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From the testing to the deployment of self-driving cars: Legal challenges to policymakers on the road ahead

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A B S T R A C T

Self-driving cars and self-driving technology are tested on public roads in several countries on a large scale. With this development not only technical, but also legal questions arise. This article will give a brief overview of the legal developments in multiple jurisdictions – California (USA), United Kingdom, and the Netherlands – and will highlight several legal questions regarding the testing and deployment of self-driving cars.

Policymakers are confronted with the question how the testing of self-driving cars can be regulated. The discussed jurisdictions all choose a different approach. Different legal instruments – binding regulation, non-binding regulation, granting exemptions – are used to regulate the testing of self-driving cars. Are these instruments suitable for the objectives the jurisdictions want to achieve?

As technology matures, self-driving cars will at some point become available to the general public. Regarding this post-testing phase, two pressing problems arise: how to deal with the absence of a human driver and how does this affect liability and insurance? The Vienna Convention on Road Traffic 1968 and the Geneva Convention on Road Traffic 1949, as well as national traffic laws, are based on the notion that only a human can drive a car. To what extent a different interpretation of the term 'driver' in traffic laws and international Conventions can accommodate the deployment of self-driving cars without a human driver present will be discussed in this article.

When the self-driving car becomes reality, current liability regimes can fall short. Liability for car accidents might shift from the driver or owner to the manufacturer of the car. This could have a negative effect on the development of self-driving cars. In this context, it will also be discussed to what extent insurance can affect this development.

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1. Introduction

In May 2016 on a road in Florida, USA, a car and a tractor trailer collided, killing the person in the car. Although accidents like these happen every day[1], this accident was different.[2] The car involved was a Tesla Model S, equipped with the so-called 'Autopilot', a technical feature allowing the car to drive itself under the supervision of the conventional driver. The 'Autopilot' was turned on at the time of the accident. The person in the car overlooked the truck, but so did the 'Autopilot'.[3] This fatal crash sparked a discussion on the safety of self-driving technology.[4] Currently self-driving cars and self-driving technology (like Tesla's Autopilot) are tested on public roads in several countries on a large scale.[5] With this development not only technical, but also legal questions arise. Policymakers are confronted with the question how this development can be regulated. For the short term, the main question that rises is how trials with self-driving cars should be regulated.

This article will first describe the current state of technological developments (Section 2) and will look into the interests at stake and actors involved (Section 3). Before taking a closer look at the legislative developments in different jurisdictions, the legal consistency across different jurisdictions will be discussed (Section 4). Subsequently, how trials with self-driving cars are regulated in different jurisdictions will be studied (Section 5). The jurisdictions that will be discussed – California (USA), United Kingdom, and the Netherlands – all choose a different approach. Are these approaches suitable for the objectives the jurisdictions want to achieve? As technology matures, self-driving cars will at some point become available to the general public. Regarding this post-testing phase, two pressing problems arise: how to deal with the absence of a human driver and how does this affect liability and insurance? Besides addressing these questions, recommendations will be made regarding these topics (Sections 6 and 7).

2. Terminology and technology

In the media and literature several terms are used to describe a vehicle that can operate without a human driver, either under certain circumstances or for the complete trip. Terms like self-driving car, driverless car, and autonomous car are all commonly used terms but do not necessarily have the same meaning in every context. In this article these three terms – self-driving car, driverless car, and autonomous car – are used to describe a motor vehicle that can operate during a whole trip without human interference; it does not require a user to intervene when a problem occurs.[6]

The degree to which a car is able to drive independently, without human interference, is described by the SAE International.[7] The level of automation is described on a scale from 0 (no automation) to 5 (full driving automation):

- Level 0: no driving automation. The whole dynamic driving task (the lateral and longitudinal vehicle motion control,

[1] Every year over 1,2 million people die in road traffic: World Health Organization, *Global Status Report on Road Safety, 2015* (World Health Organization 2015) <www.who.int/violence_injury_prevention/road_safety_status/2015/en/ > accessed 18 April 2017.

[2] Anjali Singhvi and Karl Russel, 'Inside the Self-Driving Tesla Fatal Accident,' *The New York Times* (New York City, 12 July 2016) <www.nytimes.com/interactive/2016/07/01/business/inside-tesla-accident.html?_r=0 > accessed 30 March 2017. See for a more extensive legal contemplation of the accident: Lennart S. Lutz, 'Unfälle mit dem Tesla Autopiloten: Implikationen für das automatisierte Fahren?'[2016] Deutsches Autorecht 506. The police report of the accident is available at <http://documents.latimes.com/tesla-accident-report/> accessed 3 May 2017.

[3] The Tesla Team, 'A Tragic Loss' (30 June 2016) <www.tesla.com/blog/tragic-loss?redirect=no> accessed 30 March 2017. The American National Highway Traffic Safety Administration started an investigation into this accident: <www.documentcloud.org/documents/2991479-NHTSA-letter-to-Tesla.html> (last visited 29 November 2016). The final report is available at <https://static.nhtsa.gov/odi/inv/2016/INCLA-PE16007-7876.PDF> accessed 9 February 2017.

[4] Anjali Singhvi and Karl Russel, 'Inside the Self-Driving Tesla Fatal Accident,' *The New York Times* (New York City, 12 July 2016) <www.nytimes.com/interactive/2016/07/01/business/inside-tesla-accident.html?_r=0> accessed 30 March 2017, Danny Yadron and Dan Tynan, 'Tesla driver dies in crash while using autopilot mode,' *The Guardian* (London, 1 July 2016) <www.theguardian.com/technology/2016/jun/30/tesla-autopilot-death-self-driving-car-elon-musk> accessed 30 March 2017, Larry Greenemeier, 'Deadly Tesla Crash Exposes Confusion over Automated Driving. Amid a federal investigation, ignorance of the technology's limitations comes into focus' (*Scientific American*, 8 July 2016) <www.scientificamerican.com/article/deadly-tesla-crash-exposes-confusion-over-automated-driving/> accessed 4 April 2017, Bill Vlasic and Neal E. Boudette, 'Self-Driving Tesla Was Involved in Fatal Crash, U.S. says,' *The New York Times* (New York City, 30 June 2017) <www.nytimes.com/2016/07/01/business/self-driving-tesla-fatal-crash-investigation.html?_r=0> accessed 11 April 2017, Letter from the Federation of European Motorcyclists' Associations (FEMA), Koninklijke Nederlandse Motorrijders Vereniging (KNMV) and Motorrijders Actie Groep (MAG) to the Dutch Vehicle Autorithy (RDW) of 14 October 2016, <www.fema-online.eu/website/wp-content/uploads/RDW_141016_EN.pdf> accessed 11 April 2017, 'Tesla soll in Deutschland nicht mehr mit "Autopilot" werben' (*heise online*, 16 October 2016) <www.heise.de/newsticker/meldung/Tesla-soll-in-Deutschland-nicht-mehr-mit-Autopilot-werben-3351230.html> accessed 11 April 2017.

[5] On the public roads of California alone, Google's self-driving car company Waymo had a fleet of 60 self-driving cars driving over 600,000 miles on Californian public roads (50% more miles than in 2015): Report on Autonomous Mode Disengagements For Waymo Self-Driving Vehicles in California December 2016 <www.dmv.ca.gov/portal/wcm/connect/946b3502-c959-4e3b-b119-91319c27788f/GoogleAutoWaymo_disengage_report_2016.pdf?MOD=AJPERES> accessed 11 April 2017. An overview of trials across the globe is available at <http://knowledgeagenda.connekt.nl/engels/2017/03/09/overview-roadmaps-and-pilots/> accessed 9 March 2017.

[6] Level 5 of SAE International, *Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles. Standard J3016* (revised September 2016).

[7] SAE International, *Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles. Standard J3016* (revised September 2016). Other descriptions are available, see for instance National Highway Traffic Safety Administration, 'Preliminary Statement of Policy Concerning Automated Vehicles', 2013, and Tom M. Gasser (Projektgruppenleitung) and others, *Bericht zum Forschungsprojekt F1100.5409013.01 des Arbeitsprogramms der Bundesanstalt für Straßenwesen: Rechtsfolgen zunehmender Fahrzeugautomatisierung* (Bundesanstalt für Straßenwesen 2012).

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