road Traffic Act).

c. other laws (e. g. criminal law)

The scenario description gives no information that the registered keeper knew of any technical malfunction of the vehicle. In consideration of these circumstances, no other laws seem to be affected. Furthermore, it seems to be very unlikely that a user or registered keeper would be able to detect a technical malfunction of the automated driving system in advance, so that he could have known about it and avoided driving the vehicle.

11.2.5 Insurance law (overview)

In Germany, third party liability insurance is legally required for all motor vehicles. This insurance is legally compulsory (compulsory insurance law [PflVG]). In the absence of a third party insurance policy, it is not possible to register a vehicle. Therefore, registered keepers are usually covered by insurance. Use of a vehicle on public roads without the necessary third party insurance is a criminal offence.

There are minimum insured sums for different kinds of damage: at least € 7.5 M. for personal injury, € 1.22 M. for damage to property and € 50,000.00 for pecuniary damage.

The injured party has a direct claim against the insurer in accordance with Article 115 of the German Insurance Act. However, usually the insured party will sue the driver, the registered keeper and the insurer of the other vehicle(s) concurrently.

If the registered keeper is not liable for an accident, the insurance is not required to pay compensation.

11.3 Sweden

11.3.1 Main principles of the Swedish transposition of Directive 85/374/EEC

Technical approval of vehicles is required for vehicle manufacturers or importers to be able to sell and register cars, trucks, buses and trailers within the EU. This is stipulated in EU framework directive 2007/46/EC17. The rules for approval are harmonized within the EU, and in some instances are even global. The purpose of the EU-wide provisions on vehicles is to create an internal market within the Community. It also aims to ensure a high level of road safety, health protection, environmental protection, energy efficiency and protection against unauthorized

use. In other words, the EU regulates which requirements vehicles must meet. However, the more detailed technical provisions are mainly contained in UNECE (WP 29) and can be found in the UNECE regulations to which the EU legislation refers.

11.3.1.1 Compensation issues

The current regulatory framework concerning compensation for traffic accidents is such that it can be applied to all levels of automated vehicles.

As far as liability for claims in general is concerned, Swedish law has something known as the *Culpa Rule*. "Culpa" can be translated as negligence. The Swedish Tort Liability Act (1972:207) includes elements such as "negligence" and "fault or neglect" to express the basic prerequisites required so that a party causing a loss can be held liable. This can be said to constitute a primary rule for liability claims. However, as can be seen in Chapter 1 (1) of the Swedish Tort Liability Act, this act applies unless specifically prescribed or occasioned by contracts or otherwise following on from rules on claims in contractual relationships.

Claims arising in road traffic are generally subject to special legislation primarily in accordance with the Swedish Traffic Damage Act (1975:1410). The Swedish Traffic Damage Act includes provisions on requirements for motor vehicle liability insurance and compensation from motor vehicle liability insurance for claims resulting from the driving of motor vehicles, with certain exceptions as specified in the statute, such as – for example – motor vehicles designed to be operated by pedestrians and motor vehicles being used within enclosed areas.

11.3.2 Potential Laws affected

11.3.2.1 Swedish Vehicle Ordinance (2009:211)

The current regulations largely involve guaranteeing the performance of vital functions, such as ensuring that vehicle brakes provide sufficient slowing of the vehicle. Driver assistance systems, which help the driver with the task of driving, are available in approved cars at present. As regards complex electronic systems which affect steering or brakes, these are covered by certain provisions via UNECE regulations 79 and 13 respectively, even though the function itself is not regulated. These requirements include fault strategies. Furthermore, manufacturers of such systems have to demonstrate how they have ensured that the systems will not adversely affect basic functions. Brakes must provide sufficient slowing of the vehicle even if the vehicle is fitted with an emergency brake system or a system for driving in heavy traffic.

To date, therefore, the driver has controlled the vehicle using different assistance systems.

The EU has determined which requirements vehicles must meet by means of Article 17 of framework directive 2007/46/EC. However, there is a certain amount of scope to allow Member

States to permit exceptions. The EU's provisions are primarily implemented in the Swedish Vehicle Ordinance (2009:211). The Swedish Transport Agency is able to make decisions on exceptions from requirements via the authorization in Chapter 8(18). Exceptions may only be permitted under certain conditions, e.g. if they do not put road safety at risk. This authorization can be utilized to make decisions on matters concerning vehicles for use for testing purposes.

11.3.2.2 SOU 2016-28

Test experiments with self-driving vehicles on the road will be regulated by special Swedish law (SFS 2017:309) described in SOU 2016-28. This special Swedish law is referred to in the text below on civil liability. The law came into force July 1, 2017.

Below are excerpts from two paragraphs that give requirements on integrated vehicle EE system architecture from the special new Swedish law regulating experiments with self-driving vehicles on the road:

Information access

§ 8 In experiments with self-driving vehicles, information from vehicle sensors shall then be stored for at least two years.

Security

§ 12 Before images are stored, they must be made anonymous.

11.3.3 Scenarios

11.3.3.1 Scenario 1 "technical malfunction"

The white vehicle is equipped with a level 3 system.

11.3.3.1.1 Liability of the manufacturer

a. product liability law

The essential information is that a defective product caused damage.

For a final clarification there is not enough information about the failure and about whether the failure could possibly have been predicted.

b. tort law

See 11.3.1.1

c. guarantee / warranty

The legal consequences depend on what the manufacturer granted in the warranty. Most manufacturers grant a manufacturer´s warranty to the customer. The warranty period varies between two and seven years (depending on the manufacturer), starting at the registration date of the vehicle. Any liability under a manufacturer´s warranty often requires a material defect or defect of manufacturing.

d. other laws (e. g. traffic law, criminal law)

See 11.3.2.2 SOU 2016-28

11.3.3.1.2 Liability of the user

a. tort law

See 11.3.1.1

b. traffic law

The driver of the white vehicle in this scenario can be liable in such a case, because he should have realized that the vehicle steered for no reason to the right so he should have taken necessary action to avoid an accident. This “non-reaction” is negligent and caused the corresponding damage (Act (1951:649) on penalties for certain road traffic offences).

c. other laws (e. g. criminal law)

When a vehicle collides with another vehicle because of a technical fault, a traffic accident has been caused. Who will incur criminal liability or be subject to criminal sanctions? Criminalization means that a certain act is proscribed so a person breaking the rule may be subject to punishment for a criminal offence. The inevitable question which follows is: has the offense caused the accident?

Is the case that the driver activated the automatic driving system and thus the corresponding function, or that the driver failed to ensure that the vehicle is in the state that can be expected.

In this scenario, the driver of the white vehicle failed to ensure, that the white vehicle was in the state that could be expected. The driver had to break the rule, thus might be punished for a criminal offence (Chapter 3 of the penal code states, that negligence is considered a crime; this is a case of negligence in traffic).

11.3.3.2 Scenario 2 “functional/technical limits”

Assumption A (the system reacts as well as an average driver could have).

The white vehicle is equipped with a level 4 system. The general safety expectation with regard to a vehicle with an automated driving system will be compliance with the traffic laws.

Therefore, the safety expectation is that the white vehicle will not change lanes in this situation.

Assumption B (the system does not react as well as an average driver could have done).

For assumption B, the general safety expectation with regard to a vehicle with an automated driving system will be compliance with the traffic law. Therefore, the safety expectation is that the white vehicle will not change lanes in this situation (the same safety expectations as for assumption A).

11.3.3.2.1 Liability of the manufacturer

a. product liability law

A product is defective if the product is not as safe as can be reasonably expected. Safety shall be assessed taking into account how the product can be expected to be used and how it is marketed, as well as with respect to the operating instructions, the date when the product was put into circulation, together with certain other circumstances.

b. tort law

See 11.3.1.1

c. guarantee / warranty

The legal consequences depend on what the manufacturer granted in the warranty. Most manufacturers grant a manufacturer´s warranty to their customers. The warranty period varies between two and seven years (depending on the manufacturer), starting at the registration date of the vehicle. Any liability under a manufacturer´s warranty often requires a material defect or defect of manufacturing.

d. other laws (e. g. traffic law, criminal law)

See 11.3.2.2 SOU 2016-28

11.3.3.2.2 Liability of the user

a. tort law

See 11.3.1.1

b. traffic law

Under Swedish traffic law it is possible that the driver would have been expected to react to the system´s decision to overtake the other vehicle, if the driver could have foreseen that the systems´ decision could cause an accident.

c. other laws (e. g. criminal law)

The driver will not incur criminal liability (for negligent bodily injury), because driver´s behaviour was not negligent.

11.3.3.3 Scenario 3 "take over request"

The white vehicle is equipped with a level 3 system.

Variation 1: "request too late, driver reacts immediately, but accident unavoidable".

Variation 2: "request in time, driver´s reaction too late to avoid accident" – accident would not have happened if the driver had reacted fast enough (but the driver did not – the driver did not react in due time)

11.3.3.3.1 Liability of the manufacturer

a. product liability law

For variation 1 the essential information is that a defective product caused damage.

It could be difficult to prove that the vehicle was at fault. There is a risk that there is an imbalance in the supply of information in self-driving vehicles. In future automated vehicles, accident investigations need to be able to focus on the software of the automatic driving system, as well as information about the traffic accident stored in the "black box". It will require special skills to interpret and analyse the content of the black box. It is also important who owns the information about the vehicle and thus can dispose of or delete it.

For variation 2, the system works correctly and the request to the driver to retake the driving task is in time, but the driver reacts too late.

b. tort law

See 11.3.1.1

c. guarantee / warranty

For variation 1, the legal consequences depend on what the manufacturer granted in the warranty. Most manufacturers grant a manufacturer´s warranty to the customer. The warranty period varies between two and seven years (depending on the manufacturer), starting at the registration date of the vehicle. Any liability under a manufacturer´s warranty often requires a material defect or defect of manufacturing.

For variation 2 the manufacturer should not be liable under any guarantee / warranty.

d. other laws (e. g. traffic law, criminal law)

See 11.3.2.2 SOU 2016-28

11.3.3.3.2 Liability of the user

a. tort law

See 11.3.1.1

b. traffic law

In level three automated systems, vehicles and drivers must work in coordination. This means that even if the vehicle can run by itself under certain conditions, the driver must be able to take over driving at any time during the journey when the system requests it. The driver is thus still a part of the system and his or her liability will be assessed on the basis of negligence.

c. other laws (e. g. criminal law)

If the driver injures a person in variation 2 (no information in the scenario), he could incur liability for a criminal offence (for negligent bodily injury)

11.3.3.4 Scenario 4 "misuse"

The white vehicle is equipped with a level 3 system.

A, B, C: Incorrect activation by the driver. The driver activates the system even when the driver knows it is inappropriate.

B, C: Functional deficiency for avoiding inappropriate activation.

11.3.3.4.1 Liability of the manufacturer

a. product liability law

There will be no liability under product liability law. The accident was not caused by a defect, but by the incorrect activation and use of the system by the driver. The driver activates the system even though he knows it is inappropriate.

b. tort law

See 11.3.1.1

c. guarantee / warranty

The legal consequences depend on what the manufacturer granted in the warranty. Most manufacturers grant a manufacturer´s warranty to their customers. The warranty period varies between two and seven years (depending on the manufacturer), starting at the registration date of the vehicle. Any liability under a manufacturer´s warranty often requires a material defect or defect of manufacturing.

d. other laws (e. g. traffic law, criminal law)

See 11.3.2.2 SOU 2016-28

11.3.3.4.2 Liability of the user

a. tort law

See 11.3.1.1

b. traffic law

It is important to start with the expectations of the driver. At automation levels 1-3, the driver and the vehicle are part of the same driving system and the driver must always be in control of the vehicle. For road accidents in which the vehicle is at automation levels 1-3, traffic accident insurance is used to manage risk, i.e. there is no difference from today.

It becomes difficult to see that someone can be negligent if he or she has received information that the vehicle can handle all situations in a safe manner (under certain specified conditions such as limits based on road type) and that the vehicle does not need any assistance or supervision by a human driver while in self-driving mode.

However, if a human driver is abusing the technology in any way, he or she can be considered reckless. It therefore becomes important to carefully inform users about what the technology can do, the limitations of the technology, what the human driver is expected to do or not to do, and what the risks are, if the instructions for use are not followed. It is also important that it is clear to a human driver in the vehicle whether the vehicle is in a self-driving mode or whether it is expected that the vehicle will be operated manually.

For liability for traffic accidents to be determined, it is important that there is a "black box" that records data from the sensors of vehicles. The recording of such data is necessary to find out if someone has been negligent or whether the vehicle was not in self-driving mode.

c. other laws (e. g. criminal law)

If the driver of the white vehicle injures the driver of the red vehicle as a result of the accident, the driver of the white vehicle will incur criminal liability (for negligent bodily injury).

11.3.3.5 Scenario 5 "traffic violation"

The white vehicle is equipped with a level 3 system.

11.3.3.5.1 Liability of the manufacturer

a. product liability law

The system worked correctly, but could not see the traffic sign because it was hidden behind a truck in the next lane. The system was not at fault.

b. tort law

See 11.3.1.1

c. guarantee / warranty

The legal consequences depend on what the manufacturer granted in the warranty. Most manufacturers grant a manufacturer´s warranty to their customers. The warranty period varies between two and seven years (depending on the manufacturer), starting with the registration date of the vehicle. Any liability under a manufacturer´s warranty often requires a material defect or defect of manufacturing.

d. other laws (e. g. traffic law, criminal law)

See 11.3.2.2 SOU 2016-28

11.3.3.5.2 Liability of the user

a. tort law

See 11.3.1.1

b. traffic law

A traffic sign is an administrative act, which applies from the moment of its installation. In principle a traffic sign has to be installed in accordance with the "visibility principle", meaning that drivers are able to see it quickly in passing. For a fine to be lawful (for exceeding the speed limit), it is necessary that the driver actually sees the traffic sign. Neither the system nor the driver could see the traffic sign in the situation described in this scenario.

c. other laws (e. g. criminal law)

No other laws are affected.

11.3.4 Insurance law (overview)

See 11.3.1.1

Issues of compensation for traffic accidents are regulated at national level rather than at UN or EU level. This means that legislation can vary greatly between countries.

In Sweden, the Traffic Damage Act (1975: 1410) regulates liability insurance. A special insurance is compulsory for all vehicles (except for government vehicles) under § 2 to cover damage that may arise in motor vehicle transport. It is designed to guarantee the payment of compensation

even in situations where the owner has not paid the necessary premiums or it is unclear which vehicle caused the damage (§ 16).

Anyone who wants to claim compensation from another driver's liability insurance has to prove that the driver was at fault or that the vehicle was defective. As for self-driving vehicles, it may be interesting to include details of cases where the wrongdoer is the driver, user or owner of the vehicle. One requirement is there must be fault in the operation of the vehicle (§ 10). This refers not only to carelessness by the driver himself, but also to passenger actions which may be negligent or impact negatively on the operation of the vehicle, for example, a passenger grabbing the steering wheel while the vehicle is being driven.

11.3.5 Conclusions

Automated driving is a clear example of the complexity presented by development of a new component in the road traffic system, in this instance the vehicle. The technology cannot be developed in isolation as it will have a major impact on the road traffic system. It needs to be developed in interaction with humans, vehicles, infrastructure and society in order to have maximum utility. Moreover, the technology is being developed quickly and many different stakeholders are involved in or affected by its development. This complexity means that it is impossible either to predict the directions its development will take or to steer it in any meaningful way.

Although we do not want legislation to impede the development of automated driving in Sweden, we should avoid introducing provisions which cannot be used by other countries´ drivers and vehicles, or which we have to reassess in the short term because technical development is progressing so quickly. The fact that road traffic rules in different countries have been aligned, has been a success factor for all types of road transport over many years. Therefore, the starting point is that special traffic regulations, special road signs and other arrangements for self-driving vehicles should be implemented internationally within UNECE.

11.4 United Kingdom

Product liability encompasses any regime that imposes civil liability on manufacturers, suppliers and other parties (such as distributors or importers) for personal injury or damage to property that is caused by a defective product. There is also a product safety regime which imposes criminal liability on these parties in certain circumstances.

Under English law[101], a product liability claim can be made on three grounds: contract, tort and the strict liability regime under the Consumer Protection Act 1987.[102] These three causes of action exist concurrently, and a claimant may potentially bring a product liability claim under any and all of these causes of action.[103]

Section I of this memorandum provides an overview of the product liability regime in England.

11.4.1 Civil liability

11.4.1.1 Strict liability under the Consumer Protection Act 1987

Introduction: Directive 85/374/EEC was implemented in the UK by way of Part I of the Consumer Protection Act 1987, which entered into force on 1 March 1988.[104] It applies to products supplied to consumers after this date. It imposes a strict liability regime for defective products in the UK. It does not, though, affect the ability of a claimant to make a product liability claim under the other causes of action which were already available to consumers before the Consumer Protection Act 1987, such as in contract and tort.[105]

These alternative regimes, however, present difficulties that may not apply to claims under the Consumer Protection Act 1987. With respect to claims in contract, for example, a claim can typically only be brought by a party to the contract. This makes it difficult or impossible for third parties who suffer damage from a defective product to bring a claim.[106] Regarding claims in tort, the claimant has to prove negligence on the part of the defendant which, depending on the circumstances, may be challenging or impossible.[107]

The Consumer Protection Act 1987, on the other hand, creates a regime of strict liability to the extent that it removes the need to prove negligence or actual fault, as required to make out a negligence claim.[108] Under this Act, an injured party may take action against a vehicle (or

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101 N.B. the analysis in this memorandum of common law issues, i.e. case law, may differ in Scotland, which has its own body of case law, which is beyond the scope of this memorandum. The regulatory and legislative framework discussed in this memorandum, on the other hand, substantially applies throughout the United Kingdom.

102 The Consumer Protection Act 1987 implements Directive 85/374/EEC. See more below at Section 11.4.1.1.

103 Subject to the bar on double recovery for the same loss.

104 The UK was the first Member State to implement the Directive. See Christopher Johnston, "A personal (and selective) introduction to product liability law", *Journal of Personal Injury Law* 2012, p.2.

105 See below at 11.4.1.2 and 11.4.2 for more details.

106 See below.

107 *Benjamin Sale of Goods* 9th Edition para. 14-094: "*the need to prove negligence constituted an unacceptable barrier to recovery*".

108 Thomas Samuels, *Product Liability: Overview*, Westlaw, para. 11.

vehicle component) manufacturer (or importer, distributer etc.) that supplied a defective product without having to prove actual fault by the manufacturer, etc.[109]

Exclusion of liability: s.7 Consumer Protection Act 1987 prohibits exclusions of liability under Part I of the Act.[110] Any term that purports to exclude such liability will not be valid by virtue of this section.

Definition of product: Product is defined under s.1 (2) of the Consumer Protection Act 1987 as: "any goods or electricity and […] includes a product which is comprised in another product, whether by virtue of being a component part or raw material or otherwise".[111]

Liable parties: Parties liable under the Consumer Protection Act 1987 include the producer of a product (including the producer of a component part, of a raw material or of a product otherwise comprised in another product),[112] anyone that holds themselves out as being a producer, and an importer of a product. A supplier of a product is also liable if the person who suffers damage asks the supplier to identify the producer within a reasonable time and the supplier refuses to do so.[113]

Who can make a claim?: Under s.2(1) Consumer Protection Act 1987 damage is established when there has been "*any damage*" (as to the meaning of damage, see below). S.7 Consumer Protection Act 1987 also states that liability is owed to all persons who suffer damage caused by a defect in a product.[114] This means that any person who suffers damage is entitled to make a claim. Therefore, liability is not limited to the person who bought the product – the consumer/purchaser. It also extends to any person injured by the product who either (i) uses the product or (ii) is a third party bystander.

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109 Liability is established for producers and importers under s.2 Consumer Protection Act 1987.

110 S.7 Consumer Protection Act 1987: "*The liability of a person by virtue of this Part to a person who has suffered damage caused wholly or partly by a defect in a product, or to a dependant or relative of such a person, shall not be limited or excluded by any contract term, by any notice or by any other provision*."

111 S.1(2) Consumer Protection Act 1987.

112 For these purposes, producer is defined in s.1(2) of the Consumer Protection Act 1987 as: "*(a) the person who manufactured it; (b) in the case of a substance which has not been manufactured but has been won or abstracted, the person who won or abstracted it; (c) in the case of a product which has not been manufactured, won or abstracted but essential characteristics of which are attributable to an industrial or other process having been carried out (for example, in relation to agricultural produce), the person who carried out that process*". Product in turn means "*any goods or electricity and […] includes a product which is comprised in another product, whether by virtue of being a component part or raw material or otherwise.*"

113 S.2(3) Consumer Protection Act 1987.

114 S.7 Consumer Protection Act 1987: "*The liability of a person by virtue of this Part to a person who has suffered damage […]*". See also s.6(7) which states that liability under this Part is "*to be treated as liability in tort.*"

No limit of liability: there is no monetary limit specified in the Consumer Protection Act on the liability of a producer.[115]

Definition of defect: Under the Consumer Protection Act 1987, a product has a defect "*if the safety of the product is not such as persons are generally entitled to expect*."[116] The standard is therefore based on consumer expectations, which are subject to a reasonableness test.[117] To determine this, "*all circumstances*" are taken into account under s.3 (2) of the Consumer Protection Act 1987, including: the way the product is marketed, instructions or warnings, ways in which the product may reasonably be expected to be used and the time of supply. Case law has clarified that the question to be answered, in determining whether a product has a defect, is whether the product has met the "*legitimate expectation of safety*" for that product.[118] In this case the Court took into account the circumstances in Article 6 of the Directive (equivalent to s.3(2) Consumer Protection Act 1987) to determine the legitimate expectation of the public at large.[119] The appropriateness of the assessment of the expectations of the public at large for the determination of defect is supported by Recital 6 Directive 85/374/EEC which states: "*the defectiveness of the product should be determined by reference not to its fitness for use but to the lack of the safety which the public at large are entitled to expect*".[120]

Causation: The burden of proof is on the claimant to show not only that the damage occurred but also that the product is defective under s.3 of the Consumer Protection Act 1987 (on the balance of probabilities).[121] The claimant must also prove the causal link between the damage and the defect.[122]

What damage is covered: Death, personal injury[123], and loss or damage to property (other than the defective product itself)[124] are actionable under the Consumer Protection Act 1987.[125]

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115 See by comparison Article 16 Directive 85/374/EEC which states that a Member State may provide that a producer's total liability for damage resulting from personal injury shall be limited to an amount not less than EUR 70 million.

116 S.3 Consumer Protection Act 1987.

117 *Richardson v LRC Products* (2000) 59 BMLR 185.

118 *A v National Blood Authority (No.1)* [2001] 3 All E.R. 289, paras. 55-73.

119 *A v National Blood Authority (No.1)* [2001] 3 All E.R. 289, para. 33.

120 Recital 6 Directive 85/374/EEC.

121 *Foster v Biosil* (2001) 59 B.M.L.R. 178.

122 *Foster v Biosil* (2001) 59 B.M.L.R. 178.

123 See s.45(1) Consumer Protection Act 1987 for definition of personal injury: "*includes any disease and any other impairment of a person's physical or mental condition*."

124 S.5(2) Consumer Protection Act 1987 "*A person shall not be liable under section 2 above in respect of any defect in a product for the loss of or any damage to the product itself or for the loss of or any damage to the whole or any part of any product which has been supplied with the product in question comprised in it.*"

125 S.5(1) Consumer Protection Act 1987: "*'damage' means death or personal injury or any loss of or damage to any property (including land).*"

However, damage to business property not ordinarily intended for private use is not covered.[126] The Consumer Protection Act 1987 also does not cover purely financial or economic loss[127], or damage valued at less than £275.[128]

Defences: The statutory defences to a product liability claim are set out in s.4 of the Consumer Protection Act 1987. An important defence for a manufacturer is the 'state of the art'/'development risks' defence which is set out in s.4(1)(e) of the Consumer Protection Act 1987. [129] This provision states that it is a defence to show that "*the state of scientific and technical knowledge at the relevant time was not such that a producer of products of the same description as the product in question might be expected to have discovered the defect if it had existed in his products while they were under his control.*"

Section 4 of the Consumer Protection Act 1987 also provides the following potentially relevant defences to claims under the Act: (i) the defect is attributable to compliance with any domestic or EU law; (ii) the defendant did not supply the product; (iii) the defect did not exist in the product when circulated;[130] and (iv) where the product is comprised as a component part in a subsequent product, the defect is attributable to the design of the subsequent product or to compliance with the instructions of the producer of the subsequent product.

Contributory negligence: s. 6(4) of the Consumer Protection Act 1987 also expressly provides for contributory negligence to be taken into account. This may be of particular relevance to automated vehicles as the manufacturer may want to argue that the claimant (i.e. potentially the driver of the automated vehicle or another road user) is also at fault. Note, however, that contributory negligence in this sense is a defence to a claim and as such may only be used by a defendant where the claimant himself has been negligent. If a third party in negligence proceedings contributed to the loss for which a claimant claims, the defendant may seek a contribution from the third party towards his liability by joining that third party to the claim or else by bringing a separate action against him.[131] For the purposes of this memorandum, this liability to contribute to liability for a claim by a third party is also described as contributory negligence.

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126 S.5(3) Consumer Protection Act 1987.

127 See *Benjamin Sale of Goods* 9th Edition para. 14-094.

128 S.5(4) Consumer Protection Act 1987.

129 Note that this defence is an optional part of the directive and not all countries have implemented it. See Christopher Johnston, "A personal (and selective) introduction to product liability law", *Journal of Personal Injury Law* 2012, p.14

130 Note that the language of the Consumer Protection Act 1987 is more strict than the Directive itself which provides in Article 7 that "*having regard to the circumstances, it is probable that the defect which caused the damage did not exist at the time when the product was put into circulation by him or that this defect came into being afterwards.*"

131 See the Contribution Act 1978.

Limitation period: The general rule under English law is that a claim must be brought within six years from the date of the cause of action. A different regime applies specifically in relation to the Consumer Protection Act 1987 which, simply stated, provides that (i) a claim must be brought before the expiration of 10 years from the 'relevant time'[132] (the relevant time being the date the product was last supplied by the producer under s.4 of the Consumer Protection Act 1987);[133] and (ii) an action in respect of personal injuries or loss or damage to any property cannot be brought after the expiration of three years from the accrual of the cause of action, or (if later) from the date the claimant became aware of the damage.[134]

11.4.1.2 Contract

Introduction: Contractual liability may provide a direct means of redress against the supplier or warrantor of a sub-standard product. Contractual liability was particularly important before the creation of the strict liability regime under the Consumer Protection Act 1987 but nevertheless can still be pursued as a cause of action in conjunction with or independently of the strict liability regime.[135]

Contract claims may allow recovery for pure economic loss, which is not recoverable under the strict liability regime[136] e.g. diminution of the value of the product from the purchase price.

Contractual liability may arise from the express or implied terms of the contract:

Express contractual terms: Liability for an express term in the contract will depend on the term in the contract. These terms may relate to the condition of product itself or to remedies for breach of contract. These may also include a manufacturer's warranty.[137]

Implied contractual terms: The Sale of Goods Act 1979 provides that certain terms may be implied at law in relation to the supply of goods. Particularly relevant is s.14 Sale of Goods Act 1979 which provides for an implied term that goods sold in the course of business are of satisfactory quality and fit for their purpose. Liability for breach of the implied statutory terms

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132 See s.11A(3) Limitation Act 1980, which serves as a longstop date.

133 See s.4(2) Consumer Protection Act 1987.

134 S.11A(4) and s.14(3) Limitation Act 1980.

135 Discussed above.

136 See above and s.5(2) Consumer Protection Act 1987.

137 The Consumer Rights Act 2015 s.30 provides for rules on guarantees. It provides that where there is a contract to supply goods and there is a guarantee, otherwise known a manufacturer's warranty, in relation to them "*[t]he guarantee takes effect, at the time the goods are delivered, as a contractual obligation owed by the guarantor under the conditions set out in the guarantee statement and in any associated advertising*"(s.30(3) Consumer Protection Act 2015). See also *Benjamin Sale of Goods* 9th Edition 14-080.

as to satisfactory quality and fitness for purpose cannot be excluded or restricted against a consumer.[138]

Privity of contract: The general rule under English law is that a person can bring a claim in contract against another party if that party has privity of contract with them i.e. both are parties to the contract.[139] However, a third party may have enforceable rights by virtue of the Contracts (Rights of Third Parties) Act 1999. This Act confers rights on third parties if the contract expressly provides for this or a term purports to confer a benefit on a third party (see s.1(1) and s.1(2) Contracts (Rights of Third Parties) Act 1999). Therefore, in practice, in a contractual product liability claim, the situations where a third party would be able to claim under the Act are limited as the contract will not typically confer a benefit on them.[140] The party who can make a claim is the party to the contract i.e. the purchaser of the defective goods. This contracting party may claim under the contract of sale against the immediate vendor of the goods, who will normally be a retailer.[141] As noted above, separate rules apply to manufacturer's guarantees which provide for a direct claim against the manufacturer.

Damages and remedies for breach of express and implied terms: The remedies for breach of contract under English law are intended to put the buyer in the position he would have been in had the breach not occurred i.e. had the contract been properly performed. The remoteness principle operates to limit potentially recoverable damages to those arising naturally from the breach and those in the reasonable contemplation of the parties at the time the contract was entered.[142] Contractual damages are primarily focused on recovering pure economic loss (i.e. the reduction in the value of the goods from the purchase price as a result of the defect). Consequential loss in the form of personal injury and property damage may also be available.[143] The compensation awarded aims to put the claimant in the position he would have been in had the contract been properly performed provided the damage is not too remote.

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138 of s.6 of the Unfair Contract Terms Act 1977 ("UCTA").

139 *Benjamin Sale of Goods* 9th Edition para. 14-019: "*It is important to emphasise that in English law it is generally only the buyer, or the equivalent contracting party in the case of a contract for the provision of services, who may sue on the contract. A third party cannot sue.*"

140 See *Benjamin Sale of Goods* 9th Edition para. 14-094 "*this liability benefits only a contracting party and not others who may be affected by defective goods*". See also *Daniels and Daniels v R White & Sons Ltd and Tarbard* [1938] 4 All E.R. 258.

141 *Benjamin Sale of Goods* 9th Edition para. 14-019.

142 *Hadley v Baxendale* [1854] EWHC J70 and *Chitty on Contracts* 32nd Edition para. 26-110.

143 *Goldley v Perry* [1960] 1WLR 9; *Grant v Australian Knitting Mills* [1936] AC 85. See also *Ashington Piggeries Ltd v Christopher Hill Ltd* [1972] A.C. 441. See also *Benjamin Sale of Goods* 9th Edition para. 14-018.

11.4.2 Common law torts

Tortious liability at common law in relation to products may arise through breach of a duty of care (negligence) or a breach of statutory duty.

11.4.2.1 Breach of duty of care

Actions in tort can be made against manufacturers, producers and anyone involved in manufacturing the product. Under the neighbour principle, the duty of care will be owed to "*persons who are so closely and directly affected [the defendant's] act that [the defendant] ought reasonably to have them in contemplation as being so affected*".[144] Therefore, not only consumers but third party users and bystanders all potentially fall within this category.

In every action for negligence it is necessary to show that (i) the defendant owed a duty to the claimant, (ii) the defendant breached that duty (by failing to meet the standard required of them) and (iii) the defendant's breach of duty caused the claimant to suffer recoverable damage (which is not remote). In negligence there is no strict liability but it is necessary to demonstrate that the defendant failed to act with reasonable care. The standard of care required is determined objectively. Liability may potentially arise from any breaches of the duty of care at any stage, including design, manufacturing and marketing.[145]

Causation: Once a breach is established, causation must be proved by the claimant who must demonstrate that 'but for' the defendant's breach (of his duty of care), the damage would not have occurred.[146]

Damage: Damages are assessed to put the claimant in the position he would have been in had the tort not occurred. Note that pure economic loss i.e. diminution in the value of the property itself is actionable in negligence only in tightly confined circumstances.[147] The damage must be reasonably foreseeable.[148]

Defences: Contributory negligence can be a significant defence in mitigating liability where the claimant's own negligence contributed to the damage.

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144 [1932] AC 562 para. 580.

145 These are the three types of defect generally identified in negligence case law.

146 *Cork v Kirby Maclean Ltd* [1952] 2 All ER 402 at 406. See also *Winfield and Jalowicz on Tort*, 19th Edition para. 7-007.

147 *Winfield and Jalowicz on Tort*, 19th Edition para. 5-059.

148 *Overseas Tankship (UK) Ltd v Morts Dock and Engineering Co Ltd* [1961] UKPC 2 (*The Wagon Mound*), *Overseas Tankship (UK) Ltd v Miller Steamship Co Pty Ltd)* [1966] UKPC 10 (*The Wagon Mound No.2*) and *C Czarnikow Ltd v Koufos* [1967] UKHL 4 (*The Heron II*)).

11.4.2.2 Breach of statutory duty

The claimant must establish a breach of a statutory obligation which was intended to confer private rights of action upon a class of persons of whom the claimant is one.[149] The damage must be a type which the statute intended to prevent and the normal rules of causation apply.[150] This may be relevant where there is a breach of specific safety legislation, for example.

11.4.3 Criminal liability

Criminal liability arises under the Consumer Protection Act 1987, the General Product Safety Regulations 2005, the Health and Safety at Work etc. Act 1974, and the Corporate Manslaughter and Corporate Homicide Act 2007.

Consumer Protection Act 1987: s.11 of the Consumer Protection Act 1987 provides that the Secretary of State may make regulations to ensure the safety of goods. Criminal liability is provided for under s.12 of the Consumer Protection Act 1987 for the breach of any of these regulations. S.39 (1) Consumer Protection Act 1987 provides a statutory defence to these offences where the defendant can show that "*he took all reasonable steps and exercised all due diligence to avoid committing the offence*".[151]

General Product Safety Regulations 2005: There are a number of sector specific regulations made using these powers provided for in s.11 Consumer Protection Act 1987. In addition, the General Product Safety Regulations 2005/1803, address product safety in a non-sector specific manner, and reflect similar provisions for safety as the Consumer Protection Act 1987. Under Regulation 5 General Product Safety Regulations 2005/1803 a producer will not market[152] or supply[153] a product unless it is a '*safe product*'.[154] Contravention of this regulation is a criminal offence punishable by imprisonment not exceeding 12 months and/or a £20,000 fine.[155] In addition, Regulation 7(1) General Product Safety Regulations 2005/1803 provides that consumers be provided the relevant information on the risks of the product. Again contravention of this

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149 *London Passenger Transport Board v Upson* [1949] AC 155, 168.

150 As discussed above.

151 The facts of the case will be considered in determining this defence: *Tesco Supermarkets Ltd v Nattrass* [1972] AC 153.

152 Regulation 5(1) General Product Safety Regulations 2005/1803.

153 Regulation 5(3) General Product Safety Regulations 2005/1803.

154 See s.2 General Product Safety Regulations 2005/1803 for definition of "*safe product*" means "*a product which, under normal or reasonably foreseeable conditions of use including duration and, where applicable, putting into service, installation and maintenance requirements, does not present any risk or only the minimum risks compatible with the product's use, considered to be acceptable and consistent with a high level of protection for the safety and health of persons.*"

155 Regulation 20(1) General Product Safety Regulations 2005/1803.

Regulation 7 is a criminal offence punishable by up to three month imprisonment and or a fine of up to £5,000.[156]

Health and Safety at Work etc. Act 1974: Under s.6 of the Health and Safety at Work etc. Act 1974 any person who designs, manufacturers, imports or supplies a product for use at work has a duty to ensure "*as far as is reasonably practicable*" that the product is safe. In addition under s.37 of this Act an individual director or manager of a company can be held criminally liable for a health and safety offence where: (1) the company is found guilty of a health and safety offence, and (2) the offence was committed with the consent or connivance of, or was attributable to any neglect on the part of the director or manager.

Corporate Manslaughter and Corporate Homicide Act 2007: Under this act an organisation (not an individual) will be guilty of an offence where the way in which a company's activities are managed causes a person's death and amounts to a gross breach of a relevant duty of care owed to that person.[157] Although directors may not be found to be criminally liable under this act, they may still be liable under the common law offence of gross negligent manslaughter if it can be established that: (1) the director owed a duty of care to the deceased, (2) that there has been a breach of this duty which had been a substantial cause of the death, and (3) that the breach was so grossly negligent that his conduct should be seen as criminal and deserving of punishment.[158]

11.4.4 Any other national laws for product liability?

Legislation relevant to product liability and affected by the introduction of automated vehicles are Sale of Goods Act, the Unfair Contract Terms Act 1977 ("UCTA") and the General Product Safety Regulations 2005/1803 as discussed above.

11.4.5 Legal evaluation of scenarios

11.4.5.1 Assumptions:

- Automated systems are developed and produced pursuant to the "state of the art" and that any potential remaining risks of the systems are outweighed by their benefits;
- Driver followed all operator's manual and in vehicle instructions and warnings (unless otherwise stated); and
- Automated vehicle met all types of approval requirements;

156 Regulation 20(2) General Product Safety Regulations 2005/1803.

157 S.1(1) Corporate Manslaughter and Corporate Homicide Act 2007.

158 *R v Adomako* [1994] UKHL 6.

- Use of full and high automated systems is permitted under English law;
- Driver is owner and vehicle is used for private purposes;
- There are no exonerating circumstances so that liability of the manufacturer is not excluded; and
- The accident occurs within any relevant guarantee/warranty period.

11.4.5.2 Introduction:

The analysis of the scenarios would at this time be impacted by current traffic laws that are inconsistent with automated vehicle use,[159] most obviously the Road Vehicles (Construction and Use) Regulations 1986 Regulation 104 which requires the driver to be in full control of the vehicle with a full view of the road and traffic ahead.[160] The scenarios provide for a level 3 or 4 system to be activated which allows for the driver to disengage from the driving task. This disengagement is not currently permitted under English law. Therefore, for the purposes of the analysis of potential liability in the five scenarios, we will proceed on the assumption that the UK Government will have made the required changes to the legislation so that the driver is permitted disengage from the driving task in order to operate a level 3 and 4 system under English law.

The scenarios discussed below are as set out in the "Annex 2 – Version 2016-07-22" scenarios document (see chapter 4.3) and are not repeated below.

11.4.5.3 Scenario 1 "technical malfunction"

11.4.5.3.1 The liability of the manufacturer

11.4.5.3.1.1 Product liability law

11.4.5.3.1.1.1. White vehicle:

Strict liability under Consumer Protection Act 1987 - The manufacturer has provided the consumer with a product. Therefore the strict liability regime under the Consumer Protection Act 1987 applies. The definition of product is wide enough to encompass automated vehicles.[161]

There is no information regarding the nature of the defect that caused the system to change lane without cause or warning. Nevertheless, the facts in the scenario suggest that a malfunction of some sort must have occurred and therefore the claimant should have no difficulty in making out a claim. The test for a "defect" is whether the product provides the

159 More detail on this is in the first memorandum provided by White & Case LLP on the matter in August 2016.

160 The Road Vehicles (Construction and Use) Regulations 1986, reg. 104.

161 See s.1(2) of the Consumer Protection Act 1987 for the definition of 'product'.

level of safety that the public is generally entitled to expect[162], and the public would generally be entitled to expect that the product they bought would not cause an accident in the manner described in this scenario.

The manufacturer would be liable to any parties injured because of the defect for property damage and/or personal injury or death. Most obviously, the manufacturer would be liable to the driver and/or owner of the white vehicle. The manufacturer would be liable to the owner for any damage (excluding the damage to the defective product itself i.e. the white vehicle[163]) damaged by virtue of the defect so long as the value of the damage exceeded £275 and was intended for private use.[164]

There is no limit to the amount of compensation that may be claimed. The amount claimed will aim to put the claimant in the position he would have been in had the damage not occurred.

11.4.5.3.1.1.2. Blue vehicle:

The manufacturer will be liable for any personal injury or death to the driver of the blue vehicle as well as any property damage caused by the defect in the white vehicle.

11.4.5.3.1.2 Tort law

11.4.5.3.1.2.1. White vehicle:

A manufacturer owes a duty to the consumer to take reasonable care. Therefore the manufacturer will be liable for breach of its duty of care owed to the driver of the vehicle. This duty will also be owed to the other passengers of the car as they can reasonably be contemplated as being affected by the manufacturer's act (of providing a defective product). The manufacturer will be liable for any personal injury, death or property damage caused as a result of the breach of the duty of care. Unlike in the strict liability regime outlined above, the claimant would have the burden of proving that the manufacturer was negligent. Damages will aim to put the claimant in the position he would have been in had the tort not occurred.

11.4.5.3.1.2.2. Blue vehicle:

A manufacturer owes a duty to the consumer to take reasonable care when providing them with a product and, due to the neighbour principle outlined above, this duty will extend to those parties who could have reasonably been contemplated as being affected by the manufacturer's act (of providing a defective product). This will extend to other road users, such as the passengers and driver of the blue vehicle. Again, the claimant third party in the blue car would

162 See above.

163 S.5(2) Consumer Protection Act 1987.

164 See above for more detail.

have the burden of proof of proving that the manufacturer was negligent, but can claim for personal injury and property damage caused as a result of the tort.

11.4.5.3.1.3 Contract/ guarantee/ warranty

The manufacturer may be liable under the manufacturer's warranty depending on the content of the warranty.[165] The owner of the white vehicle may have a claim against the supplier (as opposed to the manufacturer, if they are separate) under express or implied terms of fitness for purpose and satisfactory quality.[166] This would only be available between the parties to the contract of sale (N.B. this applies potentially to the other scenarios where the vehicle is defective, but is not repeated elsewhere).

11.4.5.3.1.4 Other laws (e.g. traffic law/criminal law)

Criminal law: The manufacturer may be considered to be criminally liable for providing an unsafe product, and receive a fine or imprisonment,[167] unless the manufacturer has taken all steps and due diligence to avoid committing this offence.[168]

11.4.5.3.2 The liability of the user

11.4.5.3.2.1 Tort law

On the basis of the facts, there should be no driver liability in tort law as the driver used the vehicle as per the instructions and there was no request to take over control of the vehicle. The driver has not breached his duty of care to other road users.

11.4.5.3.2.2 Other relevant liability regulations/ other laws (e.g. traffic, criminal law)

On the assumption that the law will be updated to allow the driver to cede control to the automated system, it is unlikely that the driver could be found to be criminally liable, as he followed the instructions in the manual and activated the automated system as instructed.

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165 See above for more details on warranties.

166 See s.13 SGA and satisfactory quality.

167 Consumer Protection Act 1987 and the General Product Safety Regulations 2005. See also Section 11.4.3 above. Note that offences under the General Product Safety Regulations 2005 can be committed by both individuals and corporate entities, with imprisonment only applying to individuals. For more details see Lisa Wilson and Peter Shervington *Product Liability: safety and labelling*, Westlaw update, paras. 41-46.

168 See Section 11.4.3 above.

11.4.5.4 Scenario 2 "functional/technical limits"

11.4.5.4.1 The liability of the manufacturer

11.4.5.4.1.1 Product liability law

11.4.5.4.1.1.1. Assumption A - the system reacts as well as an average driver could have done:

Strict liability under Consumer Protection Act 1987: The manufacturer's liability turns on what the public is generally entitled to expect from the safety of the product. It is not yet clear what standard will be applied to the definition of 'defect' in the context of automated vehicles. However, we would assume that the minimum safety standard that the public would generally be entitled to expect is the standard of an average driver. This standard may change as case law and technology in the area develop. Therefore, although it is possible that the product will not be seen as defective within the definition of 'defect' in the Consumer Protection Act 1987 (as an average driver would have reacted in the same way), the courts may apply a higher standard, particularly if the available technology would have allowed a faster response time which would have avoided the accident. Therefore, whether the injured parties would have a claim is unclear and may depend on the stage of development of the relevant technology.

If a claim does lie against the manufacturer, the third vehicle driver appears very likely to have been negligent (the facts would suggest that the driver may have been driving too fast). On that basis, the manufacturer would be able to seek a contribution from the negligent third party to offset its liability.

11.4.5.4.1.1.2. Assumption B - the system does not react as well as an average driver could have done:

Strict liability under Consumer Protection Act 1987: There appears to be a defect in the product as the system allowed for automated use but reacted less well than an average driver. This seems highly likely to constitute a defect and so is a potential cause of action under the Consumer Protection Act 1987. The third vehicle may also be found to be negligent if it is found that the driver was driving negligently (the facts would suggest that the driver may have been driving too fast) and the manufacturer may therefore seek a contribution from this third party as a result.

11.4.5.4.1.2 Tort law

11.4.5.4.1.2.1. Assumption A:

It is questionable whether there has been a breach of the manufacturer's duty of care if an ordinary driver would have reacted in the same way. Still, if it can be shown that the manufacturer failed to exercise a standard of care which led to the white car not reacting faster and avoiding the accident, a claim in negligence against the manufacturer is theoretically

possible.[169] The driver of the third vehicle may also be found to be negligent and the manufacturer may seek a contribution from him to offset his liability as a result.

11.4.5.4.1.2.2. Assumption B:

The manufacturer may be liable if negligence can be established as the cause of the apparent defect.[170] It may be arguable that the driver of the white vehicle has been contributorily negligent, although there is little to support this on the facts. The driver of the third vehicle may also be found to be negligent and the manufacturer may seek a contribution from him to offset his liability as a result.

11.4.5.4.1.3 Contract/ guarantee/ warranty

The manufacturer may be liable under the manufacturer's warranty depending on the content of the warranty.[171]

11.4.5.4.1.4 Other laws (e.g. traffic law/criminal law

Criminal law: The manufacturer may be found to be liable criminally if it can be established that the product is unsafe, unless the manufacturer has taken all steps and due diligence to avoid committing this offence. This is of particular relevance to assumption B.

11.4.5.4.2 The liability of the user of the automated vehicle

11.4.5.4.2.1 Tort law

The user followed the instructions in the manual. Assuming it was reasonable for the user to do so, he is unlikely to be found liable in negligence. The driver of the third vehicle may well be liable in negligence.

11.4.5.4.2.2 Other relevant liability regulations/ other laws (e.g. traffic, criminal law)

The user is unlikely to be found to be criminally liable in relation to either assumption as he followed the instructions in the manual and did not contribute to the accident.[172]

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169 Department for Transport, *The Pathway to Driverless Cars: A detailed review of regulations for automated vehicle technologies*, February 2015, p.12.

170 i.e. manufactured according to specifications but defective design at pre-production stage.

171 See above for more details on guarantees/ warranties.

172 Although, as indicated above, this assumes certain changes to current legislation to allow for automated car use.

11.4.5.5 Scenario 3 ("take over request")

11.4.5.5.1 The liability of the manufacturer

11.4.5.5.1.1 Product liability law

11.4.5.5.1.1.1. Strict liability under Consumer Protection Act 1987:

11.4.5.5.1.1.1.1. Variation 1 ("request too late"):

In this variation, the request by the automated system for the driver to take over control is given too late to avoid an accident. The manufacturer may therefore be liable for providing a defective product. The issue here is whether the vehicle ought to have a failsafe mechanism to deal with real life road situations. It is well arguable that the public has a right to expect that an automated vehicle is capable of responding safely to real life situations involving unexceptional road circumstances such as incomplete lane markings. The failure to give a timely warning or otherwise avoid an accident arguably amounts to a design defect which would be likely to lead to liability for the manufacturer. Note also that the facts suggest that there may be damage to the passengers of the car but there is no third party damage: recovery for simple damage to the defective product itself is not available under the Consumer Protection Act 1987 regime[173].

11.4.5.5.1.1.1.2. Variation 2 ("request in time"):

In this variation, the request for the driver to take over was made in time for the driver to react and prevent the accident. However, the accident still occurred. It is open to consideration whether in such circumstances where the driver does not take over control as directed, that the system should be capable of taking alternative action automatically, e.g. bringing the vehicle to a safe stop, if possible. If that is the case, the product may be considered defective for not providing such a function. In addition, it is necessary to consider whether the driver acted consistently with the manufacturer's manual and to what extent it is reasonable to assume he would have responded in time in the circumstances. In short, the manufacturer is not obviously liable but it is possible to envisage arguments that the vehicle was defective even if it was theoretically possible for the driver to have prevented the accident.

11.4.5.5.1.2 Tort law

11.4.5.5.1.2.1. Variation 1:

The manufacturer may be found liable for the same reasons as outlined above in paragraph 11.4.5.3.1.2 above.

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[173] This includes damage to the defective product itself and another product in which the defective component was a part (s.5(2) Consumer Protection Act 1987).

11.4.5.5.1.2.2. Variation 2:

The manufacturer may be found liable for the same reasons as outlined above in paragraph 11.4.5.3.1.2 above.

11.4.5.5.1.3 Contract/ guarantee/ warranty

The manufacturer may be liable under the manufacturer's warranty depending on the content of the warranty.[174]

11.4.5.5.1.4 Other laws (e.g. traffic law/criminal law)

Criminal law: The manufacturer may be found to be criminally liable if it can be established that the product is unsafe, unless the manufacturer has taken all steps and due diligence to avoid committing this offence. This is of particular relevance to variation 1.

11.4.5.5.2 The liability of the user of the automated vehicle

11.4.5.5.2.1 Tort law

11.4.5.5.2.1.1. Variation 1:

In this variation, the request for the driver to take over is too late so it is unlikely that the driver could be considered to be negligent in failing to prevent the collision in spite of the driver taking over control to try to avoid the collision (unsuccessfully). In any event, it appears that the driver does not in any event cause damage to any third party on the facts which could give rise to a tort claim.

11.4.5.5.2.1.2. Variation 2:

In this variation, the request for the driver to take over was in time. However, the accident still occurred as the driver's reaction was too late to avoid the accident. The manual required that the driver follow a request by the system to take over and to stay attentive at all times in terms of unusual events. The driver's liability in this situation will depend on whether it is determined that the driver was sufficiently warned of the risks and acted negligently in failing to react (or being in a position to react) so as to avoid the accident. This may include the manual specifying the time within which a driver must take over following a request and whether the driver took over in good time. Again, it appears that the driver does not in any event cause damage to any third party on the facts which could give rise to a tort claim.

11.4.5.5.2.2 Other relevant liability regulation/ other laws (e.g. traffic, criminal law)

The driver may be considered to be criminally liable if his conduct was considered to constitute dangerous driving.[175]

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174 See above for more details on guarantees/ warranties.

175 See Road Traffic Act 1988 s.1 and s.1A.

11.4.5.6 Scenario 4 ("misuse")

11.4.5.6.1 The liability of the manufacturer

11.4.5.6.1.1 Product liability law

11.4.5.6.1.1.1. Scenario A:

This design may be considered to be defective on the basis that the product is not fitted with a device to avoid inappropriate activation. However, this depends on the public being entitled to expect that the vehicle would have such a device. Whether such a device must be fitted is likely to be addressed in subsequent regulations. However, absent any regulations requiring cars to have such a failsafe, or an industry standard that such failsafes are fitted, this seems unlikely to amount to a defect. It would reasonably be the responsibility of the driver not to use the car in obviously inappropriate and dangerous circumstances contrary to the manufacturer's manual. Furthermore, the user's conduct may be deemed at law to be the sole cause of the damage such that the defect was not the cause of the damage and no liability could accrue to the manufacturer under the Consumer Protection Act 1987.

11.4.5.6.1.1.2. Scenario B:

The producer may be found to be liable for the defective manufacture of its product. This manufacture may be considered to be defective because although the product was fitted with a device to avoid inappropriate activation, this device had a functional deficiency. Nonetheless the user may be held to be contributorily negligent (see below at 7.6.6.2.2). Furthermore, as indicated above for Scenario A, the manufacturer may be able to establish that the user's conduct was the sole cause of the damage and escape liability. Clearly, this argument will be more difficult where the damage would not have occurred but for the defect as is the case in Scenario B.

11.4.5.6.1.1.3. Scenario C:

The manufacturer may be found to be liable for the defective manufacture of its product. This product may be considered to be defective because although the product was fitted with a device to avoid inappropriate activation, this device had a functional deficiency and as a result indicated to the user that he could switch the system on. The user may be held to be contributorily negligent (see below at 11.4.5.7.2). The causation defence highlighted above may be available to the manufacturer, but seems unlikely to succeed in this scenario.

11.4.5.6.1.2 Tort law

The liability of the producer will be as specified directly above but with the added requirement for the claimant to prove negligence.

11.4.5.6.1.3 Contract/ guarantee/ warranty

The manufacturer may be liable under the manufacturer's warranty depending on the content of the warranty.[176]

11.4.5.6.1.4 Other laws (e.g. traffic law, criminal law)

The manufacturer may be criminally liable if it is considered that the product it provided was unsafe, unless the manufacturer has taken all steps and due diligence to avoid committing this offence.

11.4.5.6.2 The liability of the user of the automated vehicle

11.4.5.6.2.1 Tort law

11.4.5.6.2.1.1. Scenario A:

The user is likely to be liable in negligence as the facts suggest that the user did not follow the manual and used the automated system in an inappropriate and dangerous situation (i.e. on a two way road).

11.4.5.6.2.1.2. Scenario B:

The user is likely to be liable in negligence as the facts suggest that the user used the automated system in an inappropriate and dangerous situation (a two way road). Whether the user is able to deny any breach of his duty of care on the basis that the system failed to avoid being used in this situation will be fact-specific, but if the user has been properly warned that the vehicle cannot be used in this situation (or this is deemed obvious) and is warned not to rely on the system to prevent this, it should be difficult for him to avoid liability.

11.4.5.6.2.1.3. Scenario C:

The user may be liable in negligence as the facts suggest that that the user may have used the automated system in an obviously inappropriate and dangerous situation (a two way road). However, the driver will have a much stronger defence given that the vehicle notified him that the automated system could be used safely. Even if liability is established, in any claim for contributory negligence, he is likely to be found liable to a lesser degree than under Scenario B.

11.4.5.6.2.2 Other relevant liability regulation/ other laws (e.g. traffic, criminal law)

The driver may be considered to be criminally liable if his conduct was considered to be dangerous driving.[177] On the facts, it is possible that this would be the case, particularly in Scenarios A and B.

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176 See above for more details on guarantees/ warranties.

177 See Road Traffic Act 1988 s.1 and s.1A.

11.4.5.7 Scenario 5 "traffic violation"

11.4.5.7.1 The liability of the manufacturer

11.4.5.7.1.1 Product liability law

Product liability law under the Consumer Protection Act 1987 is not engaged as there is no "*damage*" (as defined) suffered as a result of the speeding.

11.4.5.7.1.2 Tort law

As above under the product liability law section.

11.4.5.7.1.3 Contract/ guarantee/ warranty

The manufacturer may be liable under the manufacturer's warranty depending on the content of the warranty.[178]

11.4.5.7.1.4 Other laws (e.g. traffic law, criminal law)

The manufacturer may be criminally liable if it is considered that the product it provided was unsafe, unless the manufacturer has taken all steps and due diligence to avoid committing this offence.

11.4.5.7.2 The liability of the user of the automated vehicle

11.4.5.7.2.1 Tort law

There is no damage to any third party that could give rise to a tort claim.

11.4.5.7.2.2 Other relevant liability regulations/other laws (e.g. traffic, criminal law)

Currently, it an offence to drive at a speed in excess of the speed limits, punishable by fines, demerit points and/or disqualification.[179] Section 89 The Road Traffic Regulation Act 1984, which specifies this criminal offence, will have to be reconsidered in the case of automated cars to appropriately balance criminal liability between drivers and manufacturers.

"Driver" in the most relevant legislation is currently defined as "where a separate person acts as steersman of a motor vehicle, includes that person as well as any other person engaged in the driving of the vehicle".[180] No further guidance is given as to what it means to be "engaged in the driving" of a vehicle or who would be classed as a driver in the case of automated vehicles. However, there is some case law that indicates that a person may fall within this definition of "driver" even if the person is not in primary control of the vehicle but has the ability to retake

[178] See above for more details on warranties.

[179] Road Traffic Regulation Act 1984, s. 89. S.89(1) provides "A person who drives a motor vehicle on a road at a speed exceeding a limit imposed by or under any enactment to which this section applies shall be guilty of an offence."

[180] Road Traffic Regulation Act 1984, s. 142(1). See also Road Traffic Act 1988, s. 192(1), although note that the s.(1) Road Traffic Act 1988 on causing death my dangerous driving is carved out of this definition of driver.

control if necessary.[181] It seems that the level of control necessary to be classed as a driver in English law is relatively low and may include the operators of automated vehicles. However, it is anticipated that this legislation will be amended as automated vehicle technologies become available.

On the assumption that the relevant clarifications in legislation are made, the driver is unlikely to be seen as liable under criminal law as the vehicle was correctly operated in automated mode.

11.4.6 Civil liability of the registered owner

In general there is no strict liability on vehicle owners or users for road traffic accidents under English law. Owners and users of vehicles may be liable under the common law torts of breach of statutory duty and negligence.[182] The latter of these is by far the most common.

Under English law, liability for vehicle use is focussed on the user rather than the owner. However, the owner is subject to certain duties and may face liability in certain circumstances.

11.4.6.1 Liability for Breach of Statutory Duty

There is a tort of breach of statutory duty in English law. It is only necessary to show that the statutory duty was breached and not that there was any element of fault on the part of the defendant in doing so. However, not every breach of statute will give rise to such an action: it is necessary to establish that the statute was intended to confer private rights of action upon a class of persons of whom the claimant is one.[183]

In some limited cases, a breach of statutory duty in the context of a road traffic accident may give rise to an action for damages.

This has most commonly given rise to liability on the part of vehicle owners. For example, where a defendant allowed an uninsured driver to drive his vehicle contrary to a statutory provision,[184] the vehicle owner was liable to the claimant when his judgment against the driver went unsatisfied.[185]

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181 See *Marsh v Moores* [1949] 2 KB 208; *Langman v Valentine* [1952] 2 All ER 803.

182 It is also possible to bring an action for public or private nuisance (despite any provision in the legislation: Road Traffic (Consequential Provisions) Act 1988 s. 7) for example where an unreasonable obstruction is caused, or where a vehicle of unreasonable size or character is used which causes injury, danger or substantial obstruction: see for example *A-G v Gastonia Coaches Ltd* [1977] RTR 219; *Jacobs v London County Council* [1950] AC 361, 375.

183 *London Passenger Transport Board v Upson* [1949] AC 155, 168.

184 Road Traffic Act 1930, s. 35.

185 *Monk v Warbey* [1935] 1 KB 75, followed in Scotland in *McLeod v Buchanan* [1940] 2 All ER 179.

11.4.6.2 Liability in Negligence

Liability for traffic accidents is generally determined in accordance with the ordinary principles of negligence at common law. In every action for negligence it is necessary to show that (i) the defendant owed a duty to the claimant, (ii) the defendant breached that duty and (iii) the defendant's breach of duty caused the claimant to suffer recoverable damage. In negligence there is no strict liability but rather it is necessary to demonstrate that the defendant failed to act with reasonable care. The tort of negligence is governed by judge-made common law principles rather than by particular statutes or regulations passed by Parliament.

The burden of proving that a defendant's acts were negligent lies on the claimant. If it is impossible to say on the evidence presented whether a particular act was negligent, the court may dismiss a claim in negligence on the basis that the burden of proof has not been discharged.[186]

Registered Owners: An owner may be liable if he is negligently responsible for a state of danger and it is reasonably foreseeable that interference with it may cause damage by "sparking off" the danger.[187]

For example, in *Haynes v Harwood* the owner of a horse-drawn vehicle was liable where it was left unattended in a busy street and a third party, by throwing a stone at the horses, caused them to bolt and cause injury.[188] Likewise, where a vehicle with defective brakes was left on a steep slope on a highway with merely a block of wood under the wheel to hold it and it was interfered with by a child, liability was held to rest on the owner.[189] Under this principle an owner may also be liable "*where he hands over a car to be driven by a person who is drunk, or plainly incompetent, who then runs over the plaintiff*".[190] However, this will always turn on an assessment of the facts and circumstances of the particular case.[191]

In addition, owners of vehicles who exercise control over their use may owe a duty of care to do so in a way that avoids damage. For example, an employer whose employees operate vehicles owes a duty to manage the business and the employees at its depot in such a way as to avoid

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186 *Carter v Sheath* [1990] RTR 12, 15.

187 *Haynes v Harwood* [1935] 1 KB 146.

188 *Haynes v Harwood* [1935] 1 KB 146.

189 *Martin v Stanborough* (1924) 41 TLR 1.

190 *P Perl (Exporters) Ltd v Camden London Borough Council* [1984] QB 342, 359, referring to *Ontario Hospital Services Commission v Borsoski* (1974) 54 DLR (3d) 339.

191 Compare, for example, *Wright v Lodge* [1993] 4 All ER 299 (no liability on the negligent obstructor of the highway if the driving of the third party was reckless rather than simply negligent); *Topp v London Country Bus (South West) Ltd* [1993] 3 All ER 448 (no liability for leaving a minibus unlocked, with keys in the ignition, which was then stolen by a third party who negligently drove it into the plaintiff); *Ruoff v Long & Co* [1916] 1 KB 148 (where a lorry was left on the highway, but in such a condition that it could not be set in motion except by four distinct operations, and it was put in motion by a person in mischief the owners were held not liable for the ensuing damage).

reasonably foreseeable injury to road users, by either causing, or permitting, drivers to create dangerous hazards in the road.[192]

In addition, if the driver of a vehicle is an employee, the general rules of vicarious liability may render the employer liable for loss caused by the driver's negligence. Even if the driver is not an employee, if the owner authorises the driver to drive for the owner's purposes, the owner may be liable for damage caused by negligence in the course of that use.[193]

11.4.7 Insurance law (overview, relating to the driver's/ registered owner's liability)

11.4.7.1 Introduction

The main relevant legislation on insurance of vehicles is Directive 2009/103/EC, otherwise known as the 'Motor Insurance Directive'. This directive requires that all vehicles in the European Union be insured against third party liability. However, the determination of liability in the event of a collision is not addressed in the directive. This is determined by the civil liability regimes in each EU Member State.

Directive 2009/103/EC was implemented in the UK by way of Part VI of the Road Traffic Act 1988.

11.4.7.2 Insurance against third party liabilities

11.4.7.2.1 General requirement:

Under s.143 Road Traffic Act 1988 "*a person must not use a motor vehicle on a road*" unless he is insured or secured against third party risks.[194] A person must also not "*cause or permit any other person to use a motor vehicle on a road*" unless he is insured or secured against third party risks.[195] If a person contravenes either of these sections, he will be guilty of an offence under s. 143(2).[196] However, a person will not be found to be guilty if the person proves that the vehicle didn't belong to him or in his possession, or that he was using the vehicle in the course

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192 *Tompkins v Royal Mail Group Plc* [2005] EWHC 1902, [39].

193 *Ormrod v Crosville Motor Services Ltd* [1953] 2 All ER 753; *The Thelma v University College School* [1953] 2 Lloyd's Rep 613; *Carberry v Davies* [1968] 2 All ER 817; *Vandyke v Fender* [1970] 2 QB 292; *Nelson v Raphael* [1979] RTR 437.

See s.143(1)(a) Road Traffic Act 1988: "*a person must not use a motor vehicle on a road [or other public place] unless there is in force in relation to the use of the vehicle by that person such a policy of insurance or such a security in respect of third party risks as complies with the requirements of this Part of this Act*".

195 See s.143(1)(b) Road Traffic Act 1988: a person must not cause or permit any other person to use a motor vehicleon a road [or other public place] unless there is in force in relation to the use of the vehicle by that other person such a policy of insurance or such a security in respect of third party risks as complies with the requirements of this Part of this Act.

196 See s.143(2) Road Traffic Act 1988: "*If a person acts in contravention of subsection (1) above he is guilty of an offence*." A person guilty of such an offence is liable on to a fine not exceeding level 5 on the standard scale.

of his employment or that he did not know that the insurance was not in force.[197] There are certain vehicles which are exempt from the requirement to have third party insurance or security, such as vehicles owned by a police authority.[198]

11.4.7.2.2 Requirement to meet insurance requirements:

It is an offence if a motor vehicle registered under the Vehicle Excise and Registration Act 1994 does not meet the insurance requirements required under the act i.e. insurance policy or security covering the vehicle.[199]

11.4.7.2.3 Insurance policy requirements:

In order to comply with statutory requirements, a policy of insurance must satisfy certain conditions for example insuring a person in respect of any liability for the death of or bodily injury to any person or damage to property caused by, or arising out of, the use of the vehicle on a road in the UK.[200]

11.4.7.2.4 Issues of insurance certificate:

An insurer is required to issue an insurance certificate "in the prescribed form and containing such particulars of any conditions subject to which the policy is issued and of any other matters as may be prescribed."[201]

11.4.7.2.5 Insurer of last resort:

A key aim of the Motor Insurance Directive is to ensure that victims who suffer damage[202] are appropriately compensated for the damage suffered by them.[203] The Directive in Article 10 provides that each Member State should set up a fund of compensation for when victims of a road traffic accident are injured (or suffer damage to property) by uninsured parties or parties that cannot be traced. The fund that victims have recourse to in the UK is administered by the Motor Insurers Bureau.[204]

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197 S.143(3) Road Traffic Act 1988.

198 See s.144 Road Traffic Act 1988 for more details.

199 S.144A Road Traffic Act 1988.

200 S.145(3) Road Traffic Act 1988.

201 S.147 Road Traffic Act 1988.

202 This covers "*damage to property or personal injuries*" See Article 10 Motor Insurance Directive.

203 Department for Transport, The Pathway to Driverless Cars: A detailed review of regulations for automated vehicle technologies, February 2015, p. 98.

204 For more details see https://www.mib.org.uk.

11.4.7.3 Insurance liability generally

As mentioned above,[205] neither Directive 2009/103/EC nor Part VI of the Road Traffic Act 1988 address the determination of liability for insurance purposes. Liability for personal injury or damage is a matter determined by civil law. This primarily involves an assessment under the law of tort, typically meaning an examination of negligence.

Claims are usually dealt with on behalf of insurance policy holders by their insurer. The majority of claims are settled out of court. If the claim does go to court, once negligence is determined, the insurer of the negligent party will be required to pay any compensation awarded.

11.4.7.4 Insurance liability considerations for automated cars

11.4.7.4.1 Testing of automated cars:

The requirements in the Road Traffic Act 1988 in relation to insurance will apply equally to a vehicle being tested. As the company or manufacturer conducting the testing will be 'using' the vehicle[206], it will need to obtain insurance or be vicariously liable for the test driver. For the testing stage, the driver will be required to monitor the road and environment, retaining full control of the vehicle regardless of whether it is in automated mode or not. Therefore, the normal rules of insurance apply. However, given the innovative nature of the testing, suitable insurance should be sought.[207]

11.4.7.4.2 Highly automated vehicles:

Under current laws a user of a vehicle must remain in full control of the vehicle at all times. When the vehicle is being operated in manual mode, the civil liability position currently applicable will apply and insurance will be required.[208] However, once automated mode is operated, the situation becomes more complicated, and the liability between the driver, manufacturer and owner becomes more difficult to determine. The user will likely be responsible for obtaining third party cover but when automated vehicles are produced it is anticipated that manufacturers will bear the responsibly for insurance of the vehicle when it is operating in automated mode. Further clarification on this will be required in the legislation.[209]

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205 See Section 11.4.7.1 above.

206 See s.143 Road Traffic Act 1988.

207 Department for Transport, The Pathway to Driverless Cars: A detailed review of regulations for automated vehicle technologies, February 2015, p.96.

208 Department for Transport, The Pathway to Driverless Cars: A detailed review of regulations for automated vehicle technologies, February 2015, p.96.

209 Department for Transport, The Pathway to Driverless Cars: A detailed review of regulations for automated vehicle technologies, February 2015, p.96.

Furthermore, it is likely that when highly automated vehicles are developed that they will be fitted with event data recorders which will record material that will be helpful to insurers regarding whether a vehicle was operating automatedly or under manual control.[210]

There will also be the question, when highly automated cars are developed, whether injured parties should have recourse to the fund of last resort, administered by the Motor Insurers Bureau, if the damage was caused by a vehicle with no driver or there was no liability on the part of the driver.[211]

11.4.7.4.3 Fully automated cars:

The key question will be whether a user of a fully automated car which does not even have driver controls would need third party liability insurance at all. It seems likely that the onus would be placed entirely on the vehicle manufacturer to insure the car against third party damage.[212]

11.5 Italy

11.5.1 Main principles of the Italian transposition of Directive 85/374/EEC

In line with the relevant provisions of the Directive, the Italian Consumer Code provides for a strict liability regime of a non-contractual (*i.e.* tortious) nature.

The product liability regime provided for under the Consumer Code does not prejudice the application of the general provisions on tort liability set out in Articles 2043 to 2055 of the Italian Civil Code. In this respect, Article 127 of the Consumer Code expressly stipulates that injured persons can seek compensation for damage suffered from defective products also pursuant to any other applicable laws or regulations (including the general tort law remedies set forth under the Italian Civil Code as well as the rules on breach of contract, where applicable)[213].

Department for Transport, The Pathway to Driverless Cars: A detailed review of regulations for automated vehicle technologies, February 2015, p.96.

211 Department for Transport, *The Pathway to Driverless Cars: A detailed review of regulations for automated vehicle technologies*, February 2015, p.98.

212 Although, that being said the user would want to obtain insurance akin to personal property insurance for e.g. theft See also Department for Transport, *The Pathway to Driverless Cars: A detailed review of regulations for automated vehicle technologies*, February 2015, p.98.

213 The same general principle is provided under Article 13 of the Directive and has been consistently confirmed by the Italian Supreme Court (*Corte di Cassazione*) (see, *Corte di Cassazione*, III Chamber, 15 March 2007, No. 6007; *Corte di Cassazione*, III Chamber, 14 June 2005, No. 12750).

Thus, injured persons shall have the right to choose between the liability regime provided for under the Consumer Code and any other remedies available under the applicable provisions of Italian law to seek compensation for any damage suffered from any defective product.

11.5.1.1 Automated driving systems under Italian law

Before going through an analysis of specific aspects of the liability regimes mentioned above, and their application to the scenarios (see 4.3) described in the Daimler engagement letter dated 22 July 2016 (the "Engagement Letter"), it is worth remarking that – as better illustrated in the specific memorandum prepared on this matter – the introduction of fully automated driving systems (*i.e.* from level 3 to 5) is not currently allowed under Italian law, in the light of the provisions of Legislative Decree No. 285/1992 ("*Codice della Strada*", hereinafter also referred to as the "Road Traffic Code") and related implementing regulations[214]. Accordingly, for the time being, the analysis of the liability scenarios conducted in this memorandum must be deemed to be merely hypothetical and must not be relied upon as a legal opinion in respect of any possible issues considered in this memorandum.

11.5.1.2 General principles of the current liability regime and possible uncertainties deriving from the introduction of automated vehicles

It should also be pointed out that, in general terms, the liability regime provided under the Italian Civil Code is based on the implicit assumption – which is consistent with the regulatory regime summarised above – that the driver of any vehicle is a human being having full control of the vehicle on a continuous basis, who may accordingly be deemed to be liable for any (negligent) breach of the rules of conduct set forth in the Road Traffic Code. This approach is strictly connected with the mandatory insurance regime provided under Italian law, pursuant to which the owner shall insure any risks connected with possible liabilities *vis-à-vis* third parties arising from car accidents. As a matter of fact, the imposition of mandatory insurance is aimed

[214] In general terms, Italian law requires that the driver shall at all times be able to control his vehicle. In particular, Article 128 of the Road Traffic Code provides that "*the driver shall always keep control of his vehicle and be able to carry out all manoeuvres that are necessary in safety conditions, especially by stopping the vehicle in a timely manner within the limits of his line of sight and in front of any foreseeable obstacle*". As a consequence, the driver has to control and monitor the driving task constantly (also in case of using driver assistance systems) to fulfil this requirement.

Moreover, Article 148 of the Road Traffic Code provides that "*the driver intending to overtake is obliged to previously ensure that: a) the visibility is such that the manoeuvre can be done without any danger or hindrance; b) the driver moving in front of him on the same lane has not signalled his intention to make similar manoeuvres; c) no driver who follows the same lane or roadway* ["semicarreggiata"]*, or on the lane immediately to the left, if the road or roadway* ["semicarreggiata"] *are divided into lanes, has started an overtaking; d) the free space of the road allows the complete execution of the overtaking, also taking into account the difference between the speed of the driver performing the overtaking and that of the driver to be overtaken, as well as the presence of drivers that come from the opposite directions or travel in front of the driver to be overtaken*". Accordingly, also in this case the full control of the overtaking task by the driver is required under the Road Traffic Code (this circumstance acquires particular relevance with respect to the liability scenario no. 2, which will be examined in the paragraphs below).

at allocating the economic burden connected with damage deriving from car accidents to insurance companies (also by providing for direct action of the injured person against the insurer of the damaging party, as better detailed in the paragraphs below).

Against this background, the introduction of automated vehicles may give rise to a number of legal issues, the implications of which are currently unexplored under Italian law, with specific regard to certain dangerous situations caused by interactions with external factors or other human behaviours. In particular, it is currently unclear how the choices made by producers of automated vehicles in programming driving software may affect the allocation of relevant liabilities in accordance with the relevant provisions of Italian law[215]. In addition, due to the reasons mentioned under section 11.5.1.1, there is no case law on issues relating to liability arising from accidents caused by automated vehicles (such as, for instance, with respect to the application of the notion of "negligence", the related standard of diligence, or the programming and functioning of driving software) and, as far as we know, such issues have up to now not been investigated in depth by legal scholars. As a consequence, positions given in the following paragraphs must not be relied upon in order to assess the potential legal consequences arising from accidents involving such vehicles.

11.5.1.3 Future rules or regulations

Furthermore, we may not exclude that specific rules or regulations will be introduced into the Italian legal framework in order to specifically address issues dealt with in this memorandum. Specifically, it cannot be excluded that any future legal norms applying to automated driving systems will allocate the economic burdens connected with damage caused by third parties to the producer of the driving system – also considering the fact that, when the driving tasks are entirely performed by the driving system in an automated manner, the "driver" of the vehicle for the purposes of the applicable liability provisions of Italian law, may appear to be the producer itself rather than the human being(s) using the vehicle. A similar allocation of liability may also entail a review of the mandatory insurance regime currently provided under Italian law in order to impose on the producer an obligation to enter into an insurance policy covering the risks of damage to third parties. The analysis conducted below is accordingly subject to any subsequent amendments to applicable laws and regulations and will have to be reviewed in the light of any updates to the relevant Italian legal framework.

[215] A possible example – although not strictly connected with the liability scenarios dealt with in this memorandum – is related to those cases where the driving software deliberately choses / is specifically programmed to carry out a manoeuvre which would surely cause harm to (or even the death of) the driver or other persons (or, by contrast, to protect the life or safety of the driver, regardless of any other harmful consequences towards third parties).

11.5.2 Product liability under the Consumer Code

11.5.2.1 Scope of application and liable parties

Introduction: the provisions of the Consumer Code defining the scope of application of the Italian product liability regime and the parties that may be deemed to be liable are in line with the relevant rules of the Directive.

Defective products: the product liability regime provided for under the Consumer Code applies to all defective products as defined under Articles 115 and 117 of the Consumer Code. The notions of "*products*" and "*defective products*" contained in such provisions are consistent with the corresponding definitions and notions provided for under the Directive.

Notion of products: according to Article 115, paras. 1 and 2 of the Consumer Code – and for the purposes of the product liability regime regulated thereunder – the notion of "*products*" encompasses all "*movables, even though incorporated into another movable or into an immovable*", including electricity. In this connection, it is worth mentioning that pursuant to Article 815 of the Italian Civil Code, any movables registered with public registers (such as, in particular, vehicles, boats, airplanes, etc.) are subject to all laws and regulations generally referring to movable goods, unless otherwise specified by the relevant provisions of law. By contrast, immovable goods and services fall outside the scope of application of the product liability regime provided under the Consumer Code.

Notion of defective products: based on the definition set forth in Article 117, para. 1 of the Consumer Code, a product shall be deemed to be defective when it does not provide the safety which a person is entitled to expect, taking into account all relevant circumstances on a case by case basis, including, by way of example:

a. The way the product has been put into circulation, its presentation, its identifiable features and the instructions and warnings provided in relation to the same;

b. The use to which it can reasonably be expected that the product would be put and the behaviours that can reasonably be expected in relation to that product; and

c. The time when the product was put into circulation.

In line with the Directive, Article 117, para. 2 of the Consumer Code specifies that a product shall not be considered defective for the sole reason that a better product is subsequently put into circulation.

Finally, Article 117, para. 3 of the Consumer Code provides that a product shall be deemed to be defective if it does not provide the same safety normally offered by other models of the same type.

Liable parties: the product liability regime provided under the Consumer Code applies to:

a. The producer (*produttore*)[216]; and

b. The supplier of the product (*fornitore*), who shall be liable for defective products supplied only where the producer cannot be identified, unless he informs the injured person, within three months from the relevant claim made by the latter, of the identity and domicile of the producer or its own supplier[217] (Article 116, para. 1, Consumer Code).

It is important to note that although the Consumer Code is primarily aimed at regulating the relationships between business undertakings and "*consumers*"[218], the product liability regime contained therein is actually addressed to any person injured by a defective product, irrespective of whether that person qualifies as a consumer. Indeed the rules of the Consumer Code governing the Italian product liability regime provide that "injured persons" (rather than "consumers") are entitled to get compensation for damage suffered from defective products.

The Italian Supreme Court (*Corte di Cassazione*) also confirmed that (i) all persons that have been somehow – even occasionally – exposed to the risk arising out of defective products are entitled to bring an action for damages under the aforesaid rules, and (ii) the capacity to bring any such action is not limited to consumers or non-professional users[219].

The only exception to the principle described under section 11.5.1 is provided for under Article 123, para. 1, letter (b) of the Consumer Code, which defines the compensation that may be recovered by injured persons. According to this provision, the relevant compensation includes, *inter alia*, the damage to, or destruction of, any item of property, other than the defective product itself, provided that such item of property (i) is of a type ordinarily intended for private use or consumption and (ii) was accordingly used by the injured person. Therefore, only an

[216] Please note that, according to legal scholars, the notion of "manufacturer" set forth under Article 3, para. 1, of the Directive has been fully implemented in Italy through the definitions contemplated under Articles 3, para. 1, letter d), 103, para. 1, letter d) and 115, para. 2 bis, of the Consumer Code.

[217] The same rule applies in case of imported products, when the importer of the product is not identified, even though the identity of the manufacturer is known (Article 116, para. 6 of the Consumer Code, which is in line with Article 3(3) of the Directive). However, the Italian Supreme Court ruled that the importer and the distributor in Italy of a vehicle manufactured by a European manufacturer shall not be liable for damage caused by a defective vehicle due to the fact that under the Italian product liability regime the injured person shall be entitled to bring an action for damage directly against the manufacturer (see *Corte di Cassazione*, III Chamber, 20 May 2009, No. 11710).

[218] Pursuant to Article 3, para. 1, letter a) of the Consumer Code, a consumer is a *"natural person who is acting for purposes other than those pertaining to the entrepreneurial, commercial, handicraft or professional activity carried out by the same*".

[219] See *Corte di Cassazione*, III Chamber, 29 May 2013, No. 13458.

injured person qualifying as a consumer shall be entitled to claim for compensation for damage to items of property[220].

11.5.2.2 Nature of the liability and related regime

Non-contractual liability: as anticipated under section 11.5.2.1, Article 114 of the Consumer Code states that "*the producer shall be liable for damage caused by a defect in his products*". In accordance with Article 1 of the Directive, the Consumer Code provides for non-contractual (*i.e.* tortious) liability of the producer of defective products, considering, *inter alia*, that the abovementioned provision does not require the existence of any contractual relationship between the producer and the injured person.

Strict liability: as may be inferred from a literal reading of Article 114 of the Consumer Code, the product liability regime provided for under Italian law applies regardless of any producer's fault in producing the defective product. As a consequence, the product liability regime set forth under the Consumer Code must be deemed to amount to a strict liability regime, where producer liability may arise out of the mere circumstance that the defective product has been put into circulation by the producer, irrespective of any intentional or negligent behaviour by the latter.

Evidence: the aforesaid nature of the Italian product liability regime is confirmed by Article 120 of the Consumer Code, providing that the injured person shall bear the burden of proving (i) the product defect, (ii) the damage suffered , and (iii) the causal relationship between the defect and the damage suffered (in line with Article 4 of the Directive). Accordingly, the injured person does not have to provide evidence of negligent or intentional behaviour on the part of the producer in order to get compensation for damage[221].

Relevant case law: the above qualification of the Italian product liability regime has been consistently confirmed by Italian case law[222]. With specific regard to car producer's liability, the Italian Supreme Court (*Corte di Cassazione*) established the right of a driver to be compensated for damage suffered from the malfunctioning of an airbag system, specifying that in order to get compensation, the injured person must only prove – through any means of proof allowed under

[220] This principle has been confirmed also by the Italian Supreme Court (*Corte di Cassazione*) (see the decision No. 19414 dated 22 August 2013).

[221] Legal scholars noted that the product liability regime set forth under the Consumer Code may be deemed to be a "*typical case of liability without fault*".

[222] See *Corte di Cassazione*, 29 May 2013, No. 13458; *Corte di Cassazione*, III Chamber, 26 July 2012, No. 13214; *Corte di Cassazione*, 15 March 2007, No. 6007; *Corte di Cassazione*, III Chamber, 14 June 2005, No. 12750; *Tribunale di Monza*, 18 October 2008.

the relevant rules of civil procedure (including presumptive evidence or witnesses) – to have suffered damage which is causally connected with the use of the defective product[223].

Exclusion of liability: it must however be noted that the strict liability regime provided for under the Consumer Code has a relative nature, as no liability applies in the cases listed in Article 118 of the Consumer Code (see also Article 7 of the Directive). More specifically, product liability shall be excluded if the producer can prove that:

a. he did not put the product into circulation[224];

b. the defect which caused the damage did not exist at the time when the product was put into circulation, provided that occurrence of this exonerating circumstance shall be deemed to be proved by the producer when, having regard to the circumstances, it is probable that the defect, which caused the damage, did not exist when the product was put into circulation[225];

c. the product was neither manufactured by him for sale or any other form of distribution for economic purpose, nor manufactured or distributed by him in the course of his business;

d. the defect is due to compliance of the product with mandatory laws and regulations or compulsory provisions of authorities[226];

e. the state of scientific and technical knowledge at the time when the producer put the product into circulation was not such as to enable the existence of the defect to be discovered; or

f. in the case of a producer of a component, the defect is attributable to the design of the product in which the component has been fitted or to the instructions given by the producer of the product.

[223] See *Corte di Cassazione*, III Chamber, 4 January 2010, No. 14; *Corte di Cassazione*, III Chamber, 26 July 2012, No. 13214.

[224] Pursuant to Article 119 of the Consumer Code a product is put into circulation when: (a) it has been delivered to (i) the purchaser, (ii) the user, (iii) any auxiliary staff of the purchaser or the user; or (b) it has been delivered to the carrier or the forwarder for dispatching to the purchaser or the user.

[225] See Art. 120, paragraph 2, of the Consumer Code.

[226] Legal scholars have highlighted that this exonerating circumstance does not apply where applicable laws and regulations provide for minimum technical requirements (as are usually required for technical approval), given that in this circumstance the manufacturer is in any event allowed to make all improvements it deems necessary to provide product safety. Therefore, compliance with such minimum technical requirements is not sufficient to exclude product liability.

Furthermore, as noted by legal scholars[227], product liability shall also be excluded in all cases in which – irrespective of the occurrence of the exonerating circumstances described above – the producer proves that the product was actually not defective and that it provided the safety which a person is entitled to expect, in compliance with Article 117 of the Consumer Code.

Finally, in addition to the exonerating circumstances provided for under Article 118 of the Consumer Code, Article 122, para. 2, of the Consumer Code specifies that product liability may be excluded when the injured person was aware of the defects of the product and of the danger arising out of the defective product.

11.5.2.3 Damage and compensation

Conditions for compensation: if the injured person can prove producer's liability and that no exonerating circumstances pursuant to Article 118 of the Consumer Code exist, the injured person shall be entitled to get compensation for damage suffered from the defective product.

Damage that may be compensated: if the aforesaid conditions are met, the producer must compensate the injured person (or, under certain circumstances, his successors) for any:

a. damage caused by death or personal injuries;

b. damage to, or destruction of, any item of property other than the defective product itself, with a lower threshold of Euro 387.00, provided that the item of property is of a type ordinarily intended for private use or consumption and was used accordingly by the injured person.

Pecuniary and non-pecuniary damage: where the producer is held liable for the defects of its products, it must compensate the injured person for both pecuniary and non-pecuniary damage (*i.e.* any damage which is not strictly related to concrete goods – including so-called moral damage ("*danno morale*"), biological damage ("*danno biologici*"), existential damage ("*danno esistenziale*") which constitute specific classes of non-pecuniary damage according to Italian case law)[228].

Personal injuries and death: with specific respect to personal injuries, the injured person shall be entitled to get compensation for both the non-pecuniary damage classified by the Italian case

[227] E. Graziuso, *La responsabilità per danno da prodotto difettoso* ("*Defective products liability*"), Milano, 2015;G. Buffone, *Responsabilità civile automobilistica, Risarcimento e liquidazione dei danni alle cose e alle persone* ("*Motor civil liability. Compensation for damage to items of property and persons*"), Milano, 2016; F. Busoni, *La responsabilità per danno da prodotti difettosi (artt. 114-127)* ("*Defective products liability (Articles 114-127)*") in G. Vettori, *Il contratto dei consumatori, dei turisti, dei clienti, degli investitori e delle imprese deboli. Oltre il consumatore* ("*The contract entered into by consumers, tourists, customers, investors and weak companies. Beyond the consumer.*"), Padova, 2013.

[228] In particular, compensation for moral damage ("*danno morale*") has been confirmed, among others, by the following case law: *Tribunale di Sulmona*, 23 October 2010, *Tribunale di Milano*, 12 February 2005, *Tribunale di Torino*, 2 December 2005 and *Tribunale di Vercelli*, 5 February 2003.

law as biological damage ("*danno biologico*") and for pecuniary damage, by compensating the costs of medical treatment as well as the loss of or reduction in the working capacity of the injured person. The Court of Milan (*Tribunale di Milano*) confirmed this principle by ruling that the producer may be required to compensate (i) pecuniary damage arising out of the costs of medical treatments and of the loss of profits suffered by the injured person, and (ii) the so called non-pecuniary biological damage arising out of temporary or permanent disabilities[229].

When the defective product has caused the death of the injured person, relevant Italian case law has awarded the successors of the deceased person both non-pecuniary compensation for the loss of their relative as well as the so called death-damage compensation ("*danno tanatologico*"). This is deemed to be a specific class of non-pecuniary compensation and has to be specifically taken into account in determining the overall amount of non-pecuniary compensation awarded to the injured person's successors[230].

It is worth noting that in implementing the Directive, the Consumer Code has not provided for any limit to producer's liability for damage resulting from death or personal injury.

Items of property: on the other hand, with respect to damage to items of property suffered by the injured person, the reader should be aware that pursuant to Article 123 of the Consumer Code, only damage exceeding an amount equal to Euro 387.00 shall be compensated by the producer.

Limitation: the Consumer Code provides a limitation period of three years to start proceedings for the recovery of damages running from:

a. the day on which the injured person become aware, or should reasonably have become aware of the damage suffered, the defect and the identity of the producer; or

b. in case of aggravation of the damages, the day on which the injured person become aware, or should reasonably have become aware of damage significant enough to start judicial proceedings[231].

Statute of limitation: in line with Article 11 of the Directive, the Consumer Code specifies that the rights conferred on the injured person pursuant to the Consumer Code shall be extinguished upon the expiry of a period of ten years running from the date on which the producer or the importer put the product into circulation, unless the injured person has in the meantime instituted proceedings against the producer.

[229] See *Tribunale di Milano*, 31 January 2003.

[230] See *Corte di Cassazione*, Sez. III, 8 April 2010, No. 8360.

[231] Article 125 of the Consumer Code.

11.5.3 Contract

Contractual liability: as anticipated, the product liability regime set forth under the Consumer Code does not affect the rights of the injured person to claim for damages pursuant to the contractual liability regime applying in accordance with the provisions of the Italian Civil Code.

Contractual relationship: in light of the general principle of law according to which a contract is only binding between the parties thereto[232], contractual liability may be claimed exclusively by the injured person who entered into a contract for the purchase of the defective product with a (third party) supplier[233]. Therefore, it can be argued that the producer might be contractually liable towards the injured person only in the event that the former directly entered into a contract of sale with the latter. In all other cases, the contractual liability for defects or lack of quality (*vizi*) of the product lies with the direct supplier of the product (*i.e.* the undertaking which directly sold the product to the final user).

Relevant provisions: the contractual liability regime set forth under Italian law is based on:

a. the general rules set forth under Article 1490 *et seq.* of the Italian Civil Code, which apply to all sales contracts[234]; and

b. the specific rules set forth under Article 128 *et seq.* of the Consumer Code providing for a specific consumer-friendly contractual liability regime applicable only when one of the parties to the sales contract is a consumer.

Product warranty by operation of law under the Consumer Code: Article 128 *et seq.* of the Consumer Code provide for a product warranty regime applying by operation of law (*garanzia legale*) which is aimed at protecting consumers (*i.e.* not professional buyers) when purchasing

[232] See Article 1372 of the Italian Civil Code.

[233] It has however to be pointed out that, in principle, a third party may have enforceable rights *vis-à-vis* the parties to a contract, where such parties so provided. More specifically, Article 1411 *et seq.* of the Italian Civil Code expressly provide that the parties to a contract may specify that the contract confers rights or obligations on a third party, when at least one of the parties to the contract has an appreciable interest in such a provision (and provided that the third party express its consent). As a consequence, a third party may benefit from a contract entered into by other persons exclusively where a specific contractual provision confers rights to such a third party pursuant to Article 1411 of the Italian Civil Code.

[234] Pursuant to Article 1490 of the Italian Civil Code, the seller must warrant to the buyer – for a minimum term of one year – that the sold goods are free from defects that may (a) make the goods unsuitable for their intended use; or (b) considerably decrease the value of the goods. The remedy for breach of the defects warranty is provided in Article 1490 of the Italian Civil Code; the buyer is entitled to ask for (i) termination of the agreement, or (ii) a reduction of the purchase price. Whichever remedy the buyer selects, the seller might also have to pay the buyer for damage (including damage deriving from the defects), unless it proves having acted without fault. The defects warranty does not apply if the buyer was aware of the defects before purchase or the defects were easily identifiable (unless the seller declared that the goods did not have any defects).

defective products – meaning any products which work poorly or do not fulfil the purpose stated by the seller or to which that good is usually intended.

Available remedies: in case of a lack of conformity or defect, the consumer is entitled, at his own discretion, to have the defective goods repaired or replaced by the seller, without charge, unless the remedy requested is impossible or disproportionate to the latter. If such replacement or repair is not possible, the consumer is still entitled to get a price reduction or the reimbursement of an amount proportional to the value of the product, against the restitution to the seller of the defective product.

Enforcement of remedies: consumers may enforce the remedies connected with the product warranty referred to above directly against the seller of the goods, even if different from the producer. The rationale behind this provision is to allow (and facilitate) the consumer to enforce his rights against the person with whom he has the closest relationship.

Limitations: pursuant to Article 132 of the Consumer Code, the product warranty regime lasts up to two years from the date of delivery of the goods and must be enforced by the consumer within two months from discovery of the defect. Any contractual provision limiting the duration of, or excluding, the product warranty can constitute an unfair contractual provision under Article 33, para. 2, letter b) of the Consumer Code and shall be deemed to be null and void unless specifically negotiated with the consumer.

Actions against other distributors: although the product warranty regime is primarily addressed to the "direct" seller of products, it is worth mentioning that pursuant to Article 131 of the Consumer Code, the seller shall be entitled to bring actions against the producer or intermediate distributors in the same distribution chain, where the product warranty is enforced against the seller due to a product defect or a fault of the intermediate distributor.

Voluntary warranties: in addition to the product warranty applying by operation of law (*garazia legale*), it is noteworthy that the producer may, in its own discretion, grant a voluntary producer's warranty (*garanzia convenzionale*) to the (consumer or professional) buyer of the product.

Voluntary warranties vs. warranties applying by operation of law: voluntary producer's warranties offered by the producer (for consideration or without any form of consideration) do not replace or reduce the product warranty applying by operation of law under the Consumer Code. Producers offering voluntary producer's warranties must clearly specify that such warranties are different and additional guarantees with respect to the product warranty applying by operation of law, as set forth under Art. 128 *et seq.* of the Consumer Code.

11.5.4 Tort

Tortious liability: in addition to the foregoing – and as already mentioned in the previous paragraphs – the product liability regime applying under the Consumer Code does not affect the remedies which the injured person may exercise under the rules on non-contractual liability set forth in Article 2043 *et seq.* of the Italian Civil Code.

General rule under Article 2043 of the Italian Civil Code: according to the general criterion for non-contractual liability set out in Article 2043 of the Italian Civil Code – which is the key provision of Italian tort law – "*any wilful or negligent fact causing an unjust damage to third parties gives rise to the obligation of the person committing the fact to compensate the damage*".

Therefore, under Italian law the obligation to compensate damage generally requires causing unjust damage in fact. This fact is characterized as negligence or wilful misconduct of the person who has committed the same. The burden of proving the existence of such elements is borne by the person claiming compensation through the related civil lawsuit.

Differences between the Consumer Code product liability regime and the tort regime: the main difference between the product liability regime governed by the rules of the Consumer Code and the non-contractual liability regime (tort) provided under Article 2043 of the Italian Civil Code is reflected by the requirements for proving liability. Indeed Article 2043 of the Italian Civil Code sets forth a fault-based non-contractual liability regime pursuant to which the injured person shall have to specifically prove the wilful misconduct or negligence of the producer, while no such evidence is required under the Consumer Code. Additional differences between the two regimes arise from the fact that under Article 2043 of the Italian Civil Code: (i) there is no limitation to the amount of compensation for damage to items of property; (ii) the injured person may in any case be either a consumer or professional customer; and (iii) claims are subject to a statute of limitation equal to five years from the date on which the damage has occurred.

Special provision applying to the circulation of vehicles under Article 2054 of the Italian Civil Code: in consideration of the special hazardous nature of road traffic and risks associated therewith, an *ad hoc* provision concerning the civil liability of drivers arising from the circulation

of vehicles is set out under Article 2054 of the Italian Civil Code[235]. This provision aims at enhancing the protection afforded to injured persons in the context of car accidents by providing for the application to the driver of a liability regime which is more burdensome than the one generally applying under Article 2043 of the Italian Civil Code.

Severe liability under Article 2054, para. 1, of the Italian Civil Code: pursuant to Article 2054, para. 1, "the driver of a vehicle – other than a vehicle moving on railways – shall compensate the damage caused to persons or goods as a consequence of the vehicle circulation, unless he provides evidence that he has done everything possible to avoid the damage". Even though, in the case of road traffic, the liability obligation related to the damage caused by the driver is still connected with the "subjective" element of negligence (or wilful misconduct) of the driver, such negligence (or wilful misconduct) is presumed. According to a long-established interpretation of Article 2054 of the Italian Civil Code, this rule provides for a regime of so-called "severe liability" ("responsabilità aggravata") due to the presumption of negligence by the driver.

Burden of proof: based on the foregoing, the distinction between the rules applying to the compensation of damage caused by road traffic, and the general principles relating to damage arising from tortious actions, lies in the rules governing the burden of proof as regards the "subjective" element of negligence (or wilful misconduct) – rather than in the absence or presence of this element. Indeed in case of a road traffic accident, negligence is presumed and the driver must provide evidence to rebut the presumption in order to be exempted from liability.

Contributions to damage by multiple drivers: the second paragraph of Article 2054 of the Italian Civil Code reads as follows: "in the event of a collision between vehicles, it is presumed, until proven otherwise, that each driver equally contributed to cause the damage occurred to the vehicles". This provision is intended to specify the criteria for allocating liability among multiple drivers involved in road traffic accidents. Unless evidence of different contributions is given, each driver is presumed to have caused with equal negligence and equal causal effect the

[235] Art. 2054 of the Italian Civil Code provides that: "*1. The driver of a vehicle – other than a vehicle moving on railways – shall compensate the damage caused to persons or goods as a consequence of the vehicle circulation, unless he provides evidence that he has done everything possible to avoid the damage. 2. In the event of a collision between vehicles, it is presumed, until proven otherwise, that each driver equally contributed to cause the damage occurred to the vehicles. 3. The owner of the vehicle, or, in lieu of the same, the person having a usufruct title on the vehicle or the person who bought it subject to retention of property by the seller, shall be jointly liable with the driver, unless he can prove that the circulation of the vehicle occurred against his will. 4. In any case the persons mentioned in the preceding paragraphs shall be liable for any damages caused by construction or maintenance defects of the vehicle*". For a detailed analysis of the driver civil liability under Italian law, see the memorandum "Overview of legal framework concerning road traffic with regard to higher degrees of vehicle automation: English and Italian law".

damage resulting from the accident. In a few words, paragraph 2 provides for a presumption – until proven otherwise – of equal contributions (in negligence) to damage by multiple drivers.

This presumption (which is rebuttable, *i.e.* it can be overturned if evidence of the contrary is given by the relevant party) applies only in cases where it is not possible to ascertain – based on assessment of the evidence collected during civil proceeding – to what extent the conduct of the two drivers has caused the harmful event. Accordingly, this presumption appears to have a subsidiary function.

Joint liability: according to the third paragraph of Article 2054, the owner of the vehicle, the person having a usufruct title on the vehicle or the person who bought it subject to retention of property by the seller, shall be jointly and severally liable with the driver, unless they prove that the circulation of the vehicle occurred against their will. The rationale of this provision is to incentivize monitoring the use of the vehicle by those having legal title to dispose of the same under applicable law.

Liability for construction or maintenance defects: finally, the fourth paragraph of Article 2054 provides that "*in any case the persons mentioned in the preceding paragraphs* [i.e. the driver, the owner, the person having a usufruct title on the vehicle or the person who bought it subject to retention of property by the seller] *shall be liable for any damages caused by construction or maintenance defects of the vehicle*". Therefore, this provision stipulates that the aforesaid persons must compensate any damage caused by any (original or subsequent) defects of the vehicle. An exemption from liability is possible only if evidence is given that the damage derived from a cause other than a construction or maintenance defect of the vehicle.

Liability under Article 2054 of the Italian Civil Code and other forms of civil liability: although under Article 2054, para. 4 of the Italian Civil Code, liability towards the injured person lies with the driver (as well as with the registered owner, any person having a usufruct title on the vehicle, or the person who bought it subject to retention of property by the seller), for the purposes of this memorandum, it is important to note that this driver liability might concur with producer liability provided for under the Consumer Code (or, depending on the remedy chosen by the injured person, with the non-contractual liability regime set forth under Article 2043 of the Italian Civil Code).

11.5.5 Certain kinds of criminal and administrative liability

Additional provisions of the Consumer Code: in order to fully implement the Directive (as well as Directive 2001/95/EEC on general product safety) and to strengthen consumer protection, the Consumer Code – in addition to the product liability regime described above – introduced into the Italian legal framework (i) certain safety obligations, warranties and controls aimed at preventing risks and damage deriving from consumer products put into circulation, and (ii) a

number of criminal and administrative sanctions applying to producers in case of breaches of those obligations[236].

Criminal sanctions for breach of the prohibition on putting a defective product into circulation: with respect to criminal sanctions, Article 112 of the Consumer Code provides that unless the act constitutes a more serious criminal offence and without prejudice to the product liability regime described above, the producer or the distributor who put into circulation a defective product in breach of the administrative prohibition to do so issued pursuant to Article 107, para. 2, letter e), of the Consumer Code[237] shall be liable to criminal punishment in the form of imprisonment for a term between six months and one year and a fine ranging between Euro 10,000 and Euro 50,000.

Criminal sanctions for breach of administrative prescriptions: Article 112, para. 3 of the Consumer Code provides that the producer and the distributor who violate certain public administrative prescriptions specifically issued in order to fully inform the consumer of the dangers connected with a product or to prevent the producer from putting a product into circulation before all safety controls have been completed or all safety conditions are met[238], shall be liable to criminal punishment in the form of a fine ranging between Euro 10,000 and Euro 25,000.

Qualified criminal offences: it is noteworthy that the criminal offences briefly described above are defined by Italian legal scholars as "qualified criminal offences" (*reati propri*) as they can be

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[236] Please note that this section of the memorandum is intended to provide a general overview of certain administrative and criminal liabilities connected with the matter at hand. For a comprehensive overview of any possible administrative and criminal offence provisions it would be advisable to instruct lawyers specialized in this field. In addition, for the purposes of the other paragraphs of this memorandum (and in particular of the analysis of the different liability scenarios) we have not considered any specific issues connected with administrative or criminal offences applying under Italian law, save for certain general considerations which must not be relied upon in any manner for the assessment of liability that may be attributed under Italian law to producers, resellers, owners and/or drivers of vehicles.

[237] According to this provision, public authorities, that are entrusted with the responsibility for controlling product safety, may prohibit any dangerous product from being put into circulation. They may adopt all measures required to implement such a prohibition.

[238] Administrative measures triggering criminal liability under Article 112, paragraph 3, of the Consumer Code are the following:

(a) Art. 107, paragraph 2, letter b), numbers 1) and 2): "*b) for any product that could entail risks in certain conditions: 1) require that a product be labeled with appropriate warnings on the risks it may entail, written in Italian language and in a clear and easy way to understand; 2) subject to prior conditions the placing on the market, in order to make the product safe*";

(b) Art. 107, paragraph 2, letter c): "*c) for any product that could entail risks for certain persons: 1) provide that such persons are informed promptly and in an appropriate form of such risks, also including the publication of specific warnings*".

(c) Art. 107, paragraph 2, letter d), numbers 1) and 2): "*d) for any product that can be dangerous: 1) prohibit, for the time required to perform the checks, audits or investigations on the safety of the product, to provide it, to propose the provision of or display it; 2) order, within a mandatory deadline, the adaptation of the product or batch of products already sold with safety requirements provided for under this title, if there is not an imminent risk to public health and safety*".

committed exclusively by producers and/or distributors who put dangerous products into circulation. Furthermore, another common characteristic of those criminal offences is that both provisions punish producers and distributors who put dangerous products into circulation in clear breach of prohibitions issued by relevant public authorities: it is the breach of the administrative measure which triggers the criminal liability of producers and distributors.

Criminal sanctions for the circulation of dangerous products: paragraph 2 of Article 112 of the Consumer Code provides that the criminal sanctions set forth under paragraph 1 of the same Article (*i.e.* imprisonment for a term between six months and one year and a fine ranging between Euro 10,000 and Euro 50,000) shall be imposed also on producers who, in the absence of any administrative measure issued by the relevant public authorities, put dangerous products into circulation[239]. As stated by the Italian Supreme Court (*Corte di Cassazione*), in order to charge a producer with acriminal offence provided for under Article 112, para. 2, of the Consumer Code, the public prosecutor shall have to prove that the product is actually and credibly dangerous[240]: a concrete and non-abstract assessment of the dangerousness of the product shall be carried out by the public prosecutor (also taking into account the type of consumer to whom the product is addressed).

Administrative sanctions under the Consumer Code: as mentioned above, in addition to civil and criminal liability of producers, the Consumer Code also provides for certain administrative sanctions aimed at preventing dangerous products from being put into circulation. More specifically, Article 112, paras. 4 and 5, of the Consumer Code provide that:

a. producer who are not proactive and cooperative in carrying out product safety verification and ongoing monitoring after the product has been put into circulation[241] shall be subject to an administrative fine ranging between Euro 2,500 and Euro 40,000 (para. 4); and

b. producers who violate the obligations set forth under Article 104, para. 2 to 9, of the Consumer Code (e.g. providing for (i) certain information obligations to the benefit of the consumer with respect to the assessment and prevention of risks usually and reasonably associated with the use of the product, (ii) the obligation to adopt appropriate measures to allow the consumer to be fully informed of the risks associated with the use of the product, (iii) the obligation to carry out all actions to prevent risks associated with the use of its products, including their withdrawal from the market and recall as well as providing consumers with appropriate and effective information) shall

[239] Article 112, paragraph 2, of the Consumer Code.

[240] See *Corte di Cassazione*, 8 November 2007, No. 46656.

[241] Article 107, paragraph 2, letter a), of the Consumer Code.

be subject to an administrative fine ranging between Euro 1,500 and Euro 30,000 (para. 5).

Additional criminal liability: finally, it is noteworthy that in addition to the criminal and administrative sanctions directly connected with obligations set forth under the Consumer Code described above, the infringement of any laws or regulations relating to product safety and defective products may trigger the criminal liability of producers under other provisions of the Italian Criminal Code. In this respect, according to the relevant case law, typical criminal offences committed by producers as a consequence of the infringement of legislation relating to product safety and defective products are the following: (i) manslaughter and negligent personal injury (Articles 589 and 590 of the Italian Criminal Code); (ii) fraud (Article 640 of the Italian Criminal Code); (iii) fraud in trade (Article 515 of the Italian Criminal Code); (iv) fraud in public supply (Article 356 of the Italian Criminal Code); (v) tangible fraud committed by a private person (Article 482 of the Italian Criminal Code); and (vi) failure to conform to public authority measures (Article 650 of the Italian Criminal Code).

11.5.6 Other national laws on product liability

Other potential regulations affected by the introduction of automated vehicles – in addition to the Consumer Code and the Italian Civil Code – are the following:

a. the Road Traffic Code and the related implementing regulations (*Regolamento di esecuzione e di attuazione del nuovo codice della strada*)242;

b. Legislative Decree no. 209/2005 (*Codice delle Assicurazioni Private*, hereinafter also referred to as the "Code of Private Insurance"); and

c. the Italian Criminal Code (*Codice penale italiano*).

The infringement of provisions of the Road Traffic Code and related implementing regulations may in principle acquire relevance in order to assess the liability of the driver and/or the producer in those cases where the plaintiff is required to provide evidence of the putative tortfeasor's negligence under the relevant liability regime. This is due to the fact that according to the general principles of Italian law – and, in particular, of the Italian Criminal Code – the violation of precautionary rules (*i.e.* those rules which are aimed at protecting the interests of third parties, such as typically those included in the aforesaid regulations) amounts to a form of *specific* negligence (*colpa specifica*). In these circumstances, it would be difficult for the

[242] Presidential Decree No. 495/1992.

defendant to prove that there was no negligence on his side, notwithstanding the aforesaid violations.

As to the relevance of the Code of Private Insurance, see Section 11.5.9 below.

11.5.7 Legal evaluation of the scenarios

11.5.7.1 Assumptions

Assumptions included in the engagement letter: the analysis of the five scenarios concerning liability shall be subject to the overall assumptions for all scenarios provided for by Annex 2 of the engagement letter – namely the following:

- Automated systems are developed and produced pursuant to the "state of the art" and that any potential remaining risks of the systems are outweighed by their benefits;
- Driver followed all operator's manual and in vehicle instructions and warnings (unless otherwise stated); and
- Automated vehicle met all types of approval requirements.

Additional assumptions: in addition to the foregoing, our analysis related to the liability scenarios is based on the following assumptions:

- Use of full and high automation systems is permitted under the applicable Italian law;
- The driver of a vehicle is the owner and at the same time the purchaser of the vehicle, who paid for it fully (i.e. no loan, leasing or similar arrangements). He uses the vehicle only for private purposes;
- There are no exonerating circumstances that may potentially exclude the liability of the producer[243];
- The purchaser of the vehicle qualifies as a consumer in accordance with the provisions of the Consumer Code; and
- Any accident occurs within the period of a voluntary producer's warranty (*garanzia convenzionale*) and such a warranty is triggered, inter alia, in cases of any defect or malfunctioning of the vehicle.

[243] As a matter of fact, the assumption set forth under the Engagement Letter pursuant to which "*automated systems are developed and produced pursuant to the "state of the art""*, could be construed as a specific exonerating circumstance under Article 118 of the Consumer Code and, if certain conditions are met, could lead to a full exoneration of the producer from its liability under the product liability regime set forth by the Consumer Code.

11.5.7.2 Scenario 1

11.5.7.2.1 The liability of the manufacturer

11.5.7.2.1.1 Product liability law

11.5.7.2.1.1.1. Liability towards the driver / owner of the blue vehicle:

The producer may be liable under the provisions on product liability set forth in the Consumer Code towards the driver / owner of the blue vehicle, because the accident was caused by a defect of the vehicle itself. It does not matter which type of product defect exists (construction fault, or a faulty instruction or why there was no request to the driver to take over). The essential information is that a defective product caused damage. The producer may be requested to pay compensation to the driver (and/or the owner) of the blue vehicle for damage to items of property and (if the relevant conditions are met) for bodily injury or death. As described above, with respect to damage to items of property, no compensation must be paid if the value of the damage is lower than Euro 387. There is no upper limit concerning the amount of compensation.

11.5.7.2.1.1.2. Liability towards the driver / owner of the white vehicle:

The producer may be liable under the aforesaid provisions of the Consumer Code in cases of bodily injury or death of the driver due to the relevant defect. If damage to items of properties (other than the defective vehicle) occurs as a consequence of the accident, there could also be liability for damage to items of property of the driver.

11.5.7.2.1.2 Tort law

11.5.7.2.1.2.1. Liability towards the driver / owner of the blue vehicle:

The producer could also be deemed liable under the general provision set forth in Article 2043 of the Italian Civil Code. However, in contrast to the strict liability regime applying under the Consumer Code, the claimant / plaintiff would have to prove that the producer was negligent (*e.g.* with respect to updates of the IT system of the white vehicle or production of the vehicle). The producer may therefore have to pay compensation to the driver of the vehicle for damage to property and (if the relevant conditions are met) for bodily injury or death. Also pursuant to Italian tort law, there would be no upper limit concerning the amount of compensation.

11.5.7.2.1.2.2. Liability towards the driver / owner of the white vehicle:

The producer would be liable under the same provision mentioned above *vis-à-vis* the driver / owner of the white vehicle. Furthermore, in this case, the claimant / plaintiff would bear the burden of proving the negligence of the producer.

11.5.7.2.1.3 Guarantee/ warranty

11.5.7.2.1.3.1. Warranty under the Consumer Code

With respect to the warranty applying by operation of law, in accordance with the relevant provisions of the Consumer Code, the producer would not be directly liable towards the driver / owner of the white vehicle (unless it directly sold that vehicle to the consumer), as any action under these provisions may only be brought by the consumer against the direct reseller of the vehicle. However, the reseller may in turn bring action against the producer where the former is sued by the consumer due to defects in the vehicle. No action can be brought by the driver / owner of the blue vehicle under the warranty applying in accordance with the Consumer Code.

11.5.7.2.1.3.2. Voluntary warranty

A system failure may potentially trigger the enforcement by the consumer of any voluntary warranties (*garanzia convenzionale*) given by the producer. The remedies available to the consumer would depend on the contents of the respective warranties. In particular, if a warranty specifies that in such cases the producer would only have to repair or replace the faulty part – there would be no possibility for the consumer to raise any other claims (*e.g.* claim for consequential damage, price reduction, withdrawal etc.) against the seller – no liability for damage should apply (although we cannot exclude that compensation for damage would be awarded by the competent court, also on the basis of other provisions of the law, as referred to above).

11.5.7.2.1.4 Other laws

The accident described in scenario 1 may trigger the application of sanctions provided for under the Consumer Code (in particular, having regard to Article 112 thereof) if the relevant conditions are met (*i.e.*, in particular, if the white vehicle is deemed to constitute a "dangerous" product). Moreover, we may not exclude the possibility that other criminal law provisions (including those set forth in the Criminal Code) would also come into consideration.

11.5.7.2.2 The liability of the user of the automated vehicle

11.5.7.2.2.1 Tort law

11.5.7.2.2.1.1. Liability under Article 2054, para. 1, of the Italian Civil Code

Under the current Italian legal framework, the driver of the white vehicle may be deemed to be liable pursuant to Article 2054, para. 1 of the Italian Civil Code, unless he can prove "*that he has done everything possible to avoid the damage*". In this respect, we note that: (i) if no "request to take over" was signalled by the vehicle to the driver before the accident, there may be room for the driver to be exempted from liability under this provision; (ii) in contrast, if the vehicle signalled a "request to take over", it would be more difficult for the driver to provide

any such evidence that he did everything possible (as it may be argued that he was under a duty to take control of the vehicle in order to prevent damage to third parties).

11.5.7.2.2.1.2. Liability under Article 2054, para. 4, of the Italian Civil Code

Assuming that the accident was due to production or maintenance defects, the driver would be liable under Article 2054, para. 4 of the Italian Civil Code. As highlighted above, in this case it would be particularly hard for the driver to avoid liability (save for the considerations outlined under Section 11.5.9 below as to the enforcement of the mandatory insurance coverage required under Italian law).

11.5.7.2.2.2 Traffic law

The liability of users under the relevant traffic laws will depend on provisions that will be introduced in this respect in order to regulate the use of automated motor vehicles. Currently, Italian law expressly requires the driver to take control of the vehicle and this appears to be inconsistent with the "level 3" automation used by the white vehicle in the scenario at hand.

11.5.7.2.2.3 Other laws

Considering that Italian criminal law generally requires negligent or intentional conduct as a condition for criminal liability, it is likely that no criminal liability should apply to the driver of the white vehicle, assuming that the driver did not act negligently (*e.g.* also with respect to the maintenance of the vehicle). In this respect, the failure by the driver to take control of the vehicle after a "request to take over" may in principle amount to negligent behaviour under the applicable provisions of the Italian Criminal Code.

11.5.7.3 Scenario 2

11.5.7.3.1 Introduction:

At the outset, it is worth mentioning that in a case similar to the one described in this scenario (albeit absent the automated driving system), the Italian Supreme Court (*Corte di Cassazione*)[244] stated that even when one vehicle is overtaking another, the same rules of the Road Traffic Code, regulating safety distance and collision in the right lane, shall apply. According to these rules, liability for the accident is normally borne by the rear vehicle (*i.e.*, in the scenario at hand, the red vehicle). In particular, in order to avoid liability, the rear vehicle must prove that the accident was caused by the negligent driving of the vehicle ahead of it, that it acted unpredictably and caused the accident, in violation of the Road Traffic Code.

In relation to the foregoing, we note that the relevant provisions of the Road Traffic Code are based on the assumption that the white vehicle is driven under the control of the respective driver (hence reference to the negligent driving conduct of the front vehicle). It is unclear how

[244] See *Corte di Cassazione*, 15 December 2015, No. 25227.

this provision would apply in the scenario at hand, although it may be expected that the rear vehicle may also be given the opportunity to prove that the accident was due to an error or malfunctioning of the white vehicle (*i.e.* regardless of the negligence / control of the respective driver).

In any event, for the purposes of the analysis conducted below, we would assume that the driver of the red vehicle is actually in a position to provide the aforesaid evidence in full (*i.e.* without any form of contribution (i.e. negligence) to causing the accident) and accordingly to "shift" the entire burden of liability onto the white vehicle.

11.5.7.3.2 The liability of the manufacturer

11.5.7.3.2.1 Product liability law

11.5.7.3.2.1.1. Liability towards the driver / owner of the red vehicle:

The producer may be liable under the provisions on product liability set forth in the Consumer Code because the accident was caused by a defect of the white vehicle. It does not matter which type of product defect exists (construction fault, or faulty instructions or whether the overtaking vehicle was not detected due to technical limits of the rear sensors). The essential information is that a defective product caused the damage. In this respect, it may be noted that the aforesaid technical limits of the rear sensors may be deemed to make them unfit to ensure compliance with the rules set forth in Article 148 of the Road Traffic Code, and accordingly, that such rear sensors are "defective" for the purposes of the relevant provisions of the Consumer Code.

The producer may be requested to pay compensation to the driver (and/or the owner) of the red vehicle for damage to items of property and (if the relevant conditions are met) for bodily injury or death. As described above, with respect to damage to items of property, no compensation need be paid if the value of the damage is less than Euro 387. There is no upper limit concerning the amount of compensation.

11.5.7.3.2.1.2. Liability towards the driver / owner of the white vehicle

The producer may be liable under the aforesaid provisions of the Consumer Code in the case of bodily injury or death of the driver due to the relevant defect. If damage to items of properties (other than the defective vehicle) occurs as a consequence of the accident, there could also be liability for damage to items of property of the driver.

11.5.7.3.2.1.3. The relevance of assumptions A and B

Given that no relevance is given under the provisions of the Consumer Code to negligence (or absence thereof) of the producer, the product liability regime would in any event apply in

accordance with the above discussion, regardless of whether an average driver would have carried out the same manoeuvre as was made by the white vehicle.

11.5.7.3.2.2 Tort law

11.5.7.3.2.2.1. Liability towards the driver / owner of the red vehicle

The producer could also be held liable under the general provision set forth in Article 2043 of the Italian Civil Code. However, in contrast to the strict liability regime applying under the Consumer Code, the claimant / plaintiff would have to prove that the producer was negligent. In this respect, given that the accident was caused by the failure of the rear sensors to ensure compliance with the provisions set forth in Article 148 of the Road Traffic Code, it is possible that a court may hold the producer to have negligently designed the product put into circulation.

The producer may therefore have to pay compensation to the driver of the vehicle for damage to property and (if the relevant conditions are met) for bodily injury or death. Furthermore, pursuant to Italian tort law, there would be no upper limit on the amount of compensation.

11.5.7.3.2.2.2. Liability towards the driver / owner of the white vehicle

For the same reasons outlined above, the producer may also be liable under Article 2043 of the Italian Civil Code *vis-à-vis* the driver / owner of the white vehicle. Furthermore, in this case, the claimant / plaintiff would bear the burden of proving the producer's negligence.

11.5.7.3.2.2.3. Relevance of assumptions A and B:

The above conclusions should not be affected by assumptions A and B indicated in the description of the scenario at hand. As highlighted above, the violation of a specific provision of law aimed at protecting the interests of third parties (such as the one set forth in Article 148 of the Road Traffic Code) amounts *per se* to a form of *specific* negligence (*colpa specifica*). In these circumstances, it would be particularly difficult for a normal driver (in our view as well as for the producer of the automated vehicle) to avoid liability on the basis of the "average behaviour" of other drivers.

11.5.7.3.2.3 Guarantee / warranty

The same considerations outlined under section 11.4.5.3.1.4 above should apply *mutatis mutandis*.

11.5.7.3.2.4 Other laws

11.5.7.3.2.4.1. Criminal law:

The same considerations set out under section 11.4.5.3.1.4 above should apply *mutatis mutandis*.

11.5.7.3.2.4.2. Traffic law:

With respect to traffic law, under the current rules the driver of the white vehicle would be liable for the breach of Article 148 of the Road Traffic Code. It is unclear whether, in a scenario where no control may be exercised by the driver on the vehicle, the driver himself or rather the producer may be held to be liable for any such breach. In this respect, it may not be excluded that the relevant administrative liability will be "shifted" onto the producer of the vehicle – considering also the possible avoidance of liability by the driver due to the reasons outlined under section 11.4.6 above.

11.5.7.3.3 The liability of the user of the automated vehicle

11.5.7.3.3.1 Tort law

11.5.7.3.3.1.1. Liability under Article 2054, para. 1, of the Italian Civil Code

In this scenario it would be possible for the driver of the white vehicle to demonstrate that he has done "*everything possible*" to avoid the damage, owing to the fact that under a level 4 system the user is not supposed to monitor and control the vehicle and road traffic conditions.

11.5.7.3.3.1.2. Liability under Article 2054, para. 4, of the Italian Civil Code

By contrast, the defect of the rear sensors may amount to a production defect triggering the driver's liability under Article 2054, para. 4 of the Italian Civil Code. As highlighted above, in this case it would be particularly hard for the driver to avoid liability (save for the considerations outlined under Section IV below as to the enforcement of the mandatory insurance coverage required under Italian law).

11.5.7.3.3.2 Traffic law

In this scenario there should be no user's liability under the Road Traffic Code because the accident was not caused by the negligent behaviour of the user, for the same reasons as outlined under section 9.7.7 above.

11.5.7.3.3.3 Other laws

For the same reasons referred to under section 11.4.5.4.2.2 above, no criminal liability should be imputed to the driver of the white vehicle.

11.5.7.4 Scenario 3

11.5.7.4.1 The liability of the manufacturer

11.5.7.4.1.1 Product liability law

11.5.7.4.1.1.1. Variation 1 ("too late"):

In this variation, the request by the automated system for the driver to take over control is given too late to avoid an accident. The producer may therefore be liable for providing a defective product, as the failure to give the driver a timely and prompt request to take control is arguably a design / production defect of the white vehicle. In this respect, it may be argued that the public in general has a right to expect that an automated vehicle is capable of responding safely to unexceptional, real life, road situations such as incomplete lane markings.

The producer may have to pay compensation to the driver of the white vehicle for damage to items of property, other than the defective vehicle itself, and for bodily injury or death (as applicable). As explained above, with respect to damage to items of property, no compensation must be paid if the value of the damage is lower than Euro 387. There is no upper limit on the amount of compensation.

11.5.7.4.1.1.2. Variation 2 ("request in time")

In this case, the request for the driver to take over was made in time for the driver to react and prevent the accident. However, the driver's reaction was too late and the accident still occurred. Accordingly, it may be possible for the producer to argue that it is not liable under the provisions of the Consumer Code, as the level 3 automated system reacted properly to the unusual road traffic conditions and made a request to the driver to take over the system in a timely manner. Of course we may not exclude the possibility that the product may nevertheless be deemed to be defective, also in this situation (*i.e.* because the driver should have been alerted well in advance).

11.5.7.4.1.2 Tort law

11.5.7.4.1.2.1. Variation 1 ("too late")

If the request to take over control was given too late by the level 3 system, it may be possible for the owner / driver of the white vehicle to argue that the producer was negligent with respect to the manufacture of the system. This may trigger liability of the producer under the general liability provision set forth in Article 2043 of the Italian Civil Code.

11.5.7.4.1.2.2. Variation 2 ("request in time")

In contrast, if the request was made in time, it would be more difficult for the owner / driver of the white vehicle to prove negligent behaviour on the part of the producer. Similarly to what

was discussed in section 9.7.7 above, we may not exclude that a court would in any event award damages in favour of the plaintiff based on the argument that the safety standards of the white vehicle should have ensured that the car would avoid the accident.

11.5.7.4.1.3 Guarantee/warranty

11.5.7.4.1.3.1. Variation 1 ("too late")

The same considerations outlined under section 11.4.5.4.1.3 above should apply *mutatis mutandis*.

11.5.7.4.1.3.2. Variation 2 ("request in time")

In this situation the producer may argue that there was no defect in the product – as the request to the driver to take control was made in time– and that accordingly the warranties given to the user may not be enforced.

11.5.7.4.1.4 Other laws

11.5.7.4.1.4.1. Variation 1 ("too late")

The same considerations outlined under section 11.4.5.4.1.3 should apply *mutatis mutandis*.

11.5.7.4.1.4.2. Variation 2 ("request in time")

In this situation the producer may argue that there was no negligence on his part given that the product was not defective. This should in principle reduce any risk of possible criminal liability of the producer. However, we may not exclude that a different view would be taken by the competent courts (*e.g.* with respect to the dangerous nature of the product put into circulation, notwithstanding the fact that the request to take control was made in time).

11.5.7.4.2 The liability of the user of the automated vehicle

11.5.7.4.2.1 Tort law

11.5.7.4.2.1.1. Contributory negligence:

As general remark, we note that in this case the owner / driver of the white vehicle may not be held liable towards third parties (contrary to the cases considered in scenarios no. 1, 2 and 4). Accordingly, in our view any issue relating to the behaviour of the owner / driver of the white vehicle may only acquire relevance in terms of contributory negligence (and assuming the liability of the producer).

11.5.7.4.2.1.2. Variation 1 ("too late")

Given that the request to take over driving was not made in a timely and prompt manner by the system, the risk that the driver may be deemed to have negligently contributed to the accident appears to be reduced.

11.5.7.4.2.1.3. Variation 2 ("request in time")

In contrast, if the request was made in time, it could be possible that the producer's liability would be reduced due to contributory negligence of the driver.

11.5.7.4.2.2 Traffic law

Based on the scenario description, the driver might be liable under the Road Traffic Code for not having duly controlled the driving task, at least in variation 2 – and assuming that (i) the accident amounts to a violation of any of the applicable provisions of the Road Traffic Code, and (ii) the failure of the driver to take control of the vehicle may be deemed to amount to a form of negligence.

11.5.7.4.2.3 Other laws

Given that no harm would be caused to any third parties, there should in principle be no relevant criminal liability for the driver under the provisions of the Italian Criminal Code that usually come into consideration with respect to car accidents (as mentioned briefly above).

11.5.7.5 Scenario 4

11.5.7.5.1 The liability of the manufacturer

11.5.7.5.1.1 Product liability law

11.5.7.5.1.1.1. Scenario A

The producer may be liable under the Consumer Code to the extent that the lack of a device aimed at avoiding the activation of the system in inappropriate situations is required under the applicable laws and regulations or in any event would be deemed to amount to a "defect" in the vehicle. In contrast, if these conditions are not met, it may be argued that it was the responsibility of the driver not to use the system in such (inappropriate) circumstances.

11.5.7.5.1.1.2. Scenario B

In this second case it would be more difficult for the producer to avoid liability provided under the Consumer Code, given that, although the vehicle was equipped with a device aimed at preventing activation of the system in inappropriate situations, the system had a functional deficiency.

11.5.7.5.1.1.3. Scenario C

The same considerations outlined under section 11.4.7.2.5 would apply *mutatis mutandis*. Indeed the circumstance that the system wrongfully indicated to the driver that it was possible to activate the automated driving system should strengthen the argument that the product itself was defective.

11.5.7.5.1.1.4. Liability towards the driver / owner of the red vehicle

Assuming that the producer is held to be liable in accordance with the discussion above with respect to the three scenarios under consideration, the producer may be required to pay compensation to the driver (and/or the owner) of the red vehicle for damage to items of property and (if the relevant conditions are met) for bodily injury or death. As described above, with respect to damage to items of property, no compensation need be paid if the value of the property damage is lower than Euro 387. There is no upper limit on the amount of compensation.

11.5.7.5.1.1.5. Liability towards the driver / owner of the white vehicle

In addition, the producer may be liable under the aforesaid provisions of the Consumer Code in the case of bodily injury or death of the driver due to the relevant defect. If damage to items of property (other than the defective vehicle) occurs as a consequence of the accident, there could also be a liability for damage to items of property of the driver.

Level 3: the description in the scenario at hand does not clarify whether a "request to take over" was made by the system to the driver – although it specifies that the white vehicle is equipped with a level 3 system. In this respect, it is worth mentioning that if any such request was made by the system, the analysis conducted above as to the liability of the producer (as well as the considerations below relating to the liability of the driver) may be affected – in particular, if the "request to take over" was made in a timely manner. However, for the purposes of our analysis, we have assumed that no such request was made by the system (given that no specific information was provided in this respect).

11.5.7.5.1.1.6. Contributory negligence of the driver / owner of the white vehicle

It must also be noted that, in the scenario at hand, the system was activated by the driver / owner of the white vehicle, even though he knew that this was inappropriate on a two way road. This scenario may entail contributory negligence for the driver / owner of the white vehicle and accordingly limit the liability imposed on the producer.

11.5.7.5.1.2 Tort law

11.5.7.5.1.2.1. Liability of the producer towards the drivers / owners of the red and white vehicles

If any of the circumstances referred to in section 11.4.7.2.4, 11.4.7.2.5 and 11.4.7.3 11.4.2.1 (first paragraph) is deemed to amount to negligent behaviour on the part of the producer, the drivers / owners of the red and white vehicles should be entitled to claim compensation of any damage suffered by them, in accordance with the discussion given above.

11.5.7.5.1.2.2. Other aspects

As to the possible relevance of the "level 3" nature of the system, as well as to the behaviour of the owner / driver of the white vehicle in the circumstances under consideration, see the first two paragraphs of section 11.4.7.4.2.

11.5.7.5.1.3 Guarantee/warranty

The same considerations outlined in section 11.4.5.4.1.3 above should in principle apply *mutatis mutandis*. Possible contributory negligence of the driver of the white vehicle may limit (or exclude) the liability of the producer under warranties he provided.

11.5.7.5.1.4 Other laws

The same considerations outlined under section 11.4.5.4.1.3 should apply *mutatis mutandis*.

11.5.7.5.2 The liability of the user of the automated vehicle

11.5.7.5.2.1 Tort law

11.5.7.5.2.1.1. Liability under Article 2054, para. 1, of the Italian Civil Code

In this scenario it would be difficult for the driver of the white vehicle to demonstrate that he has done "*everything possible*" to avoid the damage. As highlighted above, the driver of the white vehicle has activated the system although he was aware that this was inappropriate for the purposes of driving on a two way road.

11.5.7.5.2.1.2. Liability under Article 2054, para. 4, of the Italian Civil Code

In addition, assuming that the failure of the vehicle to prevent the activation of the automatic driving system amounts to a construction defect of the product, the driver of the white vehicle may also be held liable under Article 2054, para. 4 of the Italian Civil Code. As highlighted above, in this case it would be particularly hard for the driver to avoid liability (save for the considerations outlined under Section IV below as to the enforcement of the mandatory insurance coverage required under Italian law).

11.5.7.5.2.2 Traffic law

The driver might in principle be held liable under the relevant provisions of the Road Traffic Code (assuming that these are held to have been breached due to the overtaking made by the white vehicle) as any such violation would have been due also to the negligent behaviour of the user.

11.5.7.5.2.3 Other laws (e.g. criminal laws)

Similarly to the discussion in section 11.4.5.6.2.2 above, the driver may be held criminally liable – assuming that all other conditions are met – because he voluntarily misused the system (*i.e.* he knew that the use of this system was inappropriate on a two way road).

11.5.7.6 Scenario 5

11.5.7.6.1 Introduction

Under current Italian law the driver would be subject to an administrative fine for having breached the speed limits set forth under Article 142 of the Road Traffic Code. Nonetheless, the driver would be entitled to challenge the fine before the relevant courts alleging and proving, pursuant to Article 3 of Law No. 689 of 24 November 1981, that the violation of the Road Traffic Code was committed without negligence or due to a "*mere mistake on the factual circumstances*", provided that such "*mistake was not caused by a negligent behaviour*".

A similar argument may be used where the driver was actually not in a position to ascertain the applicable speed limit, owing the fact that the relevant traffic sign was hidden from view by a truck. As explained below, in our view the situation should not be significantly different in a scenario where the white vehicle was driven by an automatic driving system – although it may be possible that different rules will be introduced in the future with respect to these specific cases.

11.5.7.6.2 The liability of the manufacturer

11.5.7.6.2.1 Product liability law

In our view the rules on product liability set forth in the Consumer Code should not apply in this sitation, given that, *inter alia*, they only provide for compensation for damage to items of property or for compensation for injuries or death. The "damage" connected with the fine received by the driver should not be covered by these rules – unless there is jurisprudence to the contrary in Italian case law.

11.5.7.6.2.2 Tort law

In contrast to the provisions of the Consumer Code, the driver of the white vehicle may in principle be allowed to recover the monetary damage deriving from the infringement of the applicable speed limit (*i.e.* in particular, the fine imposed by the competent public authority) under Article 2043 of the Italian Civil Code. For this purpose, the driver would have to demonstrate that the inability of the vehicle to detect the applicable speed limit constituted negligence by the producer. In our view, though, the producer may challenge such an argument in the light of the circumstances of the case (*i.e.* the sign was hidden by a truck).

11.5.7.6.2.3 Guarantee / warranty

In order to trigger the warranties given by the reseller of the white vehicle, the owner / driver of that vehicle would have to demonstrate that the violation of the speed limit was due to a defect in the product. However, in this scenario, too, the producer may challenge such an argument on the basis of the specific circumstances of the case (*i.e.* the sign was hidden by a truck).

11.5.7.6.2.4 Other laws

11.5.7.6.2.4.1. Criminal law:

The same considerations outlined under section 11.4.5.4.1.3 should apply *mutatis mutandis*.

11.5.7.6.2.4.2. Traffic law

As highlighted above, in this scenario the driver would be subject to an administrative fine for having breached the speed limits set forth in Article 142 of the Road Traffic Code. It is unclear whether any such liability will be "shifted" on the producer in the future, especially in the case of "level 4" systems. In any event, there should be room for the producer to demonstrate, at least in the scenario under consideration, that the breach of the speed limit was not attributable to his "fault".

11.5.7.6.3 The liability of the user of the automated vehicle

11.5.7.6.3.1 Tort law

In this scenario the driver would not be liable as there is no damage to be compensated to third parties.

11.5.7.6.3.2 Traffic law

As anticipated, the driver may be held liable for speeding in accordance with the relevant provisions of the Road Traffic Code. However, taking into account the factual circumstances described in this scenario, it may be possible for the driver to demonstrate that there was no fault on his part and that accordingly no administrative liability should be incurred.

11.5.7.6.3.3 Other laws

The driver would not be liable under the criminal law as no criminal offence occurred in this scenario.

11.5.8 Civil liability of the registered owner

11.5.8.1 Article 2054, para. 3, of the Italian Civil Code

As anticipated, the third paragraph of Article 2054 of the Italian Civil Code provides that "the owner of the vehicle, or, in lieu of the same, the person having a usufruct title on the vehicle or the person who bought it subject to retention of property by the seller, shall be jointly liable with the driver, unless he can prove that the circulation of the vehicle occurred against his will".

Accordingly, this rule provides that the registered owner of the vehicle involved in an accident (or, *in lieu* of that person, any person having a usufruct title on the vehicle or the person who bought it subject to retention of property by the seller) shall be jointly liable with the driver,

whenever he does not provide the exonerating evidence required by the provision under consideration. The rationale behind this rule is to provide a further warranty to injured persons, who shall be entitled to claim compensation both from the driver and from the registered owner of the vehicle (or the other persons indicated in Article 2054, para. 3, of the Italian Civil Code).

11.5.8.2 Liable persons

It should be noted that the registered owner is not jointly and severally liable with the other persons indicated in Article 2054, para. 3, of the Italian Civil Code (*i.e.* any person having a usufruct title on the vehicle or the person who bought it subject to retention of property by the seller). Indeed civil liability is allocated only to the person who actually has the power to legally dispose of the vehicle, including prohibiting circulation of same[245].

In addition, according to the majority of legal scholars and case law, the list of persons jointly liable with the driver, set out in Article 2054, para. 3 of the Italian Civil Code, is exhaustive and cannot be extended, by way of interpretation to persons other than those expressly mentioned therein. As a consequence, the injured person would not be entitled to claim for damages from persons other than the driver and one of the jointly liable persons expressly contemplated in the rule at hand.

11.5.8.3 Identification of the registered owner

In light of the joint liability of the registered owner of the vehicle, it is crucial for the injured person to identify exactly who the registered owner is. In fact, the injured person claiming compensation from the registered owner of the vehicle shall bear the burden of proving that the defendant actually was the registered owner of the vehicle at the time of the accident (in case any objection is raised by the latter in such respects). For this purpose, it is common practice for injured persons to use as documentary evidence excerpts from the Public Register of Vehicles ("*Pubblico Registro Automobilistico*", hereinafter also referred to as "PRA") – *i.e.* a public register which reports all changes of ownership of vehicles[246]. According to recent case law[247], excerpts from the PRA are deemed to constitute presumptive evidence of the actual ownership of the vehicle, which can be rebutted by the defendant through any other means of proof allowed under the relevant rules of civil procedure (including witness testimony).

[245] See *Corte di Cassazione*, No. 2209/1977; *Corte di Cassazione*, 19 December 2006, No. 22399.

[246] See Article 6 of Royal Law Decree, 15 March 1927, No. 436.

[247] See *Corte di Cassazione*, 3 February 1978, No. 503; *Corte di Cassazione*, 26 October 2009, No. 22602.

11.5.8.4 Financial lease

With specific reference to the liability of the registered owner in cases of financial leases, it is worth mentioning that the Italian Supreme Court[248] – overruling a former interpretation of Article 2054, para. 3, of the Italian Civil Code[249] – stated that in such cases only the lessee (rather than the lessor) under the financial lease agreement shall be jointly liable with the driver. Starting from the entry into force of the Road Traffic Code, this interpretation has been confirmed by Article 91, para. 2, thereof, which provides that "*for the purposes of compensating damage caused to persons and items of* properties *as a consequence of road traffic, the lessee shall be jointly liable with the driver pursuant to Article 2054, paragraph 3, of the Italian Civil Code*"[250].

11.5.8.5 Exemption from liability

As described above, the registered owner (or, *in lieu* of him, any person having a usufruct title on the vehicle or the person who bought it subject to retention of property by the seller) is jointly liable with the driver, "*unless he can prove that the circulation of the vehicle occurred against his will*". However, in order for such evidence to be successfully provided, it is not sufficient to demonstrate that the circulation of the vehicle occurred without the consent of the registered owner (*invito domino*). Rather, it is necessary to provide the (harder) evidence that such circulation occurred against the will of the owner (*prohibente domino*) – which confirms the interpretation of this rule as a case of strict liability. This prohibition must be expressed through concrete behaviour specifically suitable to prevent the circulation of the vehicle.

11.5.9 Insurance law

11.5.9.1 Sources of law

The key norms in the area of civil liability for road accidents are the Road Traffic Code and the Code of Private Insurance. The provisions of the Road Traffic Code acquire relevance for the purpose of liability in case of road accidents owing to the fact that it is this code that specifies the rules of conduct that road users must comply with. These rules of conduct must be taken

[248] See *Corte di Cassazione*, 27 June 2014, No. 14635.

[249] Pursuant to the former interpretation of Article 2054, paragraph 3, of the Italian Civil Code (see *Corte di Cassazione*, 9 December 1992, No. 13015) the lessor under the financial lease agreement (*i.e.* the registered owner of the vehicle, as opposed to the lessee) was jointly liable with the driver towards any injured person, while no liability was attributed to the lessee.

[250] In this respect, the relevant case law stated that in any car accident which occurred before the entry into force of the Road Traffic Code, the party who was under an obligation to compensate the damage suffered by the injured person was exclusively the lessor (*i.e.* registered owner of the vehicle) and not the lessee (see, *Corte di Cassazione*, 19 October 2006, No. 22399; *Corte di Cassazione*, No. 11006/2004; *Corte di Cassazione*, 27 October 1998, No. 10698).

into account when assessing the existence of conditions required under the applicable provisions in order to allocate liability for damage to persons involved in a road accident.

11.5.9.2 Mandatory insurance regime

In this connection, consideration must also be given to the fact that Article 193 of the Road Traffic Code provides for a mandatory liability insurance regime for motor vehicles, by stating as follows: "*motor vehicles - other than vehicles circulating on railways and including trolleybuses and trailers - cannot circulate on public road* roads *without any insurance coverage in accordance with current legal provisions on civil liability. Anyone who circulates without insurance coverage is* subject *to an administrative sanction consisting in the payment of a sum ranging from Euro 848 to 3,393*".

In line with the Road Traffic Code, Article 122 of the Code of Private Insurance confirms that all vehicles – other than vehicles circulating on railways and including trolleybuses and trailers – cannot circulate on public road roads without holding insurance coverage in accordance with current legal provisions (as set forth under Article 2054 of the Italian Civil Code and Article 91 of the Road Traffic Code). In addition, this provision also specifies that the relevant insurance policy shall:

a. include coverage in respect of liabilities connected to personal injury caused to passengers, irrespective of the title under which the carriage is performed;

b. not apply in case of circulation against the will of the owner, any person having a usufruct title on the vehicle or the person who bought it subject to retention of property by the seller or the lessee in case of leasing, from the day following the submission to the police or other competent authorities of the relevant report251;

c. also cover the liability for damage caused in the territory of other Member States, under the conditions and within the limits set by the national legislation of each of these States, concerning compulsory insurance for civil liability arising from the movement of motor vehicles and provided in any case the more favourable guarantees as may be provided by the contract or by the law of the State where they are normally located.

11.5.9.3 Duty to enter into an insurance policy:

In light of the above mentioned mandatory liability insurance regime for motor vehicles, Article 132 of the Code of Private Insurance provides, *inter alia*, that all insurance companies shall be

[251] In this case, notwithstanding Article 1896, first paragraph, second sentence, of the Italian Civil Code, the insured person is entitled to get a refund of a portion of the premium, relating to the remainder period of duration of the insurance coverage, net of any taxes paid and contribution provided for in Article 334 of the Code of Private Insurance.

obliged to accept any proposals to enter into relevant policies submitted to them by potential clients, according to their policy terms and rates (to be established in advanced) and subject to the necessary assessment of the correctness of the data shown in the certificate of risk, as well as identification of the policyholder and the vehicle's owner, if different.

11.5.9.4 Duration:

As regards duration, the mandatory liability insurance policy usually lasts one year and cannot be automatically renewed. The insurance company is obliged to inform the policyholder of the expiry of the contract by giving at least thirty days prior notice. The policy continues to be valid and effective until the fifteenth day following the expiry date. Within this term, a new insurance policy shall be entered into by the policyholder[252].

11.5.9.5 Limits to compensation paid by insurance companies:

The insurance company shall cover civil liability up to an amount equal to the limits (*massimali*) provided for under the relevant insurance policy. Given the importance of the insurance coverage with respect to road traffic, Article 128 of the Code of Private Insurance sets forth certain minimum limits (*massimali*) that all insurance companies must apply, namely:

a. in the event of personal injury, the minimum insured amount is Euro 5,000,000 per claim, irrespective of the number of injured parties;

b. in the event of damage to items of properties, the minimum insured amount is Euro 1,000,000 per claim, irrespective of the number of injured parties.

11.5.9.6 Direct action for damages

Third parties suffering damage shall be entitled to bring "direct action for damages against the insurance undertaking, within the limits of the amounts for which the insurance policy was entered into" (Article 144 of the Code of Private Insurance), regardless of whether the damage has been caused by the "registered owner" or a mere "driver" of the vehicle.

11.5.9.7 Mandatory insurance in case of vehicle testing

The mandatory liability insurance regime referred to above also applies to vehicle testing. Indeed, pursuant to Article 122 of the Code of Private Insurance and Presidential Decree No. 474 of 24 November 2001, manufacturers of vehicles intending to test or experiment with new vehicles must submit a request to the Ministry of Economic Development for the issuance of a test plate and further enter into a relevant compulsory insurance policy. In such a case,

[252] See Article 170-bis of the Code of Private Insurance.

however, under Italian law, the insurance policy (and related cover) shall be exclusively connected with the test plate, and will cover all vehicles which from time to time are equipped with the relevant test plate. For the testing stage, the driver will be required to monitor road and traffic conditions, retaining full control of the vehicle regardless of whether it is in automated mode or not. Therefore, the normal rules of insurance apply.