

**Autonomous driving lacks legal basis**  
**Drivers liable for technological deficiencies**

**Automaker's pledge to accept liability implies safety**

Volvo's announcement that the company will accept full liability whenever one of its cars is operating in the autonomous mode and crashes is at least a well played publicity stunt. As regards product liability law, it also provides the basis for liability claims: Due to the implicit message that Volvo's vehicles are absolutely safe, a defect according to Section 3 of the German Product Liability Act (ProdHaftG) will always be existent if something happens, be it because the vehicle failed or because the driver manually operated the vehicle and thereby caused the accident. The vehicle will be deemed defective because it does (or did) not offer the level of safety to the driver and other traffic participants which they were justified to expect due to the automaker's statement.<sup>1</sup> Unconditionally accepting full liability implies the vehicle's absolute safety and wraps the drivers in carefree cotton wool in which they bear no responsibility whatsoever. The German laws governing contracts of sale allow for no other conclusion insofar as in these cases the car lacks the agreed quality required by Section 434(1) Sentence 3 of the German Civil Code (BGB), which leads to the full array of legal consequences for auto dealers to compensate the disappointed driver of such a vehicle<sup>2</sup>.

Autonomous driving is the latest trend in the entire automotive and computer industry and holds out great prospects of high profits. Nevertheless, it will not be a sure-fire success but rather needs an anchor in reality which currently does not exist, neither technically nor legally. Legal approaches to autonomous driving should therefore not be limited to pure liability issues regarding manufacturers' and drivers' responsibility. They have to include into legal reality the environment created by the automobile industry's demeanor, technology, the economy, politics and legislation, just as they have to include the ambivalence of these areas of conflict. The scandals that are currently shaking the automotive industry worldwide make this even more obvious as it is precisely said industry which claims to offer an ideal world of autonomous driving. There has never been such an obvious discrepancy between

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<sup>1</sup> ECJ judgment of 5.3.2015, C-501/13

<sup>2</sup> *Frankfurter Allgemeine Zeitung* (online) of 11.10.2015: Volvo has now taken a clear position on this. The Swedish automaker said it will accept full liability in the event one of its self-driving cars crashes. This is what President and chief executive officer Hakan Samuelsson announced on behalf of Volvo Cars in Washington D.C.. So far, drivers have been the ones statutorily responsible.

<http://www.faz.net/aktuell/wirtschaft/maechtige-internetriesen/volvo-uebernimmt-haftung-fuer-selbstfahrende-autos-13847238.html>

politically motivated legislation on product safety and environmental protection on the one side, and legal reality on the other side, between propagated technological innovation, legislation thus ensuing and deliberate violations of regulations while liability questions remain yet to be tackled.

### **Technology always has a lead over legislation**

Legal skepticism that is based on regulations which were adopted in the past and currently still preclude autonomous driving is not an effective means to evaluate visions of the future and trust in innovation. There is no reason not to welcome autonomous driving or to think of it as technologically unfeasible. Technology develops at a much faster pace and is thus miles ahead of legislation which usually lags behind. As half life periods of technological innovation become shorter and shorter, they will often have expired long before legislation enters into force that gives technological advances a legally sound basis.

### **There is no ideal world**

The worldwide increasing number of vehicle recalls over safety defects in automobiles of almost every automaker as well as the daily headlines about the multifaceted Volkswagen emissions cheating scandal since 18 September 2015 cannot be played down by pretending individual manufacturers and their management made some simple mistakes. These incidents disprove the assumptions that

- (i) the political demand for product safety and environmental protection is met by available, perfectly adequate technology,
- (ii) legal requirements based thereon are complied with, and
- (iii) monitoring systems jointly established by manufacturers, approval authorities and independent monitors such as the system for type-approval for motor vehicles are effective.

This ideal world cannot exist for systemic reasons.

Against the backdrop of practical considerations and judging by the high number of safety- and emissions-related recalls in the automotive industry, there is much to be said which indicates that

- (i) legal requirements are ignored and the tools to enforce them do not work,
- (ii) circumventing legal requirements or standards is given more attention than seeking to comply with them,
- (iii) statutory monitoring systems for type-approval are ineffective,

- (iv) today's vehicle manufacturing and its technologies are no reliable basis for visions of the future of autonomous driving.

Along these lines, one of the most recent examples deserves mentioning: On 3 November 2015, Volkswagen admitted an internal investigation had revealed that "irregularities" might have arisen and lead to "implausible" figures when the company determined CO<sub>2</sub> emissions figures for vehicle type-approval. These very few words, unworthy of a global corporation and even less credible ("irregularities", "implausible"), clearly show that testing methods and measures used in the type-approval procedure were hardly cheated by accident and that the people responsible for the procedure did not fulfill their mission. The company's statement that some emissions figures were "implausible" could not be more contradictory: If documented test and measurement results can be "implausible" but still produce the figures required for type-approval, then each and every technological and ethical mechanism has collapsed: the figures were manipulated, as Volkswagen has now also admitted.<sup>3</sup> The vehicles affected should have never been type-approved. Tampering with test results for type-approval or in-service conformity is illegal pursuant to Article 13(2) b of Regulation (EC) No 715/2007<sup>4</sup>.

The discovery of the software Volkswagen used to cheat at emissions tests was hardly surprising. The only thing surprising is that it took until now for it to become public. The European legislator has been aware of the existence of such software since 2007, probably even earlier: EU Regulation No 715/2007 on E5 and E6<sup>5</sup> for the implementation of the "Clean Air for Europe" (CAFE) program already contained an explicit ban on manipulation devices, the unlawful function of which had thus been anticipated because otherwise there would have been no point in including the ban into the Regulation. Article 13(2) d of Regulation No 715/2007 stipulates that Member States shall lay down provisions on effective and dissuasive penalties for the "use of defeat devices"<sup>6</sup>. The legal definition of defeat device in European

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<sup>3</sup> <http://www.finanzen.net/nachricht/aktien/Abgas-Skandal-VW-Manipulationen-bei-Messungen-Grund-fuer-falsche-CO2-Angaben-4596242> (06.11.2015)

<sup>4</sup> Regulation "type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information", Official Journal of the European Union L 171/1 of 29.06.2007.

<sup>5</sup> Official Journal of the European Union L 171/1 of 29.06.2007

<sup>6</sup> According to the definition provided by Article 3 No. 10 of Regulation No 715/2007, defeat device "means any element of design which senses temperature, vehicle speed, engine speed (RPM), transmission gear, manifold vacuum or any other parameter for the purpose of activating, modulating, delaying or deactivating the operation of any part of the emission control system, that reduces the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal vehicle operation and use."

law is no different from the one in US law.<sup>7</sup> The Directive establishing a framework for the approval of motor vehicles, also adopted in 2007 as Directive 2007/46/EC<sup>8</sup>, replaced the preceding Directive 70/156/EEC and included the provisions of Regulation No 715/2007 at type-approval level.

### **Cost advantages before law abidance**

After everything that has now been revealed bit by bit, Volkswagen is not an isolated case, neither in Europe nor in the US.<sup>9</sup> Competitive interests and cost considerations have in general been the driving forces behind violations of the law which are themselves grounded in a number of statutory regulations. Article 12 of Regulation No 715/2007 expressly allows Member States to set financial incentives and offer financial rewards if they serve the Regulation's purpose.<sup>10</sup> These financial support measures however – such as the German car scrappage scheme in 2009 – did not correspond to what the automotive industry offered in return: The technology the sector pretended to use in order to reach noble environmental protection goals, and which it combined with attractive slogans and buzzwords such as “Blue Motion”, never existed or, from the automotive industry's point of view, not at acceptable prices. The risks inherent in choosing cost advantages over law abidance seemed to be of calculable extent, at least in Europe. In the US, such action was much more risky.<sup>11</sup>

It is therefore not surprising that it is now demanded (anew) that the costs for fittings cars with the correct exhaust emissions technology, which was due as of

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<sup>7</sup> On 03.11.2015, the online version of the German newspaper *Handelsblatt* reported that the US Environmental Protection Agency (EPA) put the core issue as follows: “An AEC (Auxiliary Emission Control Device) designed to circumvent emissions tests is a defeat device”.

<http://www.handelsblatt.com/unternehmen/industrie/3-liter-motoren-von-porsche-und-audi-diesel-skandal-erfasst-premium-modelle-/12532946.html>

<http://yosemite.epa.gov/opa/admpress.nsf/21b8983ffa5d0e4685257dd4006b85e2/4a45a5661216e66c85257ef10061867b!opendocument>

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<sup>9</sup> German online newspaper *Focus* reported on 05.11.2015: “They all do it.” <http://www.focus.de/auto/news/abgas-skandal/abgas-skandal-alle-hersteller-manipulieren-hosen-runter-was-vw-mit-seiner-co2-beichte-wirklich-erreiche>

<sup>10</sup> Article 12(1) states: „Member States may make provisions for financial incentives that apply to vehicles in series production which comply with this Regulation and its implementing measures. Those incentives shall be valid for all new vehicles offered for sale in the market of a Member State which comply at least with the emission limit values in Table 1 of Annex 1 in advance of the dates set out in Article 10(3); they shall cease on those dates.”

<sup>11</sup> According to a report in *Welt* on 25.10.2015, General Motors and manufacturers of commercial vehicles were punished as early as in 1996 and 1998, respectively. More were following until recently. The deception was apparently deemed an economic necessity in all cases, according to a consulting expert quoted by *Welt*.

<http://www.welt.de/wirtschaft/article147995347/So-wie-VW-haben-schon-viele-Autobauer-betrogen.html>

2007, be paid – as if there had been no violations of the law before that: The German newspaper *Frankfurter Allgemeine Zeitung* quoted Volkmar Denner, chief executive at Bosch GmbH, on 24 October 2015 saying that it was perfectly clear what suppliers and automakers had to do, namely to “reduce the difference between actual emissions and emission limit values in testing procedures”. This difference “between actual emissions and emission limit values in testing procedures”, which has existed since 2007, is now being handled like a simple matter of fact of today without any reflection of earlier violations of the law. If politicians still want to enforce the 2007 objectives, then these objectives have to be paid for now: “Ambitious emission limit values for actual emissions force technological advancement, but they have to be technologically and economically feasible”, Denner is quoted further.<sup>12</sup>

Without financial incentives for the automobile sector, for instance to produce electric or autonomous cars, there will be no new technologies, at least not to the extent which politicians would like to see in the future due to their own interests.<sup>13</sup> Matthias Wissmann, President of the German Association of the Automotive Industry (VDA), is very clear on this point: “It is important that politicians act fast”, he is quoted by *Zeit*. According to him, we need a decision for strong incentives this year, so that more electric cars will be on the road.<sup>14</sup>

This lacking respect for statutory provisions seems to be part of a broad, general consensus: The European Commission and national Competition and Antitrust Authorities have imposed fines in the billions for cartel infringements over the past years.<sup>15</sup> Cartel arrangements still pay off as *Frankfurter Allgemeine Zeitung* reported about the Monopolies Commission on 24 October 2015. This is why said Commission demands prison sentences of up to five years in order to enforce anti-trust laws.<sup>16</sup>

### **European legislation and lobbying**

The automotive industry has a strong lobby in Europe because of its tremendous economic importance. The European Commission itself paved the way to a legal

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<sup>12</sup><http://www.faz.net/aktuell/wirtschaft/vw-abgasskandal/abgasskandal-bosch-chef-fordert-klarheit-bei-abgastests-13873685.html>

<sup>13</sup> The costs for the software and electronic hardware on autonomous cars can be higher than those for raw materials for the entire vehicle, *Automotive News* on 03.08.2015, p. 29.

<sup>14</sup><http://www.zeit.de/mobilitaet/2015-10/elektroauto-foerderung-elektromobilitaet/seite-2>

<sup>15</sup> Apparently, the German Competition Authority (Bundeskartellamt) most recently imposed a fine of € 75 million on five manufacturers of acoustic components, *Automobilwoche* of 29.06.2015, p. 2.

<sup>16</sup><http://www.faz.net/aktuell/wirtschaft/wirtschaftspolitik/monopolkommission-fordert-fuenf-jahre-haft-fuer-kartellsuender-13872993.html>

system which allowed the invention and use of defeat software, insufficient exhaust emissions testing and malfunctioning quality management systems and in which almost all national control systems failed. One giant success of the automotive industry's lobbying efforts was the adoption of Commission Regulation (EU) No 371/2010<sup>17</sup> which introduced the possibility of "self-testing" conducted by the automakers. Self-testing was established under the pretext that it would serve a simplification of type-approval procedures, which in turn would be in the interest of European automakers' competitiveness. The Commission followed recommendations of the lobbying group "CARS 21 High Level Group", set up by the Commission in 2005 and counting among its members, inter alia, the ACEA<sup>18</sup>, the European Automobile Manufacturers' Association, and Clepa<sup>19</sup>, the European Association of Automotive Suppliers. By allowing self-testing, i.e. by enabling automakers to be judges in their own cases, the Commission took away national control over the automotive industry and left it to itself. The competent authorities, such as the Federal Motor Transport Authority (KBA), gave up their own tests and control measures and left them to the so called technical services.<sup>20</sup>

In light of the field damage that has now occurred, the extent of which is not yet assessable, the European Commission is back-peddalling on this issue without any recollection of its earlier causal participation. On 5 November 2015, it piped up with a powerful message: In view of the Volkswagen scandal, the European Commission wants to monitor national authorities when it comes to the certification of new cars: "The certification regimes of the Member States have failed. In the future, we will monitor whether the national authorities work properly," the new European Commissioner for Internal Market, Industry, Entrepreneurship and SMEs Elżbieta Bieńkowska told the German newspaper *Süddeutsche Zeitung*. She has only been working in Brussels since November 2014. Moreover, she argues that Member

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<sup>17</sup> Commission Regulation (EU) No 371/2010 of 16.04.2010, Official Journal of the European Union L 110/1 of 01.05.2010.

<sup>18</sup> Association des Constructeurs Européens d'Automobiles, Brussels

<sup>19</sup> Comité de liaison européen des fabricants d'équipement et de pièces automobile, Brussels

<sup>20</sup> Recital 2 of the Regulation states: „When examining the major policy areas which impact the competitiveness of the European automotive industry the CARS 21 High Level Group, set up by the Commission in 2005 to chart the way towards sustainable development of a competitive European automotive industry, agreed on a number of recommendations aiming at enhancing the industry's global competitiveness and employment while sustaining further progress in safety and environmental performance. In the area of simplification the Group recommended the introduction of the possibility for a manufacturer to conduct himself tests required for approval, which implies his designation as technical service (hereinafter 'self-testing'). ...”

States should exchange test results from certification procedures.<sup>21</sup> This undesirable development has long been recognized in the US.<sup>22</sup>

### **The Type-Approval Directive 2007/46/EC**

The Directive 2007/46/EC<sup>23</sup> regulates the entire type-approval system in the European Union. According to Recital 13, the Directive's noblest objective is "to ensure that the procedure for monitoring conformity of production, which is one of the cornerstones of the Community type-approval system, has been correctly implemented and functions properly". In order to do so "manufacturers should be regularly checked by the competent authority or by an appropriately qualified technical service<sup>24</sup> appointed for that purpose." As set out in Recital 14, the Directive is intended to "ensure that new vehicles, components and separate technical units put on the market provide a high level of safety and environmental protection<sup>25</sup>". The Federal Motor Transport Authority (KBA) does use these technical services. According to a guide, tests are usually not carried out by the KBA: The tests are to be conducted by technical services designated by the KBA. The manufacturer may choose the technical service.<sup>26</sup>

Articles 41 and 42 of Directive 2007/46/EC provide that the technical services shall ensure the "conformity of production" of a vehicle manufacturer as required by Article 12 of Directive 2007/46/EC. Within the context of conformity of production as laid down in Annex X of Directive 2007/46/EC<sup>27</sup>, the technical services take part in developing the vehicles, certifying the manufacturers' (and their suppliers') quality

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<sup>21</sup> <http://www.n-tv.de/wirtschaft/EU-spricht-im-VW-Skandal-von-Versagen-article16284781.html>

<sup>22</sup> While in Germany and Europe, the system is only just now beginning to be called into question, awareness has been much higher in the US, also with regard to self-testing regimes, *Automotive News* of 19.10.2015 (p. 12): "VW strains shaky tie with regulators."

<sup>23</sup> Directive establishing a framework „for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles“ of 05.09.2007, Official Journal of the European Union, L 263/1 of 09.10.2007; corrected OJ L 127/22 of 26.05.2009.

<sup>24</sup> Pursuant to the legal definition of Article 3 No. 31, technical service "means an organisation or body designated by the approval authority of a Member State as a testing laboratory to carry out the initial assessment and other tests or inspections, on behalf of the approval authority, it being possible for the approval authority itself to carry out those functions".

<sup>25</sup> This is why the Directive refers to and includes the Product Safety Directive 2001/95/EC which provides for regulations on recalls. Where the corrective measures of a manufacturer whose vehicles are affected by a recall are not satisfactory, EC vehicle type-approval may be withdrawn pursuant to Article 32(3) of Directive 2007/46/EC. To the author's knowledge however, this has never been done so far.

<sup>26</sup> [http://www.kba.de/DE/Fahrzeugtechnik/Zum\\_Herunterladen/ErteilungTypgenehmigungen/Wegweiser\\_pdf.pdf?\\_\\_blob=publicationFile&v=4](http://www.kba.de/DE/Fahrzeugtechnik/Zum_Herunterladen/ErteilungTypgenehmigungen/Wegweiser_pdf.pdf?__blob=publicationFile&v=4) (only available in German)

<sup>27</sup> As amended by Regulation No 371/2010

management systems (QMS) and verifying the quality management systems' effectiveness, the latter being a precondition for the correctness of the certificate of conformity which the manufacturer is required to deliver according to Article 18 of Directive 2007/46/EC (EU certificate of conformity): Thus, all this adds up to a closed system of latent conflicts of interest, a situation which is in fact covered by the EU's legal order. According to a report of *Frankfurter Allgemeine Zeitung* on 7 November 2015, the tests which were now unmasked as manipulation were carried out by Technical Inspection Associations (TÜV).<sup>28</sup> These associations, beside others such as Dekra, are also responsible for the external side of testing within the scope of EC type-approval: The vehicle inspection certificates, including smog tests, which have to be renewed every two years in Germany and the results of which inevitably have to correspond to those of prior type-approval tests.

### **The technical services' legal status**

Through the strong legal status the Directive 2007/46/EC endows them with, the technical services also pursue a business (model) for the future of autonomous driving. They see autonomous driving as an opportunity that will considerably expand their competences and the scope of their mission, as Dekra Automobil Managing Director Gerd Neumann was quoted: "If the vehicle itself takes over driving, the inherent risks will pass from the driver to the system. (...) Thus, it will be all the more crucial that these systems function properly and are reliable in the long run – which is something that naturally has to be able to be tested in the course of vehicle inspection and smog tests (by the TÜV). (...) It has to be determined as early as in the stages of development and homologation of these vehicles how *our* inspection engineers will be able to test them later on."<sup>29</sup> This sounds promising, but will have to be proven after the sobering statement of the European Commission on how the current type-approval procedure has failed: The technical services are part of the system and therefore also part of the problem about overall trust which has been

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<sup>28</sup> The corporation had vehicles with cheated CO2 emission limit values tested by TÜV inspection bodies, among others. According to a list provided by the Federal Motor Transport Authority (KBA) upon request by the financial news agency dpa-AFX, TÜV Nord conducts emissions testing for new Volkswagen models, whereas TÜV Süd, among others, tests vehicles produced by the Volkswagen subsidiary Skoda. Both TÜV associations confirmed that they had conducted emissions tests. The two other subsidiaries, Audi and Seat, have their emissions tested abroad: Audi assigned its tests to an inspection company in Luxembourg, Seat to two Spanish service providers. <http://www.faz.net/aktuell/wirtschaft/vw-abgasskandal/vw-liess-autos-mit-falschen-spritverbrauchswerten-vom-tuev-abnehmen-13899255.html>

<sup>29</sup> *Automobilwoche* of 21.09.2015, p. 15

and will remain destroyed for a long time. In the US, there is a trend towards deviation from this practice.<sup>30</sup>

The technical services' legal status and the legal significance of their work have to all appearances not yet been the subject of an in-depth legal examination. Clarity will be improved at the end of 2016 when the European Court of Justice<sup>31</sup> (ECJ) will for the first time pronounce on the significance of QMS and the responsibility of the organizations which have confirmed the effectiveness of a given QMS or quality assurance program as the German Federal Court of Justice (BGH)<sup>32</sup> has submitted an order for reference to the ECJ. In its reference for a preliminary ruling the BGH has already indicated that the certification of conformity by certifying bodies or "designated authorities" may indeed have third party effects for patients. The fact that these proceedings revolve around an issue of the laws governing medical devices does not diminish the judgment's significance and validity regarding quality management systems in the automotive industry because the EU certificate of conformity, which has to be delivered by manufacturers and suppliers, is intended to prove that any given QMS as well as the products manufactured thereunder comply with the relevant statutory regulations, thereby trying to satisfy the need for trust on the part of consumers. Autonomous driving cannot do without statutorily protected trust.

#### **Autonomous driving must be safe**

The conditions needed to go ahead with plans for autonomous vehicles are far from being reality, in particular with respect to reliable forms of manufacturing autonomous vehicles, the necessary infrastructure and the general acceptance of their predominance over the sheer, ego-driven "pleasure of driving".<sup>33</sup> The conflicts of objectives remain.

This is why the question of how sound the basic technology behind the vision of autonomous driving really is has to be asked from a legal point of view, too. Not only do the individual vehicles offered to everyone have to be safe, but they also have to prove their safety in the broader social context of consumer protection, en-

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<sup>30</sup> *Automotive News* of 05.10.2015, p. 4

<sup>31</sup> C-219/15, breast implant case; for further detail see Helmig, "Manufacturer responsibility under European Union law – prevention and prophylaxis in ECJ jurisprudence" (the German original was published in *PHi* 2015, p. 86)

<sup>32</sup> Decision of 09.04.2015, VII ZR 36/14, *EuZW* 2013, 840

<sup>33</sup> Nissan, for instance, considers the production of "intelligent cars" as feasible, but says it only make sense under certain necessary framework conditions: "Ultimately, we must achieve full integration with the transportation infrastructure, such as traffic control and road systems, in order to achieve a society without congestion and accidents."

[http://www.nissan-global.com/EN/TECHNOLOGY/OVERVIEW/autonomous\\_drive.html](http://www.nissan-global.com/EN/TECHNOLOGY/OVERVIEW/autonomous_drive.html)

environmental protection and public road safety so as to satisfy the provisions of higher-ranking product safety law which represents a fundamental social principle. Against this backdrop, some scepticism is warranted:

The difference between autonomous vehicles and conventional cars is basically that the former are equipped with electronic systems and steering mechanisms and that they are connected with the other vehicles within a certain reach. They entertain the illusion of absolute technical controllability of a vehicle in (almost) all traffic situations and events of failure as well as the illusion of excluding to the greatest possible extent human risk factors posed by drivers or other traffic participants. There is probably still room and need for improvement with respect to these accomplishments of autonomous vehicles.<sup>34</sup> Even pioneer Tesla is far from having mastered basic problems as the American *Consumer Reports* has revealed.<sup>35</sup>

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<sup>34</sup> Take the example of illegal parking: Imagine someone committed a parking violation by parking their car by the roadside and it would technically be impossible to pass due to a center line dividing traffic lanes moving in opposite directions. A human driver would gradually and cautiously approach the obstacle and pass the parked vehicle as soon as there was no more oncoming traffic – center line or not. The self-driving car on the other hand would wait for days on end if in doubt. “What is it supposed to do?”, says Pan. “Are we supposed to tell it that it is sometimes okay to break the law? And if so: to which cases does this apply?” This is an almost philosophical question. In Silicon Valley, research is currently conducted on the development of self-learning computer programs, i.e. artificial intelligence, which may one day be capable of making instinctive decisions. PSA (Peugeot/Citroen) does not expect its own vehicles to be fully capable of self-driving before 2030, *Automobilwoche* of 24.08.2015, p. 10.

<http://www.sueddeutsche.de/auto/autonomes-fahren-crash-kurs-mit-google-1.2684782> (11.10.2015)

<sup>35</sup> “As part of our [Annual Auto Reliability Survey](#), we received about 1,400 survey responses from Model S owners who chronicled an array of detailed and complicated maladies. From that data we forecast that owning that Tesla is likely to involve a worse-than-average overall problem rate. That’s a step down from last year’s “average” prediction for the Model S. It also means the Model S does not receive Consumer Reports’ recommended designation. (To be recommended, a vehicle has to meet stringent testing, reliability, and safety standards, including having average or better predicted reliability.)

The main problem areas involved the drivetrain, power equipment, charging equipment, giant iPad-like center console, and body and sunroof squeaks, rattles, and leaks.

Specific areas that scored worse on the 2015 model, compared with the 2014 model in [last year’s survey](#), were the climate control, steering, and suspension systems. Complaints about the drive system have also increased as the cars have aged—specifically for the 2013 model, which was the car’s first full model year. (See [more details on the Tesla Model S model page](#).)

But those problems mostly still fall under Tesla’s four-year/50,000-mile bumper-to-bumper warranty (and eight-year/unlimited mileage battery and drivetrain warranty), so they are generally being corrected at no cost to owners.”

<http://www.consumerreports.org/cars/tesla-reliability-doesnt-match-its-high-performance>

### **Autonomous driving requires trust**

Autonomous vehicles are however developed, produced and propagated by auto-makers of conventional vehicles (and their suppliers) based on the technology of these same conventional vehicles – with the exception of Apple and Google but they lack experience regarding the mass production of automobiles. The auto-makers raise the flag of inevitable progress which they claim for themselves. They act on the assumption that they enjoy credibility regarding their ability to deliver high-quality goods, but their credibility is on the contrary shaken by the high number of worldwide recalls.

Part of having faith in their ability to deliver quality is to be able to trust that quality defects which bear risks are immediately and effectively made public and eliminated. This trust is missing, particularly in Europe. In the US, authorities take much more rigorous action. With so called “Consent Orders” they imposed severe penalties on a number of vehicle manufacturers – among them also German automakers – because defects had not been notified within the statutory notification period of five days or because recalls had been delayed.<sup>36</sup> The number of safety recalls has globally been spiralling over recent years. In 2014 – with a similar trend in 2015 – the automotive industry recalled so many cars which had been manufactured between 1998 and 2015 that the recalls affected the equivalent of the annual total number of cars produced in 2014 and 2015, respectively. The amount of vehicles affected by recalls – Volvo apparently being an exception – is continuously increasing. The unknown number of unreported recalls and “service campaigns” of the manufacturers, i.e. cases in which components that are internally known to be defective are replaced without the driver’s or owner’s knowledge within the warranty period or only within an internally fixed period of time, should be factored in as well as cases in which defects are kept secret to begin with.<sup>37</sup> At least one of the biggest car dealers in the US, AutoNation, has stopped selling cars that are under recall until evidence of their effective repair is produced.<sup>38</sup> The supply of the spare parts

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<http://www.handelsblatt.com/unternehmen/industrie/tesla-aktien-auf-talfahrt-testbericht-bringt-model-s-ins-schleudern/12477202.html>

<sup>36</sup> For example: [www.nhtsa.gov/.../pdf/May-16-2014-TQ14-001-Consent-Order.pdf](http://www.nhtsa.gov/.../pdf/May-16-2014-TQ14-001-Consent-Order.pdf); [www.nhtsa.gov/staticfiles/communications/pdf/Hyundai-NHTSA](http://www.nhtsa.gov/staticfiles/communications/pdf/Hyundai-NHTSA); [www.safercar.gov/staticfiles/safercar/recalls/consent-order-takata](http://www.safercar.gov/staticfiles/safercar/recalls/consent-order-takata);

<sup>37</sup> It is impossible to calculate the number of delayed recalls where no or only an insufficient number of spare parts are available. Such cases have already seen drastic penalties in the US, *Automotive News* of 06.07.2015, p. 4. In Europe, there is no legal basis for such harsh measures.

<sup>38</sup> *Automotive News* of 07.09.2015, p. 3.

required for remedying the recall causing defect is often insufficient in terms of quality and quantity or the parts need to be developed first. A striking example is the Takata airbag recall in the US: As the actual root cause of the airbags' failure is not fully known, they are being replaced with those airbags which caused the recall in the first place.<sup>39</sup>

### **Technology deficiencies**

The recent Volkswagen scandal over emissions defeat software adds a special feature to this scenario as basis for autonomous vehicles. The affected Volkswagen vehicles are not technically defective or unsafe, however very much so legally because they do not meet statutory requirements. The planned measures within the scope of recalls are not very promising as only new software or technical changes – if these are at all possible – could fulfil the requirements, otherwise cheating software would not have been needed in the first place: The technological deficiencies have not been remedied in a sustainable way that would satisfy statutory requirements. And the technological deficiencies of conventional vehicles will not be overcome with the technology for autonomous cars. It is much more likely that it is a basis for perpetuating the current situation, thereby letting it also spread to autonomous vehicles which are still at an early, experimental stage. In the practical debate on the functional safety of all electric and electronic systems according to ISO 26262, which is fundamental to this early stage, the integration of these systems into a quality management system according to ISO/TS 16949:2009 is of minor importance.

### **Defective quality management systems**

All safety recalls are – cum grano salis – caused by technological defects in the failing components' development or design, manufacturing defects or incorrect assembly. The quality management systems (QMS) of automakers and/or their suppliers have failed altogether, be it at whichever level, and thereby violated the law in a twofold way:

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<sup>39</sup> For further detail see Helmig, "Recall debacle in the automotive industry: no end in sight" (the German original was published in *PHi* 2015, p. 56 ff.). In contrast to Europe, where car certification and market surveillance authorities are largely passive, the US National Highway Traffic Safety Administration (NHTSA) has taken over full control as regards the execution of recalling approximately 34 million vehicles in the US alone. What makes this recall so unique is that it cannot be ruled out that the repaired vehicles may have to be recalled a second time because the replacement airbags are no safer than the ones replaced, *Automotive News* of 08.06.2015, pp. 1, 12 and 50.

- (i) Safety-related technical defects always constitute violations of the law with respect to the product as product safety law forbids placing unsafe products on the market.
- (ii) QMS that are actually ineffective are illegal in two ways: First, QMS are conceived as means to also ensure compliance with legal provisions. EN ISO 9001:2008 sets out the following: "The International Standard specifies requirements for a quality management system where an organization a) needs to demonstrate its ability to consistently provide product that meets customer and applicable statutory and regulatory requirements ...".<sup>40</sup> In the automotive supply chain, this standard always forms an integral part of contracts between automakers and suppliers. Non-compliance with the requirements for a QMS' effectiveness therefore always constitutes a breach of contract (according to Section 280(1) BGB), irrespective of the product's defectiveness.

Moreover, the effectiveness of a QMS, i.e. the company's ability to avoid defects, has itself direct force of law. A QMS as set out in EN ISO 9001 is a precondition for a manufacturer's eligibility to receive type-approval at all according to Annex X of Regulation 371/2010<sup>41</sup>. Non-compliance with the provisions on quality assurance measures laid down in the Type-Approval Directive 2007/46/EC, which require the implementation of a QMS certified according to EN ISO 9001:2008, is a direct violation of Regulation No 371/2010 and entails the penalties of Article 13.

### **Risks posed by hackers**

As individual products, autonomous cars as well as those equipped with the latest technology have a high potential for safety, also when looked at from product safety law. But this safety potential suffers from at least five major weaknesses: (i) the manufacturers and suppliers, (ii) the driver, (iii) other traffic participants and (iv) lack of comparable national infrastructure which would allow for the use of these cars all around the world as well as (v) vulnerability through hackers. Only this last weakness shall be addressed in more detail:

Hackers have on multiple occasions managed to directly interfere with safety-related vehicle systems with relatively little effort and simple tools. They were able to switch off the manual driving mode and even had the vehicle steer into a ditch.<sup>42</sup>

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<sup>40</sup> ISO 9001:2008, Chapter 1.1 letter a); this also applies to ISO/TS 16949/2009 which is the authoritative standard for the automotive industry and supplements ISO 9001 with specific requirements tailored to said industry's needs.

<sup>41</sup> Official Journal of the European Union, L 110/1, of 01.05.2010

<sup>42</sup> [http://www.nxtbook.com/nxtbooks/crain/an5038325406GSDCN\\_supp/#/12](http://www.nxtbook.com/nxtbooks/crain/an5038325406GSDCN_supp/#/12)

Fiat Chrysler had to recall 1.4 million vehicles in August 2015 due to this hacking incident which affected the Jeep.<sup>43</sup>

The vehicle manufacturers are aware of this vulnerability of individual vehicles and its disastrous impact on overall road safety. It is also a matter of certainty that they have no sustainable and proactive concept to counteract these attacks since hackers will always be one step ahead of available defense mechanisms. Vehicle manufacturers have already formed alliances with hackers so as to at least draw level with them.<sup>44</sup> Nevertheless, the automakers will never get a head start out of this. Hackers dwell in their own world and are focused on technology. The vehicle manufacturers have no solution as to what the “switched off driver” is to do for lack of expertise: They know absolutely nothing about this driver. They do not know what the driver can or should do in the event that the autonomous car is hacked.

As regards product liability law, Volvo’s announcement to accept full liability for autonomous cars also includes liability for the consequences of hacker attacks, including possible unfortunate reactions on the part of the driver, foreseeable or not, because this acceptance is a safety-related presentation of the product that implies the product’s resilience against cyber attacks, a promise which can obviously never be kept. The driver’s own entitlement to claim damages from Volvo and indemnification against third party claims due to accidents caused by hacker attacks are of absolutely no use to a driver who died in the accident. And the purpose of public road safety is not served, either. Will the driver, if s/he survives, or the driver’s heirs be entitled to claim damages from the manufacturer if it turns out in the end that the autonomous car was after all not as perfect as imagined?<sup>45</sup>

### **The responsibility of the driver remains**

In this event, the question arises of whether such promises are simply dubious and unprofessional or also cross the threshold to illegality. Vehicles which are praised as being absolutely safe only because the manufacturer accepts liability while excluding the driver’s responsibility or contributory negligence, but which are not im-

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<sup>43</sup> *Automobilwoche* of 24.08.2015, p. 15

<sup>44</sup> The manufacturers want to establish an „Information Sharing and Analysis Center“ (ISAC) so as to satisfy cyber security requirements and be a match to their opponents, i.e. the hackers, *Automobilwoche* of 07.09.2015, p. 30

<sup>45</sup> Volvo is apparently not perfectly sure about this itself. When asked in an interview whether he sees the risk that Volvo customers may complain about connected vehicles, Volvo’s Chief Information Officer, Klas Bendrik, said “We are working very hard with our partners to ensure that we are all focused on providing the best customer experience no matter where you are in the world.” In the same interview, he linked connected with autonomous vehicles saying: „They are partly two separate developments but they are highly integrated. Connectivity in the car, the connected customer and autonomous driving capabilities are living together symbiotically.” *Automotive News* of 06.07.2015, p. 10.

mune to intrinsic defects or cyber attacks – which makes no difference legally – are still defective vehicles. Placing them on the market is illegal under product safety law for good reasons, particularly because it is in the interest of public road safety and health protection. The promise to release a third party from the liability resulting from the fact that this party assumed the risk of using a potentially defective product as well as the risk of being liable for ensuing damage is, in my opinion, illegal, because it cannot be brought into conformity with the fundamental values of society: The driver who feels encouraged due to this promise will – probably – violate the law, therefore the offer made by the manufacturer is contrary to public policy and public morals.

Behind these thoughts is the heated debate on the question of whether the driver of an autonomous vehicle or a vehicle with sophisticated safety features still bears responsibility as has been the case up until now under the applicable codified law, for instance under the 1968 Vienna Convention on Road Traffic as well as current national road traffic law.<sup>46</sup> I believe, this question definitely has to be answered in the affirmative as long as individual driving preferences exist and the drivers decide whether they opt for a self-driving vehicle and leave their safety to this vehicle and, above all, as long as they decide whether they yield to the temptation of being free from liability. This decision of the drivers also includes the decision to confront the vehicles' direct environment with the risks that come with autonomous cars, thereby exposing the environment to danger. Using an autonomous car is an autonomous decision of the drivers of which no pledge by manufacturers to accept full liability can disburden them. There is no law or legal principle stating that it is lawful to create unlimited sources of danger without being responsible for them only because someone else will accept liability instead. And this applies in particular, where the risk of creating such a source of danger to others can neither be assessed nor controlled by the driver. The strict liability enshrined in Sections 7 and 18 of the German Road Traffic Act (StVG) remains unaltered.

### **The deprived driver**

This issue is not only about assessing legal risks and liability. It is about the idea of man in general. To relieve the drivers of the burden of their moral and legal responsibility due to available technology that replaces them means to instrumentalize the drivers according to technological, generally error-prone rules and to deprive them

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<sup>46</sup> Mathias N. Schubert, „Autonome Fahrzeuge – Vorüberlegungen zu einer Reform des Haftungsrecht“ (“Autonomous driving – Preliminary considerations on a product liability reform”), *PHI* 2015, p. 46 ff; Lennart S. Lutz, „Autonome Fahrzeuge als rechtliche Herausforderung“ (“Autonomous vehicles as legal challenge”), *NJW* 2015, p. 119; Jänisch/Schrader/Reck, „Rechtsprobleme des autonomen Fahrens“ (“Legal problems posed by autonomous driving”), *NZV* 2015, p. 313.

of their personal responsibility. It means to animate them to let themselves be deprived. This can by no means be reconciled with the dignity of man, which rests on personal responsibility in the interest of the public and society at large, and in particular not if this deprivation is solely driven by economic interests. Because in this case, we are not “only” talking about deprivation within or because of a contractual relationship, which is well known from legal relationships such as employment contracts, health insurance contracts or the participation in social networks. We are talking about deprivation as a precondition for being allowed to participate in public road traffic and consequently about social relationships within the framework of public life under the conditions of no longer controllable communications technology, in which the drivers as traffic participants (and especially in this capacity) become the target audience of advertisement as well as other forms of influence and propaganda and are inescapably caught therein. If the drivers wish to drive autonomously out of their own interests, they will only be able to do so in an autonomous car if they succumb to being influenced and controlled. It is possible that one day this will be part of normal life – the power of continuous persuasion through subtle propaganda forms man’s beliefs – but currently it does not conform to the idea of man, at least not the one enshrined in the Basic Constitutional Law of Germany.

#### **Loss of control over personal data**

The risk of deprivation does not “only” materialize in terms of moral or ethical categories or references to the Basic Constitutional Law. The purchase price for an autonomous vehicle that the driver has to pay consists of two essential elements: The share paid in the currency “money” for using the autonomous vehicle and the share paid in the currency “personal data” by giving up one’s sovereignty over personal data. The drivers have to disclose their data profiles before acquiring an autonomous vehicle in order to check their eligibility to become buyers or users of autonomous cars or to customize the vehicles. Be that as it may, it is certain that every action and behavior of the drivers is recorded and saved as well as their conformity to those of the vehicle, the discrepancy between both and the conclusions drawn therefrom.<sup>47</sup> This data has an eternal life, the handling and manipulation of this data

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<sup>47</sup> This storage of basic data is common practice with almost all newer vehicles. The control over this data is held by the vehicle manufacturers. Functions such as data from automotive navigation systems or driving behavior data are maintained until they are changed or deleted by repair shops. Even if some of the functions can be deactivated by the driver, their exploitation until such time is arbitrary.

<http://www.handelsblatt.com/technik/it-internet/audi-vw-opel-daimler-und-bmw-das-geschieht-mit-den-daten-in-ihrem-auto/12484932.html> vom 27.10.2015.

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, Official Journal of the European Union, L 137/25 of 27.05.2008.

by the manufacturers and third parties<sup>48</sup> is completely beyond the driver's control. In cases where drivers want to use the data as evidence against the manufacturer, the data will hardly be made available to the driver without prior filtering if it proves that the manufacturer is at fault or only that the vehicle is defective. This state of being forced to adapt to data requests, a predestined route for self-driving cars, and the inevitable loss of control over personal data is a high, albeit increasingly inflationary, price to be paid. If one were to argue that the drivers were free to decide whether they wanted to use an autonomous car, this would only underscore the argued instrumentalization and deprivation. Cars have already been computers on wheels for a long time. The driver travels in roughly eight square meters through the landscape and is caught in the connectivity which Google and others take advantage of to inescapably infuse the driver with their products. The drivers cannot evade them because if they did, functions such as assistance or navigation systems might fail. This is a business model of unique nature. The chairman of the executive board of the automotive supplier Continental does the math:

Some 3 billion people worldwide use the internet, their average online time amounts to three hours per day: "Thus, this makes for about 9 billion online hours per day. In the internet industry, one online hour has a certain value due to advertisement and similar other aspects. This amounts to a multi billion market for all providers." The counterpart, as Degenhardt explains, are 1 billion passenger cars and light commercial vehicles which are operated for an average of one hour per day: "In theory, this would thus amount to a potential of 1 billion additional online hours per day – if everyone were to drive autonomous cars and (had) to use the internet. But even a fraction of this potential would be attractive to the internet industry." Against this backdrop, he continues, it makes sense that Google is working on robotic cars and attaches such great importance to connected mobility: "This is one of the main reasons why Google urges the automotive industry to finally realize more automatic driving functions. They have a very clever strategy and at the same time they cultivate their image and reputation as technology company", Degenhardt argued. Continental, as supplier for Google's robotic cars, will of course be open to and available for this new business model.<sup>49</sup> This is not per se condemnable, but not legally unproblematic, either.

### The fight for driver data

<sup>48</sup> Insurance companies, for instance, are increasingly engaging in such actions **so as to prevent/in return for** premium discounts.

<sup>49</sup> <http://www.finanzen.net/nachricht/aktien/Weisser-Fleck-des-Internets-Continental-Chef-Google-will-ins-Auto-und-nicht-ins-Autobaugeschaeft-4574087>; <http://www.n-tv.de/wirtschaft/Conti-will-Tech-Konzerne-belieferten-article16212601.html>

**Kommentar [CK1]:** Ich war mir in FN 48 unsicher, ob das „gegen“ im Original i.S.v. „Gegenmittel/Verhinderung“ oder i.S.v. „Gegenleistung“ zu verstehen ist. Bitte wählen Sie die korrekte Lösung unten aus.

A fierce battle is fought over gaining control over driver data while at the same time excluding the drivers' participation or influence, in particular between vehicle manufacturers and insurance companies. According to a study by KPMG, automakers have taken the lead.<sup>50</sup> The insurance companies' interests are mainly focused on preventing a loss of insurance business, whereas those of the automobile sector are spread among different dimensions: Superficially, they certainly have a necessary interest to have the data at their disposition to improve existing technologies so as to strengthen their stance on autonomous driving as a way to prevent accidents. However, the control over personal data and the applied data storage technology also serves the purpose of disclosing data which helps determine defects and responsibility – or having it disappear.<sup>51</sup> If for the time being the current legal provisions of German manufacturer liability law, according to which the injured party shall bear the burden to prove causality between the damage suffered and a defect in the (autonomous) car, remain applicable, it will be very difficult for the injured party to satisfy the burden of proof. According to product liability law, which allocates the burden of proof to the manufacturer, the manufacturer will have to answer the question as to why causality establishing data is not available (any more) to his disadvantage. Perhaps Volvo's voluntary pledge to accept liability was also informed by this consideration. The desire for data control is also always the desire to avoid transparency.

## Conclusion

Autonomous driving will come, just not right away and not exactly as envisioned. The American senators Edward Markey and Richard Blumenthal proposed a bill in early 2015 to protect drivers' privacy and generate safety protocols in order to ensure the connected vehicles reliability in view of fixed standards.<sup>52</sup>

Autonomous driving requires the credibility of and the trust in type-approval and certification procedures, manufacturing methods and testing. The basis for trust has to be found (or found again) first.

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<sup>50</sup> KPMG, „Gibt es eine Zukunft für die KFZ-Versicherung?“ („Does car insurance have a future?“), KPMG November 2015, [www.KPMG.de](http://www.KPMG.de)

<sup>51</sup> The terms “volatile storage”, containing data which cannot be reproduced, and “permanent storage”, containing data which can be reproduced and thereby also legally serve the allocation of the burden of proof, are already common practice in fields such as the assessment of functional safety according to ISO 26262.

<sup>52</sup> *Automotive News* of 01.06.2015, p. 38