

STREETS AHEAD

Alex Glassbrook, barrister, October 2017

As cars with automated driving features are tested on our roads and fully “driverless” vehicles seem a more likely prospect, legislators across the world have started to write the laws for driverless future.

Many states are starting to consider, individually, the legal implications of the next advances in driving technology. But legislators in the European Union and the United States of America are looking further into the future.

Alex Glassbrook (barrister at Temple Garden Chambers¹ in London and author of “The Law of Driverless Cars: An Introduction”²) examines those two approaches - and the challenge of writing laws for an unexplored, robot world.

Introduction

We are standing on the edge of discovery. The technology of artificial intelligence has not yet advanced to the stage of the robot driver – a computer system capable of controlling the speed and direction of a car safely, automating a vehicle entirely and removing the need for human driving, with all its dangers. But the technology is close. And the smartphone generation expects it to happen.

So does the motor vehicle industry. The development of the electric car is at a similar stage to the driverless vehicle – accelerating but not yet at its destination. Automated driving has been promoted as a feature of electric vehicles. For the electric car, the stage not yet reached is the battery, not yet durable enough for the distances expected by owners of fuel-powered cars.

But, as with artificial intelligence, the technology has hope on its side. And the unprecedented resources of a world-dominating phenomenon: the commercialisation of the internet. The

¹ <http://tgchambers.com/member-profile/alex-glassbrook/> . Email ag@tgchambers.com. The opinions in this paper are those of the writer and not necessarily those of Temple Garden Chambers. This paper should not be relied upon as legal advice. Links are included for the purposes of comment only and the views or information within them are not endorsed. **Acknowledgments:** The writer was among the speakers at the first Future of Transportation World Conference, held in Cologne, Germany, on 5 and 6 July 2017 (www.thefutureoftransportconference.com). I am grateful to all participants at that conference, especially to the following speakers whose work I have referred to again while writing this article: Roeland de Bruin of the University of Utrecht; Lucy McCormick, barrister, of Henderson Chambers, London; Katherine Sheriff of the Warshauer Law Group in Atlanta, Georgia; Martijn Steger, Leader of Global Business Law and Chief Innovation Officer of Kegler Brown, Hill and Ritter in Columbus, Ohio; Dr Benedikt Wolfers of Freshfields Bruckhaus Derringer, Berlin. Any errors are my own.

² <https://www.amazon.co.uk/Law-Driverless-Cars-Introduction/dp/1911035282>

internet has expanded and accelerated access to consumer goods and services, creating new services and leaving others obsolete.

The “Internet of Things”- the network of connected devices constantly absorbing and exchanging information - will include driverless cars. The autonomous vehicle (“AV”) industry is well-fuelled and already racing. In the race to dominate that market, the finish line is coming into sight. Recent experience – of smartphones, in particular – suggests that the race to sell a fresh technology could end in sudden, bursting sprint.

So regulators are watching the race attentively, even nervously. Worldwide, lawmakers are seeing both the ways in which this precocious technology might need to be restrained (to limit the risks of physical injury and of the exposure of users’ private data) and how regulation might realise the technology’s advantages.

This article describes the work of some of those lawmakers - and their dilemma. Should they attempt prophecy and legislate pre-emptively for fully driverless vehicles? Or should they stand back and watch, making the occasional adjustment as technology advances through stages of automation, but risk the sudden arrival of a driverless technology, for a time beyond legal control?

There is material enough in this subject for a book. Germany and the United Kingdom are among the countries writing national laws for autonomous vehicles (eg. Germany’s amendment to its Road Traffic Act in May 2017 and the UK’s Automated and Electric Vehicles Bill³).

But those measures would not reach as far into the future - to regulate the development of fully driverless vehicle technology into maturity - as would the proposed European and American laws (the British bill proposes shorter-term changes, chiefly to confirm the application of the UK’s compulsory motor insurance model to automated vehicles⁴; the amendment to the German law still assumes the presence of a human driver, who might intervene to prevent an accident). And the British bill is essentially reactive - to liability and insurance questions where accidents have already occurred. The E.U and U.S legislatures propose a longer-term, preventive approach to safety concerns.

³ The text of which was published on 18 October 2017, as this article was going to press. See <https://services.parliament.uk/bills/2017-19/automatedandelectricvehicles/documents.html>

⁴ See, at the same link, the October 2016 UK government impact assessment which described the insurance problem (“UK law requires the driver to be insured, so when the driver uses automated mode, gaps would emerge in the insurance framework, making it difficult and time consuming for victims to claim compensation”) HMG’s preferred solution: to “Extend compulsory motor vehicle insurance (Part 6 of the Road Traffic Act 1988) to include the use of AVs, and establish a ‘single insurer’ model, where an insurer covers both the driver and the AV technology, without prescribing how this will work in practice”.

So in this article I shall focus upon the European Union's and the United States' approaches. Neither is yet in force as law.

The Regulators' Dilemma

The European Parliament puts the central problem this way:

“... the more autonomous robots are, the less they can be considered to be simple tools in the hands of other actors (such as the manufacturer, the operator, the owner, the user, etc.); ... this, in turn, questions whether the ordinary rules on liability are sufficient or whether it calls for new principles and rules to provide clarity on the legal liability of various actors concerning responsibility for the acts and omissions of robots where the cause cannot be traced back to a specific human actor...”⁵

Two types of harm are risked by driverless road vehicles. The risk of physical injury is familiar from a century of motor-propelled, human-driven vehicles. While reducing that risk, autonomous vehicles, connected to networks, raise the further risks of financial and reputational harm through the potential insecurity of users' data.

Added to that sense of insecurity is the uncertainty as to which laws might apply. The machine capable of human intelligence (including human-like intuition) does not yet exist. We have not grappled with the questions of responsibility that might flow from it. Whether a robot could be responsible for its own actions is the stuff of gothic and science fiction⁶. In terms of current law, driverless vehicles sit in the gaps between current legal principles (such as the laws of product liability). And even the shapes of the gaps are not clear.

Which regulatory approach should society take? Should we prescribe a scheme of rules, comprehensively, to try to give reasonable certainty to the public and to industry? Or should we regulate loosely, mainly by guidance and by making as few hard rules as possible, in an attempt to support flexible development?

Laws are starting to emerge. Arguably the two most active legislators – the European Parliament and the U.S. Congress – are moving towards a comprehensive and more far-seeing approach, laying out the rules for driverless technologies before the technologies arrive. Those two legislators

⁵ European Parliament's Report with recommendations to the Commission on Civil Law Rules on Robotics, 27 January 2017, report A8-0005/2017 (the “JURI report”) at <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A8-2017-0005+0+DOC+PDF+V0//EN>

⁶ Eg. Mary Shelley's Frankenstein (1818) and Isaac Asimov's Robot stories (written between 1939 and 1985).

are moving faster than individual states. While support for a far-seeing legislative approach has not been universal, the AV industry (including insurers) has been supportive, seeing legal certainty as a necessary part of risk analysis and of doing business.

But the argument for proactive, prophetic and comprehensive regulation has its dissenters. Some regulators – including the U.S. Department of Transport – seem to favour a lighter touch, concerned that the heavy hand of regulation might discourage “nimble” development. And other organisations, including labour unions, warn of adverse effects upon employment rights, including concerns as to health and safety, should legislation reach ahead of technology. The absence from the U.S. Congressional bills of proposed regulation of autonomous commercial vehicles is explained in part by that⁷.

Which view is correct – to stride ahead or to tread cautiously? All sorts of variables are at work in that question. Different approaches are emerging.

European Union

The Legal Affairs (JURI) committee of European Parliament has made recommendations to the European Commission in its report, “Civil Laws on Robotics”⁸. As the European Parliament website puts it:

“In June 2016, the EPRS Scientific Foresight Unit published an expert study on the Ethical Aspects of Cyber-Physical Systems (CPS). CPS are intelligent robotics systems, linked with the Internet of Things, or technical systems of networked computers, robots and artificial intelligence that interact with the physical world. Examples include automated cars and drones, as well as robots used in healthcare, as aids for disabled people and in agriculture. The study drew attention to possible risks from the development of robotics, including such aspects as employment, privacy protection, safety and civil liability”⁹

The JURI Committee has asked the European Commission

⁷ The absence of regulation for the emerging US AV haulage industry is a significant gap (given the amount of testing of AV truck technology in the US). But it is a highly contentious area, given the impact of AV technology upon human labour – see eg. the statement of the Teamsters’ (the American union whose membership includes freight drivers) in response to the announcement of S.1885, at <https://teamster.org/news/2017/10/hoffa-senate-committee-right-reining-push-include-trucks-legislation>

⁸ The JURI report, page 6

⁹ [http://www.europarl.europa.eu/RegData/etudes/ATAG/2017/599250/EPRS_ATA\(2017\)599250_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/ATAG/2017/599250/EPRS_ATA(2017)599250_EN.pdf)

*“to submit ... a proposal for a legislative instrument on legal questions related to the development and use of robotics and artificial intelligence foreseeable in the next 10 to 15 years, combined with non-legislative instruments such as guidelines and codes of conduct...”*¹⁰

Liability

The JURI report suggests two possible approaches to determining liability for the injurious acts or omissions of robots: either strict liability or attribution of liability to the person who could have managed the risk:

“... strict liability requires only proof that damage has occurred and the establishment of a causal link between the harmful functioning of the robot and the damage suffered by the injured party;”

*“... the risk management approach does not focus on the person “who acted negligently” as individually liable but on the person who is able, under certain circumstances, to minimise risks and deal with negative impacts;... once the parties bearing the ultimate responsibility have been identified, their liability should be proportional to the actual level of instructions given to the robot and of its degree of autonomy, so that the greater a robot’s learning capability or autonomy, and the longer a robot’s training, the greater the responsibility of its trainer should be; notes, in particular, that skills resulting from “training” given to a robot should be not confused with skills depending strictly on its self-learning abilities”*¹¹

And JURI recommended that “*all potential responsibilities in the chain*” should be required by law to be insured¹². JURI asked the Commission to consider “*the implications of all possible legal solutions*”, including whether “*the manufacturer, the programmer, the owner or the user [might] benefit from limited liability if they contribute to a compensation fund, as well as if they jointly take out insurance to guarantee compensation where damage is caused by a robot*”¹³.

Data

As to data, the preamble to the JURI report notes that:

“whereas Regulation (EU) 2016/679 of the European Parliament and of the Council (the General Data Protection Regulation) sets out a legal framework to protect personal data; whereas further aspects of data access and the protection of personal data and privacy might still need to be addressed, given that

¹⁰ JURI report page 16, para.51

¹¹ JURI report page 17, para’s 54, 55, 56

¹² JURI report page 17, para.58

¹³ JURI report page 18, para.59(c)

*privacy concerns might still arise from applications and appliances communicating with each other and with databases without human intervention,”*¹⁴.

And highlights:

*“... the principle of transparency, namely that it should always be possible to supply the rationale behind any decision taken with the aid of AI that can have a substantive impact on one or more persons’ lives; considers that it must always be possible to reduce the AI system’s computations to a form comprehensible by humans; considers that advanced robots should be equipped with a ‘black box’ which records data on every transaction carried out by the machine, including the logic that contributed to its decisions;”*¹⁵

EU Regulatory Machinery

JURI recommends that a European Agency for robotics and artificial intelligence be established, *“dedicated to the cross-sectorial and multidisciplinary monitoring of robotics-based applications, identifying standards for best practice, and, where appropriate, recommending regulatory measures, defining new principles and addressing potential consumer protection issues and systematic challenges”*¹⁶.

European Commission’s Response

The Commission stated at the end of May 2017 that it is *“looking at the appropriate framework to ensure public confidence in particular the certification approach, cyber security, the liability and privacy issues”*¹⁷. It is understood to be due to submit that proposal in Autumn 2017. At the time of writing (early October 2017), it has not yet done so.

United States of America

The U.S. Congress is accelerating along the road to comprehensive regulation of autonomous vehicles (excluding “commercial motor vehicles” as defined by the U.S. Code, which essentially

¹⁴ EP Civil Law Rules on Robotics Report, page 5, (O).

¹⁵ JURI report, page 10

¹⁶ JURI report, p.10

¹⁷ Page 26 of European Commission Staff Working Document SWD (2017) 177 Final, at <https://ec.europa.eu/transport/sites/transport/files/swd20170177-europe-on-the-move.pdf>

excludes trucks and buses¹⁸). So I use the phrase “autonomous car” as shorthand when discussing the U.S. Congressional approach to date.

There are several practical reasons for this acceleration, including (in no particular order):

- the rapid development of “machine learning” types of artificial intelligence (the continuity of which is essential to driverless vehicles);
- the social benefits of autonomous vehicles (improved road safety; pollution reduction by more efficient driving of fewer, non-fossil-fuel vehicles); and
- the economic benefits (eg. in domestic sales and exports of AV technology, in which American companies are world-leaders).

But perhaps the most pressing need is to standardise American regulation of the features (chiefly the safety features) of road vehicles. Each American state now has its own powers to regulate vehicle features. In the pre-AV United States, that presents little difficulty: state regulation is guided by a Federal Agency and tends not to deviate significantly between states, as the features of current road vehicles are well-established, familiar and mainly uncontroversial.

But the prospect of a radical new technology makes disagreement between states and disparate regulatory approaches more likely (as is already the case in relation to testing). So, absent a nationwide, permissive regulation, an autonomous vehicle driving across the state line might be stopped by local law enforcement officers, and the occupant(s) thought responsible for the vehicle possibly even exposed to criminal charge.

That would be impractical and would frustrate the several benefits of the technology. Hence the need for a nationwide (ie. a federal) approach.

Both Houses of Congress (the House of Representatives and the Senate) have produced bills. Soon, a single Congressional Act will be presented to the President for approval (or veto). So the American AV law is fast taking shape.

U.S. House of Representatives

On 7 September 2017, after debate and committee stages in the House, the U.S. House of Representatives passed its SELF DRIVE Act¹⁹.

¹⁸ H.R. 3388, Section 13(7)(B), S.1885, Section 15 and U.S. Code 31101, which defines commercial vehicles mainly by reference to vehicle weight and number of passengers, at <https://www.law.cornell.edu/uscode/text/49/31101>.

¹⁹ H.R. 3388, acronym of “Safely Ensuring Lives Future Deployment and Research in Vehicle Evolution Act”. Text of the Bill, with updated position of the Act, at <https://www.congress.gov/bill/115th-congress/house-bill/3388?q=%7B%22search%3A%5B%22H.R.3388%22%5D%7D&r=1>

The SELF DRIVE Act has as its purpose:

“to memorialize the Federal role in ensuring the safety of highly automated vehicles as it relates to design, construction and performance, by encouraging the testing and deployment of such vehicles”

The SELF DRIVE Act proposes a national, Federal regulation of fully self-driving vehicles, subject to regulations to be announced by a Federal administration, the National Highway Traffic Safety Agency²⁰, in stages over two years.

At first sight, it is a liberalising Bill – providing the means to write the nationwide safety rules of vehicles all the way to the “highly automated” – ie. fully driverless – level and so preparing the way for driverless vehicles to travel across the country, unhindered by different rules in different states. Its stated purpose is positively to “encourage ... the deployment” of driverless vehicles.

At a second glance, the SELF DRIVE Act shows sharp regulatory teeth. These are in a tightly-timetabled set of tasks to be carried out by the Federal agency responsible for traffic safety, the NHTSA. Under the Congressional Act, the Secretary of Transportation would be required to carry out the following tasks in relation to driverless vehicle safety:

- Within 6 months (180 days) of enactment of the safety rule, the Secretary would be required to “*initiate or continue a review of the Federal motor vehicle safety standards in effect*” on the date of enactment²¹ and to establish a “*Highly Automated Vehicle Advisory Council*”, with members drawn from several areas of expertise, to research and advise upon all safety issues of the technology (including cybersecurity) and to report to the relevant Committees of both Houses of Congress²²;
- Not later than 1 year after enactment, the Secretary would publicise and send to the relevant Committees of both Houses of Congress a detailed “*rule-making and safety priority plan, as necessary to accommodate the development and deployment of highly-automated vehicles and to ensure the safety and security of highly automated vehicles and motor vehicles and others that will share the roads with highly automated vehicles...*”. “*Process and procedure standards for software and cybersecurity*” would be included and the plan would be “*updated [at least] every 2 years*”²³.
- Within 18 months, the Secretary of Transport would start “*rulemaking proceedings*”;
- Within 24 months, the Secretary would “*issue a final [safety] rule*” clearly describing: “*the relevant test results, data and other contents required to be submitted by*” [an] entity” developing a

²⁰ The NHTSA is an administration of the U.S. Department of Transportation, under the Secretary for Transport: <https://www.transportation.gov/administrations>

²¹ HR 3388 Section 4(5)

²² HR 3388, Section 9

²³ HR 3388, Section 4

highly-automated vehicle or an automated driving system, “*in order to demonstrate that such entity’s vehicles are likely to maintain safety*”²⁴;

- Periodically review and, if necessary, update the safety rule, not later than 5 years after its date of issue²⁵;

Section 5 of the SELF DRIVE Act provides that:

“a manufacturer may not sell, offer for sale, introduce or deliver for introduction into commerce, or import into the United States, any highly automated vehicle, vehicle that performs partial driving automation, or automated driving system unless such manufacturer has developed a cybersecurity plan ...”

The cybersecurity plan must include the means of “mitigating reasonably foreseeable” cyber attacks (notably not “preventing” such attacks). Section 12 provides in similar terms for a “privacy plan” to protect users’ information.

Section 8 requires the Secretary of Transportation to

“complete research to determine the most effective method and terminology for informing consumers for each highly automated vehicle or a vehicle that performs partial driving automation about the capabilities and limitations of that vehicle”

So the SELF DRIVE Act would rule both upon the physical safety of users and upon the protection of their data. It would also legislate for contractual information to be provided to consumers, concerning the capabilities of the vehicle. The Act would preserve common law liability and claims.

And, as a Federal Act, it would take away the power that each state has previously enjoyed, to regulate the features of vehicles.

Strikingly, the SELF DRIVE Act – at least in its current version – aims to regulate cars at Level 5. Level 5 is an as-yet unreached level of technology: the fully-automated²⁶ (ie. fully “driverless”) car. Whether the possible implication of this (the exclusion of lesser levels of autonomy from any federal regulation) was intended is unclear.

There are lesser levels of autonomy that have not yet been achieved (some current AV technology has been described as being at Level 3²⁷). As an explanatory note to the later Senate Bill put it:

²⁴ HR 3388 Section 4

²⁵ HR 3388 Section 4

²⁶ HR 3388, Section 13 (defining “automated driving task” and other key definitions in terms of a level 5 vehicle, ie. fully driverless). See https://www.sae.org/misc/pdfs/automated_driving.pdf for chart showing levels of vehicle autonomy.

²⁷ See eg. <http://www.carmagazine.co.uk/car-news/tech/audi-a3-level-3-autonomy-how-did-they-get-it-to-market/>

*“A Level 3 vehicle can drive itself in some circumstances (e.g., on highways, or in specified geographic areas), but requires that a human driver be present to take over if needed. A Level 4 vehicle can drive itself in some circumstances, and does not need a human driver to take over (e.g., it can pull itself over safely if needed). A Level 5 vehicle can drive itself in all circumstances, and does not need a human driver to take over.”*²⁸

The Response to the H.R. SELF DRIVE Act

The House of Representatives’ Act, with its acceleration to Level 5, raised safety concerns. Professor Raj Rajkumar, Co-Director of the General Motors-Carnegie Mellon Autonomous Driving Collaborative Research Lab at Carnegie Mellon University²⁹, was quoted as saying:

“We have a whole bunch of other companies, the non-carmakers and non-automotive suppliers, who basically want to get a foothold and some publicity by being first on the road, and don’t necessarily understand the complexities of what happens in the real world. Things go wrong. I worry that people could get hurt in the process. And if people get hurt, and god forbid someone gets killed, that in turn could induce a backlash, and people could start saying “this technology is too immature.””³⁰

And the regulators in the US Department of Transport (NHTSA) and the legislators in the House of Representatives seem to be on different paths.

The NHTSA already publishes regular reviews of traffic safety – including of developing autonomous vehicle technology. But the NHTSA has not progressed as far as the House of Representatives has proposed, by envisaging and setting out comprehensive and mandatory rules for a driverless future, now.

The NHTSA website in September 2017 said this –

“Let’s be clear: fully automated or “self-driving” vehicles aren’t arriving in showrooms tomorrow; they’re likely years, maybe even decades, away”

- and the NHTSA described its September 2017 “Vision for Safety” document as a “roadmap” and a “non-regulatory approach”³¹, aimed at making “Department regulatory processes more nimble to help match the pace of private sector innovation” and “not imped[ing] progress with unnecessary or unintended barriers to

²⁸ https://www.commerce.senate.gov/public/_cache/files/debff507-c526-4548-a026-c83e8fc43679/DF690176DCD1293C1A531DF3EEE893BB.av-start-section-by-section.pdf

²⁹ <https://www.cylab.cmu.edu/education/faculty/rajkumar.html>

³⁰ <https://www.theverge.com/2017/9/6/16259170/self-drive-act-autonomous-cars-legislation>

³¹ <https://www.nhtsa.gov/automated-vehicles/vision-safety>

*innovation*³².

But the SELF DRIVE Act had started a journey. And press coverage was sympathetic to its aims, noting that “*Silicon Valley has long pressed lawmakers for a federal framework to deploy more self-driving cars on the roads*”³³. And, (as NHTSA acknowledges in its report, against the background of mixed Federal and State sources of current vehicle law) “*States are looking for reassurance that the Federal Government has tools to keep their roadways safe*”³⁴.

And, while not as far-reaching in its regulation of future technology as the SMART DRIVE Act, the NHTSA “*Vision for Safety*” document was a detailed roadmap, describing many of the areas that would be prescribed if the House of Representatives’ SELF DRIVE Act were enacted.

The U.S. Senate

The Senate Bill was announced on 28 September, passed its committee stage on 4 October and the text was published on 5 October 2017. It will now move to the floor of the Senate for debate³⁵.

Its title is the AV START³⁶ Bill (S.1885)³⁷.

Some terms and timings differ, but the Senate Bill replicates the House of Representatives’ SELF DRIVE Act in several key ways, including these:

- It would not regulate AV commercial vehicles;
- It would ensure the Federal government’s role in taking “*responsibility for automated vehicle design, construction, and performance*”, including the updating of pre-AV vehicle specifications, while “*maintaining state and local roles in determining traffic laws, registration, and licensing*”³⁸;
- It seeks to strengthen vehicle safety, data security and cybersecurity standards;
- It would promote consumer education.

But the Senate Bill takes a different approach to the House of Representatives in the following areas:

³² NHTSA “*Vision for Safety*” document, September 2017, at pages i and ii

³³ <http://www.politico.com/tipsheets/morning-tech/2017/09/05/tracking-daca-tax-reform-self-driving-cars-222111>

³⁴ NHTSA “*Vision for Safety*” document, September 2017, at page 3

³⁵ <https://www.thune.senate.gov/public/index.cfm/press-releases?ID=EE5438EB-D2C6-41CF-8A59-C76907907E66>

³⁶ Acronym for “*American Vision for Safer Transportation through Advancement of Revolutionary Technologies*”

³⁷ <https://www.congress.gov/bill/115th-congress/senate-bill/1885/text>

³⁸ <https://www.thune.senate.gov/public/index.cfm/2017/9/thune-introduces-bipartisan-autonomous-vehicle-legislation>

- The Senate (possibly correcting the Level 5 approach in the H.R. SELF DRIVE Act) distinguishes between types of autonomous car. It does so by adopting the commonly accepted definitions of those levels, as defined by the SAE International Standard or by any different standard “*subsequently adopted by the Secretary*”³⁹. S.1885 describes “*level 3, 4 or 5 automated driving system[s]*”⁴⁰. The Secretary of Transport is required to “*commence a rulemaking proceeding*” - on a timetable similar to that set out in the SELF DRIVE Act - “*by reference into the relevant safety standards*”⁴¹;
- The Senate would prevent “*the denial of a license to operate a self-driving vehicle on the basis of a disability*”⁴². That is an especially significant provision – not only for the benefit of increased mobility for those with a disability, but because it challenges the idea that an AV must always be capable of control by a human driver. That principle remains at the core of international vehicle construction regulation; its survival is questionable⁴³.

The Shape of Emerging U.S. AV Law

A shape emerges, even while some important areas (chiefly commercial AV’s) remain controversial. The Senate has yet to debate the Bill on the floor. The future - including the political future - is inherently uncertain. But, in summary:

- The case for greater Federal regulation of cars has been accepted (and is obvious by the swift legislative activity of both Houses of Congress). So the AV industry’s argument in favour of legal certainty seems to have won legislative favour;
- The case for regulating prospectively and from the centre, for car technologies not yet in existence (Level 4 and 5 AV’s) has also been accepted (and the NHTSA argument for merely “voluntary” guidelines appears to be in retreat, at least in the view of Congress);
- Conversely, Congress as a whole appears to agree that employment effects should not be predicted and should be tackled as the technology is rolled out (hence the absence of regulation for commercial AV’s). That might be explained not just by the unpredictability of those economic and social effects, but also by the current technological unavailability of electric engines capable of powering such large vehicles. Or it might be for reasons of

³⁹ S.1885, Sections 2 and 8 (pages 3, 4, 17, 18)

⁴⁰ Ibid

⁴¹ S.1885, Section 4 (page 10)

⁴² <https://www.thune.senate.gov/public/index.cfm/2017/9/thune-introduces-bipartisan-autonomous-vehicle-legislation> and S.1885, Section 3 (page 7, lines 15 to 21) and Section 10 (page 28)

⁴³ See Chapter One of my book “The Law of Driverless Cars: An Introduction” (Law Brief Publishing, 2017)

political calculation. Whatever the reason, the omission of larger vehicles leaves an obvious gap in the otherwise far-reaching American AV legislation.

Conclusion

Technology advances rapidly. But, at this moment, can we practically ask regulators “to explore, analyse and consider the implications of all possible legal solutions” such as this?

“... creating a specific legal status for robots in the long run, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons responsible for making good any damage they may cause, and possibly applying electronic personality to cases where robots make autonomous decisions or otherwise interact with third parties independently”⁴⁴

It is tempting to see this as extreme speculation – fanciful at best, at worst a distracting guess at the far-future. A common lawyer might respond, wearily, that there are some judgments worth reserving.

But change has already happened fast. The challenge of fully autonomous robots might arrive sooner than we expect. And the *type* of innovation that achieves full autonomy might surprise us. Innovation could change not just our views but our methods of reasoning. The touchscreen and the smartphone have changed how we use computers, habitually, and even our language.

So the task of rule-making might then be on a grand scale; not just to write new laws for robots as pieces of equipment, but to shift our legal perspective entirely – even to new perceptions of legal personality.

Whether we stride into the hazy future or take slighter steps, the fog of uncertainty might not clear until we reach our destination. At that moment, we might find ourselves standing on unfamiliar and – unless we go prepared - hazardous ground. Imaginative, intrepid laws suddenly seem essential.

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⁴⁴ JURI Report, page 18, para.59(f)