

Driving without a Driver

Edited by
UWE KISCHEL and
MICHAEL RODI

Gesellschaft für Rechtsvergleichung e.V.

*Rechtsvergleichung
und Rechtsvereinheitlichung*

93

Mohr Siebeck

Rechtsvergleichung und Rechtsvereinheitlichung

herausgegeben von der
Gesellschaft für Rechtsvergleichung e.V.

93



Driving without a Driver

Autonomous Driving as a Legal Challenge

Proceedings of the 38th Congress
of the Society of Comparative Law in Tübingen,
September 29 to October 1, 2022

Edited by

Uwe Kischel and Michael Rodi

Mohr Siebeck

Uwe Kischel, born 1964; 1991–1992 assistant at the Max Planck Institute for Comparative and International Private Law (Prof. Drobnig); 1992–1993 LL.M. (Yale Law School); 1994 law clerk at the German Constitutional Court (Prof. P. Kirchhof); 1998–2002 senior assistant at the University of Mannheim (Prof. E. Riedel); 2003 substitute professor, University of Heidelberg; since 2003 Mercator Professor of Public Law, European Law and Comparative Law (North-Eastern Europe), University of Greifswald; member of the executive committee, International Association of Constitutional law; since 2022 president of the Society of Comparative Law.

Michael Rodi, born 1958; 1995 Master of Arts in Political Science; 1998 Habilitation, *venia legendi* (teaching qualification) in Public Law, Tax Law and European Law at the University of Munich; 1999–2021 Chair of Public Law, Financial Law, Environmental and Energy Law, University of Greifswald; 2006 honorary member of the Brazilian Tax Institute (IBPT); 2007–2009 adviser to the Vietnamese government for the implementation of an ecological tax reform; since 2009 Director of the Institute for Climate Protection, Energy and Mobility (IKEM); since 2023 Academic Director of the MBL European and International Energy Law, Technical University Berlin.

ISBN 978-3-16-162483-4 / eISBN 978-3-16-162532-9
DOI 10.1628/978-3-16-162532-9

ISSN 1861-5449 / eISSN 2569-426X (Rechtsvergleichung und Rechtsvereinheitlichung)

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliographie; detailed bibliographic data are available at <https://dnb.de>.

© 2023 Mohr Siebeck Tübingen, Germany. www.mohrsiebeck.com

This book may not be reproduced, in whole or in part, in any form (beyond that permitted by copyright law) without the publisher's written permission. This applies particularly to reproductions, translations and storage and processing in electronic systems.

The book was typeset by Martin Fischer in Tübingen using Stempel Garamond typeface, printed on non-aging paper and bound by Laupp & Göbel in Gomaringen.

Printed in Germany.

Preface

Driverless vehicles are one of the most prominent examples in the discussion about artificial intelligence, having gained much attention even in the general populace. New technical possibilities of digitalization and automation have moved the issue to the center of research on mobility. While the expectation that conventional vehicles could largely be replaced in the near future proved premature, many examples of practical applications are now emerging in which motor vehicles with autonomous or cooperative driving functions can actually be deployed in limited circumstances. Although an international legal framework aimed at harmonizing licensing law exists, national approaches to regulating individual applications diverge widely. They may be based on very different assumptions about the technical possibilities, solutions and range of application for these vehicles, as well as on diverging ethical and socio-economic frameworks and conditions. This range of solutions creates different national fields of experimentation that can inspire both technical and regulatory development. By contrast, this very diversity is a hindrance for cross-border traffic and vehicle markets.

The 38th Congress of the Society of Comparative law, which took place in Tübingen in fall 2022, offered a chance to discuss these questions in an international setting. The session of the Society's Section of Comparative Public Law aimed at contrasting different legislative and administrative approaches. Throughout the session, participants sought starting points for mutual inspiration as well as for possibilities to harmonize governmental regulatory practice, but also tried to identify points of orientation for vehicle developers and other actors in the field.

This volume contains the different contributions to the session of the Section of Comparative Public Law. For a topic such as this, the traditional method of country reports and general report proved to be most effective. *Eric Hilgendorf* presents the German point of view. *Martin Ebers*, together with *Mats Volberg* and *Rauno Kinkar*, explains the challenges under Estonian law, while *Jonas Knetsch* expounds the specific French point of view. *Nynke Vellinga* explicates the situation in the Netherlands, while *Gary Marchant* expands on the United States experience. Wrapping up all these divergent discussions, viewpoints and regulatory frameworks, *Michael Rodi* presents the general report. For purposes

of reference, the questionnaire that had originally been submitted to all contributors to form a common basis for discussion is also reprinted here.

As editors of this volume, we would like to express our special gratitude to the authors for their remarkable contributions and for the speed with which they submitted their manuscripts, as well as to the Secretary of the Section of Comparative Public law, Prof. Sebastian von Kielmansegg, whose calm and constant support in the background made our session the smooth experience that it was. We would also like to thank our assistants and students in Greifswald and Berlin, respectively, for their help during the course of the session as well as in preparing these Proceedings: Sara Reinhardt, who was in charge of editing this book on the Greifswald side, as well as Julius Fromm, Jytte Lauenstein, Lea Freitag, Hannah Gabriel, Michaela Hentze, Anna Mitzlaff, Robert Riep and Tim Seidensticker; Roman Weidinger for the editing on the Berlin side, as well as Nils Baumann and Mary Keogh.

Greifswald and Berlin, February 2023

Uwe Kischel
Michael Rodi

Table of Contents

Preface	V
<i>Eric Hilgendorf</i> Autonomous Driving and the Law in Germany	1
<i>Martin Ebers, Mats Volberg, Rauno Kinkar</i> Autonomous Driving – Challenges under Estonian Law	29
<i>Jonas Knetsch</i> The Legal Challenges of Autonomous Driving in France	61
<i>Nynke E. Vellinga</i> Report on the Legal Framework for Automated Driving on Public Roads in the Netherlands	85
<i>Gary E. Marchant</i> Autonomous Vehicles – The United States Experience	119
<i>Michael Rodi</i> General Report: Driving Without a Driver – Autonomous Driving as a Legal Challenge	145
<i>Matthias Hartwig, Michael Rodi</i> Questionnaire: Driving without a Driver – Autonomous Driving as a Legal Challenge	167
List of Contributors	175

Autonomous Driving and the Law in Germany

Eric Hilgendorf

A. Background to the Discussion

Rarely has a technological development attracted as much public attention in Germany as automated driving. At the present time – at least in the media – all kinds of ideas are being bandied about. In the plethora of promises, fears, suspicions and scandalizations, highly rational arguments may easily be lost sight of.

First of all, the media hype about automated driving probably has a lot to do with the fact that car driving in Germany is not just associated in people’s minds with transportation, but rather is also an expression of particular lifestyles, associated with attributes such as social status, longing for freedom, fun doing sports, and occasionally the desire for adventure. Automated driving does not fit well with those images. Furthermore, huge disruptions in road transport are just one part of the *digital transformation* which has changed very many aspects of our living and working environments in recent years, obviously at an increased pace. The “automated vehicle” therefore looks almost like a phantom upon which not only promises, but also fears, associated with digitization and automation are being projected.

All forms of transport are currently being put to the test by the pressing demands of energy conservation and climate protection. Related challenges are the switch to “electric driving”¹ and the changed appreciation of automobiles which, especially among the younger generation, are often no longer seen as important status symbols and expressions of individual freedom but at best as a means of individual transportation. Road transport today is therefore in a phase of radical upheaval; a disruptive change that can probably only be compared with the advent of passenger cars at the beginning of the 20th century.²

¹ *Oekom e.V.* – Verein für ökologische Kommunikation (ed.), *Postfossile Mobilität. Zukunftstauglich und vernetzt unterwegs*, 2014; for a critical treatment of e-driving; cf. *Karin Kneissl*, *Die Mobilitätswende und ihre Brisanz für Gesellschaft und Weltwirtschaft*, 2020, p. 124 et seq.

² The various aspects of the current “disruption in transport” are highlighted in: *Lawrence Burns*, *Autonomy. The Quest to Build the Driverless Car – and How It Will Reshape Our*

In particular, the German automotive industry is facing great challenges in a range of different areas. On the one hand, it forms “the backbone of the German economy”.³ More than any other industry, it creates jobs in Germany and makes substantial tax payments to the Federal Treasury that are urgently needed to maintain social standards in the Federal Republic of Germany.⁴ On the other hand, the automotive industry has been criticized for neglecting environmental issues,⁵ for not waking up to the switch to e-driving, and even for using criminal methods to defend its privileged position during the so-called *dieselgate scandal*.⁶ Even if some of those accusations may be exaggerated, it cannot be doubted that the German automotive industry is not only struggling with this technological upheaval, but also with severe acceptance problems that are partly self-inflicted.

A further challenge is posed by new regulatory proposals currently being drafted at EU level that affect road transport at least to the extent that it is AI-based.⁷ Regulations specifically for the e-driving sector are also already being prepared.⁸ Both European transport policy and the regulation of AI, which is still in its infancy, must be designed in accordance with European consumer

World, 2018; *Weert Canzler/Andreas Knie*, Die digitale Mobilitätsrevolution. Vom Ende des Verkehrs wie wir ihn kannten, 2016; *Katja Diehl*, Auto-Korrektur. Mobilität für eine lebenswerte Welt, 2022; *Ferdinand Dudenhöffer*, Wer kriegt die Kurve? Zeitenwende in der Autoindustrie, 2016; *Timo Daum*, Das Auto im digitalen Kapitalismus. Wenn Algorithmen und Daten den Verkehr bestimmen, 2019; *Andreas Herrmann/Walter Brenner*, Die autonome Revolution. Wie selbstfahrende Autos unsere Straßen erobern, 2018; *Nari Kable*, Mobilität in Bewegung. Wie soziale Innovationen unsere mobile Zukunft revolutionieren, 2021; *Hod Lipson/Melba Kurman*, Driverless. Intelligent Cars and the Road Ahead, 2016; *Markus Maurer et al.* (eds.), Autonomes Fahren. Technische, rechtliche und gesellschaftliche Aspekte, 2015; *Stephan Rammler*, Schubumkehr. Die Zukunft der Mobilität, 2014; *W.I.R.E.* (ed.), Transforming Transport. Zur Vision einer intelligenten Mobilität, 2016; see also *acatech* (ed.), Horizonte: Transformation der Mobilität, 2021.

³ *Kneissl*, Die Mobilitätswende (fn. 1), p. 137.

⁴ It is a truism that has unfortunately repeatedly been overlooked, although rarely openly denied, that an efficient welfare state presupposes an efficient economy in which the necessary resources are generated. Conversely, however, it is also true that the economy benefits considerably from a high general level of education, social equality, committed consumer policy and social mobility.

⁵ *Oekom e.V.* – Verein für ökologische Kommunikation (ed.), Mobilitätswende. Die Zeit ist reif, 2021.

⁶ On the dieselgate (emissions) scandal, cf. *Kai Borgeest*, Manipulation von Abgaswerten: Technische, gesundheitliche, rechtliche und politische Hintergründe des Abgasskandals, 2nd ed. 2021; *Gerhard Ring*, Straßenverkehrsrecht vol. 20 (2020), p. 401 et seq.; the same author, Straßenverkehrsrecht vol. 21 (2021), p. 121 et seq.; see also *Kneissl*, Die Mobilitätswende (fn. 1), p. 121 et seq.

⁷ *Eric Hilgendorf/David Roth-Isigkeit* (eds.), Die neue Verordnung der EU zur Künstlichen Intelligenz: Rechtsfragen und Compliance, 2023.

⁸ For an overview of EU activities in the field of automated and connected driving, see <https://www.europarl.europa.eu/news/en/headlines/economy/20190110STO23102/self-driving-cars-in-the-eu-from-science-fiction-to-reality> (last accessed 08.12.2022).

protection requirements that are intended not only to promote the creation of a common internal market, but also to protect European consumers from unnecessary risks and to ensure relevant consumer rights.⁹ Consumer protection is a cross-cutting task not only at national level, but also at the European one, which also and especially applies to the regulation of modern road transport.¹⁰ It is to be expected that in the future, current national legal frameworks for automated and connected driving¹¹ will be increasingly overlaid and influenced by European legislation.

That does not merely include automated and connected road vehicles, although the “autonomous vehicles” referred to here are often almost the only focus of media interest. Modern transportation includes rail, air, and water transport, and, ultimately, the use of roads and highways by motorcyclists, cyclists and pedestrians.¹² Transport in the future will probably mean primarily networked systems of transport,¹³ especially in metropolitan areas: after arriving by car, bus or train, passengers will transfer to inner-city rail transport, which then takes them very close to their destinations. The “last kilometer” may be covered by autonomously driven taxis, waiting pedelecs or bicycles, or even on foot.

Networked transportation systems require extremely precise coordination and control to function well; for the moment it can hardly be imagined that anything other than digitized control systems using AI-control could be up

⁹ For European rules on consumer policy see *Stefan Ulrich Pieper*, in: Jan Bergmann (ed.), *Handlexikon der Europäischen Union*, 6th ed. 2022, p. 1045 et seq.; *Britta Lurger*, *ZEUP* 2018, p. 788 et seq.

¹⁰ Transport policy has, of course, always been linked to concerns about the common good and thus also to environmental and consumer protection, even if concepts such as “consumer protection” and “sustainability” are of more recent origin, cf. for example *Hendrik Ammoser*, *Das Buch vom Verkehr. Die faszinierende Welt von Mobilität und Logistik*, 2014, p. 314 et seq.; *Christoph Maria Merki*, in his book *Verkehrsgeschichte und Mobilität*, 2008, p. 88 et seq. distinguishes the following sustainability dimensions of modern transport: social costs, energy consumption, land consumption, and private vs. public. On the history of transportation in general, cf. *Hermann Schreiber*, *Verkehr*, 1969.

¹¹ For an outline of the problem, cf. *Eric Hilgendorf*, *Automatisiertes Fahren und Recht. Gutachten für den 53. Deutschen Verkehrsgerichtstag in Goslar*, in: 53. Deutscher Verkehrsgerichtstag 2015, p. 55 et seq.; see also *Bernd H. Oppermann/Jutta Stender-Vorwachs* (eds.), *Autonomes Fahren. Technische Grundlagen, Rechtsprobleme, Rechtsfolgen*, 2nd ed. 2019; for a treatment concentrating on criminal law problems, cf. *Nina Nestler*, *Jura* 2021, p. 1183 et seq.; regarding threats to fundamental rights, cf. *Alexander Roßnagel/Gerrit Hornung* (eds.), *Grundrechtsschutz im Smart Car. Kommunikation, Sicherheit und Datenschutz im vernetzten Fahrzeug*, 2019; finally, see also the focus issue “Verkehrswende” of *Zeitschrift für das Recht der Digitalen Wirtschaft (ZdW)* 2022, issue 1.

¹² Transport policy must therefore focus on much more than just autonomous road transport, see for example *Ammoser*, *Das Buch vom Verkehr* (fn. 10), p. 241 et seq.

¹³ *Acatech* (ed.), *Transformation der Mobilität* (fn. 2), p. 22 et seq.; *Karsten Lemmer* (ed.), *Neue autoMobilität II: Kooperativer Straßenverkehr und intelligente Verkehrssteuerung für die Mobilität der Zukunft*, 2019 (acatech study).

to the task. The creation of such systems, which should not only function conveniently and smoothly¹⁴ but also meet the requirements of sustainable, energy-saving and environmentally friendly transport, will perhaps be one of the greatest challenges to transport policy in the coming decades.¹⁵ In this context, there are not only practical challenges but also difficult basic issues that are particularly important from the consumer point of view, such as the balance between individual freedom and (legally or technologically) enforced conformity to rules.¹⁶

B. New Transportation and Consumer Protection

In summer 2021, Germany became the first country in the world to enact rules for the autonomous operation of motor vehicles. This was preceded by many years of planning, as well as ethical and legal analyses, and practical tests. According to experience and discussion to date, the reform has been successful.¹⁷ It is to be expected that the German regulatory model will also exert a strong influence on the future European regulation of automated and autonomous driving. At present (June 2022), the first practical projects are being prepared on the basis of the new legislation.¹⁸

It is obvious that it is not easy for national parliaments and regulatory agencies to control and steer technological development with the necessary restraint and sense of proportion. At the moment, academics and civil servants, together with experts from the Ministry of Transport and Infrastructure, seem to dominate. But car manufacturers, insurance companies and consumer organizations such as the German Automobile Club ADAC, a very influential drivers' organization, are also taking part in the debate. One could say that by and large that debate is currently shifting away from fundamental issues towards more concrete problems.

A public welfare-oriented (and indeed public welfare-promoting) consumer policy in the field of modern transport can be developed on the basis of the following principles, among others:

¹⁴ Increasingly, this includes resistance (or resilience against) to cybercrime.

¹⁵ *Rammler*, Schubumkehr (fn. 2), p. 73 et seq.

¹⁶ On this point, *Dieter Birnbacher*, Fahrerlose Fahrzeuge – Wieviel Gleichheit, wieviel Freiheit?, in: Susanne Beck/Carsten Kusche/Brian Valerius (eds.), Digitalisierung, Automatisierung, KI und Recht. Festgabe zum 10jährigen Bestehen der Forschungsstelle RobotRecht, 2020, p. 17 et seq.

¹⁷ *Eric Hilgendorf*, JZ 2021, 444 (454).

¹⁸ See *Heike Buchter/Claas Tatje*, in: DIE ZEIT, 10.2.2022, p. 24.

(1) Transportation should not be seen solely as an expression of individual aspirations for freedom, but as an essential aspect of the common good.¹⁹

(2) It should be possible to reach all individual transport destinations quickly and conveniently. To achieve this goal, a compromise must be found between different freely selectable means of transport (e. g., cars and bicycles).²⁰

(3) Transport in all its forms must be designed to be as safe as possible. A balance must be struck between individual freedom and risk-minimizing equality.²¹ In particular, from the point of view of consumer protection, risk reduction through technological coercion (i. e., technological paternalism) should per se not be viewed negatively.²²

(4) The cost of transport should be affordable for all, i. e., convenient transportation should not become a privilege of the rich. Free public transport is also an option in this context.²³

(5) All means of transportation should be designed to be as environmentally friendly and sustainable as possible.²⁴ This will require technological innovation.²⁵

(6) To the extent that transport requires the operation of mobile phones or similar devices (e. g., for ordering an autonomous shuttle or driving a vehicle), the technology should be designed so that average consumers can readily use it.²⁶

(7) Adequate transport services must also be available for the elderly and the disabled.²⁷ Switching between different means of transport (e. g., changing from train to bus or shuttle) must in principle be possible for everyone irrespective of age or handicap.

¹⁹ *Nari Kable*, *Mobilität in Bewegung* (fn. 2), p. 23.

²⁰ This means, in fact, that the privileging of automobile transport at the expense of pedestrians and cyclists must be pushed back. This process is already under way. A look into a (possible) future is provided by *Rammler*, *Schubumkehr* (fn. 2), p. 219 et seq.

²¹ See above fn. 16.

²² *Eric Hilgendorf*, *Gemeinwohlorientierte Gesetzgebung auf Basis der Vorschläge der EU "High-Level-Expert-Group on Artificial Intelligence"*, in: Chris Pierrat (ed.), *Wert der Digitalisierung. Gemeinwohl in der digitalen Welt*, 2021, p. 223 (247 et seq.).

²³ On reducing the price of transport services in general, cf. *Merki*, *Verkehrsgeschichte und Mobilität* (fn. 10), p. 81 et seq.

²⁴ *Rammler*, *Schubumkehr* (fn. 2), p. 75 et seq.

²⁵ A whole panorama of forward-looking ideas is discussed by *Rammler*, *Schubumkehr* (fn. 2), p. 219 et seq.

²⁶ The problematic area of the "digital divide" is often neglected in the debate about the new forms of transport. Above all, the concerns of older people, who feel overwhelmed by the speed of the "digital revolution", are regularly overlooked. There are still many people in Germany who do not have a smartphone, and there is also no legal obligation (yet?) to acquire and carry a smartphone.

²⁷ On the related problems and challenges, cf. *Reinhilde Stöppler*, *Menschen mit (Mobilitäts-)Behinderung. Teilhabe und Verkehrssicherheit*, 2015 (Deutscher Verkehrssicherheitsrat, Schriftenreihe Verkehrssicherheit 18).

(8) Public transportation must provide adequate opportunities for users to report problems encountered during travel, make suggestions for improvements, and possibly request compensation. Sufficient opportunities should be available to support civic engagement and incorporate it into transportation planning.

(9) Transport law should be designed in such a way that those affected can be compensated in an uncomplicated and unbureaucratic manner in the event of damage. The increasing use of AI and other forms of connected technology must not lead to liability gaps or diffusion of responsibility.²⁸

(10) Private consumer protection organizations active in the field of transportation must be granted appropriate opportunities for participation in the planning and implementation of projects. They must also be consulted when new legislation is being considered.²⁹

C. The New Law for Autonomous Cars in Germany

At the beginning of February 2021, the German government presented a draft statute that would allow autonomous driving in Germany.³⁰ In August 2021, the bill was enacted into law. Possible deployment scenarios include municipal transportation needs in the context of local public transport, for example between town centres and shopping malls, out-of-town train stations, areas where logistics firms (such as mail or document distribution) are located, operational shuttles for companies, or even trips between medical care centres and retirement and nursing homes. However, vehicles used for these purposes are supposed to be autonomous not teleoperated. The explanatory memorandum to the new legislation states that the aim is “to go beyond the testing of autonomous, driverless vehicles, which is already possible in public road transport and to commence their regular operation”.³¹

²⁸ For a general view on the subject of “responsibility during road use”, cf. *Eric Hilgendorf*, in: Roßnagel/Hornung (eds.), *Grundrechtsschutz im Smart Car* (fn. 11), p. 147 et seq.

²⁹ Well-known and influential organizations of this kind include the German Automobile Club (ADAC) and the German Road Safety Council (DVR).

³⁰ Draft Law on the Amendment of the Road Traffic Act and the Compulsory Insurance Act Law on Autonomous Driving, Bundesrat Drucksache 155/21, 12.2.2021, <http://dipbt.bundestag.de/dip21/brd/2021/0155-21.pdf> (last accessed 08.12.2022). In parallel, the law on passenger transport was reformed, see <https://www.bundestag.de/dokumente/textarchiv/2021/kw09-de-personenbefoerungsrecht-824864> (last accessed 23.03.2023). The above text is based on *Eric Hilgendorf* (fn. 17), p. 444 et seq.

³¹ Draft (fn. 30), p. 1. See also *Dieter Birnbacher*, *Fahrerlose Fahrzeuge – Wieviel Gleichheit, wieviel Freiheit?*, in: Beck/Kusche/Valerius (eds.), *Digitalisierung, Automatisierung, KI und Recht* (fn. 16), p. 17 et seq.

Towards that end, a legal framework for the operation of driverless vehicles in specified operating areas is to be created. This follows on from the regulations already set out in the Eighth Law Amending the Road Traffic Act on the operation of motor vehicles with highly and fully automated driving functions:³² “In the absence of international, harmonized regulations, such far-reaching technological developments require national parliaments to enact legislation on the operation of motor vehicles with autonomous driving functions, as well as requirements for persons involved, as well as for the motor vehicles themselves.”³³ The automotive industry is already working on vehicles which will comply with these requirements.³⁴

It had been predicted that the development of automated and connected driving would develop in the direction of autonomous motor vehicle use in specifically designated areas.³⁵ What is surprising, however, is the extent and level of detail of the requirements contained in the new statute. It raises highly complex issues relating both to the regulation of new IT technologies, as well as to the interactions between man and machines³⁶, which extend far beyond autonomous driving and will need to be discussed intensively in the coming years. This also applies specifically to questions relating to the duty of care requirements for drivers and other parties involved.

I. Terminology

The new statute begins with definitions, some of which are based on the language contained in §§ 1a and 1b of the German Road Traffic Act (StVG), which were introduced in the summer of 2017.³⁷

1. Motor Vehicles with Autonomous Driving Function

§ 1d of the new legislation defines the concept of a motor vehicle with autonomous driving functions in subsection 1: “For purposes of this Act, a motor vehicle with autonomous driving functions is a motor vehicle that (1) is

³² Eighth Act Amending the Road Traffic Act of June 16, 2017 (BGBl. I p. 1648), entered into force on June 21, 2017.

³³ Draft (fn. 30), p. 1.

³⁴ See, for example, https://lohr.fr/lohruploads/2021/02/2021-02-23_de_mobileye-transde-v-lohr-collaboration_final.pdf (last accessed 08.12.2022).

³⁵ *Hermann/Brenner*, Die autonome Revolution (fn. 2), p. 26 et seq., 50 and further. Another currently important development is the emergence of so-called “level 2-hands free” models.

³⁶ On the relevant liability and intellectual property law issues, cf. *Renate Schaub*, JZ 2017, p. 342 et seq.

³⁷ The Eighth Law Amending the Road Traffic Act of June 16, 2017 (BGBl. I, p. 1648) entered into force on June 21, 2017. Details may be found in *Eric Hilgendorf*, Automatisiertes Fahren als Herausforderung für Ethik und Rechtswissenschaft, in: Oliver Bendel (ed.), Handbuch Maschinenethik, 2019, p. 355–372 (359 et seq.).

capable of performing driving tasks independently within a specified operating range without a person driving the vehicle, and (2) has the technological equipment as specified in subsection (2) of § 1e.”³⁸

The first thing worth noting here is the reference to “autonomous” driving functions in contrast to the “highly and fully automated” driving functions addressed in §§ 1a and 1b StVG. A technological system is “autonomous” if it can react appropriately in specific kinds of problem situations without additional human input.³⁹ Since the statute is about regulating transport using driverless vehicles that travel autonomously so that remote driving control is assumed by technological supervisors (i.e., the control center) in exceptional cases, use of the word “autonomous” seems appropriate.

However, the vehicles addressed here are only supposed to operate in defined areas, namely “specified operating areas” (§ 1d subsection 2), and must not operate in other areas. The new statute therefore rightly assigns them to SAE level 4, and not level 5 (and corresponding BAST classifications⁴⁰).⁴¹ In order to distinguish the driving functions meant here from unrestricted autonomous use, one could call them “restricted autonomous driving functions” (and thus also restricted autonomous technological systems).

It is noteworthy that the new statute refers generally to “motor vehicles”. This includes motor vehicles of every type and weight class, from motorized scooters to automated taxi cabs and minibuses to trucks and heavy goods vehicles. In view of the dangers posed by motor vehicles in road traffic, it would have been preferable to first permit only vehicles up to a certain weight class to drive autonomously, or to impose more stringent safety requirements on vehicles with a higher mass or those that could possibly operate at higher speeds. There have been frequent calls for such a system of risk classification in recent years in connection with the regulation of modern technologies, such as artificial intelligence;⁴² it would have clear advantages over traditional liability concepts.⁴³

³⁸ My translation.

³⁹ Hilgendorf, *Automatisiertes Fahren und das Recht* (fn. 11), p. 56.

⁴⁰ For a current overview, see https://www.bast.de/BAST_2017/DE/Presse/Mitteilungen/2021/06-2021.html (last accessed 08.12.2022). The significance of the level classification for the law is regularly overestimated; in particular, no legally binding standards of conduct can be derived from the technical assignment of a vehicle to a particular level. For more detail, see Hilgendorf, *Automatisiertes Fahren und das Recht* (fn. 11), p. 62.

⁴¹ Draft (fn. 30), p. 15.

⁴² For example, in the “Ethics Guidelines” of the European High Level Expert Group (EU HLEG AI) on Artificial Intelligence, <https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai>, p. 17 (last accessed 08.12.2022).

⁴³ Whereas the traditional determination of the “care required to drive in traffic” in principle leaves judges and other legal practitioners with a great deal of freedom, a model graded according to risk allows to prescribe the requirements of care in more detail. In this way, decision making on the required level of safety is shifted to parliaments and thus democratically legitimized. At the same time, the courts are relieved of the burden. Determining the duty of

2. Specified Operating Range

§ 1d (2) defines the term “specified operating area”, i.e. the area in which (restricted) autonomous vehicles could travel: “For purposes of this Act, a designated operating area means the locally and spatially determined public road space in which a motor vehicle with an autonomous driving function may be operated if the requirements under § 1e (1) are met.”

The explanatory memorandum to the new statute emphasizes that the new regulations only apply to areas dedicated to road transport.⁴⁴ However, this does not prevent the regulation from also applying to autonomous use on private property, for example on the premises of a company. A more detailed definition of the operating areas intended for use by autonomous vehicles is not specified. This allows driving zones to be defined as needed, depending on the requirements and in accordance with local conditions. Autonomous driving in parking garages (automated valet parking, AVP) is also covered by the statute’s regulatory model, i.e., a parking garage or individual lanes in the parking garage also qualify as “defined operating areas”.

The statute states that the operating area is initially defined by the owner of the autonomous car or, more likely, fleet of cars. After that, this operating area defined by the owner is subject to approval by the authority responsible under state law.⁴⁵ This means that the owners of autonomous cars, who are best able to judge the technological performance of their vehicles, can make proposals for the routes to be driven on and also for the design of those routes, including special safety provisions such as signs and the like. However, final approval of routes lies with the respective (state) authority responsible under state law. The statute also emphasizes that it is conceivable that an autonomous vehicle could be used in several defined operating areas.⁴⁶

3. Technological Supervision

Probably the most interesting and at the same time most problematic concept in the new statute, not only from the perspective of the duty of care to be applied, is that of the “technological supervisor” (§ 1d (3) StVG): “A technological supervisor of a motor vehicle with autonomous driving function within the meaning of this Act is the natural person who can approve driving maneuvers for the vehicle, or can deactivate the motor vehicle during operation.”

care necessary for new areas of technology requires technological knowledge that the courts are unlikely to possess to a sufficient degree.

⁴⁴ Draft (fn. 30), p. 23.

⁴⁵ Draft (fn. 30), p. 23.

⁴⁶ Draft (fn. 30), p. 24.

The task(s) allocated to technological supervision are therefore the approval of special driving maneuvers and the deactivation of the vehicle in emergencies.⁴⁷ These are telematic tasks that would traditionally have been assigned to a “driving center” or “traffic control center” or the like. Telematics⁴⁸ has long been an important topic in the context of modern transportation – one need only think of rail and air transport. It involves remote access of varying intensity, from observation and data storage or transmission to central servers, through intervention in (variously defined) exceptional cases, to complete remote control (think, for example, of remote-controlled drones). In the context of automated driving, telematically guided convoys of trucks (so-called “platooning”) have, among other things, been discussed.⁴⁹

It is very remarkable that the new statute explicitly assigns the task of “technological supervision” to natural persons, i.e., to human beings. In the case of autonomous driving, one would intuitively see the task of a traffic control center more in the hands of an AI system, which would be capable of responding to numerous complex queries simultaneously and without delay, efficiently and reliably. Whether humans are equally capable and resilient seems unclear; in contrast, an AI system can in principle work around the clock, seven days a week, without fatigue or distraction.

The assignment of the task of technological supervision to natural persons can be justified by the fact that it would first have to be shown that available AI systems can actually perform the task of technological supervision in the sense outlined above without error (or at least nearly without error). Furthermore, in tort law only human beings may be liable for damages but not machines as machines cannot be bearers of rights and obligations in the German legal system (at least not yet).⁵⁰ In addition, the acceptance of vehicles driven and controlled exclusively by AI would probably not be great among the population. It is the case that railway shuttles at airports and some underground subway trains are already in driverless operation under AI control, but there are usually human personnel who can intervene to override the AI. Similarly, human staff are available to answer passenger questions.

According to § 1f (1) No. 3 StVG, the tasks of “technological supervision”, i.e. central monitoring, control and, if necessary, problem control, are the responsibility of vehicle owners. This makes sense, especially in the absence of human drivers, as the owners are also responsible for the safety of the vehicle under current German road traffic law. The function of “technological super-

⁴⁷ For more detail, see below C.II.2.d).

⁴⁸ The term “telematics” is a compound of the terms “telecommunications” and “information technology”.

⁴⁹ *Herrmann/Brenner*, Die autonome Revolution (fn. 2), p. 82.

⁵⁰ On the debate about “e-persons”, cf. *Hilgendorf*, Automatisiertes Fahren als Herausforderung für Ethik und Rechtswissenschaft (fn. 37), p. 357 with further references.