Law Commission
Reforming the law

Remote Driving: Advice to Government

FEBRUARY 2023

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THE LAW COMMISSION: ADVICE TO GOVERNMENT ON REMOTE DRIVING

Topic of the Advice Paper: The Centre for Connected and Autonomous Vehicles (CCAV) and International Vehicle Standards of the Department for Transport have asked the Law Commission of England and Wales to consider the law surrounding remote driving, where a person outside a vehicle uses wireless connectivity to control a vehicle on a public road. They have asked us to clarify the current legal status of remote driving and consider whether reforms are needed.

About the Law Commission: The Law Commission was set up by the Law Commissions Act 1965 for the purpose of promoting reform of the law.

The Law Commissioners are: The Rt Hon Lord Justice Green, *Chair*, Professor Sarah Green, Professor Nicholas Hopkins, Professor Penney Lewis and Nicholas Paines KC. The Chief Executives are Stephanie Hack and Joanna Otterburn.

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Glossary

Automated Driving System (ADS): A term used in the SAE Taxonomy to describe a vehicle system that uses both hardware and software to perform the entire dynamic driving task on a sustained basis.

Automated and Electric Vehicles Act 2018 (AEVA): An Act designed in part to facilitate the payment of compensation to persons injured by automated vehicles. The Act establishes a listing procedure for automated vehicles and requires that each listed vehicle carry insurance. Section 2(1) requires the insurer to pay compensation for any damage caused by an automated vehicle when driving itself.

Automated vehicles: A general term used to describe vehicles which can drive themselves without being controlled or monitored by an individual for at least part of a journey.

Automated Vehicles report: The report published by the Law Commission of England and Wales and the Scottish Law Commission in January 2022, which recommended new laws for the safe and responsible introduction of automated vehicles onto roads in Great Britain. It is available at: https://www.lawcom.gov.uk/project/automated-vehicles/.

Construction and use regulations: Regulations made under section 41 of the Road Traffic Act 1988 and its predecessors to regulate the construction, weight, equipment and use of vehicles. Currently, the main regulations are the Road Vehicles (Construction and Use) Regulations 1986 as amended.

Consultation Paper 1: The first (preliminary) consultation paper in the joint review of automated vehicles by the Law Commission and Scottish Law Commission. It was published in November 2018 and is available at: https://www.lawcom.gov.uk/project/automated-vehicles/.

Consultation Paper 2: The second consultation paper in the joint review of automated vehicles by the Law Commission and Scottish Law Commission. It was published in October 2019 and is available at: https://www.lawcom.gov.uk/project/automated-vehicles/.

Consultation Paper 3: The third consultation paper in the joint review of automated vehicles by the Law Commission and Scottish Law Commission. It was published in December 2020 and is available at: https://www.lawcom.gov.uk/project/automated-vehicles/.

Dynamic driving task (DDT): A term used in the SAE Taxonomy to describe the real-time operational and tactical functions required to operate a vehicle in on-road traffic. It includes steering, accelerating and braking, together with "object and event detection and response" (OEDR). In turn, OEDR includes detecting, recognising and classifying objects and events, and executing an appropriate response.

Entity for Remote Driving Operation (ERDO): A new term proposed in Chapter 8 to describe a licensed organisation that employs remote drivers and is subject to a range of statutory duties.

Lateral control: Control of a vehicle's side-to-side or sideways movement. The SAE Taxonomy refers to this as "lateral vehicle motion control" and explains that the term includes detecting a vehicle's position in relation to lane boundaries and applying both steering controls and "differential braking inputs" to keep the correct position in lane.

Longitudinal control: Control of a vehicle's movement along its longitudinal axis (the axis running along the length of a vehicle through its centre of gravity). This includes applying and removing the brakes, accelerating and reversing. The SAE Taxonomy refers to longitudinal control as "longitudinal vehicle motion control".

Minimal risk condition: A term used in the SAE Taxonomy to describe a stable, stopped condition to which a user or an ADS may bring a vehicle to reduce the risk of a collision when a given trip cannot or should not be continued.

No user-in-charge (NUIC) vehicle: A legal status recommended in the Law Commissions' Automated Vehicles report. It refers to a vehicle equipped with one or more ADS features designed to perform the entire dynamic driving task without a user-in-charge (that is, without requiring a fit and qualified person to be in the vehicle).

Operational design domain (ODD): A term used in the SAE Taxonomy to describe the domain within which an automated driving system can drive itself. It may be limited by geography, time, type of road, weather or by other criteria.

Remote assistant: A person who performs remote assistance in relation to an automated vehicle in self-driving mode. Remote assistants do not control vehicles directly. Instead they provide information and advice to an ADS. The ADS uses that information to make its own decisions about the safe path ahead and performs the entire DDT.

Remote driver: For the purposes of this project, a beyond line-of-sight remote "driver" is an individual who performs all or any one of the following tasks: steering; braking; removing a brake; accelerating; or monitoring the driving environment with a view to immediate and safety-critical intervention in the way the vehicle drives. A driver is "remote" if they are not in or on the vehicle or its trailer. See Chapter 3.

Remote operations centre: A building or facility from which people oversee, assist and/or drive vehicles using remote technology.

SAE Taxonomy: Definitions produced by the Society of Automotive Engineers International, a global association of engineers and technical experts in the aerospace, automotive and commercial vehicle industries. It sets out six levels of driving automation. The full reference is J3016 Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles. It was first published in 2014 and last revised, in collaboration with the International Standards Organisation (ISO), in April 2021.

Safety driver: A person who is employed to test drive vehicles equipped with driving automation technologies. In this report we use the phrase "in-vehicle safety driver" to refer to an individual in the vehicle with access to the controls who monitors the driving environment with a view to immediate intervention. They carry all the responsibilities of a driver.

Self-driving: Driving automation technology which performs the entire dynamic driving task. The Automated Vehicles report recommended that the term should only be used where the technology has been authorised as self-driving by regulators.

Small series type approval: A vehicle approval scheme with technical and administrative requirements commensurate with smaller production runs. The UK's approval authority for small series type approvals is the Vehicle Certification Agency (VCA).

Special Types General Order (STGO): This refers to the Road Vehicles (Authorisation of Special Types) (General) Order 2003, made under section 44 of the Road Traffic Act 1988. It modifies the application of construction and use requirements in relation to "special types" of motor vehicles and trailers, exempting them from some regulations whilst also providing further conditions and requirements. The modifications apply to vehicles which fall within the STGO without the need for an individual application.

Type approval: Confirmation that production samples of a type of vehicle, vehicle system, component or separate technical unit meet specified requirements. The process involves the testing of production samples and the evaluation of the measures in place to ensure conformity of production. Once type approval is given by an approval authority it allows the manufacturer to produce the vehicle type in an unlimited series, provided that vehicles continue to meet the specified requirements.

United Nations Economic Commission for Europe (UNECE): An organisation established in 1947 to promote economic cooperation and integration among its member states. The UNECE provides a multinational platform for policy dialogue, negotiation of international legal instruments and development of regulations and norms.

User-in-charge: An individual who is in an automated vehicle and in position to operate the driving controls while a self-driving ADS feature is engaged. A user-in-charge must be in the vehicle. Unlike a remote driver, a user-in-charge is not responsible for the dynamic driving task. However, a user-in-charge must be qualified and fit to drive as they may be called on to take over driving. See the Automated Vehicles report, Chapter 8.

Vehicle Special Order (VSO): An order made on a case-by-case basis under section 44 of the Road Traffic Act 1988 to exempt individual vehicles or fleets from construction and use requirements. The operator or owner must apply to the VCA to show that the vehicle reaches a comparable level of safety. VSOs also allow the Secretary of State to impose conditions upon how vehicles are used.

List of Abbreviations

ABI	Association of British Insurers.
ACSO	Association of Consumer Support Organisations.
ADS	automated driving system.
AEVA	Automated and Electric Vehicles Act 2018.
ALKS	automated lane keeping system.
APIL	Association of Personal Injury Lawyers.
ASDE	authorised self-driving entity.
AV	automated vehicle.
BIBA	British Insurance Brokers' Association.
BMF	British Motorcyclists Federation.
BSI	British Standards Institution.
CAV	Connected and Autonomous Vehicle.
CCAV	Centre for Connected and Autonomous Vehicles.
DDT	dynamic driving task.
DPTAC	Disabled Persons Transport Advisory Committee.
DSSAD	data storage systems for automated driving.
DVSA	Driver and Vehicle Standards Agency.
EDR	event data recorder.
ERDO	entity for remote driving operation.
GB	Great Britain.
IVA	individual vehicle approval.
ISO	International Organization for Standardisation.
MIB	Motor Insurers' Bureau.
MRM	minimal risk manoeuvre.

NUIC	no user-in-charge.
NUICO	no user-in-charge operator.
ODD	operational design domain.
PACTS	Parliamentary Advisory Council for Transport Safety.
PSV	public service vehicle.
RCM	remote control manoeuvring.
RCP	remote control parking.
RoSPA	Royal Society for the Prevention of Accidents.
SAE	Society of Automotive Engineers International.
SMMT	Society of Motor Manufacturers and Traders.
STGO	Road Vehicles (Authorisation of Special Types) (General) Order 2003.
UIC	user-in-charge.
UNECE	United Nations Economic Commission for Europe.
VCA	Vehicle Certification Agency.
VSO	Vehicle Special Order.

Chapter 1: Introduction

1.1 There is now considerable interest in remote driving, where a person controls a vehicle on public roads from outside it. The Department for Transport has asked the Law Commission of England and Wales to look at this topic.[1] Here we consider the current legal status of remote driving and provide advice about possible reform.

1.2 We present both short-term options (which do not require primary legislation) and longer-term options for a new regulatory framework.

THE RATIONALE FOR REGULATING REMOTE DRIVING

1.3 The current legal framework for driving was designed on the assumption that a human driver would be in the vehicle.[2] However, technology that enables an individual to drive a vehicle wirelessly from a remote location already exists.[3] It is already used in controlled environments such as warehouses, farms and mines, especially where there is a need to remove the driver from hazardous or uncomfortable surroundings. Remotely operated "drones" are also used in the air and under water.

1.4 Developers have expressed an interest in using remote driving on roads or other public places. This is for two main reasons:

(1) *To overcome logistical difficulties in moving the driver from one vehicle to another*. There is, for example, considerable interest in using remote drivers to deliver rental cars.

(2) *As an adjunct to automated vehicles*. A remote driver may, for example, be used as a safety driver for vehicles that do not have driving seats. Remote drivers may also intervene if an automated vehicle encounters a situation it cannot handle.[4] In these cases, the remote driver may perform all or only some of the dynamic driving task.[5]

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1 The reference was made jointly by International Vehicle Standards, a group within the Department for Transport and by the Centre for Connected and Autonomous Vehicles (CCAV). CCAV is an expert unit set up jointly by the UK Department for Transport and the former Department for Business, Energy and Industrial Strategy, reporting to the Secretary of State for Transport.

2 There is a rare exception in the case of "pedestrian-controlled vehicles", which are sometimes used for road maintenance. See Remote Driving (2022) Law Commission Issues Paper, para 2.33.

3 It has a long history. According to Fabian Kröger, a vehicle was remotely driven on the McCook air force test base in Ohio on 5 August 1921. The car was controlled via radio from an army truck driving 30 meters behind. See F Kröger "Automated Driving in Its Social, Historical and Cultural Contexts" in M Maurer and others (eds) *Autonomous Driving* (2016), https://doi.org/10.1007/978-3-662-48847-8_3.

4 See Society of Automotive Engineers International (SAE), *J3016 Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles* (April 2021) (SAE Taxonomy J3016), para 3.31.1.2 Example 4.

5 See SAE Taxonomy J3016, para 3.24. For further details of this this and other defined terms, see the Glossary at pp v to vii.

1.5 Remote driving raises new challenges and the need for legal reform appears urgent. In our view, legal reform should be introduced before developers withdraw in-vehicle safety drivers and rely on remote drivers operating beyond line-of-sight. Reform is needed both to clarify the current law and to ensure that remote driving only takes place when it is safe.

AUTOMATED VEHICLES PROJECT

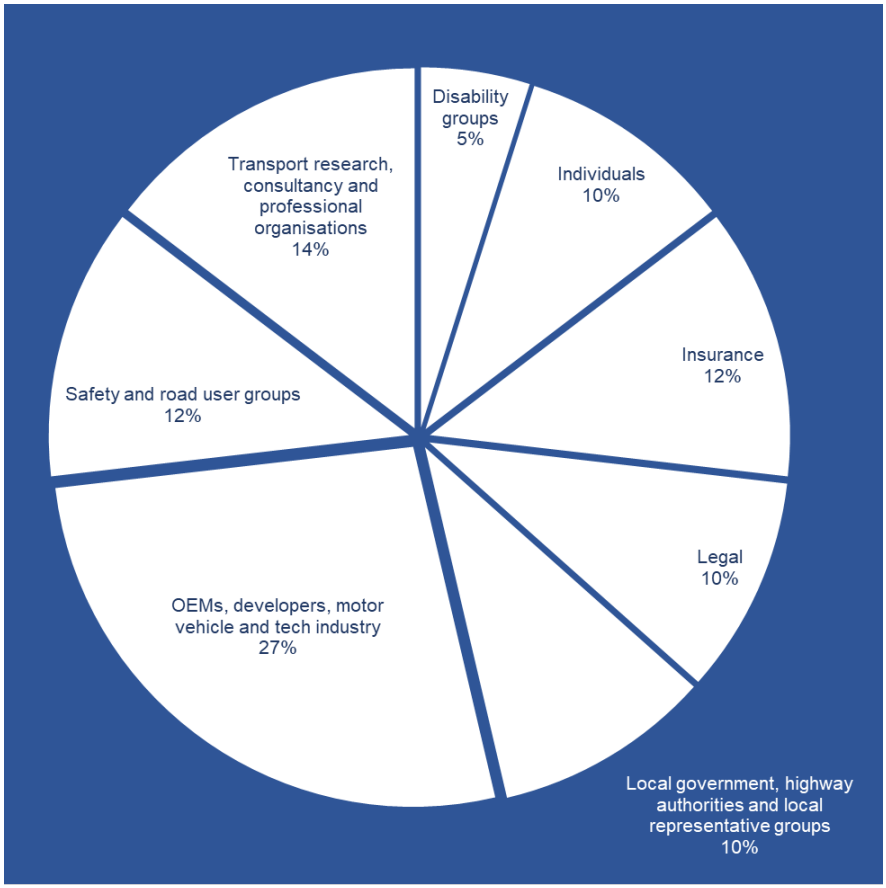
1.6 This advice follows on from a joint report by the Law Commission and the Scottish Law Commission on Automated Vehicles, published in January 2022. The report recommended new laws for the safe and responsible introduction of automated vehicles on GB roads.

1.7 Remote driving is not the same as automated driving and has its own unique challenges. However, some of the issues are similar. Therefore, in this advice we draw on the Automated Vehicles report and the three consultation papers which preceded it. For further information on our previous work, please see https://www.lawcom.gov.uk/project/automated-vehicles/.

ISSUES PAPER

1.8 We published an Issues Paper on 24 June 2022. It set out our analysis of the current law: that there is no express legal requirement for a driver to be within the vehicle, nor are there any provisions which completely prevent remote driving. We also considered the safety challenges associated with remote driving and explored civil and criminal liability.

1.9 The Issues Paper asked for views on both short-term and longer-term options for reform. We received 41 written responses. The pie chart below shows the range of individuals and organisations who responded.



1.10 A full analysis of responses (together with a list of respondents) is published alongside this advice.[6]

1.11 The project was undertaken according to particularly tight timelines. We published our Issues Paper on 24 June 2022 and asked for responses by 2 September 2022. We are very grateful to all respondents, who provided such full and detailed responses over the summer period.

TERMINOLOGY

1.12 As we discussed in the Issues Paper, there is little consensus over the terms used to describe remote driving and where to draw the line with 'remote assistance'. Confusion may arise, for example, when an individual carries out only part of the normal driving task. For example, driving automation may steer the vehicle, but a remote human driver may be required to monitor the driving environment and apply an emergency brake if a hazard arises.

1.13 For the purposes of this project, we use the following definitions:[7]

(1) A driver is an individual who performs one or more of the following tasks: steering; braking, releasing a brake, or accelerating; or monitoring the vehicle or

6 https://www.lawcom.gov.uk/project/remote-driving/.

7 For further discussion, see Ch 3.

driving environment with a view to immediate and safety-critical intervention in the way the vehicle drives.

(2) A "beyond line-of-sight" remote driver is a driver who is outside the vehicle or its trailer; and who relies on external aids (other than corrective spectacles) to see some or all safety-critical elements of the driving environment.

STRUCTURE OF THIS ADVICE

1.14 The advice is divided into 11 chapters:

(1) Chapter 1 is this introduction.

(2) Chapter 2 outlines the uses of remote driving on public roads. It then summarises the main safety challenges associated with remote driving. These include connectivity, cybersecurity and lack of situational awareness.

(3) Chapter 3 looks at what we mean by "remote driving" and how it differs from self-driving. We set out working definitions of "driver" and "remote" for the purposes of this advice.

(4) Chapter 4 looks at how the current law on vehicle approval and use applies to remotely driven vehicles. We identify three separate problems with the current law:

(a) uncertainties in the existing law may have a chilling effect, deterring some worthwhile remote driving projects;

(b) the same uncertainties could be exploited to put unsafe systems on the road; and

(c) there are problems in accountability. The main accountability lies with the individual driver, even if problems lie with the organisation as a whole.

Options for reform

1.15 Chapters 5 to 8 set out both the short-term and longer-term options for reform. We also consider the possibility of remote driving from abroad.

(5) Chapter 5 considers short-term reform. It explains how an interim solution could be introduced by secondary legislation. We propose a new construction and use regulation to prohibit beyond-line-of-sight remote driving without an in-vehicle safety driver, which would apply unless the organisation obtains a Vehicle Special Order.

(6) Chapter 6 looks at remote driving from abroad. It concludes that remote driving from outside Great Britain should be prohibited, at least until an international agreement can be reached to address accountability and enforcement.

(7) Chapter 7 considers options for longer-term reform when remote driving is used alongside self-driving. It concludes that a No User-in-Charge Operator (or

NUICO) should be responsible for both the self-driving aspects of the operation and any remote driving.

(8) Chapter 8 considers longer-term reform where organisations use remote driving without holding a NUICO licence. It concludes that a new statutory scheme is needed for vehicles without authorised NUIC (no user-in-charge) features. In our view, an organisation should require a licence if it drives such vehicles remotely from beyond line-of-sight on roads or other public places. We refer to this organisation as the Entity for Remote Driving Operation or "ERDO".

Civil liability

(9) Chapter 9 looks at civil liability. It considers the position of a person who is injured by a remotely driven vehicle, or who suffers property damage. It concludes that a similar provision to the Automated and Electric Vehicles Act 2018 should apply to remote driving.

Criminal liability

(10) Chapter 10 looks at the criminal liability of individual remote drivers. It concludes that a beyond line-of-sight remote driver employed by a licensed NUICO or ERDO should have a defence to prosecution where the problem lies with the organisation rather than the individual. The defence should apply where a competent and careful driver in the remote driver's circumstances would not have been aware of the circumstances or would not have avoided committing the offence. Instead of prosecuting the individual, sanctions should be applied to the NUICO or ERDO.

Conclusions

(11) Chapter 11 lists our conclusions.

Appendices

1.16 The advice has three appendices. The first two appendices accompany Chapter 9 on civil liability, while Appendix 3 relates to Chapter 10 on criminal liability.

(1) Appendix 1 considers other recent initiatives and proposals designed to smooth the path to compensation for victims of new technology or road traffic collisions.

(2) Appendix 2 looks at how motor insurance deals with terrorism risk.

(3) Appendix 3 compares the current criminal liability of remote assistants with that of remote drivers.

1.17 Unless otherwise indicated, all websites were last visited on 15 February 2023.

THE TEAM WORKING ON THIS ADVICE

1.18 Various staff have contributed towards this advice. The lead lawyers were Jessica Uguccioni, Tamara Goriely and Connor Champ. They were assisted by the following researchers: Gwen Edmunds, Matthew Timm and Efa Jones. The team was managed by Henni Ouahes (Head of Public Law and Law in Wales).

Chapter 2: The uses and challenges of remote driving

2.1 In this chapter, we start by looking at how remote driving is used, both as an adjunct to self-driving and in vehicles without self-driving capability. We then summarise the safety challenges posed by remote driving, drawing on the Issues Paper and responses we received.

THE USES OF REMOTE DRIVING

2.2 Remote driving, by a driver outside the vehicle, is already familiar. It has proved to be particularly useful in dangerous or unpleasant environments, such as mines. It is increasingly being used in other off-road environments, such as farms, ports and warehouses.[8]

2.3 Until now, its use on public roads has been limited to low speed and short range, for abnormal loads and remote control parking.[9] However, its use is set to expand, for two main reasons. The first is that remote driving can be used as an adjunct to automated driving, both in trials and in the longer term.

2.4 The second reason is the increasing interest in delivering rental vehicles by remotely driving them to the customer's door. Cheaper car rental services, delivered to the hirer's door, could reduce dependency on private car ownership, bringing many social benefits. However, at present, car delivery is expensive because the delivery driver must return to base. Placing the delivery driver in a remote control centre has the potential to remove the cost of a return journey. Trials are currently taking place to deliver conventional vehicles by remote driving.

2.5 Most stakeholders supported at least some remote driving of automated vehicles. Views on other forms of remote driving were more mixed, with stakeholders expressing greater concerns over safety. We outline each use in turn.

Remote driving of automated vehicles (AVs)

Trials with a remote safety driver

2.6 Remote driving can play a role in the development of self-driving technology. The Government's Code of Practice on automated vehicle trialling, last updated in January

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8 These are typically high-risk environments with no public access, where it is an advantage to have the driver in a different location to the vehicle they are controlling. In farming, for example, remote driving may be used for crop fertilisation or verge mowing. Examples include the McConnel remote control mowers (https://www.mcconnel.com/) and the Hands Free Farm project (https://www.handsfree.farm/). Remote driving is also used to improve efficiency and safety in dockyards. See, for example, https://www.5gblueprint.eu/. See also Remote Driving (2022) Law Commission Issues Paper, paras 1.10 to 1.11.

9 As described below, remote control parking is a driver assistance feature, where the driver controls the vehicle from outside, in close proximity to the vehicle. It therefore differs from automated valet parking, where the vehicle drives itself.

2022, expressly refers to the role of "remote safety operators" and "remote commands which influence the vehicle's movement".[10]

2.7 In our Issues Paper, we gave examples of trials of AV technology conducted without a safety driver on board: from Easymile's shuttles in France to Starship's personal delivery devices (small pods used on pavements) in the UK.[11] Some AVs are designed without a driving seat or have no on-board controls. For such vehicles, an in-vehicle safety driver may not be an option. A remote safety driver might be the only way to bring the vehicle through testing to deployment.

2.8 In the US, the National Highway Traffic Safety Administration (NHTSA) has referred to remote driving as a "reasonable" back-up safety measure in the context of Nuro's AV trial.[12] The trial involves monitoring by "experienced human operators who are extensively trained in the vehicle's systems", and who would be able to take over driving control if needed.[13] Nuro has been exempted from certain federal motor vehicle safety standards on the basis that "the remote operator system" would be a "fallback" safety feature and not a primary means of controlling the vehicle.[14]

Remote driving supporting AVs beyond trials

2.9 Remote driving may also have a long-term role in some AV deployments beyond the trial stage. For the foreseeable future, AVs will only be able to drive themselves under specified conditions, referred to as their "operational design domain" or ODD. The conditions may relate to a place, a type of road, a speed, weather conditions or any other limiting circumstances.

2.10 Remote driving can have a role where an AV is unable to continue its journey in self-driving mode because it has reached the limits of its ODD. For example, an automated driving system designed for motorways could rely on remote driving for the off-motorway stages of its journey.[15] It has been suggested that the combination of self-driving capabilities and remote driving could be particularly promising in the field

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10 *Code of Practice: automated vehicle trialling* (Updated January 2022), https://www.gov.uk/government/publications/trialling-automated-vehicle-technologies-in-public/code-of-practice-automated-vehicle-trialling.

11 See Remote Driving (2022) Law Commission Issues Paper, paras 1.18 to 1.22.

12 Nuro is a company developing automated vehicles (AVs), which holds an Autonomous Vehicle Deployment Permit under the California Autonomous Vehicle Regulations.

13 National Highway Traffic Safety Administration (NHTSA), *Petition for Temporary Exemption for an Electric Vehicle with an Automated Driving System: Nuro, Inc.* (2019), https://www.regulations.gov/docket/NHTSA-2019-0017.

14 Remote driving was part of the safety arguments relied on in granting an exemption from three Federal Motor Vehicle Safety Standards (FMVSS). This is explained in NHTSA's notice of grant of a petition for a temporary exemption from three provisions of FMVSS No. 500, "Low-speed vehicles". The notice states that: "The R2X is equipped with a "remote operation" system through which a remote operator can take over the driving functions of the R2X…. NHTSA understands the remote operator system to be a "fallback" safety feature and thus not a primary means of controlling the vehicle…. We think that Nuro's suggestion to use the remote operator as a stand-in for the driver, for purposes of compliance certification, is reasonable". See NHTSA, *Nuro, Inc.; Grant of Temporary Exemption for a Low-Speed Vehicle with an Automated Driving System* (2020), https://www.regulations.gov/document/NHTSA-2019-0017-0029.

15 See Ottopia: https://ottopia.tech/; Phantom Auto: https://phantom.auto/solutions/assisting-autonomy.

of logistics. Relying on remote driving for short periods might help address professional driver shortages, for example.[16]

2.11 Remote driving could also be used in unexpected situations which the AV has not been programmed to deal with. Furthermore, if an AV fails, a remote driver could move the vehicle to a safe place.

2.12 In response to our Issues Paper, the Society of Motor Manufacturers and Traders (SMMT) provided examples of where a combination of automation and remote driving could have commercial benefits. For goods delivery, these ranged from port-to-hub logistics to last-mile deliveries in light robotic vehicles. The combination could also be used to provide new rural on-demand passenger services.

"Independent" remote driving of vehicles without self-driving capability

Remote driving to deliver hire vehicles

2.13 In our Consultation Paper 2 on Automated Vehicles, we noted the potential for greater use of car sharing to reduce dependency on private cars.[17] This would have significant social benefits. It could free up space currently taken by parking and could provide the right size of vehicle for the particular journey. Furthermore, without the sunk costs of private car ownership, the cost comparison between public transport and individual car use changes, encouraging greater use of public transport.[18]

2.14 One barrier to car sharing is the difficulty of providing vehicles where they are needed. At present, if a shared vehicle is used for commuting and is driven to the town centre, it is then no longer available for others to use in the suburbs. However, this problem could be overcome by remote driving. Drivers based in a remote control centre could deliver vehicles to customers more cheaply and efficiently than in-vehicle drivers (who themselves need transport back to base or to their next collection).

2.15 A recent discussion paper submitted jointly by Finland, Germany and the UK to the United Nations Economic Commission for Europe (UNECE)'s Informal Group of Experts on Automated Driving (IGEAD) says that remote driving has considerable potential benefits. These include:

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16 The International Road Transport Union's 2022 survey found that truck driver shortages continued to grow throughout the world: see https://www.iru.org/news-resources/newsroom/driver-shortages-surge-expected-jump-40-2022-new-iru-survey. Part of the problem is an ageing workforce, with younger employees unwilling to spend time away from home, in uncomfortable surroundings. A combination of remote driving and automated driving could offer people family-friendly shifts, near home.

17 Automated Vehicles: Consultation Paper 2 - Passenger Services and Public Transport (2019) Law Commission Consultation Paper No 245; Scottish Law Commission Discussion Paper No 169, paras 2.31 to 2.86. By "car sharing" we referred to several households having access to a single vehicle. More readily available rental vehicles would be one way of sharing cars.

18 This is because car owners tend to compare the cost of public transport with the cost of fuel, ignoring other sunk costs. This comparison often makes public transport look expensive. However, those who hire vehicles compare the cost of public transport with the cost of vehicle hire, which includes vehicle depreciation, maintenance and insurance. When one compares the full cost of motoring with public transport, public transport may be seen as a more attractive option.

> Decoupling of the driver and vehicle to significantly increase the efficiency of personnel deployed in non-automated vehicles. For example, in the optimization of shared vehicles fleets.[19]

2.16 In the UK, companies working in this area include Trilvee and Imperium Drive. Trilvee's mission is to offer:

> tele-operated, on demand, right-sized vehicles meeting all urban residents' needs. In most of cases this is best achieved using a light weight EV [electric vehicle]. Using the right size vehicle for each trip maximises efficiency, minimises impact, and helps meet Net Zero targets.[20]

2.17 Imperium Drive in Milton Keynes operates a fleet of Kia cars. It offers an app-based car rental service, delivering vehicles to the customer's location. Imperium Drive states that customers can walk away at the end of a trip without the need to find parking, as this is taken care of by the remote driver.[21]

2.18 In both cases, once the vehicle is delivered, customers drive them manually, in a conventional way. This means that remote driving will only apply to empty vehicles, and within a limited geographical domain, reducing some of the safety concerns associated with this type of driving.

2.19 At present, both Trilvee and Imperium Drive operate with in-vehicle safety drivers, but they are trialling their services to operate with remote drivers. They have told us that they plan to remove the in-vehicle safety driver by the end of 2023, subject to validation of their safety case.

2.20 In Germany, Vay is using remote driving to deliver vehicles as a step towards automated driving. Vay describes itself as taking a "teledrive-first approach to autonomous driving":

> Vay's teledriving technology enables a person ("the teledriver") to control a vehicle remotely ("teledriving"). Vay aims to gradually introduce autonomous driving functions in the system as it is safe and permitted to do so.[22]

Consumer applications of remote driving

2.21 The most widespread application of remote driving for production vehicles is remote control parking (RCP). This is a driver assistance feature which enables a vehicle to

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19 The draft discussion paper, titled "Safe operation of a vehicle by a driver outside of the vehicle – 'the concept of remote driving'", was discussed at the 24th meeting of the Global Forum for Road Traffic Safety (WP.1)'s IGEAD, held on 31 January 2023.

20 https://www.trilvee.com/.

21 https://fetch-mobility.com/.

22 See https://vay.io/. Vay has been operating cars driven remotely from beyond line-of-sight on public roads in Berlin and Hamburg, also with a safety driver in the vehicle, for over three years. On 21 December 2022, the Authority for Traffic and Mobility Transition (BVM) in Hamburg issued Vay with an exemption permit. The exemption permit allows Vay to conduct its remote driving trials in a predefined area in Hamburg-Bergedorf without a safety driver in the car.

be remotely parked at low speeds.[23] The driver must stand within six metres of the vehicle, with a mobile phone or other device in their hand. The device must be "continuously activated": if the driver takes their hand off the device, the vehicle will stop.

2.22 Originally, RCP did not allow the driver to steer the vehicle. However, UN Regulations now allow for Remote Control Manoeuvring (RCM). This enables drivers to control steering angle, acceleration, and deceleration for low-speed manoeuvring through a remote control device.[24]

2.23 RCP and RCM are very limited at present but illustrate situations where consumers can already drive from outside the vehicle. We consider these features further in Chapter 3, where we consider the different approaches needed for "within line-of-sight" and "beyond line-of-sight" driving.

Abnormal indivisible loads

2.24 Finally, remote driving is sometimes used in the transport of particularly large loads, such as wind turbines or tunnel boring equipment. Very long loads often require a separate steersperson to operate the back wheels. For particularly difficult bends or bridges, the steersperson may use remote control, either from the side of the road or from an accompanying vehicle.[25]

THE SAFETY CHALLENGES POSED BY REMOTE DRIVING

2.25 We outlined some of the safety challenges associated with remote driving in Chapter 5 of the Issues Paper. We drew on a review for the UNECE by a group of human factors experts,[26] a detailed literature review by TRL on Connected and Automated Vehicles (CAVs)[27] and a report from the British Standards Institution (BSI) based on

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23 UN Regulation No 79 on uniform provisions concerning the approval of vehicles with regard to steering equipment, Revision 4 (incorporating all valid text up to supplement 1 to the 02 series of amendments) (7 November 2018) E/ECE/TRANS/505/Rev.1/Add.78/Rev.4, paras 2.4.8 and 5.6.1, https://unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2018/R079r4e.pdf.

24 UN Regulation No 79 on uniform provisions concerning the approval of vehicles with regard to steering equipment, Revision 4 – Amendment 2 (Supplement 2 to the 03 series of amendments) (2 November 2020) E/ECE/TRANS/505/Rev.1/Add.78/Rev.4/Amend.2, https://unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2020/R079r4am2e.pdf.

25 See, for example, Chris Bennett (Heavy Haulage) Ltd, "Abnormal Load Movements", https://www.chrisbennett.co.uk/services/abnormal-loads/; DCS Logistics, "Abnormal Loads Steersman", https://dcslogistics.co.uk/abnormal-loads-steersman/; and Collett, "Transporting Tunnel Boring Machine Mary", https://www.collett.co.uk/index.php/our-story/news/51-transporting-tbm-mary.

26 Position paper of the Human Factors in International Regulations for Automated Driving Systems (HF-IRADS) group, submitted to the 81st session of the Global Forum for Road Traffic Safety (WP.1) (18 September 2020) (Informal Document No. 8), https://unece.org/fileadmin/DAM/trans/doc/2020/wp1/ECE-TRANS-WP1-SEPT-2020-Informal-8e..pdf.

27 A Kalaiyarasan and others, *Remote operation of Connected and Automated Vehicles* (TRL Project Report PPR1011, November 2021) p 96, https://trl.co.uk/uploads/trl/documents/PPR1011-Remote-operation-of-CAVs---Project-Endeavour---Main-Report.pdf.

interviews with developers and others.[28] We are also grateful to the insights provided by Zeina Nazar, a researcher at the University of Southampton.

2.26 As TRL commented, "the field of remotely-operated CAVs is in its infancy". It is a step into the unknown. Most stakeholders accepted that remote driving may be a helpful adjunct to automated driving, both in trials and thereafter. However, some expressed concern about whether remote driving could ever be conducted safely if it were used independently of automated driving.

2.27 Here we summarise the main safety challenges associated with remote driving, together with the concerns expressed by stakeholders. We do not yet know if the challenges can be overcome. Any steps in this area will need to be cautious, and subject to robust regulation.

LOSS OF CONNECTIVITY

2.28 Beyond line-of-sight driving relies on connectivity – in most cases, to mobile networks. These networks are inherently problematic, with potential for latency (delay), "jitter" (inconsistency in latency) and loss of contact with the vehicle. TRL point out that connected vehicles "can be very sensitive to high latency":

> Even the slightest delay can significantly impact the driving experience and have a significant impact on safety.[29]

2.29 A fixed time lag can be a problem. However, variability in lag can be even more of a challenge to good performance than the lag itself.[30] A paper submitted to the UNECE by a group of human factors experts notes that "consistency of transmission could be a basic requirement".[31]

2.30 The BSI report on standardising remote vehicle operation revealed mixed views on network requirements. While some stakeholders assumed that a 5G network would be required for remote driving, others thought that there were ways of using a good 4G

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28 J McNicol, *Standardizing remote operation of vehicles* (British Standards Institution (BSI) and CCAV, July 2022), https://www.bsigroup.com/globalassets/localfiles/en-gb/cav/cav-resources-page/cav-teleoperation-report/cav-remote-operation-of-vehicles_final-report.pdf.

29 A Kalaiyarasan and others, *Remote operation of Connected and Automated Vehicles* (TRL Project Report PPR1011, November 2021) (TRL Project Report PPR1011) p 26, https://trl.co.uk/uploads/trl/documents/PPR1011-Remote-operation-of-CAVs---Project-Endeavour---Main-Report.pdf.

30 J Davis, C Smyth and K McDowell, "The Effects of Time Lag on Driving Performance and a Possible Mitigation" (2010) 26(3) Institute of Electrical and Electronics Engineers (IEEE) Transactions on Robotics (T-RO) 26(3) 590 to 593. This point also emerged from the stakeholder interviews conducted by TRL. All stakeholders to TRL's 2021 study into the remote operation of connected and automated vehicles agreed on the importance of a consistent connection: TRL Project Report PPR1011, p 70, https://trl.co.uk/uploads/trl/documents/PPR1011-Remote-operation-of-CAVs---Project-Endeavour---Main-Report.pdf.

31 Position paper of the Human Factors in International Regulations for Automated Driving Systems (HF-IRADS) group, submitted to the 81st session of the Global Forum for Road Traffic Safety (WP.1) (18 September 2020) (Informal Document No. 8) p 6, https://unece.org/fileadmin/DAM/trans/doc/2020/wp1/ECE-TRANS-WP1-SEPT-2020-Informal-8e..pdf.

network to provide adequate performance.[32] The report concluded that it was too early to make a decision on the required network standard.[33] During the course of this project, we were told of software developments to enable a remotely driven vehicle to search for capacity through a range of 4G providers. However, we do not know how reliable this will prove to be.

2.31 The Government has produced a Code of Practice on automated vehicle trialling. It notes:

> Those conducting remote-controlled vehicle tests should mitigate and safely respond to risks associated with network access. Remote-controlled operation may fail if there is wider communication network failure, or if access to the communication network is throttled. Trialling organisations should have a full understanding of connectivity in chosen operational domains.[34]

2.32 The Code states that "safety drivers and safety operators" should be trained to deal with these issues. It also recommends that data on connectivity, network access and latency should be recorded.

MITIGATING THE RISK OF A CRASH IF REMOTE DRIVING FAILS

2.33 If there is a failure in the remote driving technology, it is essential that the vehicle is able to mitigate the risk of a crash. In the Issues Paper, we asked how sophisticated the risk mitigation system would need to be. Would it effectively need to be an automated driving system and regulated as such?[35]

2.34 On one view, risk mitigation may simply involve braking. For example, Trilvee said that the appropriate mitigation would be a "controlled stop in path". They added: "in our case that results in an e-stop, ie activate [hazard warning lights], brake firmly and hold course".

2.35 Oxbotica said that simple braking may be acceptable in some circumstances, but not in others:

> *In some cases it may be acceptable for the vehicle to simply apply moderate braking in response to a loss of connectivity, but in others a sophisticated [minimal risk manoeuvre] executed with object detection and understanding of the road layout and traffic rules may be necessary.*

2.36 At its most basic, if connection were lost, the vehicle might immediately start to brake but travel several metres on its current trajectory before coming to a controlled stop. This means that in some circumstances (for example, where the lane curved to the

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32 J McNicol, *Standardizing remote operation of vehicles* (BSI and CCAV, July 2022) para 2.2.2, https://www.bsigroup.com/globalassets/localfiles/en-gb/cav/cav-resources-page/cav-teleoperation-report/cav-remote-operation-of-vehicles_final-report.pdf.

33 Above, para 4.3.

34 *Code of Practice: automated vehicle trialling* (Updated January 2022), https://www.gov.uk/government/publications/trialling-automated-vehicle-technologies-in-public/code-of-practice-automated-vehicle-trialling.

35 Remote Driving (2022) Law Commission Issues Paper, Question 7.

left), the vehicle could cross the median line and stop in the path of oncoming traffic. Such basic risk mitigation would only appear acceptable in limited environments – for example, on straight roads at very low speeds.

2.37 A somewhat more sophisticated system would permit the vehicle to stop in lane, and brake more firmly if an object were detected in its path. By following its lane, the vehicle would not present a hazard to oncoming vehicles, though it would risk being struck from behind.

2.38 Risk mitigation may do more than this, enabling the vehicle to drive to the next convenient stopping place and pull into the side of the road. Amendments to UN Regulation 79 (Steering Equipment) that entered into force in January 2022 provide for a "risk mitigation function" for driver assistance systems. This feature is designed to steer a vehicle out of a running lane of traffic in an emergency:

> "Risk Mitigation Function (RMF)" means an emergency function which can, in the event the driver becomes unresponsive, automatically activate the vehicle steering system for a limited duration to steer the vehicle with the purpose of bringing the vehicle to a safe stop within a target stop area.[36]

2.39 A "target stop area" may include the hard shoulder, beside the road, the slowest lane of traffic or the vehicle's own lane of travel.[37]

2.40 Several respondents argued that the risk mitigation system should include the ability to find a suitable stopping place. As the Royal Society for the Prevention of Accidents (RoSPA) put it:

> *as a minimum, this risk mitigation should include the vehicle being able to drive to the next convenient stopping place and pulling into the side of the road.*

2.41 It was suggested that a suitable risk mitigation system would effectively amount to automated driving:

> *Given the safety risks, we would want to see remote driving systems have very sophisticated risk mitigation systems in place in the event of loss of connectively or another similar failure. This would, in effect, need to be an automated driving system and regulated as such*. [RAC Foundation]

> *A vehicle capable of being driven remotely in all types of road environment would effectively have to be very close to being a completely autonomous vehicle.* [British Motorcyclists Federation]

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36 UN Regulation No 79 on uniform provisions concerning the approval of vehicles with regard to steering equipment, Revision 4 – Amendment 6 (04 series of amendments) (17 March 2022) E/ECE/TRANS/505/Rev.1/Add.78/Rev.4/Amend.6, new para 2.3.4.5, https://unece.org/sites/default/files/2022-07/R079r4am6e.pdf.

37 Above, new para 2.4.19.

2.42 Others, however, thought that regulations should not be prescriptive about the sophistication of the risk mitigation system. Instead, the developer should show that the system was safe enough in the particular context. As Reed Mobility put it:

> *If a more simplistic approach is being taken, it is the responsibility of the operator to demonstrate why this simplistic system is appropriate in the context of the operating domain of the remote driving use case. This might be to do with the geographic constraints under which remote driving would be operated or the speed at which remote driving would be undertaken.*

2.43 TRL drew a distinction between motorways and low-speed urban driving:

> *In high-risk environments (e.g. motorway driving) the remotely operated vehicle would need an ADS capable of navigating safely off the carriageway. This would require object and event detection and response capability and have sufficient control of the vehicle to conduct the MRM. In lower risk environments (e.g. low speed urban driving) an emergency stop functionality may be permissible.*

2.44 On the other hand, remote driving in urban environments will need measures to protect vulnerable road users, such as pedestrians and cyclists.

LACK OF SITUATIONAL AWARENESS

2.45 As TRL point out, most remote drivers rely largely on video feeds, possibly with limited aural or haptic information.[38] Drivers may find it difficult to judge depth from a two-dimensional image on a screen. They may also be deprived of the sensation of acceleration or other clues about the environment, such as the "subtle feeling of the steering wheel and brakes that might indicate an icy or oily road surface".[39]

2.46 Respondents expressed concern that some sense stimuli available to an in-vehicle driver would not be available to a remote driver. As the Motor Insurers' Bureau (MIB) put it:

> *Even smell can alert the driver to a situation that requires reaction – for instance a safety-critical fault such as an engine fire in the vehicle itself. Some aspects of weather and road conditions, such as side-winds and slippery surfaces, will cause in-vehicle drivers to drive more cautiously but may not be sensed by remote drivers.*

2.47 As we discussed in the Issues Paper, work is currently being conducted to improve workstation set-ups, adding a sense of depth and non-visual data. Software can also be used to draw the driver's attention to significant events in the environment.

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38 A Kalaiyarasan and others, *Remote operation of Connected and Automated Vehicles* (TRL Project Report PPR1011, November 2021) p 36, https://trl.co.uk/uploads/trl/documents/PPR1011-Remote-operation-of-CAVs---Project-Endeavour---Main-Report.pdf. Aural information is commonly available to remote drivers, though haptic sensations are more difficult to replicate.

39 J McNicol, *Standardizing remote operation of vehicles* (BSI and CCAV, July 2022) para 2.3.2, https://www.bsigroup.com/globalassets/localfiles/en-gb/cav/cav-resources-page/cav-teleoperation-report/cav-remote-operation-of-vehicles_final-report.pdf.

However, complex displays put greater demands on the network, and drivers could become overwhelmed by too much information. Further research is required to design workstations that provide the right data in the right way at the right time.

2.48 In the Issues Paper we expressed fears that remote driving could give rise to motion sickness, caused by a mismatch between visual signals and signals from the inner ear. TRL note that in some circumstances, exposure to dynamic visual displays might lead to "sopite" syndrome, which consists of drowsiness rather than nausea.[40] In discussions with developers, we were told that motion sickness could be a problem for some individuals in some circumstances, but that it was rare. It has not been a problem for remote drivers currently employed in trials.

DETACHMENT

2.49 A driver who is not at risk from a collision may have less of the instinctive understanding that what they do matters in the "real world". They may need to fight against the subconscious impression that they are involved in a video game rather than in something with real life consequences.[41]

2.50 Several stakeholders expressed concerns about detachment. Sustrans, for example, thought that the lack of risk to the driver increased the possibility that vehicles could be used as weapons:

> *This applies not only in the extreme circumstance of terrorism … but from other and more likely potential misuses of the system for example by individuals suffering mental ill-health, remote drivers who have a grudge against their… employer, or even by individual remote drivers just 'having a bad day' and taking out their aggression.*

CYBERSECURITY AND TERRORISM

2.51 Cybersecurity is an issue of acute public concern. SMMT has noted that failure in this area may "undermine public confidence in the technology" and "present genuine risks to public safety".[42] The combination of a cyber-attack and detachment give rise to concern that remotely driven vehicles could be used in terrorism.

2.52 At an international level, UN Regulation 155 on Cyber Security and Cyber Security Management Systems now requires that manufacturers put in place a system of

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40 A Kalaiyarasan and others, *Remote operation of Connected and Automated Vehicles* (TRL Project Report PPR1011, November 2021) (TRL Project Report PPR1011) p 42, https://trl.co.uk/uploads/trl/documents/PPR1011-Remote-operation-of-CAVs---Project-Endeavour---Main-Report.pdf.

41 A sense of detachment may also arise from lack of physical embodiment (that is, a lack of physical sensation), and may lead to decreased empathy: TRL Project Report PPR1011, pp 40 to 41.

42 Society of Motor Manufacturers and Traders (SMMT), *Connected and Autonomous Vehicles: Position paper* (February 2017) p 29, https://www.smmt.co.uk/wp-content/uploads/sites/2/SMMT-CAV-position-paper-final.pdf.

cybersecurity measures for their vehicles.[43] Vehicle approval authorities then verify that the manufacturers have taken appropriate steps to, amongst other things, implement appropriate cybersecurity measures and detect and respond to possible cyber-attacks.[44]

2.53 The UK Government has also produced general guidance on vehicle cybersecurity for connected and automated vehicles.[45] This emphasises security-by-design: as Principle 8 of the guidance puts it, the system must be "designed to be resilient to attacks". The Government's Code of Practice on automated vehicle trialling recommends that this guidance should be followed.[46] It also suggests that trialling organisations consider adopting the BSI standard on automotive cybersecurity (PAS 1885).[47]

THE SAFETY OF THE CONTROL CENTRE

2.54 Some respondents mentioned that thought should be given to the safety of the control centre, to guard against fire or intruders. Transport for London thought that the remote driving organisations should demonstrate that the remote driver's workplace environment is appropriate and not just the immediate workstation. They pointed to risks of fire, noise and disturbances generally that could affect safe operation. The centre would need a fire evacuation procedure, for example, which ensured that vehicles were left safely. The British Insurance Brokers' Association (BIBA) mentioned the need for:

> *emergency power backup facilities, and the physical security measures to prevent unauthorised access to the building.*

DEALING WITH INCIDENTS

2.55 The Automated Vehicles report recommended that those responsible for no user-in-charge (NUIC) vehicles should set out incident management protocols.[48] In the event of an adverse incident, staff would need to intervene promptly to assist passengers, alert emergency services and remove the vehicle. In some cases, they may need to

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43 UN Regulation 155 on uniform provisions concerning the approval of vehicles with regards to cyber security and cyber security management system, Revision 3 - Addendum 154 (4 March 2021) E/ECE/TRANS/505/Rev.3/Add.154, https://unece.org/sites/default/files/2021-03/R155e.pdf. A further amendment was published on 25 November 2022: E/ECE/TRANS/505/Rev.3/Add.154/Amend.1, https://unece.org/sites/default/files/2023-01/R155am1e.pdf.

44 UN Regulation 155 on uniform provisions concerning the approval of vehicles with regards to cybersecurity and cyber security management system E/ECE/TRANS/505/Rev.3/Add.154, para 5.1.1 (a) to (e).

45 HM Government, *The key principles of cyber security for connected and automated vehicles* (2017), https://www.gov.uk/government/publications/principles-of-cyber-security-for-connected-and-automated-vehicles/the-key-principles-of-vehicle-cyber-security-for-connected-and-automated-vehicles.

46 *Code of Practice: automated vehicle trialling* (Updated January 2022), https://www.gov.uk/government/publications/trialling-automated-vehicle-technologies-in-public/code-of-practice-automated-vehicle-trialling.

47 BSI*, The fundamental principles of automotive cyber security – specification*, PAS 1885: 2018.

48 Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, para 9.110.

talk to other road users who have been involved in collisions with the vehicle. Staff will then need to document the problem and retain data.[49]

2.56 The same challenges arise for remote driving. Dealing with incidents will not be easy. This process will involve communicating with multiple parties, often in emotionally fraught circumstances. Communicating with injured people may be particularly difficult. A remote driver will not be in a position to offer first aid and cannot insist that an injured person moves near a microphone or makes a phone call. Furthermore, without face-to-face communication, it may be difficult to establish rapport with someone who is angry, dazed or in shock.

SUGGESTED SOLUTIONS

2.57 Developers argued that solutions to the safety challenges were available. Trilvee, for example, thought that many safety concerns could be overcome by training and performance monitoring:

> *In general we believe the training, performance monitoring and oversight of the remote drivers will be significant in enhancing safe performance. While remote operation does introduce additional points of failure compared to a normal driver in a car, this can be mitigated by safety systems and then more than compensated for by using well trained, well supported, highly monitored professional drivers whose living is dependent on safe driving and working in a comfortable and safe environment with the support of a peer network.*

2.58 StreetDrone thought that the adequacy of a remote driving workstation should be considered in light of the "required level of functional safety to ensure the relevant accuracy and reliability of commands passed to the vehicle". As such "the rig itself has to be designed with ISO 26262 functional safety intent or equivalent to ensure the vehicle is not operated with a gaming controller or similar". They also suggested "some sort of dispatch sign off process at every start of shift or at regular intervals to ensure the vehicle is signed off physically and safely and ready to go".

2.59 It is clear that remote drivers will need specific, targeted training, in addition to holding a driving licence for any vehicle they control. They will also need health checks[50] and regular breaks. In the Issues Paper we summarised the regulation of rest breaks in similar industries. For example, an air traffic controller must be given a half-hour break during or after every two-hour period.[51] On the railways, safety-critical workers in

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49 Under the Code of Practice on automated vehicle trialling, "trialling organisations are strongly recommended to develop plans for police investigators and relevant organisations to readily and immediately access data relating to an incident": *Code of Practice: automated vehicle trialling* (Updated January 2022), "Data access", https://www.gov.uk/government/publications/trialling-automated-vehicle-technologies-in-public/code-of-practice-automated-vehicle-trialling.

50 These will be needed to check for, for example, motion sickness, fatigue or intoxication through drink or drugs.

51 The Civil Aviation Authority has established a Scheme for the Regulation of Air Traffic Controllers' Hours (SRATCOH): CAP 670 SA 2022/01, http://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=11177. This also sets out rules for the maximum hours in a shift and for the hours which can be worked in a 30-day period. Rest breaks are expected to provide a certain detachment from the operation – eg via rest areas

control centres must be given minimum breaks of 10 to 15 minutes every two hours during the day and every hour during the night.[52]

OVERALL VIEWS

2.60 Several respondents expressed concern about whether remote driving could ever be safe. The RAC Foundation said:

> *We acknowledge that technology has enabled remotely operated drone operations and remote robotic surgery. It follows that safe remote operation of a road vehicle is probably not impossible. But creating the circumstances where the remote driver would have the benefit of the haptic information enjoyed by a driver in a vehicle, in a controlled environment ensuring no loss of concentration, and for that to sit within an auditable framework of regulation strikes us as an extremely tall, expensive and, frankly, as matters stand, implausible, order.*

2.61 Similarly, the Parliamentary Advisory Council for Transport Safety (PACTS) commented:

> *It should not be assumed that remote handling constitutes a viable backup for problems encountered by vehicles under the control of an automated driving system, or that remotely controlled driving of a vehicle is feasible in busy environments or on high-speed roads.*[53]

2.62 Several respondents highlighted the difference between remote driving as an adjunct to automated driving, and remote driving in non-automated vehicles. Some questioned whether remote driving, independent of automation, could ever be acceptably safe. As DAC Beachcroft said:

> *We do wish to re-emphasise that non-automated remote driving is fundamentally unsafe for roads and other public places.*

2.63 Similarly, the Association of British Insurers (ABI) and Thatcham Research submitted a joint response that supported "more robust regulations and clearer guidance on the use of remote driving technologies for automated vehicles for use in specific and limited operational design domains". However, ABI and Thatcham Research emphasised that they did not support "the use of remote driving technologies to control manually driven vehicles".

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and quiet spaces: Air Traffic Services Safety Requirements CAP 670 (Civil Aviation Authority, 2019) D27, https://publicapps.caa.co.uk/docs/33/CAP670%20Issue3%20Am%201%202019(p).pdf.

52 See Railways and Other Guided Transport Systems (Safety) Regulations SI 2006 No 599, and the Office of Road and Rail, *Managing Rail Staff Fatigue* (2012) pp 44 and 47, https://orr.gov.uk/__data/assets/pdf_file/0005/2867/managing_rail_fatigue.pdf.

53 The same point was made by RoSPA.

CONCLUSION

2.64 There is no clear answer to the question of whether remote driving is sufficiently safe to be permitted on the roads.[54] Although remote driving gives rise to many serious safety concerns, it may be safe enough in some limited circumstances, provided sufficient care is taken over each aspect of the operation.

2.65 Remote driving has potential advantages, both to support and test automated driving, and to pioneer new forms of transport. It is therefore desirable for trials to take place, provided that this can be done without unacceptable risks to safety. This requires robust regulation.

2.66 In Chapter 5, we consider an immediate short-term scheme, which can be introduced without primary legislation using Vehicle Special Orders. In the longer term, we envisage a requirement for licensed operators, as set out in Chapters 7 and 8.

2.67 Under both schemes, the onus should be on the organisation planning to use remote driving to show why its deployment will be safe. It is not possible to set universal standards for mobile networks or workstations under the current state of knowledge. Instead, a case-by-case evaluation will be needed, looking at the context of the deployment. Low speed pods, operating in limited spaces, will be able to assure safety more easily than heavy goods vehicles on a motorway.

2.68 Similarly, it is clear that every vehicle operated beyond line-of-sight will need to have a risk mitigation system if connectivity fails. How sophisticated that system needs to be will also depend on the context of the vehicle's deployment.

2.69 Regulators will need to evaluate carefully the safety cases submitted to them. Below we provide a checklist of issues that a safety case should cover. This is far from a definitive list. Further thought and additions will be needed. However, we hope it will be a useful indication of some of the issues that regulation should address.

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[54] For a discussion of when driving is "safe enough", see Automated Vehicles: Consultation Paper 3 – A regulatory framework for automated vehicles (2020) Law Commission Consultation Paper No 252; Scottish Law Commission Discussion Paper No 171, Ch 5, and Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258 (the AV report), Ch 4. The AV report concludes that whether risks are acceptable to the public is essentially a political question, best taken by minsters: see para 4.55.

Conclusion 1.

2.70 Beyond line-of-sight driving requires robust regulation. An organisation wishing to put remotely driven vehicles on the road should submit a safety case showing how their operation is safe. The matters to be addressed include:

(1) the adequacy of the communication network;

(2) the risk mitigation system if communication fails;

(3) cybersecurity;

(4) workstation design and functionality;

(5) the security of the remote operations centre;

(6) staff training;

(7) staff health, fitness and vetting;

(8) staff attention and rest periods;

(9) roadworthiness checks; and

(10) incident protocols.

Chapter 3: Defining a remote driver

3.1 There is little agreement on how to define a remote driver. In Chapter 2 of the Issues Paper, we noted that the industry currently uses a variety of terms, including "remote driver", "teleoperator" and "remote operator". However, as TRL put it, the terminology "remains largely undefined and companies across the industry apply terms inconsistently".[55]

3.2 The Issues Paper referred to several documents that have tried to bring clarity to this issue. These include: the SAE Taxonomy, updated in April 2021; TRL's report, published in August 2021; and BSI's CAV Vocabulary, published in March 2022.[56] However, the approaches taken are not always consistent.

3.3 In this chapter we set out working definitions for the purposes of this advice. We look first at what we mean by "driver", and then at what we mean by "remote".

THE DEFINITION OF A "DRIVER"

What we said in the Issues Paper

3.4 The dynamic driving task defines the core aspects of driving. In essence, it involves sustained lateral and longitudinal control (steering, braking and accelerating) together with monitoring the driving environment to detect and respond to objects and events. In the Issues Paper, we followed the SAE Taxonomy by suggesting that a person is a driver if they perform all *or only part* of the dynamic driving task.[57]

3.5 This is consistent with our approach to automated driving. In the Automated Vehicles report we said that a vehicle was only driving itself if it could conduct the whole dynamic driving task, including responding to objects and events. If the automation requires a human to undertake any part of the dynamic driving task, or to respond to objects or events in the vehicle's environment, it is merely "driver assistance" and should not be authorised as self-driving. The human continues to be a driver and is fully responsible for how the vehicle behaves.[58]

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55 A Kalaiyarasan and others, *Remote operation of Connected and Automated Vehicles (summary report)* (TRL Project Report PPR1012, November 2021) (TRL Project Report PPR1012), para 3, https://trl.co.uk/uploads/trl/documents/PPR1012-Remote-operation-of-CAVs---Project-Endeavour---Summary-Report.pdf.

56 Society of Automotive Engineers International (SAE), *J3016 Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles* (April 2021) (SAE Taxonomy J3016); TRL Project Report PPR1012; Connected and automated vehicles – Vocabulary BSI Flex 1890 v4.0:2022-03 (British Standards Institution (BSI) and CCAV, March 2022), https://www.bsigroup.com/globalassets/localfiles/en-gb/cav/pass-and-flex-pdfs/bsi-flex-1890-v4-2022-03.pdf. For further discussion, see Remote Driving (2022) Law Commission Issues Paper Issues Paper, Appendix 1.

57 SAE Taxonomy J3016, para 3.24. A "remote driver" is defined in para 3.31 as "a driver who is not seated in a position to manually exercise" the vehicle controls. For discussion, see Remote Driving (2022) Law Commission Issues Paper, Appendix 1, para 1.13.

58 Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, para 3.65 and Recommendation 2.

3.6 The Automated Vehicles report went on to recommend that a vehicle that relies on issuing transition demands to a person in the vehicle (a user-in-charge) could be authorised as self-driving. As a result, the user-in-charge would not be liable for driving the vehicle while the automated driving system (ADS) was engaged. However, any transition demand would need to be clear and give the user-in-charge time to regain situational awareness before becoming responsible for the driving.[59]

3.7 Consistently with that, in the Issues Paper we defined a driver as an individual who performs all or any of the following tasks:

(1) steering (lateral control);

(2) braking, releasing a brake or accelerating (longitudinal control); or

(3) monitoring the driving environment with a view to safety-critical intervention by exercising the vehicle controls.[60]

3.8 We noted that a vehicle can have more than one driver at any given time.[61]

3.9 The Issues Paper also discussed the difference between a remote driver and a remote assistant. Again, this drew on the Automated Vehicles report, which recommended that a vehicle could be authorised to drive itself without a user-in-charge provided that it had a licensed organisation to help it navigate obstructions and deal with incidents. We said that a remote assistant who helps navigate obstructions is not a driver if they do not exercise direct lateral or longitudinal control, but only advise an automated driving system to undertake a manoeuvre.[62]

Respondents' views

3.10 A narrow majority of respondents agreed with our proposed definition. Those stakeholders who agreed said that our approach was consistent with the SAE Taxonomy, the Road Traffic Act 1988 and the Automated and Electric Vehicles Act 2018.

3.11 However, the issue generated considerable debate, illustrating the lack of consensus over how to define the various roles associated with remote driving. The debate focused on four issues:

(1) Is a driver always an individual (rather than an automated system)?

(2) Is a person a driver if they only perform part of the driving task (such as braking), or do they have to perform the whole task?

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59 Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, para 3.66 and rec 2.

60 See Remote Driving (2022) Law Commission Issues Paper, Question 1(1).

61 For example, in *Tyler v Whatmore* [1976] RTR 83 both a person in the passenger seat with both hands on the wheel and the person in the driving seat were held to be driving. In *Langman v Valentine* [1952] 2 All ER 803 a learner driver and an instructor with one hand on the steering wheel and one hand on the parking brake were both found to be drivers at the same time. See also the discussion of Road Traffic Act 1988, s 192(1) in the Issues Paper: Remote Driving (2022) Law Commission Issues Paper, paras 2.5 to 2.7.

62 Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, para 9.16.

(3) How does one distinguish between a remote assistant and a remote driver?

(4) Can an individual be a driver if they only monitor the environment, but do not intervene?

3.12 We consider each of these issues in turn.

A driver is an individual rather than a system

3.13 In the Issues Paper we defined a driver as an "individual" (that is, a human). Richard Morris[63] queried whether an automated driving system (ADS) could also be considered a driver.

3.14 We accept that an ADS may perform the full dynamic driving task. However, the law could not simply treat an ADS as a "driver". The current extensive system of driver regulation assumes that the driver is human. For example, a driver must meet minimum age requirements;[64] can be required to give breath, blood, and urine samples;[65] and can be imprisoned for careless or dangerous driving.[66]

3.15 As discussed in the Automated Vehicles report, automated driving requires its own system of regulation. One cannot simply define an automated system as a driver and then apply the existing system of legal regulation. An ADS may fulfil the role of a driver for some legal purposes.[67] However, many legal requirements (such as those related to age, qualifications and some forms of punishment) can only be applied to a human.

3.16 Therefore, for the purposes of this project, we define a driver as an individual.

A driver may perform only part of the driving task

3.17 Most respondents agreed that performing all or part of the dynamic driving task makes an individual a driver. The 5G Automotive Association, for example referred to its White Paper on Tele-operated Driving.[68] Here, "teleoperated driving" means that part or all the driving task is performed by a remote operator, usually over wireless communications.

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63 Richard Morris is a researcher and developer involved in road safety and vehicle automation. He responded in a personal capacity,

64 Road Traffic Act 1988, s 101.

65 Road Traffic Act 1988, s 7.

66 Road Traffic Act 1988, ss 2 and 3.

67 The Vienna Convention on Road Traffic 1968 requires every vehicle to have a driver (art 8.1). Amendments (through art 1 and 34bis) provide that this requirement is "deemed" to be satisfied while the vehicle is using an ADS which meets specified domestic and international requirements. The amendment came into force on 14 July 2021. For further discussion, see Explanatory Memorandum on the Proposal of Amendment to Article 1 and new Article 34 BIS of the 1968 Convention on Road Traffic (2021) Command Paper No CP 540.

68 5G Automotive Association, *Tele-operated Driving Use Cases, System Architecture and Business Considerations* (2021), https://5gaa.org/wp-content/uploads/2021/12/5GAA_Tele_operated_Driving_White_Paper.pdf.

3.18 However, a significant minority of respondents thought that an individual should only be considered a remote driver if they perform *all* the sub-tasks that make up dynamic driving. Developers gave examples of "interventions" they regarded as short of driving, including simply releasing the brakes.[69]

3.19 Other respondents expressed concern that we were reducing driver responsibilities, with negative implications for safety. Shoosmiths, for example, stressed that the law requires a driver to have proper control of the vehicle, in all its aspects.

3.20 The legal definition of a driver involves two distinct questions: what it takes for an individual to be defined as a driver, and what an individual needs to do to be a legally compliant driver. We explore these below.

How little does an individual need to do before being held to be a driver?

3.21 The first question is what an individual needs to do before being held to be a "driver" for the purpose of a driving offence. The answer is often very little. In one case, for example, a drunk defendant sat in the driving seat, released the parking brake, and allowed the car to roll 30 feet.[70] Even though the steering was locked, and the keys were not in the ignition, the court found this to be driving and convicted him of driving under the influence of alcohol. By releasing the parking brake, the defendant had acquired full driver responsibilities.

3.22 Similarly, in 2018, a defendant set a driver assistance system to propel a vehicle along the motorway at 40 miles an hour, and then moved into the passenger seat. He pleaded guilty to a charge of dangerous driving.[71] The defendant accepted that he had been driving, even though he had failed to exercise control of the vehicle.

3.23 We think this is the right approach. Drivers retain responsibilities for road safety even when significant parts of dynamic driving are performed by driver assistance systems. Our starting point is that driving automation can only be regarded as "self-driving" if the automation carries out all the dynamic driving task. If part of the driving task is carried out by an individual, that person is a driver, and retains full driver responsibilities. To say that a person who performs only some functions is not a driver risks leaving a regulatory gap. The system would not be self-driving, but, as a matter of law, no-one would be responsible for driving the vehicle.

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69 We also note the discussion paper submitted by Germany and the UK to the 85th session of the Global Forum for Road Traffic Safety (WP.1) (19 to 23 September 2022) Informal document No.1/Rev.1 (September 2021), https://unece.org/sites/default/files/2022-09/ECE-TRANS-WP1-Informal%201-Sept%202021e_1.pdf. The paper concerns situations where full (rather than partial) dynamic control of the vehicle is performed by a remote driver.

70 *Burgoyne v Phillips* [1983] RTR 49. We consider the case law on what is a driver in more depth in Automated Vehicles: A joint preliminary consultation paper (2018) Law Com No 240; Scot Law Com No 166, paras 2.60 to 2.67. The courts tend to take a pragmatic approach, depending on the issue at stake. For example, it has been suggested that pushing a motorcycle while holding the handlebars is not driving (and does not require a driving licence): see *R v MacDonagh* [1974] QB 442.

71 The defendant was disqualified from driving for 18 months and sentenced to 100 hours community service: BBC News, "Tesla driver banned for M1 autopilot seat-switch" (28 April 2018), https://www.bbc.co.uk/news/uk-england-beds-bucks-herts-43934504.

How much does an individual need to do to be a legally-compliant driver?

3.24 The second question is what an individual needs to do to drive in compliance with the law. Here the answer is: a very great deal. Once a person is doing enough to be considered a driver, they carry extensive legal obligations, not only for the dynamic driving task but for a wide range of other issues, including insurance, roadworthiness, reporting accidents and ensuring that children wear seat belts.[72] A person does not become a driver simply because they strap a toddler into a child seat. However, people who are drivers are required in law to ensure that this is done correctly.

3.25 This means that by doing only part of the dynamic driving task (such as steering, braking, accelerating or releasing a brake), the individual incurs full driving responsibilities.

3.26 This is an important starting point. However, in some cases this has the potential to be unfair to the individual. For example, depending on the setup, a remote driver may have no way of checking whether the tyres are bald, or the vehicle is overloaded. Instead, the driver may rely on others within the organisation to do this for them. In Chapters 7 and 8 we conclude that many issues associated with remote driving should be seen primarily as an organisational responsibility. We discuss legal protection for the individual driver in Chapter 10.

The distinction between remote driving and remote assistance

3.27 The Automated Vehicles report pointed to the need for a clear distinction between self-driving technologies and driver assistance technologies. We recommended that self-driving would be compatible with "remote assistance".

3.28 The Society of Automotive Engineers International (SAE) explain that remote assistance is not driving.[73] Instead, they give the following examples of how remote assistance might work:

(1) The ADS encounters "an unannounced area of road construction" which the system cannot navigate: the "remotely located human provides a new pathway for the vehicle to follow around the construction zone".

(2) The ADS "detects an object in its lane that appears to be too large to drive over and stops. A remote assistant uses the vehicle's cameras to identify that the object is an empty bag that can be safely driven through/over" and instructs the vehicle to proceed.

3.29 The EU ADS Implementing Regulation on Automated Driving Systems uses a similar concept: it sets out a non-exhaustive list of tasks a "remote intervention operator" may

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[72] For a discussion of 81 common offences that may apply to a "driver" see Background Paper A to Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, available at: https://s3-eu-west-2.amazonaws.com/lawcom-prod-storage-11jsxou24uy7q/uploads/2022/01/Background-papers-24-01-22.pdf.

[73] As the SAE put it, it "does not include real-time DDT or fallback performance by a remote driver" (SAE Taxonomy J3016, para 3.23 Note 1).

perform.[74] The tasks include switching the ADS on or off, requesting the ADS to start a minimal risk manoeuvre (MRM) or confirming a manoeuvre proposed by the ADS while the vehicle is at standstill.[75] One task is described in detail:

> after an MRM, while the fully automated vehicle is at standstill, request[ing] the ADS to perform safely a low–speed manoeuvre limited to 6 km/h with the remaining performance to evacuate the fully automated vehicle to a nearby preferable location.[76]

3.30 The ADS Implementing Regulation expressly states that "in the above situations, the on-board operator shall not drive the fully automated vehicle and the ADS shall continue to perform the [dynamic driving task]".[77]

3.31 In the Issues Paper we asked stakeholders if they agreed that a remote assistant is not a driver if the assistant does not exercise direct longitudinal or lateral control, but only advises an automated system to undertake a manoeuvre.

Stakeholder views

3.32 Many respondents endorsed the idea of a clear distinction between remote driving and self-driving. The Society of Motor Manufacturers and Traders (SMMT) made this point strongly:

> *We wish to emphasise that remote driving, or teleoperation, is not automated driving, as it does not pass either of the control or monitoring tests. While we support the development of new technology and the spawning of innovative technological applications, we are concerned that the public may confuse and conflate remote driving with automated driving*.

3.33 Other stakeholders, however, highlighted that the distinction between self-driving and remote driving may be difficult to draw in practice. For example, TRL noted that the difference between "advising" an automated vehicle to conduct a minimum risk manoeuvre and applying the brakes would depend on the circumstances. If the minimum risk manoeuvre were simply an emergency stop function, "advising an MRM" would look very similar to braking.

3.34 In the Automated Vehicles report we explained that when an assistant gives advice, the vehicle takes account of the input, but then makes its own decision about its safe path. We distinguished this from direct lateral or longitudinal control. In response to the Issues Paper, the Academy of Robotics drew a similar distinction between advice and control. While a remotely driven vehicle always implements a commanded

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74 Commission Implementing Regulation (EU) 2022/1426 of 5 August 2022 on the type-approval of the automated driving system (ADS) of fully automated vehicles, Official Journal L 221 of 26.08.2022, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022R1426&from=EN (last visited 16 February 2023).

75 Above, art 2(24).

76 Above, art 2(24)(d).

77 Above art 2(24).

trajectory, advice provides "a probabilistic alternative which gets processed by the AV software".

3.35 However, Oxbotica explained that remote drivers, like modern in-vehicle drivers, do not control vehicles directly. Instead, "there will be electronic systems between the remote driver's input device and the actuators":

> *With current production vehicles, increasing use of drive-by-wire means that even in-vehicle drivers are only advising electronic systems on how to steer and brake the vehicle.*

3.36 Anti-lock braking systems (ABS), introduced in the 1970s and now present in almost every vehicle, mediate between the braking command and the braking effect. Most modern cars have far more sophisticated mediations. For example, with automated emergency brakes (AEB), the brakes may be actuated without being commanded by the driver. If the driver steers straight towards a brick wall, the AEB system will detect the obstruction and automatically apply the brakes.

3.37 We accept that the distinction between advice and control can become blurred. It is a matter of fact and degree, which would need to be determined by a court in an individual case. If an authorised self-driving system relies on help from a remote operations centre, a careful evaluation may be required of whether, at any given time, the vehicle was driving itself or had a human remote driver.

Our approach

3.38 It is well established that a person is not a driver if they only advise a human driver. Advice may be given by a driving instructor or by a "banksman" (that is, a marshal directing traffic).[78] Furthermore, some special vehicle or vehicles with abnormal loads require attendants, who must be able to communicate with the driver.[79] However, attendants are not drivers.[80] We do not wish to interfere with this position.

3.39 Similarly, we recognise that humans may advise automated driving systems without becoming drivers. We accept the crucial conceptual distinction, made by the SAE and drawn on by international regulators, between remote driving and remote assistance. However, we agree that, at the margins, it may be difficult to decide whether at any given moment "assistance" to a self-driving system crosses the line to become remote driving. We have therefore attempted to reduce the need to make this distinction in practice. In Chapter 9 we conclude that the distinction should not affect civil liability: a

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78 For Health and Safety Executive Guidance on the role of banksmen, see https://www.hse.gov.uk/construction/faq-banksmen.htm.

79 The requirement for an attendant applies to abnormal indivisible load vehicles, mobile cranes, engineering plants, road recovery vehicles and agricultural vehicles: see Road Vehicles (Authorisation of Special Types) (General) Order SI 2003 No 1998, arts 12(1), 14(1), 15(4), 23(3), 24(5), 31(3) and 34(4). Such attendants must accompany the vehicle (or vehicle-combination), attend to it and any load that it carries, and give warning to the driver of any danger posed to any other person by the presence of the vehicle on the road. Where an attendant accompanies a vehicle by travelling in another vehicle, they must be able to see the vehicle at all times during the journey (as far as is reasonably practicable) and maintain a direct radio voice link to it. See: sch 6, paras 1 and 3.

80 Road Vehicles (Authorisation of Special Types) (General) Order SI 2003 No 1998, sch 6, para 4 confirms that attendants must be "additional to the person or persons employed to drive the vehicle".

victim's compensation should not depend on proving whether an ADS or human driver was in charge at any given moment.

3.40 Similarly, in Chapter 7 we propose bringing remote assistance and remote driving into the same regulatory regime. The Automated Vehicle report recommended that all self-driving features which are authorised for use without a user-in-charge should be overseen by a licensed No User-in-Charge Operator (or NUICO). In Chapter 7 we conclude that a NUICO should also be responsible for remote driving. Regulatory oversight should be aimed at improving safety and should not depend on legalistic distinctions between assistance and control.

3.41 In some circumstances, however, the distinction between a remote assistant and a remote driver will have legal effects. As we discuss in Chapter 10 and Appendix 3, the criminal liability of a driver is more extensive than the criminal liability of a remote assistant. A remote assistant who acts negligently may commit some criminal offences, including (in very serious cases) gross negligence manslaughter. However, this is much more restricted than the criminal liability of a driver, who faces a wide range of offences, from causing death by dangerous driving to speeding.

3.42 Whether an organisation employs drivers or only assistants, it is important to see safety as an organisational responsibility, with robust sanctions on the organisation if things go wrong. We wish to move away from the current tendency to blame an individual when the main responsibility lies with the organisation as a whole. In Chapter 10 we propose that remote drivers should have a new defence to criminal liability. It should apply where a competent and careful driver in the remote driver's circumstances would not have been aware of the circumstances or would not have avoided the offence.

Monitoring the driving environment

3.43 Driving involves detecting objects and events in the driving environment and responding to them. As the SAE put it, the dynamic driving task includes "monitoring the driving environment via object and event detection, recognition, classification, and response preparation".[81] In other words, a driver monitors what is happening on the road and prepares to respond.

3.44 In the Issues Paper, we said that not everyone looking at screens in a remote control centre is necessarily a driver. A person may be monitoring the screen with a view to longer-term tasks, such as route planning or safeguarding passengers, rather than immediately intervening in the way the vehicle is driving. However, we said that a person would be a driver if they were:

> monitoring the driving environment with a view to responding to objects or events by exercising lateral or longitudinal control (provided that the activity is safety critical).[82]

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81 SAE Taxonomy J3016, para 3.10(3).

82 Remote Driving (2022) Law Commission Issues Paper, Question 1(1)(c).

3.45 Thus, a person might become a driver before taking control if they monitor the environment in a safety-critical way. On this basis, a failure to intervene might amount to careless or dangerous driving.

3.46 Most stakeholders agreed with our suggested approach, but not all. Oxbotica suggested that the proposed definition could create a regulatory gap where a remote operator is required to flag any obstacles that have been missed by the perception system but has no access to the driving controls.

3.47 The concern is that such a system would not meet the test for self-driving, as the automated driving system could not drive safely and legally without an individual monitoring the driving environment. However, the system would not have a driver. Under Recommendation 50 of the Automated Vehicles report it would therefore be banned, as having neither an authorised self-driving feature nor a driver. Yet, Oxbotica pointed out, such systems could be safe and beneficial.

3.48 We agree that the definition of a driver and the self-driving test should match, so as to prevent some technologies from falling between the two. Therefore, in this advice, we propose a small adjustment to the definition of a driver put forward in the Issues Paper. We also suggest clarifying how the definition of self-driving set out in the Automated Vehicles report should apply to no user-in-charge vehicles that rely on remote operators to oversee journeys.

3.49 In our view the definition of a driver should include someone who monitors the vehicle or driving environment with a view to immediate and safety-critical intervention in the way the vehicle drives. The intervention does not necessarily have to be direct steering or braking: it may be another input which has the effect of causing the vehicle to change speed or direction. If immediate and safety-critical human input is needed for the system to be safe, the vehicle could not be authorised as self-driving. However, if the regulator is satisfied that the overall combination of human input and automation is safe, it could be permitted as a form of remote driving.

3.50 Recommendation 2 of the Automated Vehicles report sets out the definition of self-driving: the vehicle must be able to drive safely and legally even if an individual is not monitoring the driving environment, the vehicle or the way that it drives. We think that it would be helpful to clarify how this test applies to no user-in-charge vehicles, which use remote staff to oversee journeys. A vehicle may be self-driving while an individual is observing its journey on a screen, so long as that individual is not required to monitor the driving environment with a view to immediate and safety-critical intervention in the way the vehicle drives. This clarification avoids the regulatory gap identified by Oxbotica by ensuring that a system is either self-driving or has a driver.

Conclusion: what do we mean by a "driver"?

3.51 It is not the purpose of this project to define a driver for all purposes. As discussed in the Consultation Paper 1 of the automated vehicle project, the courts have approached the definition of driving pragmatically, depending on the justice of a particular case.[83] We do not wish to disrupt the existing caselaw concerned with

[83] Automated Vehicles: A joint preliminary consultation paper (2018) Law Com No 240; Scot Law Com No 166, paras 2.60 to 2.67.

individuals who, for example, push vehicles along the road.[84] However, we do need to provide a working definition of a beyond line-of-sight "driver" for the purposes of our proposed reforms.

3.52 Our starting point is that an individual who carries out part of the dynamic driving task is a driver – and becomes responsible for all of the dynamic driving task. The individual driver also acquires extensive non-dynamic driving responsibilities, involving (for example) insurance, loading, roadworthiness, children's seat belts and reporting accidents.

3.53 By contrast, an automated driving feature should only be authorised as self-driving if it can carry out *all* of the dynamic driving task. This includes not only lateral and longitudinal control but also object and event detection and response. The vehicle must be safe even if an individual is not monitoring the driving environment, the vehicle, or the way that it drives.

3.54 An ADS may rely on input from an individual in some limited circumstances. An individual may advise an authorised vehicle to undertake a manoeuvre, so long as the individual does not exercise control. Furthermore, an individual may watch a vehicle's driving environment on a screen, so long as this is not with a view to immediate and safety-critical intervention in the way the vehicle drives.

3.55 In this advice, we have designed a regulatory framework which minimises the need to decide whether the vehicle was driving itself or being remotely driven at any given time. Whichever the side of the boundary, the NUICO should face appropriate regulatory sanctions if the system fails unacceptably. Furthermore, a victim's compensation should not depend on proving whether an ADS or human driver was in charge at any given moment.

3.56 Criminal liability will differ between a remote assistant and a remote driver. However, in most cases, safety should be seen as a corporate responsibility.

[84] See *R v MacDonagh* [1974] 372. For an alternative view, see *McArthur v Valentine* 1990 JC 146.

Conclusion 2.

3.57 For the purpose of defining a beyond line-of-sight remote driver, "a driver" is an individual who performs all or any of the following tasks:

(1) steering (lateral control);

(2) braking, releasing a brake, or accelerating (longitudinal control);

(3) monitoring the vehicle or driving environment with a view to immediate and safety-critical intervention in the way the vehicle drives.

A remote assistant is not a driver if they only advise an authorised vehicle to undertake a manoeuvre and do not monitor with a view to immediate and safety-critical intervention. The distinction between advising a manoeuvre and exercising lateral or longitudinal control is a matter of fact and degree.

THE DEFINITION OF "REMOTE"

3.58 The next issue is when a driver is "remote". This is defined in various ways. According to the SAE Taxonomy, a remote driver could include a driver:

> who is not seated in a position to manually exercise in-vehicle braking, accelerating, steering, and transmission gear selection input devices (if any), but is able to operate the vehicle… . A remote driver may include a user who is within the vehicle, within line-of-sight of the vehicle, or beyond line-of-sight of the vehicle.[85]

3.59 By contrast, the BSI CAV Vocabulary uses the term "remote" to mean "beyond visual line-of-sight" of the subject vehicle.[86]

3.60 In the Issues Paper, we suggested that normal driving laws (such as those requiring proper control and view of the road ahead) apply with sufficient certainty to drivers located in or on vehicles. Similarly, we did not think additional provision needed to be made for "pedestrian controlled vehicles" where a person walks alongside the vehicle with their hands on controls physically attached to the vehicle.[87]

3.61 We proposed to define a "remote driver" as an individual who is outside the vehicle and uses some form of wireless connectivity to control the vehicle. We then identified two types of remote driving and suggested they should be dealt with differently:

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85 SAE Taxonomy J3016, para 3.31.1.2.

86 See Connected and automated vehicles – Vocabulary BSI Flex 1890 v4.0:2022-03 (British Standards Institution (BSI) and CCAV, March 2022), paras 2.1.58 and 2.1.59, https://www.bsigroup.com/globalassets/localfiles/en-gb/cav/pass-and-flex-pdfs/bsi-flex-1890-v4-2022-03.pdf.

87 See Road Vehicles (Authorisation of Special Types) (General) Order SI 2003 No 1998, reg 50(1).

(1) Within line-of-sight: here existing driving laws are generally sufficient; and

(2) Beyond line-of-sight: here significant additional regulation is needed to ensure public safety.[88]

3.62 We had two reasons for making this distinction. The first is that beyond line-of-sight driving raises greater safety concerns. For in line-of-sight driving, even if driving aids and enhancements fail, the individual can still perceive the environment and drive competently. For beyond line-of-sight driving, the individual relies on connectivity to obtain crucial information about hazards.

3.63 The second is that the most common uses of in line-of-sight driving are already regulated. The main use is controlled parking, and here the UNECE takes a cautious approach. Abnormal loads are also subject to considerable regulation, under the Road Vehicles (Authorisation of Special Types) (General) Order 2003 and through Vehicle Special Orders.

3.64 Most stakeholders agreed with this distinction. SMMT suggested that the Government should explain to the public "the difference between driver assistance features that enable the remote manoeuvring of a vehicle within line of sight, for example Remote Control Parking, and remote driving beyond line of sight".

Regulating in line-of-sight driving

3.65 The UNECE's Working Party 29 has set technical requirements for remote parking functions carried out within line-of-sight. Regulation 79 on Steering Equipment sets technical standards for two driver assistance features: remote control parking (RCP) and remote control manoeuvring (RCM).[89] Both must be used:

(1) within a maximum range of 6 metres;

(2) at very low speeds (the maximum speed is 10km/h for RCP and 5km/h for RCM); and

(3) in a vehicle equipped with means to detect an obstacle and bring the vehicle to a stop to avoid a collision.

3.66 Unlike remote control parking, remote control manoeuvring provides the driver with "direct control on steering angle, acceleration, and deceleration for low–speed manoeuvring" through a remote-control device. However, at present, it may not be

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88 See Remote Driving (2022) Law Commission Issues Paper, Question 15(2).

89 RCP was introduced in 2017, see UN Regulation No 79 on uniform provisions concerning the approval of vehicles with regard to steering equipment, Revision 4 (incorporating all valid text up to supplement 1 to the 02 series of amendments) (7 November 2018) E/ECE/TRANS/505/Rev.1/Add.78/Rev.4, paras 2.4.8 and 5.6.1, https://unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2018/R079r4e.pdf. RCM was introduced in 2020, see UN Regulation No 79 on uniform provisions concerning the approval of vehicles with regard to steering equipment, Revision 4 – Amendment 2 (Supplement 2 to the 03 series of amendments) (2 November 2020) E/ECE/TRANS/505/Rev.1/Add.78/Rev.4/Amend.2, paras 2.3.4.4 and 5.7.1, https://unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2020/R079r4am2e.pdf.

used on a public road, reflecting concerns about cybersecurity and road safety. It must be designed so that it cannot be activated:

(1) on a public road/highway;

(2) in a public car park; or

(3) in an area designated exclusively for use by pedestrians and/or pedal cyclists.

3.67 At least in consumer vehicles, the UNECE is taking a very cautious approach to in line-of-sight driving. We do not wish to interfere with these provisions. Nor are we aware of any specific concerns about in line-of-sight driving. The conclusions in this advice are aimed at regulating beyond line-of-sight driving.

Defining beyond line-of-sight driving

The distinction in aviation

3.68 The distinction between within line-of-sight and beyond line-of-sight is also a crucial distinction for aircraft with no pilot on board (drones). UK Implementing Regulation (EU) 2019/947 on the operation of unmanned aircraft sets out the following definitions:

(1) "Visual line of sight operation" (VLOS) means a type of "unmanned aircraft system"[90] (UAS) "in which, the remote pilot is able to maintain continuous unaided visual contact with the unmanned aircraft, allowing the remote pilot to control the flight path of the unmanned aircraft in relation to other aircraft, people and obstacles for the purpose of avoiding collisions";

(2) "Beyond visual line of sight operation" (BVLOS) means "a type of UAS operation which is not conducted in VLOS".[91]

3.69 Guidance issued by the UK Civil Aviation Authority explains these definitions:

> **2.1.1 Visual line of sight operations (VLOS)**
>
> Maintaining VLOS ensures the remote pilot can monitor the aircraft's position, orientation, and the surrounding airspace at all times. This is important in order to ensure the [unmanned aircraft] can be manoeuvred clear of anything that might pose a collision hazard.
>
> While corrective lenses may be used, the use of binoculars, telescopes, or any other forms of image enhancing devices are not permitted.

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90 An "unmanned aircraft system" (UAS) means "an unmanned aircraft and the equipment to control it remotely": Retained Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft, art 2(1). At the time of writing, there are amendments pending.

91 Retained Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft, art 2(7) and 2(8).

2.1.3 Beyond visual line of sight operations (BVLOS)

> Operation of an unmanned aircraft beyond a distance where the remote pilot is able to respond to or avoid other airspace users by direct visual means (ie the remote pilot's observation of the unmanned aircraft) is considered to be a BVLOS operation.[92]

3.70 The US Federal Aviation Administration (FAA) also has different rules for "visual line of sight aircraft operation":[93]

> With vision that is unaided by any device other than corrective lenses, the remote pilot in command, the visual observer (if one is used), and the person manipulating the flight control of the small unmanned aircraft system must be able to see the unmanned aircraft throughout the entire flight in order to…(1) Know the unmanned aircraft's location; (2) Determine the unmanned aircraft's attitude,[94] altitude, and direction of flight; (3) Observe the airspace for other air traffic or hazards; and (4) Determine that the unmanned aircraft does not endanger the life or property of another.

3.71 The definitions and guidance clarify some important issues in distinguishing beyond line-of-sight from in line-of-sight. The first is that the operator must not only be able to see the aircraft. They must also see the flight path and anything that the aircraft may collide with. As several respondents suggested, to be in line-of-sight, the driver must be able to see not only the vehicle itself, but also its path and surroundings. This may involve corrective spectacles, but not binoculars, telescopes, cameras or computer screens.

Our approach

3.72 In this advice we have taken a fairly narrow approach to defining a beyond line-of-sight driver. We do not wish the definition to capture drivers in the vehicle. For example, a driver within a heavily armoured vehicle may rely on cameras to see outside the vehicle. That arrangement would be regulated through existing driving laws and would not fall within our scheme.

3.73 Similarly, we do not wish to capture a person in a trailer which is hard-wired to the main vehicle, even if they rely on cameras to see the driving environment. We have been told that some abnormal loads require separate steering from the trailer. We would not wish to interfere with such arrangements, which are regulated under existing provisions.[95] Furthermore, as the connection is hard-wired, it does not face

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92 Unmanned Aircraft System Operations in UK Airspace – Policy and Guidance CAP 722 (9th edn amendment 1, 2022), paras 2.1.1 and 2.1.3, https://publicapps.caa.co.uk/docs/33/CAP722_Edition_9.1%20(1).pdf.

93 Visual line of sight aircraft operation, 14 Code of Federal Regulations §107.31 (2022).

94 "Attitude" is the orientation of an aircraft with respect to the horizon. It shows whether an aircraft is ascending, descending or flying on the level.

95 In some circumstances an abnormal load might be controlled by an attendant in an escort vehicle, which is equipped with video feeds of the driving environment. Such arrangements would come within our definition of a beyond line-of-sight remote driver. However, we would not wish to add to the regulatory burden of such

the same safety challenges associated with failures of connectivity discussed in Chapter 2.

3.74 However, we do wish to include driving where a driver outside the vehicle relies on external aids to see the driving environment. This is the type of remote driving which leads to the greatest safety challenges. During this project, we were given an example of a proposed trial involving an automated vehicle, where the safety driver would follow in a car behind. The safety driver would be able to see the vehicle, and either side of the vehicle, but would rely on cameras feeding to a computer screen to see the path in front of it. We think this would be beyond line-of-sight driving. The driver relies on external aids to see the path of the vehicle and observe hazards.

Conclusion 3.

3.75 A "beyond line-of-sight" remote driver is a driver who:

(1) is outside the vehicle or its trailer; and

(2) relies on external aids (other than corrective spectacles) to see some or all safety-critical elements of the driving environment.

arrangements. In Ch 8 we propose exemptions from the new regulatory scheme where such arrangements are suitably regulated under the Road Vehicles (Authorisation of Special Types) (General) Order SI 2003 No 1998 or Vehicle Special Orders.

Chapter 4: The current law on approval and use of remotely driven vehicles

4.1 In the Issues Paper we noted that under the current law there is no express legal requirement for a driver to be within the vehicle being driven. Additionally, although vehicles are subject to detailed approval and use regulations, no provisions completely prevent remote driving.

4.2 Many stakeholders felt that the current law was unsatisfactory. It did too little to ensure public safety, while at the same time creating unnecessary uncertainty for developers. This in turn prevented investment in worthwhile remote driving projects which might benefit society.

4.3 In this chapter, we provide a brief overview of the law relating to vehicle approval; construction and use regulations; and exemptions from construction and use regulations. We then consider problems with the current law, which we address in subsequent chapters.

APPROVAL

4.4 Generally, before a vehicle can be used on a public road or in a public place, it must be registered and have a registration number. It is a criminal offence to use a vehicle on a road without a valid number[96] or to use an incorrectly registered vehicle on a public road or in a public place.[97]

4.5 Most vehicles must obtain an approval certificate before they can be registered. Approval certificates can be obtained through:

(1) type approval;

(2) national type approval of vehicles produced in a small series (NSSTA); or

(3) individual vehicle approval (IVA).

4.6 Before the UK's exit from the European Union, type approval was governed by EU law, notably by Regulation 2018/858. Regulation 2018/858 now forms part of "retained EU law" and is enforceable under the Road Vehicles (Approval) Regulations 2020.

4.7 Regulation 2018/858 is detailed and onerous and applies in full to vehicles which are type approved. NSSTAs and IVAs permit some exemptions from technical requirements, provided that the vehicle adheres to the alternative requirements set out in the Road Vehicles (Approval) Regulations 2020. These alternative requirements

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96 Vehicle Excise and Registration Act 1994, s 59 (1). The way in which number plates must be displayed is provided in the Road Vehicles (Display of Registration Marks) Regulations SI 2001 No 561.

97 Vehicle Excise and Registration Act 1994, s 43C.

aim to ensure an equivalent level of road safety and environmental protection to the greatest extent practicable.

Exemptions from the need for an approval

4.8 Certain vehicles are exempt from the need for approval and can be registered without an approval certificate. For the present purposes, three exemptions are relevant:

(1) Prototypes of vehicles used on the road under the responsibility of a manufacturer to perform a specific test programme, provided they have been specifically designed and constructed for that purpose.[98]

(2) M and N category vehicles (that is passenger or goods vehicles) with a maximum speed of less than 25km/h (15.5 miles an hour).[99]

(3) L category vehicles with a maximum design speed that does not exceed 6 km/h (3.7 miles an hour). This applies to powered light vehicles, such small "pods" or micro-cars.

4.9 If an exemption applies, the Department for Transport advises trialling organisations to complete the registration form by writing "EXEMPT" in the type approval number field and providing an explanation in the space provided.

> Evidence does not need to be provided at the time of applying for registration, but the applicant should be satisfied that the vehicle is out of scope for one of the permitted reasons, seeking legal advice where required.[100]

CONSTRUCTION AND USE REGULATIONS

4.10 Once registered, a vehicle must comply with the Road Vehicles (Construction and Use) Regulations 1986.[101] As the name implies, these regulations deal with how vehicles are constructed and used. The regulations apply even if a vehicle is exempt from the need for an approval certificate.

4.11 The regulations apply to vehicles on "roads". Unlike most criminal offences under the Road Traffic Act 1988, they do not apply to "other public places". The definition of a road is considered in detail in Consultation Paper 3 of the Automated Vehicles project.[102] Essentially a road must be "identifiable as a route or a way" to which the

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98 Regulation (EU) 2018/858, art 2 (4)(b).

99 M and N class vehicles as defined in Regulation (EU) 2018/858, which has been retained by the UK following its exit from the EU.

100 *Code of Practice: vehicle authorisations and exemptions for more complex CAV trials* (Updated January 2022), available at https://www.gov.uk/government/publications/trialling-automated-vehicle-technologies-in-public/code-of-practice-vehicle-authorisations-and-exemptions-for-more-complex-cav-trials.

101 SI 1986 No 1078. Vehicles must also comply with and Road Vehicles Lighting Regulations SI 1989 No 1796 as amended.

102 Automated Vehicles: Consultation Paper 3 – A regulatory framework for automated vehicles (2020) Law Commission Consultation Paper No 252; Scottish Law Commission Discussion Paper No 171, paras 2.3 to 2.14 and Appendix 2.

public has access. The access does not have to be motorised: pavements and cycle paths are roads.

4.12 In the Issues Paper we considered construction and use regulations which were uncertain in their application to remote driving. As discussed below, respondents highlighted two regulations, 104 and 107, as particularly problematic.[103]

Regulation 104

4.13 Regulation 104 requires that:

> No person shall drive or cause or permit any other person to drive, a motor vehicle on a road if he is in such a position that he cannot have proper control of the vehicle or have a full view of the road and traffic ahead.

4.14 Breach of regulation 104 is a relatively minor offence.[104] It carries three penalty points, together with a maximum fine of £1,000 (or £2,500 in respect of goods vehicles or vehicles which can carry more than eight passengers). Disqualification from driving is discretionary.[105]

4.15 In a remote driving context, most respondents thought that "a full view of the road and traffic ahead" could be provided through a screen. However, respondents asked for more clarity about what qualifies as "proper control":

> *To meet the requirements of regulation 104, "proper control" must be defined, to clarify if someone who has responsibility for only some of the driving task is in control of the vehicle.* [RoSPA]

> *While we do not think there needs to be an amendment to the Regulation, we believe it would be helpful to clarify what amounts to proper control and whether a person undertaking only part of the driving task is deemed to have proper control of the vehicle.* [SMMT]

4.16 Trilvee expressed concern about how regulation 104 can be complied with during an "e-stop":

> *In the event of a latency spike or signal degradation, the system automatically detects insufficient performance for safe remote driving and effects an 'e-stop' where the hazard lights are activated and the vehicle firmly brakes (including parking brake) holding course. If the connectivity returns to suitable quality, which can be in less than a few hundred milliseconds, the remote operator can resume control of the vehicle. During the period that the e-stop is active r104 may not be complied with.*

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103 The Remote Driving Issues Paper also considered regulation 109 (which prohibits the use of screens displaying non-driving related information) and regulation 110 (which prohibits the use of mobile phones and other hand-held devices). However, these regulations were thought to be less problematic for remote driving.

104 Under Road Traffic Act 1988, s 41D.

105 Road Traffic Offenders Act 1988, sch 2.

Regulation 107

4.17 Regulation 107 prohibits a person from leaving a motor vehicle on a road where the vehicle:

> is not attended by a person licensed to drive it unless the engine is stopped and any parking brake with which the vehicle is required to be equipped is effectively set.

4.18 Breach of this requirement carries a maximum penalty of a £1,000 fine (or £2,500 for a goods vehicle or a vehicle adapted to carry more than 8 passengers).[106] A driver in breach cannot be disqualified from driving. Nor can their driving licence be endorsed with penalty points.

4.19 A driver need not be in a vehicle for it to be attended. However, it is likely that a person must be sufficiently near the vehicle to have a reasonable prospect of preventing interference.[107] The Society of Motor Manufacturers and Traders (SMMT) thought that this would be particularly difficult to comply with:

> *If, as paragraph 3.22 of the Issues Paper suggests, "attended" means there must be a person able to have a reasonable prospect of preventing interference with the vehicle, it is difficult to see how a remote driver, who though is able to observe the vehicle, could reasonably prevent someone interfering with the vehicle, apart from simply driving away.*

4.20 Neither regulation 104 nor regulation 107 were drafted with remote driving in mind. We cannot provide a definitive explanation of how they would apply to this new technology. As we discuss below, this introduces an element of uncertainty in the law, which adds to developers' costs and delay, without necessarily benefiting public safety.

Exemptions from construction and use requirements

4.21 Section 44 of the Road Traffic Act 1988 gives the Secretary of State power to make orders providing exemptions from construction and use regulations and authorising the use of special vehicles which do not comply. Furthermore, section 44 allows the Secretary of State to modify construction and use provisions, subject to such restrictions and conditions as may be specified by the order.

4.22 There are two types of order which may be made under section 44: general orders and individual orders.

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106 Under the Road Traffic Act 1988, s 42.

107 *Wilkinson's Road Traffic Offences* (30th ed 2021), para 8-54. See *Starfire Diamond Rings Ltd v Angel* (1962) 106 SJ 854 and *Ingleton of Ilford v General Accident Fire and Life Assurance Corp* [1967] CLY 2033. In *Plaistow Transport v Graham* 115 NLJ 1033, a vehicle was considered to be "attended" when the driver was asleep in the cab.

General orders

4.23 The Road Vehicles (Authorisation of Special Types) (General) Order 2003[108] (STGO) is an example of a general order made under section 44. The STGO lists "special types" of motor vehicles and trailers. If a vehicle or trailer meets the criteria set out in the order, not all construction and use or lighting regulations will apply. "Special types" of vehicle listed in the STGO include: track-laying vehicles; straddle carriers; vehicles with moveable platforms; pedestrian-controlled road maintenance vehicles and many more. It also applies to "new or improved types of motor vehicle" which are "constructed for tests or trials" or "equipped with new or improved equipment".

4.24 The STGO provides exemptions from some, but by no means all, construction and use requirements. The Order lists the regulations for which it does not provide an exemption, including 104 and 107.

4.25 There is no application process. If a vehicle meets the criteria, the STGO provides an exemption from any construction and use requirements not listed in the Order.

Individual orders

4.26 The Secretary of State also has power to make individual orders under section 44. Section 44(3) provides that the Secretary of State may make orders applying "to specified vehicles or to vehicles of specified persons". These are discretionary and provided on a case-by-case basis to individual vehicles or individual fleets. The orders are referred to as Vehicle Special Orders (VSOs). To obtain a VSO, the operator or owner must apply to the Vehicle Certification Agency (VCA).[109]

4.27 Guidance on the VCA website notes that when applying for a VSO an operator or owner must first consider whether the vehicle or type of vehicle meets the criteria of a special use vehicle under the STGO. If not, they may apply to the VCA by providing:

(1) suitable information about the processes which will be in place to address safety issues; and

(2) why non-compliance with construction and use regulations is justified.[110]

4.28 The owner or operator should provide information as requested by VCA, such that VCA can make an informed decision.[111]

4.29 A VSO may be subject to restrictions and conditions, as specified in the order.

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108 SI 2003 No 1998.

109 Vehicle Certification Agency, "Vehicle Special Orders" (last updated 28 July 2022), https://www.vehicle-certification-agency.gov.uk/other-certification/vehicle-special-orders/. Section 44(4) also allows for the issuing of individual orders to be delegated to a strategic highways company.

110 Vehicle Certification Agency, "Vehicle Special Orders" (last updated 28 July 2022), https://www.vehicle-certification-agency.gov.uk/other-certification/vehicle-special-orders/.

111 Above.

Section 11 of the Public Passenger Vehicles Act 1981

4.30 Section 6 of the Public Passenger Vehicles Act 1981 specifies the certification process for authorising the use of a vehicle adapted to carry more than eight passengers. Where such a vehicle does not have "type approval", a certificate of initial fitness is required from an authorised inspector. The inspector must confirm that the conditions under section 6 are fulfilled before issuing a certificate.

4.31 However, section 11 of the Act provides that the Secretary of State may dispense with the prescribed conditions of fitness "where it is expedient to do so for the purpose of making tests or trials of a vehicle or its equipment".[112] An order issued under this section may contain conditions relating to the construction, equipment or use of the vehicle.[113]

PROBLEMS WITH THE CURRENT LAW

4.32 In the Issues Paper we identified three main problems with the current law on approvals and construction and use:

(1) uncertainties in the existing law may have a chilling effect, deterring some worthwhile remote driving projects;

(2) the same uncertainties could be exploited to put unsafe systems on the road; and

(3) there are problems with accountability. The main accountability lies with the individual driver, even if problems lie with the organisation as a whole.

4.33 Given the responses from stakeholders, it is clear that these difficulties need to be addressed.

The chilling effect of legal uncertainty

4.34 Developers told us that uncertainties surrounding construction and use provisions were causing difficulties for remote driving deployment in practice. Oxbotica found the current legal position was undesirable for developers:

> *Expert lawyers cannot provide a definitive answer on how the courts will interpret laws that did not envision remote driving when they were written, due partly to the lack of relevant case law. The novelty of a remote driver also makes it unclear what deviations from the C&U regulations are significant enough to require a VSO, and which can be covered by the STGO.*

4.35 ABI and Thatcham Research noted that uncertainty was also an issue for insurers:

> *Certain companies in the UK have already approached our members to try to secure insurance for automated vehicle trials without a safety driver in the driver's seat and instead being controlled remotely. However, there is a lack of clarity and no Government guidance to set out the legality of such a trial….*

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112 Public Passenger Vehicles 1981, s 11(1).

113 Public Passenger Vehicles 1981, s 11(3).

Several insurance companies have had to turn down these opportunities and would continue to do so without greater legal protection or clarity from Government.

4.36 Some insurers told us that they were reluctant to insure projects involving remote driving, due to the risk that the project may be found to be illegal. This uncertainty could make insurance unnecessarily expensive. In some cases, it might deter insurers from providing insurance at all. The fear is that if something goes wrong the insurer could suffer reputational risk for having insured an illegal enterprise. Similarly, industry players might be deterred from investing in remote driving for lack of certainty over whether it is lawful.

Uncertainty around construction and use exemptions

4.37 We also asked respondents whether current exemptions from construction and use regulations were easy to navigate or whether they put unnecessary obstacles in the way of trialling new forms of vehicle.

4.38 Developers welcomed the recent guidance published as Appendix C to the Code of Practice on automated vehicle trialling, dealing with vehicle authorisations and exemptions for more complex CAV trials.[114]

4.39 However, the interaction between approvals, construction and use requirements and section 44 exemptions is complex. Several thought that further guidance would be desirable. Oxbotica said that the following issues were uncertain and should be addressed:

(1) the vehicle categories for which the exemptions can be used;

(2) whether exemptions can be used for vehicles which do not correspond to an existing category;

(3) the "implications with respect to services (e.g. a trial passenger service)"; and

(4) "examples or guidance on the justifications that would be needed to obtain exemption from regs 104,107".[115]

4.40 We think a clearer system would be helpful, clarifying what type of order is required and how it can be obtained.

A lack of appropriate safety regulation

4.41 In the Issues Paper we highlighted that legal uncertainty is also a problem for public safety. At present there is no clear legal requirement to prevent a risk-tolerant

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114 *Code of Practice: automated vehicle trialling* (Updated January 2022), https://www.gov.uk/government/publications/trialling-automated-vehicle-technologies-in-public/code-of-practice-automated-vehicle-trialling.

115 Oxbotica also highlighted regulation 109 of the Road Vehicles (Construction and Use) Regulations 1986, which relates to the use of screens whilst driving.

organisation from setting up a remote driving centre unless the vehicles are clearly unsafe.

4.42 An organisation that conducted remote operations in a clearly unsafe way would contravene the law. The organisation would, for example, breach construction and use Regulation 100, which requires a vehicle to be "in such condition … that no danger is caused or is likely to be caused to any person in or on the vehicle … or on a road".[116] They would also breach section 3 of the Health and Safety at Work etc Act 1974. This requires employers to conduct their operation in such a way to ensure, as far as reasonably practicable, that persons are not exposed to risks to their health and safety.

4.43 However, where the risks are not obvious, there is relatively little law or regulation to comply with. There is no licensing system, and no checks to ensure that the organisation is meeting the many challenges of remote driving.[117] The Government has produced a Code of Practice for organisations using remote driving as part of automated vehicle trialling.[118] However, the code does not have the force of law.[119]

Lack of corporate accountability for use of the vehicle

4.44 Under current law, the remote driver is the person primarily responsible if anything goes wrong.[120] In the event of a collision, the individual driver could face criminal prosecution, possibly for a serious offence (such as causing death by dangerous driving). This would be the case even if an individual had little control over the problems which caused an incident, such as loss of connectivity or failed sensors. It is true that the driver's employer could also be prosecuted over an unroadworthy vehicle, either because they "use" the vehicle or because they cause or permit another to use it. However, the offences faced by employers are relatively minor.[121]

4.45 A poor system of work could lead to an employer facing prosecution under section 3 of the Health and Safety at Work etc Act 1974.[122] However, this legislation is rarely used in response to road traffic accidents. Health and Safety Executive (HSE)

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116 Road Vehicle (Construction and Use Regulations) 1986, reg 100.

117 Challenges such as connectivity and training of drivers. We outline these in Ch 2. See also para 2.28.

118 *Code of Practice: automated vehicle trialling* (Updated January 2022), https://www.gov.uk/government/publications/trialling-automated-vehicle-technologies-in-public/code-of-practice-automated-vehicle-trialling.

119 See Remote Driving (2022) Law Commission Issues Paper, paras 9.26 to 9.27.

120 An analysis of how 81 road traffic offences apply to drivers is available in Background Paper A to Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, available at: https://s3-eu-west-2.amazonaws.com/lawcom-prod-storage-11jsxou24uy7q/uploads/2022/01/Background-papers-24-01-22.pdf.

121 Under section 40A of the Road Traffic Act 1988, for example, it is an offence to use or cause or permit another to use a vehicle in a dangerous condition. The maximum penalty is a £2,500 fine and three penalty points. The Law Commission has considered the issue of corporate liability in previous advice to Government. See Corporate Criminal Liability: an options paper (10 June 2022), available at: https://www.lawcom.gov.uk/project/corporate-criminal-liability/.

122 For a detailed discussion of this offence, see Automated Vehicles: Consultation Paper 3 – A regulatory framework for automated vehicles (2020) Law Commission Consultation Paper No 252; Scottish Law Commission Discussion Paper No 171, Appendix 3, paras 3.7 to 3.41.

guidance states that health and safety at work legislation generally should not be enforced in respect of road traffic accidents when more specific and detailed legislation applies.[123]

4.46 In our view, remote drivers should continue to be responsible for matters within their control. However, when the driver is beyond line-of-sight and depends on connectivity to perceive hazards, some aspects of safety are not under the control of the individual. We therefore think that beyond line-of-sight driving should be overseen by a licensed organisation. In Chapters 7 and 8 we outline our proposals in this regard. In Chapter 10 we also suggest a limited defence for individual drivers where a competent and careful driver would have been unaware of the circumstances giving rise to an offence or would not have avoided the offence.

CONCLUSION

4.47 The current law for approval and use of vehicles for remote driving is unsatisfactory. In the next chapters we consider both short-term and longer-term options for reform.

4.48 In the short term, we think that all those who use remote beyond line-of-sight driving should be required to demonstrate that their system is safe and obtain a VSO. A developer who complies with the conditions in their VSO would have the certainty of knowing that their operation is lawful.

In the longer term, we think that all organisations who conduct remote driving should obtain a licence. However, introducing a licensing scheme to promote safety and shift responsibility to the organisation behind remote driving will require new primary legislation.

[123] HSE guidance expressly states that accidents involving construction and use regulations are a matter for the police, rather than the HSE. See: *HSE's role in the investigation of work-related road accidents and advice on responding to enquiries on managing work-related road safety* (OM 2009/02 Version 2), para 21, https://www.hse.gov.uk/foi/internalops/oms/002.htm.

Chapter 5: Short-term reforms and an interim scheme for trials

5.1 As we have seen, stakeholders expressed considerable concern over the safety challenges posed by remote driving. In Chapter 3 we concluded that beyond line-of-sight driving should be subject to robust regulation. It should only be allowed if the organisation wishing to put a remotely driven vehicle on the road shows that it is safe.

5.2 A full system of regulation requires a new Act of Parliament. However, safety groups pointed to an urgent need to regulate, which may arise before new primary legislation can be passed.[124] The Department for Transport asked us to look at what can be achieved in the short term, without primary legislation. The Issues Paper therefore looked in detail at existing powers to use secondary legislation to amend the Road Vehicles (Construction and Use) Regulations 1986[125] and to provide exemptions from the regulations. We have summarised these provisions in Chapter 4.

5.3 In this chapter we outline an interim solution that could be introduced by secondary legislation. We start by proposing a new construction and use regulation to prohibit beyond line-of-sight remote driving without an in-vehicle safety driver. The regulation would apply unless the organisation obtains a Vehicle Special Order.

5.4 The effect of the new regulation would mean that anyone who wished to undertake an trial without an in-vehicle safety driver would need to apply to the Vehicle Certification Agency (VCA) for a Vehicle Special Order. Obtaining such an order would enable organisations to conduct trials of both automated vehicles and remote driving without a driver in the vehicle, with the reassurance that the trial was legal. We think Vehicle Special Orders should also be granted to permit some forms of limited commercial deployment.

A NEW CONSTRUCTION AND USE REGULATION

5.5 In our opinion, the Road Vehicles (Construction and Use) Regulations 1986 should be amended to include a new prohibition. Beyond line-of-sight remote driving should only be allowed with an in-vehicle safety driver or (in the absence of a safety driver) when authorised by a VSO. Anyone acting in contravention of this rule would commit the offence of breaching construction and use regulations, under section 42 of the Road Traffic Act 1988.

5.6 We define “beyond line-of-sight” in Chapter 3. In this context, a “safety driver” is an individual in the vehicle with access to the controls who monitors the driving environment with a view to immediate intervention. In a remote driving trial with a safety driver, under our definitions in Chapter 3, both the remote driver and the safety

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124 See our analysis of responses to the Remote Driving (2022) Law Commission Issues Paper, available at: https://www.lawcom.gov.uk/project/remote-driving/.

125 SI 1986 No 1078.

driver would be driving the vehicle. Both must be fit and qualified to drive and could be prosecuted for driving offences.

AUTHORISATION THROUGH A VEHICLE SPECIAL ORDER (VSO)

How VSOs fit into the law on approval and use

5.7 Chapter 4 provides an overview of the current law on the approval and use of vehicles. Generally, vehicles must be approved before they can be registered. However, certain vehicles are exempt from the need for approval and may be registered without an approval certificate. We explained that, for our purposes, the relevant exemptions apply to low-speed vehicles and to prototypes "used on the road under the responsibility of a manufacturer to perform a specific test programme".[126]

5.8 A vehicle must comply with construction and use regulations even if it is exempt from the need for an approval certificate. However, section 44 of the Road Traffic Act 1988 gives the Secretary of State the power to make orders providing exemptions from construction and use regulations.

5.9 Most notably for present purposes, the Secretary of State has power to make individual orders under section 44(3), which apply to specified vehicles or to vehicles of specified persons. These are referred to as Vehicle Special Orders (VSO). They are provided on a case-by-case basis.

5.10 To obtain a VSO, the operator or owner must apply to the Vehicle Certification Agency (VCA). VSOs enable vehicles to be authorised for use on roads even if they do not comply with construction and use regulations. Importantly, VSOs also allow for conditions or restrictions to be placed upon how vehicles are used and the length of their authorisation. VSOs may also be varied or revoked by subsequent order of the Secretary of State.

5.11 VSOs provide considerable flexibility. Recently VSOs have been used extensively to enable the trialling of electric scooters in the UK. VSOs enabling the trials exempted scooters from certain construction and use regulations whilst also setting specific requirements to ensure safety.[127]

Why use a VSO rather than a general order?

5.12 In Chapter 4 we explained that the Secretary of State also has power to make general orders, which apply without the need to make an application. We have considered

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126 Retained Regulation (EU) 2018/858 of the European Parliament and of the Council on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC, Article 2 (4)(b).

127 For an explanation of some of the changes that were made via VSOs to enable trialling of e-scooters, see: Active Travel England and the Department for Transport, *E-scooter trials: guidance for local authorities and rental operators* (Updated 22 February 2022), https://www.gov.uk/government/publications/e-scooter-trials-guidance-for-local-areas-and-rental-operators/e-scooter-trials-guidance-for-local-areas-and-rental-operators. For an example of a VSO issued to an e-scooter provider in relation to trialling in Oxford, see: https://www.oxfordshire.gov.uk/sites/default/files/file/roads-and-transport-connecting-oxfordshire/e-scotter_cover_letter_and_VSO_Voi.pdf.

whether a general order could be used to set out the circumstances in which remote driving may be permitted.

5.13 We have rejected the idea for two reasons. First, the state of knowledge is insufficient to establish clear rules at this stage. The technology and use cases for remote driving are still relatively new. Secondly, the safety of remote driving is context specific: systems may be safe when used at low speeds in simple environments, but unsafe elsewhere. We think each use will need to be evaluated individually, on its facts. We therefore favour using individual VSOs rather than general provisions.

Applying for a VSO

5.14 Those wishing to use remote driving without a safety driver would need to submit a safety case and any other relevant information to the VCA. The VCA should then, as a minimum, check the safety case against the checklist outlined in Chapter 2 and the provisions of the Government's Code of Practice on automated vehicle trialling.[128] VSOs could be issued subject to specific requirements covering (for example): areas of operation; how vehicles must be constructed; inspections; and maintenance. Any breach of these conditions may result in a VSO being revoked.

5.15 VSOs would be available both where remote drivers are used in trials of automated vehicles, and where they are used independently of automated driving. Each use case would need to be assessed on its merits.

Conclusion 4.

5.16 The Road Vehicles (Construction and Use) Regulations 1986 should be amended to prohibit beyond line-of-sight remote driving without an in-vehicle safety driver.

The Secretary of State should, where appropriate, authorise beyond line-of-sight remote driving by granting a Vehicle Special Order (VSO).

PROVIDING GREATER CERTAINTY TO TRIALS

5.17 We see the value of trials and do not wish to put unnecessary obstacles in their way. The process should be as smooth as possible. Furthermore, where a VSO is obtained, it should provide the trialling organisation with reassurance that the use of their vehicles is legal, if carried out in accordance with the safety case.

5.18 At present, developers who are thinking of removing the safety driver face considerable legal uncertainty. In response to the Issues Paper Oxbotica said that currently trialling organisations (TOs) face "a time-consuming and costly process" to prepare for trials of a self-driving vehicle with a remote driver":

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128 *Code of Practice: automated vehicle trialling* (Updated January 2022), https://www.gov.uk/government/publications/trialling-automated-vehicle-technologies-in-public/code-of-practice-automated-vehicle-trialling.

Effort needs to be made to understand the existing regulations and potential non-compliances due to the remote driver, to develop safety practices to ensure mitigations for those non-compliances, and most importantly to then ensure the trial can proceed legally. This requires consultation with expert lawyers and the relevant government authorities; however, even then the TO does not have absolute assurance that any particular trial is compliant with the law.

5.19 As a result, Oxbotica indicated that TOs spent "significant time and money" on trials and still faced a risk of legal non-compliance. We have considered how to simplify this process.

Removing concerns about regulations 104 and 107

5.20 In Chapter 4 we highlighted the uncertainty over how regulations 104 and 107 of the Road Vehicles (Construction and Use) Regulations 1986 apply to remote driving. This uncertainty in the law adds to developers' costs and delay, without necessarily benefiting public safety.

5.21 Where a VSO is granted, a remote driving organisation which complies with its terms should not have any further concerns over the effect of regulations 104 and 107. We have therefore concluded that where a VSO is granted, it should:

(1) modify regulation 104 so as to require control in accordance with the safety case; and

(2) disapply regulation 107.[129]

5.22 In Chapters 7 and 8 we propose that once an opportunity arises, a statutory licensing scheme should be introduced for entities that undertake beyond line-of-sight remote driving operations, whether alongside automated driving or not. Once these statutory schemes have been introduced, we think that construction and use regulations should be amended to clarify that neither regulation 104 nor regulation 107 apply to licensed remote driving operations.

The Code of Practice on automated vehicle trialling

5.23 The Government first issued guidance to support the safe conduct of trials of connected and autonomous vehicles (CAVs) on UK roads in 2015.[130] The code is an evolving document which was last updated in January 2022.[131]

5.24 It is a vital tool in giving developers guidance about how to navigate the law. In particular, developers welcomed the recent guidance on vehicle authorisations and

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[129] The VSO could also disapply other construction and use regulations as necessary. Where construction and use regulations are disapplied by VSOs, conditions are put in place to ensure an appropriate level of safety.

[130] *Code of Practice: automated vehicle trialling* (Updated January 2022), https://www.gov.uk/government/publications/trialling-automated-vehicle-technologies-in-public/code-of-practice-automated-vehicle-trialling.

[131] Above.

exemptions for more complex CAV trials. However, there was still a desire for greater communication and clarity.

Giving the Code of Practice a statutory basis?

5.25 In the Issues Paper we considered whether the Government's Code of Practice on automated vehicle trialling should be given a statutory basis, for example by being added to the Highway Code. We noted that the Highway Code, unlike the Code of Practice, has a legal status. Although it is not legally binding, the courts must take it into account.[132] We asked if this was a potential way forward, encouraging basic safety standards and making the provisions of the Code of Practice more enforceable.

5.26 Responses to this suggestion were mixed. Some developers thought that giving the Code of Practice legal status would provide greater clarity. However, others argued that adding the Code of Practice to the Highway Code was inappropriate. The Society of Motor Manufacturers and Traders (SMMT), for example, said that the Code of Practice and Highway Code were fundamentally different and should not be mixed:

> *We struggle to understand why elements within a guidance document for trialling ought to be incorporated into The Highway Code, which is nominally the rulebook for motorists using "deployed" vehicles (as well as for cyclists and pedestrians*).

5.27 Given these concerns we have concluded that giving the Code of Practice a statutory footing through the Highway Code would not be desirable.

The purpose of the Code of Practice

5.28 Following the reforms we have outlined, the Code of Practice will need to communicate how to apply for a VSO as clearly as possible. This will be essential to enabling safe trials and reducing bureaucratic hurdles.

5.29 The Code should also set out the standards that the Government expects. However, it is also important that the Government does not fetter its discretion, especially when faced with new and different approaches to vehicle safety. Trialling organisations will need to show an acceptable level of safety but need not do so in a specified way.

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132 Road Traffic Act 1988, s 38(7).

Conclusion 5.

5.30 Where a VSO is granted, it should:

(1) modify regulation 104 so as to require control in accordance with the safety case; and

(2) disapply regulation 107.

In the longer term, construction and use regulations should be amended to clarify that neither regulation 104 nor regulation 107 apply to licensed remote driving operations.

Following the reforms, the Government's Code of Practice on automated vehicle trialling should communicate how to apply for a VSO.

TRIALS WITH A COMMERCIAL ELEMENT

5.31 During our meetings with respondents, developers expressed an interest in carrying out trials with a commercial element to them, for example by carrying goods or delivering vehicles to passengers. This would allow them to test the technology and to identify any issues with their use cases before full deployment. However, developers were uncertain whether this was permissible.

5.32 In the Issues Paper we asked whether the Special Types General Order (STGO)[133] should be altered to permit trials and demonstrations with a commercial element to them. Responses to this suggestion were mixed.

5.33 Most developers agreed that the STGO should be amended to permit trials and demonstrations with a commercial element. StreetDrone, for example, said:

> *Yes, current uses under a STGO (Special Types General Order) only extend to testing, demonstration, delivery on sale and proceeding to or returning from a manufacturer. If we are using the route of the special vehicle for early commercial applications this may need to change. In addition current provisions state "A relevant vehicle that is used on roads must not carry any load or transport goods or burden" for testing and trials of delivery services this would be an issue and would require amendment.*

5.34 However, other respondents expressed reservations, on the grounds that it would encourage organisations to deploy vehicles before they are ready. Transport for London commented:

> *It could also create confusion as to when something is a trial and when it is a deployment. If the requirements for full deployment of remote driving are*

[133] This refers to the Road Vehicles (Authorisation of Special Types) (General) Order SI 2003 No 1998, discussed at paras 4.23 to 4.25.

higher than those for trialling, it is possible that unscrupulous operators will try and avoid regulation by claiming they are trialling.

Granting a VSO for trials with a commercial element

5.35 The power given to the Secretary of State to make VSOs is not limited to trials but may be exercised in respect of any special motor vehicles or any "new or improved types of motor vehicle".[134] Our proposals do not fetter this broad power.

5.36 Taking all respondent views into consideration, we can see how the ability to conduct trials with a commercial element may be useful to test certain use cases. However, this should be balanced against safety concerns.

5.37 In our view, a VSO should be available where a trial earns income from the carriage of goods or delivery of the vehicle itself, provided that the conditions are safe. Often, it is difficult to test whether a use case works without carrying out the task. For example, it is difficult to know whether people would be willing to have groceries delivered without a delivery driver except through a trial delivering groceries. The ability to earn some money from the trial would also support smaller trialling organisations.

5.38 By contrast, we take a cautious approach to trials which provide a commercial service carrying passengers. In the end, this would be a matter for the Secretary of State. However, given the greater safety concerns, we do not think that in the short term, it would be likely that the Secretary of State would allow such trials. There are unresolved issues about how to safeguard passengers and ensure accessibility. Passenger travel may be possible in the longer term, but only once the technology is at a mature stage of trialling.

How does the prototype exemption apply to trials with a commercial element?

5.39 As explained in Chapter 4, section 44 can be used to provide exemptions from construction and use regulations. It does not exempt manufacturers from the need to obtain approval before registering a vehicle, though certain approval exemptions apply to low-speed vehicles and prototypes.

5.40 We have been asked how the prototype exemption would apply to trials with a commercial element. This exemption applies to "prototypes of vehicles used on the road under the responsibility of a manufacturer to perform a specific test programme provided that they have been specially designed and constructed for that purpose".[135] The important element is that the manufacturer is responsible for the test programme. The exemption would not preclude some commercial element, provided that it was a genuine and specific test programme.

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134 Road Traffic Act 1988, s 44(1)(a) and (c).

135 Regulation (EU) 2018/858, art 2 (4)(b).

Conclusion 6.

5.41 VSOs should permit the commercial carriage of goods and delivery of vehicles on a case-by-case basis.

THE LIMITATIONS OF SHORT-TERM MEASURES

5.42 The short-term measures proposed here go some way to removing the uncertainty which exists in relation to remote driving. They also provide some external safety checks on the activity. This addresses the two major issues that respondents to our Issues Paper highlighted in their responses. However, the use of short-term measures is less than ideal, for two main reasons.

5.43 First, the short-term measures do not provide significant sanctions. In Chapter 8 we recommend a new licensing scheme where breach of conditions could be met with a wide range of sanctions, including compliance notices and significant fines. Under the scheme outlined in this chapter, the only sanction for a breach of conditions would be a prosecution for breach of the new construction and use regulation.

5.44 Without primary legislation, the offence would fall under section 42 of the Road Traffic Act 1988, which applies to "breach of other construction and use requirements". The maximum fine for a breach section 42 is low – £2,500 for goods vehicles or vehicles which carry more than 8 passengers, or £1,000 for other vehicles. The offence does not carry penalty points and there is no power to disqualify the driver.

5.45 Second, construction and use regulations apply only to vehicles driven on public roads and not in other public places. Although this will likely cover the vast majority of use cases, it is conceivable that some remote driving may also occur in public places such as town squares or public concourses.

5.46 Ultimately, if early trials show that remote driving is viable, we believe that a new statutory scheme would be needed to license remote driving. This must include a range of sanctions, together with statutory powers to inspect remote control centres and to seize vehicles used in contravention of the law. Respondents to our Issues Paper largely agreed, advocating for robust safety requirements and clear accountability for beyond line-of-sight remote driving. In the following chapters we suggest licensing schemes for remote driving that better address these issues.

Chapter 6: Remote driving from abroad

6.1 During the course of this project, some stakeholders suggested that some remote driving operations may be based abroad. Remotely driven vehicles could operate on British roads, but their remote drivers might be based in another country.

6.2 Developers raised the possibility that they might base remote operation centres in a variety of European countries, including Estonia and Belarus. One perceived advantage was that costs may be lower. However, the disadvantages are that it may exacerbate the driver's sense of detachment and make it difficult to check the safety of the operation or to hold wrongdoers accountable for their actions.

6.3 In the Issues Paper we asked stakeholders for their views on how the problems raised by remote driving from abroad could be addressed. We also asked if it should be prohibited. In this chapter we summarise the issues and the responses from stakeholders.

6.4 This advice is confined to England and Wales. However, as road traffic is a reserved matter the Government may extend our reforms to Scotland. If so, then there would be no legal issues raised by driving on roads in England, Wales or Scotland from anywhere in Great Britain. We have not considered the position in Northern Ireland, where different laws apply.

ACCOUNTABILITY FOR OPERATIONS BASED ABROAD

6.5 The Issues Paper discussed how the law would respond to a vehicle driven on roads in England and Wales by a remote driver based abroad. What would happen if the vehicle were found to be driven in a dangerous or inconsiderate way, or if the driver appeared to be under the influence of drink or drugs?

6.6 In the Issues Paper we highlighted that the first question is whether any wrongdoing would be prosecuted in England and Wales or abroad. The Crown Prosecution Service (CPS) explain that the principle of territoriality under public international law means that a crime should be prosecuted in the place where it occurred:

> A preliminary presumption should be made that, if possible, a prosecution should take place in the jurisdiction in which the majority – or the most important part – of the criminality occurred or in which the majority – or the most important part – of the loss was sustained. Hence, both the quantitative ('the majority') and the qualitative ('the most important part') dimensions should be duly considered.[136]

[136] CPS, *Jurisdiction* (Legal guidance, last updated 5 October 2022), https://www.cps.gov.uk/legal-guidance/jurisdiction.

6.7 The leading case, *Smith,* established that a crime may be prosecuted in England and Wales if "a substantial part of the offence" is committed there.[137] In the Issues Paper we stated our view that if the vehicle is driven on roads in England and Wales, this test would be met. However, the point has not been tested.

6.8 We highlighted that the main problem with ensuring accountability for operations based abroad would be practical.[138] It would, for example, be difficult to track down evidence of what happened in a foreign remote control centre. If the vehicle is driven in a way associated with drunk driving for example, it would not be possible to identify the driver and administer a breathalyser test sufficiently quickly before the driver sobers up. British authorities would likely lack sufficient investigative powers and would need considerable assistance from the foreign authorities.

6.9 Even if the driver is identified and evidence for a prosecution is obtained, the need to extradite the driver would lead to further delays and expense.[139] And extradition cannot be guaranteed in respect of all jurisdictions.[140]

6.10 Furthermore, if regulatory requirements are imposed on remote driving in Great Britain, it will be difficult to monitor compliance with them if the remote driving facilities are located abroad. It may be difficult to prosecute a foreign company for breach of a licensing scheme, or to enforce a penalty, if they do not have assets here. Nor would it be possible to inspect centres to see if they are safe. These factors combine to bring a real risk of injustice.

RESPONSES TO THE ISSUES PAPER

6.11 We asked respondents how the issues associated with remote driving from abroad could be addressed.

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137 *Smith (Wallace Duncan) (No. 4)* [2004] EWCA Crim 631, [2004] QB 1418. The traditional approach under English law was that, in the absence of specific statutory provision, an offence was deemed to be committed where it was completed: *Harden* [1963] 1 QB. However, following *Smith*, the "substantial part" approach has been endorsed in *R (Purdy) v DPP* [2009] UKHL 45, [2010] 1 AC 345 and applied in *Sheppard* [2010] EWCA Crim 65, [2010] 2 All ER 850; see also *Blackstone's Criminal Practice 2022* (33rd edn, 2023), para A8.5.

138 See, for example: CPS, *Director's Guidance on the handling of cases where the jurisdiction to prosecute is shared with prosecuting authorities overseas* (17 July 2013), https://www.cps.gov.uk/publication/directors-guidance-handling-cases-where-jurisdiction-prosecute-shared-prosecuting, which notes practical issues including whether the prosecution can be divided into separate cases in two or more jurisdictions; the availability of admissible evidence; and the location and interests of the victim(s), witnesses, and the accused.

139 The UK has a variety of extradition arrangements, through the EU-UK Trade and Cooperation Agreement, the 1957 European Convention on Extradition, the Commonwealth Scheme or bilateral treaties. See: Home Office, *Extradition: processes and review* (Guidance, last updated 1 August 2022), https://www.gov.uk/guidance/extradition-processes-and-review#extradition-to-the-uk; Home Office, *Mutual legal assistance and extradition: treaty list (accessible version)* (Updated 21 December 2021), https://www.gov.uk/government/publications/international-mutual-legal-assistance-agreements/mutual-legal-assistance-and-extradition-treaty-list-accessible-version.

140 In the Issues Paper, we cited the public concern following the death of motorcyclist Harry Dunn in 2019, when the US failed to extradite the driver. See Remote Driving (2022) Law Commission Issues Paper, para 6.10.

6.12 A majority of stakeholders who responded to the issues paper felt that without international agreements remote driving from abroad was not feasible. For example, Society of Motor Manufacturers and Traders (SMMT) said:

> *Given there is currently neither international regulation nor consensus on remote driving, we do not think it is possible to effectively address the problems associated with remote driving from abroad.*

6.13 Some stakeholders also highlighted that remote driving from abroad would present serious safety concerns. For example, PACTS said remote driving from abroad "could be catastrophic from a safety point of view". They pointed to a list of issues, including the qualification of drivers, variable driving regimes, reliable connectivity, ensuring accountability and liability in case of an incident.

6.14 Several stakeholders did suggest ways to address the issues. For example, Starship highlighted that licensing, clarity on operator licensing liability and having a remote driving organisation maintain some physical presence within Great Britain might be desirable. Similarly, Trilvee thought that the issue might be addressed by having an appropriately licensed operator:

> *with appropriate additional training (e.g. road signage, driving on the opposite side of the road to which they are familiar) and clear liability (in a jurisdiction where the UK can take legal action / with established extradition).*

6.15 In general though, stakeholders thought that without international agreements and standards, remote driving from abroad should be prohibited. Many noted that perhaps in the future an international agreement on remote driving could be established to address the issues of accountability and enforcement

CONCLUSION

6.16 In our opinion there are significant difficulties with remote driving from abroad. In addition to possible technical limitations, this model of operation would make the policing of traffic infractions by remote drivers difficult. There would also be significant practical difficulties in ensuring that operation centres were suitably staffed; that remote drivers had adequate breaks; and that systems of work were safe.

6.17 Criminal prosecutions might be less problematic where the driver and operations centre were in another part of the UK, even if our proposed legislation did not apply there, than if they were located outside the UK. But there could be practical difficulties in, for example, inspecting operations centres if these were in a part of the UK to which the legislation did not apply.

6.18 As described in the previous chapter, we have concluded that in the short term the Secretary of State should decide whether a particular use case for remote driving should be permitted, by granting a Vehicle Special Order (VSO) under the Road Traffic Act 1988. Although this advice is confined to England and Wales, the Road Traffic Act 1988 is reserved and applies equally to Scotland.[141] The Government may therefore decide to grant VSOs in respect of Great Britain. If so, we believe that a

[141] With some minor exceptions, the Road Traffic Act 1988 does not extend to Northern Ireland (see s 197).

VSO should only be granted in respect of roads in Great Britain if the operations centres and drivers are also based in Great Britain.

6.19 Longer term, in the absence of international agreements, we consider that new legislation should be introduced to make it a criminal offence to drive a vehicle remotely from a place outside the territory to which the legislation relates.[142] Exceptions could be made for Northern Ireland in the event that parallel legislation were introduced there, or for foreign countries with which the UK had agreements enabling effective enforcement of the requirements of the licensing scheme.

6.20 Although prosecuting offending operators or drivers may be difficult, particularly where they are outside the UK, police could be given powers to stop and seize vehicles which they believe are being remotely driven in contravention of this requirement. Currently, similar powers exist in relation to vehicles being driven without a licence or insurance.[143] Where a vehicle has failed to stop where required or to stop for long enough for a constable to make appropriate enquiries, constables may enter any premises (other than a private dwelling house) to seize a vehicle.[144]

6.21 Similar measures to allow police to stop and seize vehicles which they reasonably believe to be driven from outside the territory would contribute to effective enforcement of the ban.

Conclusion 7.

6.22 In the short term, Vehicle Special Orders should not be granted for remote driving operations where the driver is based abroad.

In the longer term, it should be made a criminal offence to drive a vehicle on a road or other public place remotely from outside the territory to which the remote driving legislation applies. There should be a power to create exceptions in respect of parts of the UK in which parallel legislation applies, or other countries with which the UK has an international agreement that enables effective enforcement of the licensing scheme.

To ensure the effective enforcement of this new offence, the police should be given powers to stop and seize vehicles in respect of which they reasonably believe the offence is being committed.

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142 The legislation would not need to use this formula, but could specify “outside England and Wales”, “outside Great Britain” or “outside the UK”, as appropriate.

143 Road Traffic Act 1988, ss 163 to 165A.

144 Road Traffic Act 1988, s 165A. A “private dwelling house” for these purposes does not include: (1) any garage or other structure occupied with the dwelling house; or (2) any land which belongs to the dwelling house.

Chapter 7: Remote driving and NUICO licensing

7.1 In this chapter we consider the regulation of remote driving when it is used alongside self-driving. We start by explaining the concept of a No User-in-Charge Operator (NUICO). In our view, a NUICO should be responsible not only for the self-driving aspects of the operation but also for any remote driving they conduct.

WHAT IS A NUICO?

7.2 The Automated Vehicles report distinguished between self-driving vehicles which had a responsible person in the vehicle (a user-in-charge) and those that did not (no user-in-charge). The report considered how to authorise a "ADS feature" – that is an automated driving system able to drive itself in a specific operational design domain. Each feature would be authorised for use either with a user-in-charge (a UIC feature) or with no user-in-charge (a NUIC feature).

7.3 The report recommended that any vehicle that travels without a driver or user-in-charge should be overseen by a licensed organisation with "oversight" responsibilities. We called this organisation a "No User-in-Charge Operator". We explained that a NUICO's oversight duties would include dealing with incidents and helping vehicles navigate obstructions.

REMOTE ASSISTANCE AND REMOTE DRIVING

The views expressed in the Automated Vehicles report

7.4 The Automated Vehicles report distinguished between remote assistance and remote driving.[145] It explained that a self-driving system may rely on a remote assistant, for example, to plot a new path around roadworks, or to classify an unidentified object. However, an assistant would not be a driver so long as the vehicle made its own decision about a safe path ahead rather than simply implementing the remote instructions.

7.5 We noted that in some circumstances, a remote driver might need to take over, so as to exercise control of the vehicle. We said that in applying for a licence, the NUICO should be required to state how much they relied on remote driving, and how this could be done safely.[146]

Bringing remote assistance and remote driving under a single regulatory regime

7.6 Remote assistance and remote driving are conceptually distinct. However, responses to the Issues Paper have convinced us that where both remote assistance and remote driving are used by a single organisation, they should be regulated together. The NUICO licensing regime should cover both.

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145 Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, para 9.16.

146 Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, paras 9.18, 9.108 and 9.110.

7.7 This is for three reasons. The first is to minimise duplication for business. It would impose unnecessary costs on an organisation using remote driving as an adjunct to automated driving to be required to obtain two licences - one for NUIC operation and one for remote driving. Where a single organisation used both, respondents asked for both to come under a single licence.

7.8 Second, many of the practical issues are similar. The Automated Vehicles report recommend that the NUICO's safety case should cover (amongst other things):

(1) how oversight will be provided to vehicles, including suitable connectivity, equipment, staff training and rest breaks;

(2) incident management, including communication with passengers, road users and emergency services, together with measures to remove vehicles causing an obstruction;

(3) cybersecurity;

(4) data management; and

(5) ways to learn from mistakes, including links with local authorities, highway authorities and the police.[147]

These issues also apply to remote driving. We think that a NUICO which uses both remote assistance and remote driving should discuss both in the same safety case.

7.9 Third, the line between remote assistance and remote driving is not always clear cut. As we discuss in Chapter 3, stakeholders were keen to maintain the conceptual distinction. However, determining whether a remote individual is driving or merely assisting at any given time may involve fine judgements of fact and degree.

7.10 We are keen that regulatory decisions and sanctions should not depend on which side of the line any given action falls, unless this is directly relevant to the issue at hand.[148] Both remote assistance and remote driving are the responsibility of the organisation using the technologies, and the organisation should be held accountable for both. We would like to avoid unnecessary distinctions.

THE RELATIONSHIP BETWEEN NUICO LICENSING AND ERDO LICENSING

7.11 If remote driving proves viable, there are two main options to regulate it in the longer term. The first is to use the proposed NUICO licensing scheme for automated vehicles. The second is to create a bespoke regulatory regime for remote driving. Our conclusion is that both options should be available, depending on the type of remote driving in question.

7.12 Under the recommendations in the Automated Vehicles report, all vehicles which use self-driving NUIC features will need to be overseen by a licensed NUICO. In applying

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147 Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, Recommendation 54.

148 The role of the individual may be relevant in some circumstances, for example when determining whether they have received the correct training and rest breaks.

for a licence, the applicant must submit a safety case showing how safety will be assured. We have concluded that if the operation involves remote driving, the applicant should describe this in detail, and address the safety challenges listed in Chapter 2. If its application is successful, the NUICO will then be permitted to use remote driving in the circumstances specified in the safety case and subject to the conditions of the licence.

7.13 Of course, a NUICO might not use remote driving: several developers have told us that they do not plan to use remote driving in any circumstances. This would not preclude obtaining a NUICO licence. However, a NUICO that failed to mention remote driving in their safety case would not be permitted to use remote driving without submitting a new safety case.

7.14 We have considered whether remote driving under a NUICO licence should only be permitted where the vehicle in question is fitted with NUIC features. We think this might be unduly limiting. It is possible that some vehicles in a NUICO's fleet will not have authorised NUIC features. For example, a NUICO might use a recovery vehicle without NUIC features to rescue its NUIC vehicle. The recovery vehicle would be permitted to be driven remotely without the need for a separate licence, provided that the NUICO meets the high standard required to show that this non-automated vehicle is safe.

7.15 However, where the organisation only uses vehicles without authorised NUIC features, it will not be eligible for a NUICO licence. It will need to apply for a separate licence as an Entity for Remote Driving Operation (ERDO) (as discussed in the next chapter). In Chapter 2 we outlined respondents' strong concerns about remote driving used independently of automation. The applicant will need to meet a high threshold to show that it can be conducted safely.

7.16 Both NUICO licences and ERDO licences will follow a similar legislative pattern, but the circumstances and issues will not necessarily be the same. Wayve told us that the two forms of remote driving should be considered separately:

> *Remote driving for long periods of time brings specific risks and should be considered separately to remote driving as an adjunct to NUIC AV operation.... While there are many overlapping issues, we believe these use cases are distinct and necessitate further consideration as separate activities. For example, a national or international standard for all types of remote driving could not be generalised since NUIC operation with remote driving will be under very specific circumstances for limited periods of time which means human factors and staff training differ from remote driving as an end-to-end journey. It's not clear that one licensing regime supports both activities.*

7.17 We agree that having a regulatory distinction between automated and remote driving is useful. They are different technologies which carry their own risks and safety challenges. However, it is important to avoid any significant disparity in how each technology is regulated. If one regime is, or is perceived to be, more onerous than the other this could distort the market and lead to unfairness.

CONCLUSION

7.18 We have concluded that every remotely driven vehicle should be overseen by a licensed organisation: either a NUICO or an ERDO.[149]

7.19 NUICO licences will be available where the organisation has oversight of vehicles with authorised NUIC features. If an applicant for a NUICO licence intends to use remote driving in its operations, it should submit a safety case showing how remote driving will be used and how safety will be assured. The NUICO will then be entitled to use remote driving in the circumstances specified in the safety case and endorsed in the conditions of the licence.

7.20 In the next chapter we outline a separate ERDO licensing scheme for vehicles that rely on remote driving, but which do not have any authorised self-driving features.[150]

7.21 This dual approach separates remote driving used as an adjunct to automated driving from remote driving used in the absence of NUIC features. At the same time, it is designed to avoid overlaps or disparities in regulators' treatment of the different technologies. However, if the concerns raised by stakeholders over "independent" remote driving require a divergence of regulation in the future, this flexible model allows for that possibility. It would be possible, for example, to confine ERDO licensing to trials within a limited environment.

Conclusion 8.

7.22 Every vehicle that is driven remotely should be overseen by either a licensed NUICO or a licensed ERDO.

A NUICO which uses remote driving in its operation should be regulated under NUICO licensing.

If a NUICO intends to use remote driving in its operations, it must submit a safety case showing how remote driving will be used and how safety will be assured. The NUICO would then be permitted to use remote driving in the circumstances specified in the safety case and subject to the conditions of the licence.

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149 Mixed fleets and vehicles having multiple features mean it may not always be possible to require a single licence. Protocols and flexibility will need to be built into the licensing regime to account for differing business models and combinations of technologies.

150 For further discussion, see Ch 6.

Chapter 8: ERDO licensing

8.1 We have concluded that a new statutory scheme should be available to license any organisation which operates remotely driven vehicles without authorised no user-in-charge (NUIC) features. We refer to this organisation as the Entity for Remote Driving Operation or "ERDO".

8.2 In this chapter we outline how such a licensing scheme would work. We wish to avoid unnecessary distinctions between vehicles with or without NUIC features. Therefore, much of the scheme is modelled on the recommendations for NUIC operator (NUICO) licensing, set out in the Automated Vehicles report.

8.3 Here we focus on the organisation's responsibilities. We consider the criminal liability of the individual driver in Chapter 10.

TERMINOLOGY

8.4 In the Issues Paper, we explained how the term "operator" had the potential to confuse. It is sometimes used to refer to an individual (a remote operator) and sometimes to an organisation. We wished to make it clear that the licence holder is the organisation behind remote operation, rather than the individual working for that organisation. We therefore referred to the organisation as an Entity for Remote Driving Operation (or ERDO). We asked for views on the term.

8.5 A majority of respondents agreed with the new terminology. Several respondents favoured the title because it distinguished clearly between the individual driver and the organisation:

> *We agree with the suggestion… that "entity" refers to a corporate entity rather than an individual and "operation" refers to an organisation that uses and operates vehicles rather than develops or manufactures them.* [SMMT]

8.6 Others thought it was helpful to distinguish the role of the remote driving provider from that of self-driving technology companies:

> *Yes, as it helps to separate the technology provider and the operator in case they are different.* [Imperium Drive]

THE NEED FOR ERDO LICENSING

8.7 As discussed in Chapter 2, remote driving presents many safety challenges. Without regulation, these challenges present a safety risk to other road users and expose the remote driver as being primarily responsible if anything goes wrong. For most forms of remote driving, we do not think that the use of Vehicle Special Orders (VSOs) is suitable as a long-term solution. Breach of a VSO is simply a minor criminal offence. There are too few powers to inspect or to sanction those who breach the requirements.

8.8 When the driver is beyond line-of-sight and depends on connectivity to perceive hazards, some aspects of safety are under the control of the organisation rather than the individual. We therefore think that beyond line-of-sight driving should be overseen by a licensed organisation. We think it will be important for an ERDO to prove to a regulator that its system is safe, and to be accountable for safety issues.

8.9 There was widespread support for a new licensing system from developers, safety groups and others. As Imperium Drive put it:

> *Licensing the ERDO ensures adequate legislative oversight for the safe introduction of the technology on UK roads while also providing assurance to various stakeholders that necessary due diligence on the ERDO have been performed. We strongly recommend announcing plans for such a licensing regime as this would be helpful to promote innovation and growth in the UK CAV sector and take a leading role globally.*

8.10 We think that the introduction of ERDO licensing creates certainty for industry wishing to use remote driving technology in Great Britain, whilst also ensuring the safe deployment of that technology with clear accountability on the organisation. We have therefore concluded that every vehicle which is remotely driven beyond line-of-sight must either have a licensed NUICO or a licensed ERDO.

MINIMISING DUPLICATION WITH NUIC OPERATOR LICENSING

8.11 The Automated Vehicles report recommended that all vehicles which operate without a driver or user-in-charge should be overseen by a licensed organisation. We called this organisation a “no user-in-charge” operator (or NUICO). In Chapter 7, we explain that remote driving conducted by a licensed NUICO should come within the NUICO licensing scheme. This will minimise duplication for organisations that use remote driving alongside authorised NUIC features.

8.12 Here, our focus is on vehicles that are driven remotely without oversight by a NUICO. This can arise in two contexts. An organisation may only apply for a NUICO if it oversees at least some vehicles with authorised NUIC features. However, where a NUIC feature is being trialled, it will not have been authorised, meaning that the organisation will not yet be a NUICO. The second is where the entity uses remote driving without any element of self-driving. Again, this would fall outside the NUICO licensing scheme. They therefore need to be covered by a separate licensing scheme which draws on the same principles as NUICO licensing.

8.13 SMMT agreed with this approach:

> *We believe it is useful for regulations on remote driving and no-user-in-charge (NUIC) automated vehicle operations to be as similar as possible, not least so that they offer the option of being combined with minimum duplication. Furthermore, as the concept of NUIC operator licensing has been well thought through and set out in the Law Commissions’ final report on automated vehicles regulatory review, it makes sense to draw on the principles behind the recommended NUIC operator licensing system and apply them, where appropriate, to regulating ERDO.*

8.14 Examples of remote driving without self-driving features could include:

(1) conventional vehicles adapted for remote driving (which may include driver assistance technologies); and

(2) specially constructed vehicles designed for remote driving (which may lack driving controls in the vehicle itself).

DUPLICATION WITH REGULATORY REQUIREMENTS

8.15 An ERDO licence would not remove the need for other forms of operator licences, such as those currently required for public service vehicles (PSVs) or goods vehicles above the weight limit.[151] Nor would it exempt the organisation from taxi, private hire or bus regulation. If an operator uses PSVs or heavy goods vehicles, or provides taxi or private hire services, it will need to hold separate licences and comply with the appropriate licensing framework.

8.16 These services pose particular risks, and we doubt that they will rely on remote driving for some time. If duplication with PSV or goods vehicle licensing becomes a problem in the future, protocols could be agreed between the Traffic Commissioners and ERDO licensing authority. They could, for example, resemble the service level agreement between the Traffic Commissioners and the DVSA,[152] by which the former delegate functions to named employees of the latter.[153]

A CRIMINAL OFFENCE: REMOTELY DRIVING WITHOUT AN ERDO LICENCE

8.17 In the Issues Paper, we asked if it should be an offence to drive (or cause or permit a person to drive) a vehicle beyond line-of-sight unless the vehicle is overseen by a licensed organisation. This drew majority support, with respondents commenting that it aligned with the proposed approach to automated vehicles.

8.18 We have therefore concluded that, as part of a package of longer-term legislation, a new offence should be enacted to replace the short-term construction and use offence discussed in Chapter 5. The new offence would have a higher penalty and would allow seizure of the vehicle if the driver could not be traced.

8.19 It should be an offence to drive (or cause or permit a person to drive) a vehicle beyond line-of-sight, on a road or other public place, unless the vehicle is overseen by a licensed ERDO or NUICO. We defined "beyond line-of-sight" in Chapter 3. It covers a driver who is outside the vehicle or its trailer and who relies on external aids (other

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151 Operator licences are normally required for the use of goods vehicles and trailers with a gross plated weight over 3,500 kg: see https://www.gov.uk/being-a-goods-vehicle-operator.

152 Traffic Commissioners for Great Britain, *Traffic Commissioners: service level agreement (SLA) with DVSA* (July 2021), https://www.gov.uk/government/publications/traffic-commissioners-service-level-agreement-sla-with-dvsa/traffic-commissioners-service-level-agreement-with-dvsa.

153 See Public Passenger Vehicles Act 1981, sch 2, para 7 which confers powers on the Secretary of State to appoint persons to act as officers or servants of a Traffic Commissioner. Taxi, private hire and bus regulation address different issues: we do not consider them in this advice.

than corrective spectacles) to see some or all safety-critical elements of the driving environment.[154]

Possible exemptions for trials and abnormal loads

8.20 Developers asked how ERDO licensing would apply to trials. Trilvee, for example, asked:

> *would trialling be outside of the scope of the licensing regime or would the licensing regime have more limited scope and standards for trialling?*

Oxbotica requested a specific exemption for trials.

8.21 Trials which use in-vehicle safety drivers would not require any new form of regulation. In the short term, trials without in-vehicle safety drivers would fall within the VSO scheme outlined in Chapter 5.

8.22 In the longer term, we anticipate that most trials would be covered by an ERDO licence. We would expect trials to be held in limited, relatively safe environments, so the requirements would be less onerous than those applying to high-risk environments. We hope that the ERDO licensing scheme would be simplified for limited trials, so that it does not pose an unnecessary burden on developers.

8.23 However, we think it would be helpful for legislation to allow for the possibility of exemptions from the need for an ERDO licence. These exemptions would be particularly useful for abnormal loads. As discussed in Chapter 2, trailers may be steered by remote control, from an escort vehicle equipped with video feeds. These arrangements are already regulated by orders made under section 44 of the Road Traffic Act 1988, which impose requirements to notify the police, road and bridge authorities, and to provide attendants.[155] The arrangements appear to work well, and we would not wish to add to the industry's regulatory burden.

8.24 Exemptions from ERDO licensing should also be granted by orders made under section 44 of the Road Traffic Act 1988. In other words, exemptions may be granted either through a general order or through a Vehicle Special Order.

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154 See para 3.75.

155 Orders under Road Traffic Act 1988, s 44 are discussed in Ch 4. For an account of current regulation, see Welsh Government Procedure and Advice Guidance (PAG), *Best Practice for Transporting Abnormal Loads in Wales* (September 2020), https://www.gov.wales/sites/default/files/publications/2022-01/rhoscrowther-wind-farm-rep003-welsh-government-transport-attachment-20-12-2021.pdf.

Conclusion 9.

8.25 It should be an offence to drive (or cause or permit a person to drive) a vehicle beyond line-of-sight, on a road or other public place, unless the vehicle is overseen by a licensed ERDO or NUICO.

Legislation should provide for the possibility of exemptions from this requirement, by an order made under section 44 of the Road Traffic Act 1988.

REQUIREMENTS FOR BEING AN ERDO

8.26 In the Issues Paper, we proposed that an ERDO should be required to show that it:

(1) is of good repute;

(2) has appropriate financial standing;

(3) conducts its operations within Great Britain; and

(4) is professionally competent to run the service.

8.27 The above requirements mirror those applicable to NUICOs, as recommended in the Automated Vehicles report.[156] The proposed requirements were strongly supported. A large majority of respondents agreed that an ERDO should: be of good repute; have appropriate financial standing; and be professionally competent. Slightly fewer thought that an ERDO should be required to conduct its operations within Great Britain.

8.28 Several respondents pointed to the need for clear definitions – particularly of terms such as "good repute" and "professionally competent". The Automated Vehicles report recommended that the Secretary of State should have power to specify in regulations what amounts to good repute, appropriate financial standing and operating within Great Britain for the purposes of NUICO licensing. We think a similar power should exist for ERDO licensing.

Conducting operations within Great Britain

8.29 Some developers queried this requirement for remote driving. It was argued that, whilst some operations would need to be conducted in Great Britain, requiring all operations to be in Great Britain would be disproportionate. Einride AB suggested that there should be "appropriate provisions to appoint a designated agent or other legal entity within the UK if the ERDO is a non-UK based company".

8.30 In Chapter 6, we reach the conclusion that the remote driver and remote operation centre should not be based abroad: they must be located within the territory to which the scheme relates. If the reforms were to be implemented in England, Wales and Scotland, the remote operation centre would be required to be in Great Britain. We also think that an ERDO should also have sufficient presence in Great Britain to

[156] Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, Recommendation 51.

ensure corporate accountability. PSV operators must hold documents in Great Britain relating to personnel management, driving time and safety inspections.[157] ERDOs should also make those records available in Great Britain.

8.31 Again, we think it would be helpful for the Secretary of State to have power to make regulations to specify what amounts to operating in Great Britain.

Professional competence through a safety management system

8.32 The Automated Vehicles report recommended that NUICOs should demonstrate professional competence through a safety management system:

> [The] organisation must document its system of safety management, defining individual roles with clear responsibilities and competence requirements. This should cover individual staff, supervisors and senior managers, and include details of how safety concerns are to be escalated and addressed in the organisation.[158]

8.33 A safety management system differs from a safety case, in that it focuses on roles and responsibilities rather than substantive requirements. It should name individuals, outline their roles and detail why they are qualified for the roles they undertake.

8.34 We have concluded that a documented safety management system should be required for an ERDO.

Conclusion 10.

8.35 To obtain an ERDO licence, the applicant should be required to show that it:

(1) is of good repute;

(2) has appropriate financial standing;

(3) conducts its operations within Great Britain; and

(4) is professionally competent to run the service.

Legislation should give the Secretary of State for Transport power to specify requirements as to good repute, appropriate financial standing and operating within Great Britain.

To demonstrate professional competence, the applicant must submit a documented safety management system, setting out all safety related roles and the competence required for each.

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157 See Public Passenger Vehicles Act 1981, s 14ZA(2)(a).

158 Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, para 9.102.

A SAFETY CASE

8.36 The Automated Vehicles report recommended that both an "ASDE" (the entity that puts an automated vehicle on the road) and a NUICO should be required to submit a safety case. The safety case should set out a clear comprehensible argument for the safety of their vehicles.

8.37 An overwhelming majority of respondents agreed that an ERDO should also submit a safety case. It was seen as essential to safety assurance. The onus will be on the ERDO to demonstrate how safety will be assured. This will include setting out the ERDO's approach to the issues listed in Chapter 2.

8.38 When considering the safety case, the regulator should grant a licence only if it determines that the use case as presented can be operated safely.

Conclusion 11.

8.39 To obtain an ERDO licence, the applicant should submit a safety case, showing how safety would be assured.

A DUTY OF CANDOUR

8.40 The Automated Vehicles report pointed to the importance of the information submitted in the safety case. It recommended criminal offences if an ASDE or NUICO fails to disclose or misrepresents safety-critical information. A strong majority of respondents agreed that similar offences should apply to an ERDO.[159] Respondents thought that this would introduce parity with ASDE and NUICO licensing and would promote safety and compliance.

8.41 Some developers suggested that the duty should apply only if the misrepresentations or nondisclosure were intentional, or that the duty should not involve criminal liability. However, we would not wish to introduce a disparity between ERDOs and NUICOs/ASDEs. An accurate and reliable safety case is just as critical for safe deployment of remote driving as it is for automated driving.

8.42 We therefore propose new criminal offences where an ERDO misrepresents or fails to disclose safety relevant information in its safety case. These should be similar to those that apply to NUICOs and ASDEs.

Conclusion 12.

8.43 It should be an offence for an ERDO to misrepresent or fail to disclose safety relevant information in its safety case.

[159] See analysis of responses, paras H.41 to H.47.

SETTING LICENCE CONDITIONS

8.44 The Automated Vehicles report recommended a flexible approach to setting licence conditions for NUICOs. It recommended that NUICOs should not all be subject to a single list of responsibilities. Instead, after considering the safety case, the regulator should decide what responsibilities should apply. The responsibilities would then be set out in the conditions of the licence.

8.45 In the Issues Paper, we sought views upon a list of eight duties that should apply to an ERDO. We suggested that the ERDO should be required:

(1) to ensure that the driver is able to drive safely by:

(a) taking reasonable care that connectivity is suitable;

(b) ensuring that in the absence of connectivity or driver input, the vehicle comes to a safe stop;

(c) providing suitable work-stations; and

(d) maintaining suitable training, vetting, health checks, working hours and breaks;

(2) to maintain the vehicle (including software updates and cybersecurity);

(3) to check that any load is safe and secure before that journey starts, and ensure that the number of passengers does not overload the vehicle;

(4) to insure the vehicle;

(5) following an incident, to provide information to other road users, the police and the regulator;

(6) not to impede traffic flow (for example by ensuring that vehicles are not left in inappropriate places);

(7) to check the route and pay any tolls and/or charges; and

(8) to respond to the regulator's requests for information about the safety of remote driving.

8.46 A majority agreed with all the duties listed, though many made additional comments. In particular, several respondents thought that the duty of safety should be strengthened. Transport for London and Transport for West Midlands thought that "taking reasonable care that connectivity is suitable" was insufficiently strong, given that connectivity is essential for the functioning of remote driving.

8.47 By contrast, developers thought that some duties (maintenance, loading and not impeding traffic flow) should not be strict and should only require reasonable care. They also thought that some duties may be difficult in practice. For example, Trilvee commented that checking the number of passengers by installing an internal camera or seat sensors may contravene privacy and/or data protection regulations.

8.48 Respondents also highlighted additional duties that ERDOs should comply with. It was suggested that they should include maintaining a safe operational centre (for example, from the risk of fire) and ensuring remote driving staff undergo drug and alcohol testing. It may also be necessary to require the ERDO to collect and retain specified data, such as who was driving the vehicle at any given time.

The purpose of the duties

8.49 In the Issues Paper, we suggested that a breach of the first three ERDO duties should give victims the right to claim damages for breach of statutory duty. As we discuss in Chapter 9, we no longer think that is the right way forward. Instead, we have concluded that victims should obtain compensation from the vehicle's insurer in a similar way to victims of collisions involving automated vehicles under the Automated and Electric Vehicles Act 2018.

8.50 We therefore conclude that the duties should not be the basis of civil liability. Instead, the effect of a breach would be regulatory. The regulator would apply the sanctions discussed below. The system of sanctions would need to be sufficiently flexible to respond to problems as they arose.

8.51 The Automated Vehicles report recommended that, when granting a licence to a NUICO, the regulator should specify the responsibilities which fall on a NUICO in the terms of its licence. We think that a similar approach should apply here. It should be for the regulator to decide which duties should apply, and they should be set out as conditions of the ERDO licence. The regulator will also determine whether there has been a breach of a duty and the regulatory sanction to be applied.

8.52 We hope that the duties we have set out above will be a useful checklist, which may be added as conditions of the licence. However, not all of the duties will necessarily apply in all cases, and further conditions may be needed.

Conclusion 13.

8.53 ERDO duties should be determined on a case-by-case basis. When granting a licence, the regulator should specify the duties which fall on the ERDO as conditions of the licence.

POWERS OF THE REGULATOR

8.54 The Automated Vehicles report recommended that breach of NUICO licence conditions should be enforced through a system of regulatory sanctions. The report suggested that the police, vehicle examiners and the public would bring complaints to the attention of the regulator, who would then investigate. If the regulator established that the licence conditions had been broken, it would then have a broad range of sanctions available to it.

8.55 The recommended range of sanctions included civil penalties, redress orders, compliance orders and (in the most serious cases) suspension or withdrawal of licence.

8.56 There was widespread support for applying the same regulatory sanctions to ERDOs. Respondents saw robust regulatory sanctions as crucial to maintaining safety. Some highlighted that the emphasis should remain on learning rather than punishment of the ERDO.

8.57 We agree that the regulatory sanctions should be used by the regulator to promote a safety culture that learns from mistakes. We think that the sanctions offer sufficient flexibility to encourage compliance, whilst also giving the regulator power to apply the most severe sanctions for serious breaches.

8.58 We therefore recommend the same penalties should apply to both NUICOs and ERDOs. These should include compliance orders, monetary penalties and redress orders, together with the suspension and withdrawal of all or part of the licence.

Conclusion 14.

8.59 Legislation should give the regulator powers to impose regulatory sanctions on ERDOs.

Inspection powers

8.60 In the Automated Vehicles report, we recommended that the NUICO regulator should have power to enter and inspect a remote operations centre. It will be important to see that the system outlined in a NUICO's safety case is being followed in practice.

8.61 There was widespread support for a similar power to inspect ERDO remote operation centres. Stakeholders saw inspection powers as necessary for effective enforcement. Developers also agreed so long as the powers were used proportionately.

8.62 We therefore recommend inspection powers in respect of ERDO licensing.

Conclusion 15.

8.63 The ERDO regulator should have power to inspect remote operation centres.

HOW LONG SHOULD AN ERDO LICENCE LAST?

8.64 The Automated Vehicles report recommended that the duration of a NUICO licence should be set in secondary legislation. Initially it should last for five years.[160] This was seen as a balance between the need to update NUICO licence conditions in light of experience with the need to provide some certainty to operators who have made an investment and set up a service.

[160] Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, Recommendation 59.

8.65 The same considerations apply to ERDOs. We therefore make the same suggestion in respect of ERDOs.

Conclusion 16.

8.66 The duration of an ERDO licence should be set in secondary legislation. Initially, the duration should be 5 years.

WHO SHOULD ADMINISTER ERDO LICENSING?

8.67 The Automated Vehicles report recommended that legislative responsibility for NUICO licensing should be placed on the Secretary of State for Transport, with a power to allocate responsibilities flexibly amongst departmental agencies.[161]

8.68 Given that ERDO licensing draws on the same principles as NUICO licensing, we think a similar approach should be taken here. We envisage that the same regulator will be responsible for both NUICOs and ERDOs.

Conclusion 17.

8.69 Primary legislation should place responsibility for ERDO licensing on the Secretary of State for Transport.

The same regulator should administer both the NUICO and ERDO licensing schemes.

[161] Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, Recommendation 60.

Chapter 9: Civil liability

9.1 Here we consider how to compensate those injured by remotely driven vehicles, or who suffer property damage. This issue drew a considerable response from stakeholders, particularly from claimant representatives. It was pointed out that responsibility for a remote driving collision may lie with a wide variety of parties: the individual driver; the organisation; the mobile network provider; hardware or software producers; or even with a hacker in a cyber-attack. It would be wrong to require the individual victim to take on the stress, expense and delay of establishing where any fault lies.

9.2 For automated vehicles, the Automated and Electric Vehicles Act 2018 provides compensation to the victim of any accident "caused by an automated vehicle when driving itself". We have concluded that a similar provision should apply to remote driving.

9.3 Several respondents pointed to the need to collect, retain and share data to assist with claims. In Chapters 7 and 8 we proposed schemes for licensing and regulating remote driving providers. In our view, the regulator should set standards for data retention, enforced as a condition of the licence.

9.4 Many stakeholders set the discussion within the context of a wider debate about how to smooth the path to compensation for victims more generally. We summarise other recent developments in this area in Appendix 1.

POTENTIAL PROBLEMS FACING VICTIMS

What we said in the Issues Paper

9.5 In Chapter 4 of the Issues Paper we explained that routes to claim compensation are available. Under the current law, a remote driver is obliged to carry compulsory insurance against their own negligence. Furthermore, the driver's employer is vicariously liable for the driver's negligence and for its own fault in operating the system. Therefore, a victim's normal course of action would be to bring a claim against the driver and their employer.

9.6 However, in some cases it might be difficult to establish fault or where it lies. We gave the example where the driver lost connectivity and the risk mitigation system failed to avert a collision. A victim might be forced to proceed against multiple parties, which could cause undue complexity, expense and delay. A victim may face particular problems if (for example) the remote driving system was designed by one organisation and operated by another; or if an organisation subcontracts for remote drivers; or if a cyber-attack causes harm.

9.7 We asked respondents if remote driving was likely to cause problems for victims, and for their views on possible solutions.

Respondents' views

9.8 Question 5 asked if remote driving was likely to cause victims undue delay and expense in claiming compensation; or if it could defeat claims altogether. Many respondents provided views, with several stakeholders submitting detailed discussions of the issues.[162]

9.9 The great majority of respondents said that, under the current law, victims of remote driving would face undue delay and expense. Furthermore, they could be deprived of compensation in some circumstances. Respondents focused on three issues: connectivity failure; hidden (or "latent") defects with the vehicle; and cybersecurity. They also drew attention to the difficulty of establishing whether, at any given time, a vehicle was driving itself or being remotely driven. Respondents said that any scenario involving multiple defendants would add substantially to the delay, expense and risk of claims.

9.10 We report respondents' concerns in more detail below.

Failures of connectivity

9.11 In the Issues Paper we gave an example where a remotely driven vehicle loses connectivity and is no longer controlled by the remote driver. The vehicle is fitted with software intended to bring the vehicle to a safe stop, but the software fails. In these circumstances, there is a risk is that the victim could get caught up in multi-party litigation, between the remote driving entity, the network provider and the developer, in which each blamed the other.

9.12 Several respondents commented that it would be particularly difficult (if not impossible) to show that the network service provider was at fault:

> *If that loss of connectivity was due to a failure of an entire telecommunication network, fault on the part of an ERDO may be especially difficult to prove*. [Clyde & Co]

> *As the number of customers of a broadband provider increases, the performance can deteriorate for existing customers. Unless the network used for remote driving guarantees always to give priority to remote driving, it may never be possible to prove that their service on a particular occasion was inadequate or negligent or that they broke their contract.* [John Rainbird]

9.13 Furthermore, any claim against the developer who designed the software would raise difficult issues of product liability law (as discussed below).

Latent defects

9.14 The example of lack of connectivity raises a more general problem, which is that a collision may be caused by a hidden or "latent" defect in the vehicle or the remote driving system.

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[162] We are particularly grateful for the detailed discussions provided by the Association of Personal Injury Lawyers and Paul Erdunast (a barrister specialising in civil liability).

9.15 In the Issues Paper we explained that where an injury is caused by a defect in a conventional vehicle, the driver or their employer is normally liable for the accident. However, a defendant may avoid liability for latent defects if they can show that they took all reasonable care, but despite this the defect remained hidden.[163]

9.16 We commented that in practice insurers often pay claims where a vehicle defect may be the cause of an accident due to the difficulty in proving a latent defect defence. However, several respondents expressed concern about relying on informal industry practices, which might change in the future. The British Insurance Brokers' Association felt that "the increased complexity of technology might lead to a shift in insurers' attitude".

9.17 If the driver succeeds in showing that the problem was the result of a latent defect, then the victim would need to bring an action against the producer, either under the Consumer Protection Act 1987 or under the law of negligence. Respondents stressed how difficult this would be.

9.18 The Association of Consumer Support Organisations (ACSO) represents the interests of consumers in the civil justice system. It described product liability claims as *"*extremely complex for both the claimant and their representatives". ACSO commented that such claims represent:

> *a significant shift which will undoubtedly affect the claims process and could even lead to an end to the typical 'no win, no fee' arrangements between law firms and their clients*.

9.19 In a detailed response, the Association of Personal Injury Lawyers (APIL) commented on the problems involved in product liability claims:

> *Product liability claims often result in the claimant being unsuccessful in securing compensation for their injuries due to the manufacturers' ability to fund expensive and complicated litigation both of which create an unlevelled playing field resulting in the claim being unviable for the individual claimant to pursue.*

9.20 APIL said that problems were exacerbated by "the lack of development in product liability law regarding new technology".[164] APIL pointed out that for serious injuries, the delay could prevent early access to rehabilitation therapies. For low value claims, it could be disproportionately costly for the claimant to bring a claim at all. The

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163 See *Henderson v Henry E Jenkins & Sons* [1970] AC 282, discussed at para 4.11 to 4.12 of the Remote Driving Issues Paper.

164 APIL referred to the recent review by the Office of Product Safety and Standards, which reported concerns that the increasing use of software and emerging technologies in consumer products could make claims even more complex and challenging for consumers to understand. Office for Product Safety & Standards, *UK Product Safety Review: Call for Evidence Response* (November 2021), p 16, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1035917/uk-product-safety-review-call-for-evidence-response2.pdf. For further discussion, see Appendix 1, paras 1.11 to 1.12.

development risks defence under the current Consumer Protection Act 1987 would make it particularly difficult to claim in this context.[165]

9.21 We discussed problems with current product liability law in Consultation Paper 3 of the Automated Vehicles project.[166] These problems were also raised in response to the Law Commission's consultation ahead of its 14th Programme of law reform. In our Automated Vehicles report, we recommended a review of product liability law to take account of the challenges of emerging technologies, not simply for automated driving but more generally.[167] Particularly given the EU's current revision of its Product Liability Directive to accommodate such technologies, the general issue is pressing and timely.[168] It is also one that would lend itself well to Law Commission analysis.

9.22 However, general reform is unlikely to be implemented soon. Nor would it necessarily allow the victims of road accidents to obtain compensation quickly and simply.

The practical problems caused by multi-party claims

9.23 Several respondents emphasised the practical problems a victim would face from uncertainty about who if anybody was at fault. In a detailed response, Paul Erdunast (a barrister specialising in civil liability) pointed to possible "liability gaps", where it was difficult to prove any particular defendant was at fault. Furthermore, the claimant would have to bear the expense of expert witnesses to show where the fault lies. And a claimant who sued the "wrong" party might face an adverse costs order: the requirement to pay the other side's costs could swallow up their damages. An individual victim, without expertise or resources, would be plunged into complex issues of responsibility for new technology.

9.24 DAC Beachcroft described the new Official Injury Claim portal process, designed to make it easy for victims to pursue small road traffic claims without lawyers.[169] They commented that "the system is not equipped for passing claims onto manufacturers where the incident is caused by the vehicle systems".

Cyber-attacks

9.25 Several respondents expressed concern that the victims of some cyber-attacks might find it particularly difficult to show that the remote driving entity was to blame. APIL outlined the problem:

> *It would be difficult to show that the cyber-attack was a result of the remote driving organisation's negligence. The organisation could argue that they have*

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165 Consumer Protection Act 1987, s (4)(1)(e).

166 Automated Vehicles: Consultation Paper 3 - A regulatory framework for automated vehicles (2020) Law Commission Consultation Paper No 252; Scottish Law Commission Discussion Paper No 171, paras 16.33 to 16.47. In particular, we noted criticisms by the European Commission Expert Group on Liability and New Technologies - New Technologies formation, *Liability for Artificial Intelligence and other emerging digital technologies* (November 2019), https://op.europa.eu/en/publication-detail/-/publication/1c5e30be-1197-11ea-8c1f-01aa75ed71a1/language-en.

167 Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, Recommendation 71. For an account of recent initiatives in this field, see Appendix 1.

168 We describe these developments in more detail in Appendix 1 from para 1.13 onwards.

169 We describe this process in Appendix 1.

taken all necessary steps by having cyber security software. Once again, this could result in the injured party having to pursue action against both the organisation and the software company.

9.26 A hacker who takes over control of the vehicle may well be untraceable and almost certainly uninsured, leading to a possible claim against the Motor Insurers' Bureau (MIB). The MIB had particular concerns about bringing uninsured remotely driven vehicles within their remit:

> *The MIB would find it unacceptable if the design of the compensation regime for remote driving were to expose the MIB to potentially unbounded strict liability in respect of the uninsured use of remotely-driven vehicles.*

Establishing responsibility for the driving task

9.27 Allied to these concerns, respondents raised more general issues about how a victim would be able to establish who was responsible for driving the vehicle at any given time.

9.28 In Chapter 3 we discuss the dividing line between self-driving and remote driving. Although there is a clear conceptual distinction between self-driving and remote driving, it may not be easy to establish the exact moment at which responsibility shifts. Richard Morris[170] commented that it might be particularly difficult to allocate liability when connectivity "jittered". Latency is the lag time experienced in a telecommunications network between data being transmitted and being received, and jitter refers to inconsistency in latency. The fear is that a combination of these factors may cause control to pass back and forth between the remote driver and the automation responsible for a minimal risk condition:

> *Insurance liability would, presumably, oscillate between those organisations at the same time as the jitter.* [Richard Morris]

9.29 Clearly, if the signal is subject to unacceptable degrees of latency or jitter, it should not be authorised. However, problems may still occur. They should not become a barrier to accessing compensation.

9.30 The Association of British Insurers (ABI) and Thatcham Research also highlighted the possibilities for collisions in the transitions from remote to automated driving:

> *There needs to be greater clarity to delineate responsibilities if a road traffic collision were to occur in the transition period between automated driving mode and remote driving mode. This is especially true if the collision were to be caused by an interruption to connectivity or a reconnection which occurs at an inopportune moment putting the ADS or remote driver in a hard-to-respond situation.*

9.31 Considerable attention has been given to handovers between automated driving systems and in-vehicle drivers. For example, UN Regulation 157 on automated lane

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[170] Richard Morris is a researcher and developer involved in road safety and vehicle automation. He responded in a personal capacity.

keeping systems requires a human to be in the driving seat, with their safety belt fastened,[171] available to take over the dynamic driving task. The Regulation sets requirements by which an activated system may "transition back control to the driver",[172] by issuing a "transition demand".[173]

9.32 In our Automated Vehicles report we describe the person in the driving seat in these circumstances as a user-in-charge. We made detailed recommendations about how and when responsibility transitions from the automated driving system to the user-in-charge.[174]

9.33 By contrast, there has been little discussion about handovers between "no user-in-charge" features and remote drivers. The issue is not regulated and is dealt with differently by each developer. Although regulations might develop in the future, this will take time. We agree with stakeholders that, in the absence of clear regulation, a victim's compensation should not depend on proving whether an ADS or a remote human driver was in charge at any given moment.

An urgent problem

9.34 The safety organisation, RoSPA stressed the urgency of resolving the problems victims would face:

> *These issues must be considered before trialling of these vehicles becomes more widespread, as it would be unfair for victims of collisions and their families, at an already difficult and upsetting time, to have to navigate a very complex system that results in delays in them receiving compensation. Not being able to bring justice and compensation would be of acute concern for the public. Failing to do so could reduce public confidence in remote driving.*

OPTIONS FOR REFORM

9.35 The practical problems victims would face in seeking compensation for injuries caused by faults in remote driving systems present a compelling case that reform is needed.

9.36 In Chapter 10 of the Issues Paper, we set out two possible options for reform. The first would be to give victims additional rights to claim against the ERDO for breach of statutory duty if, for example, the ERDO had failed to take reasonable care to ensure that connectivity was suitable, or the vehicle had failed to come to a safe stop. The second option was for a more comprehensive strict liability regime, along the lines of the Automated and Electric Vehicles Act 2018 (AEVA).

9.37 Most of the comments favoured the AEVA approach, which was seen as providing a simpler and easier route for victims to claim compensation. Support for applying AEVA

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171 UN Regulation 157 on uniform provisions concerning the approval of vehicles with regard to Automated Lane Keeping Systems, Revision 3 (20 October 2017) E/ECE/TRANS/505/Rev.3/Add.156 (ALKS Regulation), para 6.1.1, https://unece.org/DAM/trans/main/wp29/wp29regs/2017/E-ECE-TRANS-505-Rev.3e.pdf.

172 ALKS Regulation, para 5.4.

173 ALKS Regulation, para 2.2.

174 Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, paras 8.122 to 8.137.

principles for remote driving came from a wide variety of organisations, including developers and claimant groups:

> *The approach taken by AEVA is a good one and seems to work well to account for the imbalance between an individual seeking compensation and large companies that might be responsible for the technology.* [Reed Mobility]
>
> *This seems preferable for clarity and simplicity of route to which any injured person may make a claim.* [Trilvee]
>
> *The manufacturer or insurer would always be in a better position to access data than the injured person that has the burden of proving the guilt of the other party. We believe that strict liability is an effective way to correct the imbalance, as well as prevent disputes about whether the remote driver or the system failed at the time of the incident*. [APIL]
>
> *It is the best way of preserving the key principle that innocent third parties who are injured in a road traffic accident have immediate access to compensation via the insurer of the vehicle.* [BIBA]

9.38 By contrast, respondents highlighted the limitations of claiming against the ERDO for breach of statutory duty. One of our proposed ERDO duties, for example, would be "to take reasonable care to ensure that connectivity was suitable". Respondents commented that it would be difficult for a victim to show lack of reasonable care. Furthermore, the ERDO might take reasonable care and connectivity might still fail. The victim should still be compensated in such circumstances.

THE AUTOMATED AND ELECTRIC VEHICLES ACT 2018 (AEVA): AN OUTLINE

9.39 In 2016, the Government identified a need for new insurance provisions where an automated vehicle rather than a human driver causes an accident.[175] These provisions are set out in Part 1 of AEVA. As the Government explained:

> In the case of an automated vehicle being operated in automated mode … accidents could take place not as a result of human fault, but because of a failure in the vehicle itself, for which the only recourse available to an otherwise uninsured victim might be to sue the manufacturer through the courts.[176]

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175 Department for Transport and CCAV, *Pathway to Driverless Cars: proposals to support advanced driver assistance systems and automated vehicle technologies* (July 2016), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/536365/driverless-cars-proposals-for-adas-and_avts.pdf. The Government response to the consultation was published 2017: Department for Transport and CCAV, *Pathway to driverless cars: Consultation on proposals to support Advanced Driver Assistance Systems and Automated Vehicles: Government Response* (January 2017), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/581577/pathway-to-driverless-cars-consultation-response.pdf.

176 Automated and Electric Vehicles Act 2018 (AEVA), Explanatory Notes, para 12.

Insurer liability

9.40 AEVA therefore extended compulsory motor vehicle insurance to cover the use of automated vehicles in automated mode. Section 2(1) provides that:

> (1) Where—
>
> (a) an accident is caused by an automated vehicle when driving itself,
>
> (b) the vehicle is insured at the time of the accident, and
>
> (c) an insured person or any other person suffers damage as a result of the accident,
>
> the insurer is liable for that damage.

9.41 For these purposes "damage" includes death or personal injury. It also includes damage to property of third parties. It excludes damage to the vehicle itself; to goods carried for hire or reward in the vehicle or trailer; or to property in the custody of the insured person or the person in charge of the vehicle.[177] Personal injury compensation is unlimited. Property damage must be covered up to the amount of the statutory limit,[178] which is currently £1.2 million.

9.42 Section 2(2) includes a similar provision for "self-insured" vehicles owned by public bodies, such as local authorities, the police or health services. Here liability is placed on the owner.

Contributory negligence

9.43 Under section 3(1), where an accident is to any extent the fault of the injured party, the normal principles of contributory negligence apply. Compensation is reduced to the extent that the court thinks is just and equitable.

9.44 AEVA also allows claims by the "insured person". Normally the insured person is the human in the driving seat who is injured in the collision. Exceptions apply where the insured person is at fault in a variety of ways.[179] However, we do not think similar provisions are required here. The remote driver is unlikely to be injured in the collision. In the unlikely event that the remote driver is injured, the general rules on contributory negligence would appear to be sufficient.

Secondary claims

9.45 Once the insurer has settled a claim with the injured party, it may then claim damages from any other party liable for the accident.[180] This includes drivers of other vehicles or

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177 AEVA, s 2(3).

178 Road Traffic Act 1988, s 145(4)(b).

179 Under s 3(2), the insurer is not liable to a person in charge of the vehicle if the accident was "wholly due to their negligence in allowing the vehicle to begin driving itself when it was not appropriate to do so". The policy may also exclude liability to an insured who has failed to install software updates that the insured "knows, or ought reasonably to know, are safety-critical" (s 4(1)(b)).

180 AEVA, s 5(1), states that "any other person liable to the injured party in respect of the accident is under the same liability to the insurer or vehicle owner".

(if the accident was due to a fault in the vehicle or ADS) the vehicle manufacturer or ADS developer.

OUR CONCLUSIONS

9.46 The strong arguments put by stakeholders have convinced us that a person injured by remote driving should not be required to prove fault to obtain compensation. Fault might lie with the individual driver; an unsafe system of work; a failure of connectivity; or hardware or software in either the vehicle or the remote operations centre. Often it will be a combination of factors. In some cases, nobody would be tortiously liable. It is unrealistic to expect a victim who lacks resources, stamina or expertise to be required to prove a case against any one of these parties. Instead, the victim should have recourse to similar provisions to those laid out in Part 1 of AEVA.

An obligation to carry no-fault insurance

9.47 We have concluded that every NUICO or ERDO should be required to carry no-fault insurance. In essence, a NUICO should be obliged to take out insurance for both self-driving and any element of remote driving – and must insure self-driving and remote driving (and any failed handovers) under the same policy. Similarly, an ERDO would be required to take out a policy which includes direct insurer liability for all accidents caused while the driver is not in the vehicle (or in line-of-sight of the vehicle).

The insurer's liability to pay

9.48 Where the vehicle is insured under such a policy, the insurer should be liable to third parties to pay for damage caused by the vehicle, either when it is driving itself, or when it is being driven remotely, or when a gap occurs between the two. This means that the victim would not need to establish how the vehicle is being driven. If, for example, control shifts back and forth between the beyond line-of-sight driver and the software, this should not affect the victim's compensation.[181] We have concluded that the insurer would be directly liable for any damage caused by the vehicle except when it is being driven by a person in the vehicle or in line-of-sight of the vehicle (as defined in Chapter 3).

9.49 The definition of "damage" should mirror AEVA. In other words, the new provisions should cover all personal injury on an unlimited basis, together with third-party property damage up to the statutory limit of £1.2 million. However, there would be exclusions for damage to the vehicle itself; to goods carried for hire or reward in the vehicle or trailer; and to property in the custody of the insured person or person in charge of the vehicle.

9.50 As with AEVA, compensation would be reduced if the insurer establishes that the victim was contributorily negligent.[182] Similarly, the insurer would have the right to bring secondary claims. Once the insurer has settled its claim with the injured party, it may then claim damages from any other party liable for the accident.

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[181] It may affect the driver's criminal liability, as we discuss in depth in Ch 10.

[182] Contributory negligence might apply, for example, where an occupant of another vehicle was not wearing a seat belt, or where a pedestrian stepped into the road without looking.

9.51 We envisage that most secondary claims would be against other road users, or against any producer or developer responsible for the hardware or software in the vehicle or remote operations centre. We do not think that it would be productive for the insurer to spend time and effort bringing secondary claims against the NUICO or ERDO who pays the premium. This would effectively mean suing its own policyholder. A less expensive solution would be to raise the NUICO or ERDO's future premiums.[183]

Motor insurance and terrorism risk

9.52 Appendix 2 describes how victims are compensated for acts of terrorism arising out of the use of a vehicle on a road or other public place.

9.53 This issue has been subject to several changes over the few years. Originally, victims had to rely on the Criminal Injuries Compensation Scheme, rather than the more generous compensation provided by motor insurance. However, since 2017, victims have been able to claim from the MIB. In 2019, the risk was "mutualised". In other words, it now falls on all motor insurers collectively.[184]

9.54 Terrorism risk is difficult for insurers. This is not because the risk is high (incidents are few and far between) but because it is difficult to quantify. The MIB pointed out that the risk of a terrorist incident arising out of remote driving is particularly difficult to quantify. Remote driving is new, and there is no experience on which to judge what the risk may be. Nor it is possible to place any top limit on the risk. Under the Road Traffic Act 1988, personal injury compensation is unlimited and the fear is that many vehicles could be taken over at once.

9.55 The MIB argued strongly that the cost of any terrorist incident involving remote driving should not fall on motor insurers collectively. This would place a new and unlimited risk on all drivers, many of whom struggle to meet the current high cost of motor insurance. Nor would it provide sufficient incentive on remote driving organisations to demonstrate high standards of cybersecurity and terrorism prevention.

9.56 We agree that it would be preferable for remote driving organisations to insure against the risk themselves. On this basis, NUICOs and ERDOs should be required to pay the premium for comprehensive insurance that would compensate all those injured by remotely driven vehicles on roads and other public places. This should include where vehicles are taken over by untraced or uninsured drivers, or used for terrorist purposes. It would then be up to remote driving organisations to demonstrate high standards to their insurers, including robust cybersecurity and other measures to prevent infiltration or take-over of operations centres. This would put the cost of the risk on those most able to mitigate it.

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183 Nor would it be helpful for the insurer to sue the individual remote driver. This would require the driver to carry separate insurance, which in practice would need to be paid for by their employer (simply adding to the expense of the arrangement). We hope that in practice, insurance contracts will be written to prevent unnecessary litigation of this type. If necessary, the regulator could intervene.

184 For details, see Appendix 2, paras 2.10 to 2.24.

9.57 In careful and small-scale trials, we do not think the risk will be great. However, we are aware that when vehicles are deployed at scale, insurers may find it difficult to quantify or limit the risk. This could make insurance difficult to obtain.

9.58 In Appendix 2 we outline the Pool Re scheme, covering damage to commercial buildings caused by terrorism. The scheme was set up in 1993, following concerns that terrorism risk was becoming uninsurable. It works by allocating costs in slices: the first slice falls on the insurer; subsequent slices are borne by Pool Re, a special company set up for the purpose; while the Government acts as the insurer of last resort. In 30 years, the scheme has not needed to call on the Government. The arrangements have been emulated elsewhere and are widely seen as a success.[185]

9.59 If remote driving insurers were to struggle to obtain reinsurance, one possibility would be to consider similar arrangements in this context. In other words, if the Government wishes to encourage innovation in driving technologies, they might give consideration to entering into insurer of last resort arrangements with the industry.

Conclusion 18.

9.60 Arrangements should be put in place to compensate the victims of remotely driven collisions in a similar way to automated vehicle collisions, as set out in out in Part 1 of the Automated and Electric Vehicles Act 2018 (AEVA).

To this end, every NUICO or ERDO should be required to carry no-fault insurance.

Where such a policy is in place, the insurer would be directly liable for any damage caused by the vehicle except when the vehicle is being driven by a person in the vehicle or in line-of-sight of the vehicle.

As with AEVA:

(1) the policy should cover personal injury (for an unlimited amount) and third-party property damage up to the statutory limit. Exceptions should apply to damage to the vehicle itself, to goods carried for hire or reward in the vehicle and its trailer; or to property in the custody of the insured person or person in charge of the vehicle;

(2) compensation should be reduced if the insurer establishes that the victim was contributorily negligent; and

(3) the insurer should have the right to bring secondary claims.

The no-fault insurance should cover the risks of vehicles taken over by untraced or uninsured drivers, including the risk of terrorism.

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185 See HM Treasury, "Pool Re to offer cheaper premiums and unlimited guarantee extended" (18 March 2022), https://www.gov.uk/government/news/pool-re-to-offer-cheaper-premiums-and-unlimited-guarantee-extended. For further detail, see Appendix 2.

DATA COLLECTION, RETENTION AND SHARING

Stakeholder views

9.61 Many stakeholders emphasised the importance of collecting, retaining and sharing data to determine what went wrong following a collision.

9.62 Some developers argued that data recording could overcome difficulties in establishing who was responsible for a collision:

> *We anticipate the data and extensive video recorded during our operations to be useful in determining fault and assisting in any post-incident investigation.* [Einride AB]

> *Our initial view is that, if sufficient requirements for data sharing are put in place, there is good potential for claims to be more streamlined given the availability of ground truth data for incidents.* [Oxbotica]

9.63 ABI and Thatcham Research asked for requirements that remote driving organisations should retain specified data:

> *This data set should be similarly defined to what is set out within the UNECE Regulation 157 governing the use of ALKS but adapted to the features of remote driving.*

9.64 APIL argued that it should be a criminal offence for a driver responsible for a collision to destroy the relevant vehicle data.

9.65 Allianz agreed that "one of the many benefits of automated vehicles will be the availability of data which could seamlessly establish the cause of an accident without having to question the road user". However, "due to past incidents involving certain vehicle manufacturers, some drivers may be concerned that their data is being used inappropriately, or being ignored and hidden in the event of a system fault". They therefore wanted data to be held by an independent body.

Retaining data following a collision

9.66 One advantage of remote driving is that it provides video feeds of what occurred immediately before and after an incident. Retaining these video feeds would be helpful to a variety of people: they could inform a criminal prosecution, regulatory sanctions, or an independent safety investigation. It would allow the insurer to establish contributory negligence or found a secondary claim.

9.67 However, as we noted in the Automated Vehicles report, "there is considerable work to be done in developing standards for data collection concerning collisions and other incidents".[186]

9.68 In 2018, the United Nations Economic Commission for Europe (UNECE) convened an informal working group on this issue (known as IWG EDR/DSSAD). Two studies provided background research for the group: one from Allianz, and one from the US

[186] Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, para 2.108.

National Highway Traffic Safety Administration (NHTSA). These reports looked in detail at what information might be needed to investigate and understand collisions, drawing on existing databases.

9.69 The current US standard is that an event data recorder (EDR) should hold information from 5 seconds before the crash. A NHTSA study suggests that 5 seconds is too short to cover much of the data needed to understand a crash. For example, in around a third of accidents, the driver initiated braking before the 5 second window – but the EDR did not tell investigators how long before. Based on a naturalistic driving study which placed specialised recorders in 100 vehicles for a year, NHTSA concluded that 20 seconds of pre-crash data would be needed to understand 90% of accidents.[187]

9.70 Allianz reach a similar conclusion: only 42% of motor accidents involving a personal injury could be resolved by data retained in accordance with current US standards.[188] Allianz reported that the AHEAD group, which advised the informal working group, recommended that for automated systems, data should be recorded from 30 seconds before the collision to 10 seconds afterwards.

9.71 Allianz highlighted several cases where claims could only be fully resolved with 360-degree camera feeds. Video recordings are particularly important where the perpetrator of the collision leaves the scene – for example where the insured vehicle is forced to take evasive action due to a third party's sudden lane change.[189] To bring a secondary claim, insurers will wish to identify other parties at fault. They will therefore be looking for camera evidence of the number plates of other vehicles which may have been at fault.

Conclusion

9.72 The UNECE has not yet come to a decision on these issues. The questions posed are often technical and we have not ourselves reached a conclusion on exactly which data surrounding a collision should be stored. However, it will become crucial to understand and learn from data surrounding collisions.

9.73 We have concluded that the NUICO and ERDO regulator should set standards for data retention, enforced as a condition of the licence. The standard should draw on the available research in this area.

9.74 As with our recommendations for automated vehicles, basic data should be retained for at least 39 months.[190] Where the data is necessary to decide claims fairly and accurately, the organisation should be under a duty to share the data with the insurer.

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187 National Highway Traffic Safety Administration, *Results of Event Data Recorders Pre-Crash Duration Study: A Report to Congress* (March 2022), p 8, https://rosap.ntl.bts.gov/view/dot/60879.

188 Kreutner and others, *Needs and Requirements of EDR for Automated Vehicles – Analysis based on Insurance Claims Reported to Allianz Germany* (Allianz Study), p 15, https://wiki.unece.org/pages/viewpage.action?pageId=94047321&preview=/94047321/97648763/EDRDSSAD-05-03%20(Allianz)%20EDR%26DSSAD%20Data%20Needs.pdf.

189 Allianz Study, p 14.

190 See Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, paras 13.40 to 13.52.

Conclusion 19.

9.75 The NUICO and ERDO regulator should set standards for data retention, enforced as a condition of the licence.

Chapter 10: Criminal liability

10.1 In Chapters 7 and 8 we considered the responsibilities of the organisation responsible for remote driving. Here we consider the liability of the individual driver working for such an organisation. Under current road traffic law, drivers face extensive criminal liability, not only for the dynamic driving task but also for the condition of the vehicle. Drivers' criminal liability is much more extensive than that of most other employees.

10.2 In Chapter 3 we compared the role of a remote driver with that of a remote assistant. As discussed below, the criminal liability of a driver is much greater than that of an assistant. While remote assistants may face prosecution for negligent behaviour under health and safety legislation, health and safety prosecutions against individual employees are rare. By contrast, drivers are frequently prosecuted for dangerous or careless driving. Where such driving results in a death or serious injury, drivers face extremely serious charges. Drivers are also prosecuted for a range of strict liability offences.

10.3 Current driver liabilities have the potential to be unfair to remote drivers in some circumstances. An individual employee might have little control over problems caused by failures of connectivity, broken sensors or poor workstation design. In these cases, responsibility for maintaining safety should lie with the organisation rather than with the individual.

10.4 In the Issues Paper we proposed two reforms, with a view to reducing a remote driver's criminal liability in limited and specific circumstances. The first related to responsibilities for matters beyond the individual's knowledge and control; the second was where a competent and careful driver could not have avoided the offence. Most respondents to the Issues Paper agreed with the principles behind these reforms. However, many made detailed comments about how they might work in practice.

10.5 We have therefore modified our proposals. We conclude that a remote driver should have a defence to a driving charge if a competent and careful driver in the remote driver's circumstances would not have been aware of the circumstances giving rise to liability or would not have avoided commission of the offence.

A COMPARISON BETWEEN REMOTE DRIVERS AND REMOTE ASSISTANTS

10.6 As explained in Chapter 3, a remote driver exercises lateral or longitudinal control over the vehicle or monitors it with a view to immediate and safety-critical intervention. By contrast, a remote assistant does not exercise direct control. Furthermore, if a remote assistant is observing the vehicle, any failure to act would not be safety-critical. However, where an assistant does act, they may still cause harm. They may, for example, misclassify an object. The Automated Vehicles report cited the SAE example, where an assistant identifies an object as an empty bag that can be safety driven through. The report commented that "an assistant might mistakenly label an obstacle as a plastic bag when the bag contains concrete".[191] A tired or negligent

[191] Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, para 9.19.

assistant might also give an automated vehicle misinformation, which causes it to contravene traffic rules.

10.7 Under the schemes we have outlined for regulatory sanctions[192] and for civil liability,[193] it will not matter whether an employee was working as a remote assistant or as a remote driver at any given time. However, for criminal liability purposes there are differences.

10.8 In Appendix 3 we compare the criminal liability of a remote assistant with that of a driver. A negligent remote assistant does face some criminal liability. Two offences are particularly relevant: gross negligence manslaughter; and a failure to take reasonable care for the health and safety of others, under section 7 of the Health and Safety at Work etc Act 1974 (the 1974 Act). However, gross negligence manslaughter requires a "serious and obvious risk of death" together with behaviour that it is "truly exceptionally bad".[194] The offence is much narrower than causing death by dangerous driving, although both carry a maximum sentence of life imprisonment.

10.9 Section 7 of the 1974 Act is very general. It simply requires employees to take reasonable care for the health and safety of themselves and of other persons who may be affected by their acts or omissions at work.[195] However, as the Health and Safety Executive states, it is rarely used where the employer is primarily responsible. Where that is the case, prosecutions are brought against the employer alone.[196] However, the HSE states that where the employer has taken all reasonably practicable steps to ensure compliance then action against the employee should be considered.[197]

10.10 Given that section 7 of the 1974 Act is already available to prosecute a clearly negligent remote assistant, we do not consider that any additional offences applying to remote assistants are needed. However, the clear asymmetry between remote assistants and remote drivers has caused us to look at how the criminal law applies to remote drivers. We think it has the potential to operate unfairly in some circumstances.

10.11 We consider that the principle set out by the Health and Safety Executive should also apply to remote drivers: where the employer is primarily responsible, action should be taken against the remote driving organisation rather than the employee. Individual drivers should have a defence to prosecution when they had no reason to know about a problem or were unable to do anything about it.

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192 See Ch 8, paras 8.54 to 8.59.

193 See Ch 9.

194 *R v Broughton* [2020] EWCA Crim 1093, [2021] 1 WLR 543. For further discussion, see Appendix 3.

195 It also imposes a duty on employees to co-operate with an employer to fulfil safety requirements: s 7(b).

196 Health and Safety Executive, *Enforcement Guide (England and Wales)* (2003), "Investigation: Proceedings against employees HSWA s7", https://www.hse.gov.uk/enforce/enforcementguide/investigation/identifying-employees.htm. For a discussion of this point, see Appendix 3.

197 Health and Safety Executive, *Enforcement Guide (England and Wales)* (2003), "Investigation: Proceedings against employees HSWA s7".

THE ISSUES PAPER PROPOSALS

10.12 In the Issues Paper we explained that a remote driver is a driver and has the responsibilities of a driver. For example, remote drivers must be qualified and fit to drive. They must not drive dangerously or carelessly. They also face a wide range of responsibilities not arising from the driving task, including duties to ensure that the vehicle is roadworthy and that accidents are reported.

10.13 In many cases, these duties will be appropriate. It is right, for example, that a remote driver should face prosecution for driving under the influence of drink or drugs.[198] However, the existing law could operate unfairly in some circumstances. We therefore proposed two new defences with a view to preventing unfair criminalisation.

An immunity for offences beyond a remote driver's knowledge and control

10.14 Our first proposal concerned duties that do not arise from the driving task which remote drivers may find difficult or impossible to fulfil. For example, the individual driver might have no way of knowing that the tyres are bald, or that the number plate is obscured, or that the lamp housing is cracked. We therefore proposed that individuals who drive beyond line-of-sight should have an immunity from prosecution in respect of any issues concerned with roadworthiness, loading and seat belts which are beyond their knowledge and control.[199]

10.15 Most respondents agreed with this proposal. As the Royal Society for the Prevention of Accidents (RoSPA) put it, "the ERDO will need to find other ways to fulfil these duties, the remote driver cannot be blamed". Similarly, Starship said that the company's remote assistants are not involved in loading goods onto its "personal delivery devices", nor responsible for checking that these vehicles are roadworthy before the journey begins. These tasks would be the responsibility of Starship itself, as the ERDO.

10.16 However, several responses pointed out that issues concerning roadworthiness, loading and seat belts are not necessarily beyond a remote driver's knowledge and control.[200] For example, sensors could inform remote drivers that a vehicle is overloaded, that the tyre pressure needs adjusting or that the children's seat belts are unfastened. Respondents argued that even if a remote driver is unable to fix the problem directly, they could take other precautions such as ceasing a journey or asking parents to fasten a child's seat belt.[201] Each case would need to be considered on its facts.

Where a competent and careful driver "could not have avoided the offence"

10.17 The second proposal in the Issues Paper was that a beyond line-of-sight remote driver charged with a road traffic offence should have a defence. We suggested that this

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198 Contrary to section 4 of the Road Traffic Act 1988.

199 Remote Driving (2022) Law Commission Issues Paper, Question 23(1).

200 Charles Puckle; Oxbotica; Richard Morris; British Motorcyclists Federation (BMF); the Society of Motor Manufacturers and Traders (SMMT); Transport for London (TfL).

201 Charles Puckle; Oxbotica; SMMT; BMF.

should apply "if a competent and careful driver in the same circumstances could not have avoided the offence".[202]

10.18 Most respondents agreed with this proposal. However, concerns were expressed that the comparison should be appropriate and should not reduce the standard of road safety.

10.19 We have looked at the wording again, in the light of various comments made to us. We now wish to stress that the comparison should be with a competent and careful beyond line-of-sight remote driver in the same circumstances. The comparison, for example, is with a competent and careful remote driver who has the same (possibly inadequate) signal and the same (possibly poorly designed) workstation. Furthermore, the standard of a competent and careful driver should not be impossibly high. It should look at what a competent and careful driver "would" have done, rather than what they "could" have done had they been perfect.

OUR CURRENT VIEW: A NEW STATUTORY DEFENCE

10.20 We have been encouraged by the support for these proposals. However, we have rethought the detail in the light of the comments made.

10.21 First, we accept that not all issues concerned with roadworthiness, loading and seat belts are necessarily beyond a remote driver's knowledge and control. Each case will depend on its facts. It is therefore more appropriate to think in terms of a potential defence than in terms of an immunity.

10.22 Secondly, it would be wrong to look at what a driver actually knew. A remote driver should not, for example, be exonerated from liability where information is displayed on a screen in front of them because they failed to check the screen. We think the appropriate test is what a competent and careful driver in the remote driver's circumstances would have known at the time.

10.23 Furthermore, it would be overly complex to have two separate defences – one for dynamic driving offences and one for issues concerned with roadworthiness, loading and seat belts. In Background Paper A to the Automated Vehicles report we identified 81 separate offences that apply to driving. Not all were easy to classify as relating to either dynamic or non-dynamic driving.[203] It would be simpler to provide a general defence for all traffic offences rather than attempting to distinguish between them. We have therefore concluded that a single provision should apply to all traffic offences.

10.24 The new defence might not always be necessary. Some offences do not apply if the defendant has a reasonable excuse or is unaware of the circumstances. For example, a person driving without insurance in the course of their employment already has a defence if they prove that they did not own or lease the vehicle, and "neither knew nor

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202 Remote Driving (2022) Law Commission Issues Paper, Question 23(2).

203 Background Papers to Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, available at https://s3-eu-west-2.amazonaws.com/lawcom-prod-storage-11jsxou24uy7q/uploads/2022/01/Background-papers-24-01-22.pdf. An example would be the offence of contravening a traffic regulation order under the Road Traffic Regulation Act 1984, s 5. The traffic regulation order might relate to moving traffic (dynamic) or parking (non-dynamic).

had reason to believe" that the vehicle was uninsured.[204] However, many offences fail to take individual circumstances into account.

Conclusion: a new defence

10.25 We have concluded that a new statutory defence is needed. A remote beyond line-of-sight driver acting for a licensed NUICO or ERDO should not be found guilty of a driving offence if a competent and careful driver in the remote driver's circumstances:

(1) would not have been aware of the circumstances giving rise to liability; or

(2) would not have avoided commission of the offence.

10.26 The remote driver should only be found guilty of the offence if *neither* of these limbs applies.

10.27 Both limbs focus on what a competent and careful driver would have done if they had found themselves in the circumstances of the remote driver. Under the first limb, if (for example) there were evidence that the vehicle's sensors detected a problem and placed a clear alert on the driver's screen, the defence would be unlikely to apply. Under the second limb, if a problem was aggravated by a failure of connectivity, the court would need to consider whether a competent and careful driver would have avoided committing the offence in those circumstances. We provide more detailed examples below.

10.28 We have changed the wording from looking at what a competent and careful driver "could" have done to what they "would" have done. We have made this change to ensure that the standard is not unduly high.[205] We wish the comparison to be with the standard of driving normally associated with competent and careful driving – not with what the very best drivers might be able to do in theory. However, we are not necessarily wedded to this formulation. It may be that when legislation is drafted, the drafters can find a better way of expressing this standard.

10.29 As discussed below, where the defence applies, the regulator should explore the issue with the NUICO or ERDO to find out what went wrong, with a view to possible regulatory sanctions. Furthermore, under the current law the NUICO or ERDO may be prosecuted for some driving offences, either because they are "using" the vehicle or because the offence includes "causing or permitting" another person to commit the offence. Other parties could still be found guilty of causing or permitting the offence, even if the driver had a defence.

The legal and evidential burdens of proof

10.30 The legal and evidential burdens would apply to this defence in the same way as for many statutory and common law defences. The defendant would have the burden of adducing sufficient evidence to satisfy the judge that the defence should be put to the

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204 Road Traffic Act 1988, s 143(3).

205 A similar discussion arose in the Automated Vehicles report: see Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, paras 8.126 to 8.128.

jury (in the Crown Court)[206] or to raise the defence (in the Magistrates' Court).[207] The standard of proof in respect of this would be the balance of probabilities.[208] The burden would be discharged if there were sufficient evidence to leave a jury or the magistrates in reasonable doubt as to whether a competent and careful driver would have either been aware of the issue or avoided the offence.[209]

10.31 If the defence satisfies the evidential burden, the prosecution would bear the legal burden of proving beyond reasonable doubt that a competent and careful driver would have been aware of the issue or would have avoided the offence.[210]

EXAMPLES OF HOW THE DEFENCE MIGHT WORK

10.32 To show the purpose and limits of this defence, we provide some examples of how it might work in specific circumstances. The first examples relate to an unsafe load and bald tyres. We then consider how the defence might apply to offences such as dangerous or careless driving, which already depend on the "competent and careful driver" standard.

An unsafe load

10.33 The first example is where a remotely driven vehicle is found to be carrying an unsafe load.

> **Scenario A**
>
> A beyond-line-of-sight remote driver employed by an ERDO drives a vehicle with a load that is secured in an unsafe manner. Distributing and securing loads is the responsibility of other ERDO employees, who dispatch the vehicles from the depot. The vehicle is stopped by a police officer and the remote driver is prosecuted under section 40A of the Road Traffic Act 1988.

10.34 Section 40A of the Road Traffic Act 1988 makes it an offence to use a vehicle (or cause or permit another person to use it) when its condition or the weight, position or distribution of any load causes its use to involve a danger of injury. It is a strict liability offence: it is unnecessary for the prosecution to prove any state of mind on the part of the driver.[211]

10.35 Therefore, under existing law the remote driver could be convicted on a strict liability basis of "using" a vehicle when the manner in which the load is secured involves a

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206 *Blackstone's Criminal Practice* (33rd edn, 2023), section F3.3.

207 *Archbold Magistrates' Courts Criminal Practice* (2023), para 13-8.

208 *Blackstone's Criminal Practice* (33rd edn, 2023), section F3.5. This is the civil standard of proof.

209 *Bratty v Attorney General for Northern Ireland* [1963] AC 386 at p 419 (by Lord Morris); *Archbold Magistrates' Courts Criminal Practice* (2023), para 13-8.

210 *Blackstone's Criminal Practice* (33rd edn, 2023), sections F3.2 to F3.3.

211 *Cornish v Ferry Masters* [1975] RTR 292 at p 298 (by Lord Widgery CJ), applied in *R (Vehicle and Operator Services Agency) v Henderson* [2004] EWHC 3118 (Admin).

danger of injury.[212] The remote driver would have no defence to the charge even if they had no way of knowing how the load was secured. This would be unfair.

10.36 The proposed defence would apply if the remote driver had no means of knowing that the load was unsecured. However, if the prosecution showed that the screen included an alert which would be seen by a careful and competent driver, the knowledge requirement would be met.

10.37 If a competent and careful driver would have seen the alert, the next issue is what a competent and careful driver would have done in the circumstances. If the prosecution shows that a good driver would have stopped the vehicle on the hard shoulder, but the driver failed to do so, then the remote driver would be convicted.

10.38 Section 40A does not only apply to a driver: it applies to everyone who uses the vehicle, which includes the driver's employer. The ERDO or NUICO would therefore be guilty of the offence, irrespective of the position of the individual driver. Furthermore, a manager who was aware of the problem but failed to intervene would be guilty of causing or permitting the offence. Finally, the employee who failed to secure the load in the depot could face prosecution under section 7 of 1974 Act. However, HSE Guidance suggests that section 7 should not be used where the employer is primarily responsible.[213]

Bald tyres

10.39 A similar analysis applies where a beyond line-of-sight remote driver is unaware that a vehicle has bald tyres.

> **Scenario B**
>
> In icy conditions, a beyond line-of-sight remote driver employed by an ERDO drives a vehicle which has bald tyres. The issue would usually be brought to the attention of the remote driver before the start of the journey by other employees of the ERDO responsible for dispatching vehicles. However, the relevant checks are not carried out and consequently the remote driver has no knowledge of the issue. The remote driver is prosecuted under section 41A of the Road Traffic Act 1988 for using on a road a vehicle which does not comply with a construction and use requirement relating to tyres.

10.40 Section 41A of the Road Traffic Act 1988 is one of several offences of "using" a vehicle in breach of a requirement under the Road Vehicles (Construction and Use) Regulations 1986.[214] Again, section 41A is also a strict liability offence to which lack of knowledge would be no defence under the existing law.

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212 Road Traffic Act 1988, s 40A(d).

213 See Appendix 3, para 3.24.

214 SI 1986 No 1078.

10.41 Normally, a driver would be expected to check the tyres before setting off. However, if a competent and careful driver in the remote driver's circumstances would not have been aware of the bald tyres, our proposed defence would apply.

10.42 However, assuming that the remote driver was driving on the ERDO's business, the ERDO would be found guilty of "using" the vehicle in breach of construction and use regulations. As this is a strict liability offence, an ERDO or NUICO would not have a defence to the charge.

Offences which already incorporate the competent and careful driver standard

10.43 Some of the most serious driving offences already hold the driver to the standard of a competent and careful driver.[215] These range from causing death by dangerous driving[216] to careless, and inconsiderate, driving.[217] However, under the current law, the courts apply an objective standard of good driving. Our proposed defence would modify the current law to focus on what a competent and careful driver would have done had they found themselves in the remote driver's circumstances. We explore this issue below.

An objective standard

10.44 The courts have held that the standard of a competent and careful driver is objective. It takes no account of factors such as age, inexperience, disability, or mistaken beliefs held by the defendant (however genuine).[218] In *McCrone v Riding*,[219] Lord Hewart CJ held that the standard of due care and attention expected of a competent and careful driver is:

> an objective standard, impersonal and universal, fixed in relation to the safety of other users of the highway.[220]

10.45 Therefore, learner drivers are held to the same standard as experienced drivers. The courts have consistently held that a person who fails to exercise due care and attention will be guilty even if the failure was due to inexperience or lack of skill.[221]

10.46 Similarly, the courts have refused to take into account the driver's additional skills. In *R v Bannister*,[222] the defendant was a trained police officer. He argued that a member of the public exceeding 100 miles an hour on a motorway constituted dangerous

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215 Road Traffic Act 1988, ss 2A and 3ZA. The standard applies to the offences of causing death by dangerous driving (s 1), causing serious injury by dangerous driving (s 1A), dangerous driving (s 2), causing death by careless or inconsiderate driving (s 2B), causing serious injury by careless or inconsiderate driving (s 2C) and careless, and inconsiderate, driving (s 3).

216 Road Traffic Act 1988, s 1.

217 Road Traffic Act 1988, s 3.

218 *Wilkinson's Road Traffic Offences* (30th edn, 2021), paras 5-05 to 5-06, 5-56 and 5-58.

219 *McCrone v Riding* [1938] 1 All ER 157.

220 *McCrone v Riding* [1938] 1 All ER 157 at 158E.

221 See *McCrone v Riding* [1938] 1 All ER 157; *R v Preston Justices* [1982] RTR 173 and *Simpson v Peat* [1952] 2 QB 24.

222 *R v Bannister* [2009] EWCA Crim 1571, [2010] 1 WLR 870.

driving, but the court should judge him differently because of his special training. The Court of Appeal held that special training was irrelevant to whether the driving was dangerous.[223]

Taking account of the circumstances of the case

10.47 There are cases in which the courts have adapted the test to take account of the specific circumstances of the case. For example, driving is dangerous if it would be obvious to a competent and careful driver that driving the vehicle in its current state would be dangerous.[224] Here the court may also take account of any circumstances actually known to the defendant. A person who drives a vehicle which they know has a dangerous defect runs the risk of being convicted of dangerous driving on the basis of their knowledge, even if the vehicle was not obviously in a dangerous condition.[225]

10.48 The courts also take account of an emergency situation facing the driver. In *R v Bristol Crown Court, ex parte Jones*, the Court of Appeal quashed a conviction for careless driving on the grounds that it was necessary to have "sufficient regard to the emergency in which the defendant found himself".[226] The defendant was driving on a motorway when his lights failed. He pulled over onto the hard shoulder, where he collided with an unlit stationary vehicle. In this case, the court took into account that he could not see the vehicle.

10.49 The courts have also held that a driver should not be convicted of driving a dangerous vehicle if the vehicle has been approved for use on the roads and the driver has not done anything wrong. In *R v Marchant*,[227] the driver was driving an inherently dangerous agricultural vehicle: it had a "grab" with six one-metre spikes protruding forwards.[228] He was prosecuted for causing death by dangerous driving after a motorcyclist collided with it and suffered catastrophic injuries.

10.50 The court heard that the tractor was authorised for use on public roads by the Motor Vehicles (Authorisation of Special Types) General Order 1979. It was inspected annually and was in the same condition as it had been when it was new.[229] Both the driver and his employer had attended a training course on its use and had certificates from the Ministry of Agriculture to that effect.[230] No further criticisms of the driving could be made.

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223 *R v Bannister* [2009] EWCA Crim 1571, [2010] 1 WLR 870 at [18] and [19]. Following a review of the law of police pursuit, the Road Traffic Act 1988 was amended to overturn this decision. Designated drivers with special training are now to be judged by the standards of "a competent and careful constable who has undertaken the same prescribed training". The amendments to ss 2A and 3ZA were introduced by the Police, Crime, Sentencing and Courts Act 2022. See: https://www.gov.uk/government/consultations/police-pursuits.

224 Road Traffic Act 1988, ss 2A(2).

225 *Wilkinson's Road Traffic Offences* (30th edn, 2021), para 5-14.

226 *R v Bristol Crown Court, ex parte Jones* [1986] RTR 259 at 263H.

227 *R v Marchant* [2003] EWCA Crim 2099, [2004] 1 WLR 442

228 *R v Marchant* [2003] EWCA Crim 2099, [2004] 1 WLR 442 at [4].

229 *R v Marchant* [2003] EWCA Crim 2099, [2004] 1 WLR 442 at [5] and [32].

230 *R v Marchant* [2003] EWCA Crim 2099, [2004] 1 WLR 442 at [5].

10.51 The Court of Appeal quashed the convictions of both the driver and his employer.[231] The court rejected the submission that the authorisation of a vehicle by the Secretary of State provides a defence to a charge of driving a vehicle in a dangerous condition. However, the fact of such authorisation is relevant to whether the "current state" of a vehicle is "obviously dangerous to a competent and careful driver".[232]

Conclusion: will a remote driver be held to the standard of a conventional driver?

10.52 Obtaining a Vehicle Special Order (VSO) or licence from the Secretary of State will provide some measure of protection to remote drivers and their employers. Following *R v Marchant*, if the organisation has obtained a VSO it is unlikely that a driver or their employer would be found guilty of dangerous driving simply because remote driving is "obviously dangerous".

10.53 Furthermore, the courts will take account of an emergency due to a failure of equipment. There are parallels with the *Jones* case, where a driver was found not guilty of careless driving when a light failure led him to collide with an unlit vehicle.

10.54 However, we think that greater legal clarity would be helpful. If a driver is unable to prevent a collision because of specific problems with the remote driving set-up, they should not risk being judged by the objective standard applied to conventional drivers.

10.55 We therefore think that the defence should be applied when considering issues of dangerous or careless driving. It makes it clear that the remote driver should be judged by the standards of a competent and careful remote driver in the same circumstances.

Dangerous driving scenario

10.56 To illustrate how the new standard would apply, we have considered the following scenario. A driver loses connection with the vehicle and is unable to remedy the situation when the connection is restored.

> **Scenario C**
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> A beyond line-of-sight remote driver is driving a vehicle along a leftwards curve in a road when the connection is lost. The vehicle uses risk mitigation software which leads it to cross the white line into the opposite lane. The connection is then restored. Before the remote driver can manoeuvre the vehicle into the correct lane, another vehicle driving in the opposite lane collides with the remotely driven vehicle. The beyond line-of-sight remote driver is charged with dangerous driving.

10.57 Here, the movement of the vehicle into the opposite lane of the road was a consequence of two things: that the connection was lost; and that the risk mitigation software failed to keep the vehicle within the correct lane. When connectivity is

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231 The employer had been convicted of procuring the commission of the offence.

232 *R v Marchant* [2003] EWCA Crim 2099, [2004] 1 WLR 442 at [39].

regained, the driver would be on the wrong side of the road, and (on the face of it) guilty of dangerous driving. However, there may be little the remote driver could do. The remote driver should be entitled to rely on the defence if a competent and careful driver in the circumstances of the remote driver could not have avoided the offence.

Conclusion 20.

10.58 A remote beyond line-of-sight driver employed by a licensed NUICO or ERDO should have a defence to prosecution for a driving offence if a competent and careful driver in the remote driver's circumstances:

(1) would not have been aware of the circumstances giving rise to liability; or

(2) would not have avoided commission of the offence.

The remote driver should only be found guilty of the offence if neither limb applies.

HOLDING THE ERDO OR NUICO RESPONSIBLE

10.59 The defence is intended to protect an individual employee from being held responsible for the organisation's failure. It is not intended to reduce the overall standard of road safety. Where it is difficult or impossible for a remote driver to fulfil certain safety responsibilities, the ERDO or NUICO would need to find other ways of complying with them.

10.60 We would expect that, under our proposed licensing scheme, technical systems for detecting and alerting remote drivers to safety issues (for example, through warning lights) would be detailed in the safety case. They would be subject to review prior to the grant of a licence. The existence of clear procedures would also help to identify what the remote driver could be expected to know about a defect or safety issue at the relevant time.

Applying regulatory sanctions

10.61 We envisage that the ERDO or NUICO would be under a duty to notify the regulator of safety failures. Where prosecuting authorities conclude that a prosecution should not be brought because of the defence, or where the defence succeeds in court, the regulator should investigate why the incident took place. Where appropriate, the regulator should sanction the organisation.

"Using" offences

10.62 Many road traffic offences apply not only to the driver, but to anyone who "uses" the vehicle. When a vehicle is being used on the employer's business, the driver's employer would be considered to be using the vehicle.[233] In these circumstances, the

[233] *Wilkinson's Road Traffic Offences* (30th edn, 2021), para 1-179. For further discussion of the concept of a user, see Background Paper A to Automated Vehicles (2022) Law Com No 404; Scot Law Com No 258, paras 1.35 to 1.42, available at https://s3-eu-west-2.amazonaws.com/lawcom-prod-storage-11jsxou24uy7q/uploads/2022/01/Background-papers-24-01-22.pdf.

employer would face prosecution without the benefit of a defence. Again, the ERDO or NUICO would be held responsible.

Offences of "causing or permitting"

10.63 Some offences concerning the use of a vehicle in contravention of the Road Traffic Act 1988 or of construction and use regulations can also be committed by a person who "causes" or "permits" the offence. An example is section 40A, which makes it an offence to cause or permit another person to use a motor vehicle when, amongst other things, its condition or the weight, position, distribution or securing of any load involves a danger of injury.[234]

10.64 We do not propose to remove liability for causing and permitting offences, even where the individual remote driver is able to rely on the defence we have outlined.

Conclusion 21.

10.65 The defence outlined in Conclusion 20 should not affect the liability for "causing or permitting" a driving offence.

[234] Road Traffic Act 1988, s 40A.

Chapter 11: Conclusions

Conclusion 1.

Beyond line-of-sight driving requires robust regulation. An organisation wishing to put remotely driven vehicles on the road should submit a safety case showing how their operation is safe. The matters to be addressed include:

(1) the adequacy of the communication network;

(2) the risk mitigation system if communication fails;

(3) cybersecurity;

(4) workstation design and functionality;

(5) the security of the remote operations centre;

(6) staff training;

(7) staff health, fitness and vetting;

(8) staff attention and rest periods;

(9) roadworthiness checks; and

(10) incident protocols.

Paragraph 2.70

Conclusion 2.

For the purpose of defining a beyond line-of-sight remote driver, “a driver” is an individual who performs all or any of the following tasks:

(1) steering (lateral control);

(2) braking, releasing a brake, or accelerating (longitudinal control);

(3) monitoring the vehicle or driving environment with a view to immediate and safety-critical intervention in the way the vehicle drives.

A remote assistant is not a driver if they only advise an authorised vehicle to undertake a manoeuvre and do not monitor with a view to immediate and safety-critical intervention. The distinction between advising a manoeuvre and exercising lateral or longitudinal control is a matter of fact and degree.

Paragraph 3.57

Conclusion 3.

A “beyond line-of-sight” remote driver is a driver who:

(1) is outside the vehicle or its trailer; and

(2) relies on external aids (other than corrective spectacles) to see some or all safety-critical elements of the driving environment.

Paragraph 3.75

Conclusion 4.

The Road Vehicles (Construction and Use) Regulations 1986 should be amended to prohibit beyond line-of-sight remote driving without an in-vehicle safety driver.

The Secretary of State should, where appropriate, authorise beyond line-of-sight remote driving by granting a Vehicle Special Order (VSO).

Paragraph 5.16

Conclusion 5.

Where a VSO is granted, it should:

(1) modify regulation 104 so as to require control in accordance with the safety case; and

(2) disapply regulation 107.

In the longer term, construction and use regulations should be amended to clarify that neither regulation 104 nor regulation 107 apply to licensed remote driving operations.

Following the reforms, the Government's Code of Practice on automated vehicle trialling should communicate how to apply for a VSO.

Paragraph 5.30

Conclusion 6.

VSOs should permit the commercial carriage of goods and delivery of vehicles on a case-by-case basis.

Paragraph 5.41

Conclusion 7.

In the short term, Vehicle Special Orders should not be granted for remote driving operations where the driver is based abroad.

In the longer term, it should be made a criminal offence to drive a vehicle on a road or other public place remotely from outside the territory to which the remote driving legislation applies. There should be a power to create exceptions in respect of parts of the UK in which parallel legislation applies, or other countries with which the UK has an international agreement that enables effective enforcement of the licensing scheme.

To ensure the effective enforcement of this new offence, the police should be given powers to stop and seize vehicles in respect of which they reasonably believe the offence is being committed.

Paragraph 6.22

Conclusion 8.

Every vehicle that is driven remotely should be overseen by either a licensed NUICO or a licensed ERDO.

A NUICO which uses remote driving in its operation should be regulated under NUICO licensing.

If a NUICO intends to use remote driving in its operations, it must submit a safety case showing how remote driving will be used and how safety will be assured. The NUICO would then be permitted to use remote driving in the circumstances specified in the safety case and subject to the conditions of the licence.

Paragraph 7.22

Conclusion 9.

It should be an offence to drive (or cause or permit a person to drive) a vehicle beyond line-of-sight, on a road or other public place, unless the vehicle is overseen by a licensed ERDO or NUICO.

Legislation should provide for the possibility of exemptions from this requirement, by an order made under section 44 of the Road Traffic Act 1988.

Paragraph 8.25

Conclusion 10.

To obtain an ERDO licence, the applicant should be required to show that it:

(1) is of good repute;

(2) has appropriate financial standing;

(3) conducts its operations within Great Britain; and

(4) is professionally competent to run the service.

Legislation should give the Secretary of State for Transport power to specify requirements as to good repute, appropriate financial standing and operating within Great Britain.

To demonstrate professional competence, the applicant must submit a documented safety management system, setting out all safety related roles and the competence required for each.

Paragraph 8.35

Conclusion 11.

To obtain an ERDO licence, the applicant should submit a safety case, showing how safety would be assured.

Paragraph 8.39

Conclusion 12.

It should be an offence for an ERDO to misrepresent or fail to disclose safety relevant information in its safety case.

Paragraph 8.43

Conclusion 13.

ERDO duties should be determined on a case-by-case basis. When granting a licence, the regulator should specify the duties which fall on the ERDO as conditions of the licence.

Paragraph 8.53

Conclusion 14.

Legislation should give the regulator powers to impose regulatory sanctions on ERDOs.

Paragraph 8.59

Conclusion 15.

The ERDO regulator should have power to inspect remote operation centres.

Paragraph 8.63

Conclusion 16.

The duration of an ERDO licence should be set in secondary legislation. Initially, the duration should be 5 years.

Paragraph 8.66

Conclusion 17.

Primary legislation should place responsibility for ERDO licensing on the Secretary of State for Transport.

The same regulator should administer both the NUICO and ERDO licensing schemes.

Paragraph 8.69

Conclusion 18.

Arrangements should be put in place to compensate the victims of remotely driven collisions in a similar way to automated vehicle collisions, as set out in out in Part 1 of the Automated and Electric Vehicles Act 2018 (AEVA).

To this end, every NUICO or ERDO should be required to carry no-fault insurance.

Where such a policy is in place, the insurer would be directly liable for any damage caused by the vehicle except when the vehicle is being driven by a person in the vehicle or in line-of-sight of the vehicle.

As with AEVA:

(1) the policy should cover personal injury (for an unlimited amount) and third-party property damage up to the statutory limit. Exceptions should apply to damage to the vehicle itself, to goods carried for hire or reward in the vehicle and its trailer; or to property in the custody of the insured person or person in charge of the vehicle;

(2) compensation should be reduced if the insurer establishes that the victim was contributorily negligent; and

(3) the insurer should have the right to bring secondary claims.

The no-fault insurance should cover the risks of vehicles taken over by untraced or uninsured drivers, including the risk of terrorism.

Paragraph 9.60

Conclusion 19.

The NUICO and ERDO regulator should set standards for data retention, enforced as a condition of the licence.

Paragraph 9.75

Conclusion 20.

A remote beyond line-of-sight driver employed by a licensed NUICO or ERDO should have a defence to prosecution for a driving offence if a competent and careful driver in the remote driver's circumstances:

(1) would not have been aware of the circumstances giving rise to liability; or

(2) would not have avoided commission of the offence.

The remote driver should only be found guilty of the offence if neither limb applies.

Paragraph 10.58

Conclusion 21.

The defence outlined in Conclusion 20 should not affect the liability for "causing or permitting" a driving offence.

Paragraph 10.65

Appendix 1: Other initiatives to smooth victims' path to compensation

1.1 In Chapter 9 we discuss how to make it easier for those injured by remote driving to claim compensation. This debate is taking place against a backdrop of several other proposals designed to smooth the path to compensation for victims injured by advanced technology or on the roads.

1.2 In this appendix we summarise several recent legislative and policy developments which stakeholders raised in response to the Issues Paper. Although many of these proposals share similar aims to ours, we do not think that they are an adequate substitute for the conclusions we reach in Chapter 9. Those relating to product liability are quite narrow, and continue to put a heavy burden on victims, while those relating to all road traffic claims are wide and outside our terms of reference.

THE OFFICIAL INJURY CLAIM SERVICE

1.3 The Official Injury Claim (OIC) service was developed by the Ministry of Justice and Motor Insurers' Bureau to support a range of reforms affecting how personal injury claims related to road traffic collision are dealt with.[235]

1.4 The service launched on 31 May 2021. It is designed to be an accessible online portal for minor personal injury claims arising from road traffic collisions between vehicles.[236] The aim is to settle or determine claims without the claimant requiring legal advice.

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235 These included the Whiplash Reform Programme, a package of measures designed to address the high number and costs of whiplash claims: Ministry of Justice, Whiplash Reform Programme: Information and FAQ (March 2022), https://www.gov.uk/government/publications/whiplash-reform-programme-information-and-faq. A further reform was the increase in the small claims track limit for personal injury claims arising from road traffic collisions from £1000 to £5000: Civil Procedure (Amendment No 2) Rules SI 2021 No 196. This was accompanied by Practice Direction update 129 (24 February 2021) and the new Pre-Action Protocol for Personal Injury Claims Below the Small Claims Limit in Road Traffic Accidents (18th February 2021): Ministry of Justice, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/965269/cpr-129th-update.pdf and https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/965270/cpr-pap-update-feb-2021.pdf.

236 Ministry of Justice, Pre-Action Protocol for Personal Injury Claims below the Small Claims Limit in Road Traffic Accidents ("The RTA Small Claims Protocol"), https://www.justice.gov.uk/courts/procedure-rules/civil/protocol/pre-action-protocol-for-personal-injury-claims-below-the-small-claims-limit-in-road-traffic-accidents-the-rta-small-claims-protocol#2. See also Official Injury Claim, *Factsheet: Introducing Official Injury Claim,* p 2, https://www.officialinjuryclaim.org.uk/media/1137/introducing-official-injury-claim-factsheet-april-2021.pdf and *Guide to Making a Claim Under the RTA small claims protocol* (July 2022), https://www.officialinjuryclaim.org.uk/media/1262/guide-to-making-a-personal-injury-claim-version-301-july-2022-final-pdf.pdf.

Claims by people who were vulnerable road users at the time of the collision,[237] or children on the date the claim was started,[238] are both excluded.

1.5 Claimants who use the OIC service must follow the new pre-action protocol for personal injury claims below the small claims limit in road traffic accidents (the "RTA Small Claims Protocol"). The RTA Small Claims Protocol excludes some types of claim, including:

(1) claims which concern a breach of a duty to a road user by a person who is not a road user;[239]

(2) claims in which the injuries claimed for were at least partly caused by a breach by the defendant of one or more of the relevant provisions as defined by section 53 of the Health and Safety at Work etc Act 1974;[240] and

(3) claims to the MIB involving collisions with a driver who cannot be identified.[241]

1.6 In the Issues Paper we asked stakeholders how far small claims under the Automated and Electric Vehicles Act 2018 (AEVA) could be dealt with by the OIC service. They noted that the RTA Small Claims Protocol requires the defendant to commit to a liability decision within 30 days, which may not be long enough in some cases. Both developers and insurers emphasised to us that the determination of liability will be dependent upon timely access to vehicle data. Moreover, the potential need for at least one, and possibly many, expert reports could produce substantial delay.

1.7 At present, it appears that claims against an insurer under AEVA would be excluded because the insurer is not a road user. The same would apply to any extension of AEVA principles to remote driving. However, we would hope that in time the process could be simplified sufficiently for an online procedure to apply to small claims.

PRODUCT LIABILITY LAW AND EMERGING TECHNOLOGY

1.8 Several responses to the Issues Paper argued that the cost and complexity of bringing product liability claims under the Consumer Protection Act 1987 is a significant obstacle to compensation for victims. The Association of Personal Injury Lawyers (APIL) explained the problem as follows:

> *Product liability claims are extremely complex, difficult for consumers to pursue and extremely expensive. This will become problematic from a consumer's point of view in trying to obtain redress due to issues surrounding*

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237 RTA Small Claims Protocol, para 4.3(d). This includes claimants who were using a motor cycle, a pillion passenger on, or a passenger in a sidecar attached to, a motor cycle; using a wheel chair, a powered wheel chair or a mobility scooter; using a bicycle or other pedal cycle; riding a horse; or a pedestrian: para 1.2(37).

238 RTA Small Claims Protocol, para 4.3(f).

239 RTA Small Claims Protocol, para 4.3(a).

240 RTA Small Claims Protocol, para 4.3(b).

241 RTA Small Claims Protocol"), para 4.3(c).

software or design defects, latent defects, connectivity or other hardware or software defect in the vehicle or its operating system.

APIL argued that "the lack of development in product liability law regarding new technology is problematic and…could seriously impact injured people's access to compensation."

1.9 We discussed the problems with current product liability law in Consultation Paper 3 of the Automated Vehicles project.[242] We noted the view of an expert group that "some key concepts underpinning the EU regime, as adopted in 1985, are today an inadequate match for the potential risks of emerging digital technologies."[243] We concluded that a clear law of product liability is desirable across many industries and called for a general review of this area. We have since identified product liability and emerging technology as a potential project for our 14th Programme of Law Reform.[244] However, we did not think such a review was essential for the introduction of automated vehicles, where the AEVA provided a more targeted solution.

1.10 Recently, the need to reform product liability law to deal with new and emerging technologies has been recognised by the Office for Product Safety and Standards (OPSS) and by the European Commission.

The UK Product Safety Review

1.11 Responses to the Issues Paper drew our attention to the OPSS' recent UK Product Safety Review.

1.12 The OPSS's call for evidence noted that the liability of manufacturers under the Consumer Protection Act 1987 has remained largely unchanged for over 30 years. The current law does not reflect the complexities introduced by new technologies such as internet-enabled devices.[245] OPSS's response noted that some stakeholders from the insurance and legal sectors had "called for clarity around responsibilities and liabilities in technologies."[246] However, the review focused on safety regulation, rather than changes to product liability law.

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242 Automated Vehicles: Consultation Paper 3 - A regulatory framework for automated vehicles (2020) Law Commission Consultation Paper No 252; Scottish Law Commission Discussion Paper No 171, paras 16.33 to 16.47.

243 European Commission Expert Group on Liability and New Technologies - New Technologies formation, *Liability for Artificial Intelligence and other emerging digital technologies* (November 2019) p 27, https://op.europa.eu/en/publication-detail/-/publication/1c5e30be-1197-11ea-8c1f-01aa75ed71a1/language-en.

244 Law Commission, "Ideas for law reform", https://www.lawcom.gov.uk/14th-programme-kite-flying-document/#ProductLiability.

245 Office for Product Safety & Standards, *UK Product Safety Review: Call for Evidence* (March 2021), p 19, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1035916/uk-product-safety-review-call-for-evidence2.pdf.

246 Office for Product Safety & Standards, *UK Product Safety Review: Call for Evidence Response* (November 2021), p 19, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1035917/uk-product-safety-review-call-for-evidence-response2.pdf.

European Commission proposals for reform

1.13 On 28 September 2022 the European Commission published two proposals for new directives to address issues relating to civil liability and digital technology. The first relates to liability for defective products.[247] The second is a proposal for a new directive on adapting non-contractual civil liability rules to artificial intelligence ("the AI Liability Directive").[248]

1.14 The proposals are likely to undergo further change as they are considered by the European Parliament and the Council.

A proposed new directive on product liability

1.15 This draft directive aims to replace the 1985 Product Liability Directive, which in the UK forms the basis of the Consumer Protection Act 1987.[249] It was informed by several studies which analysed the 1985 Directive's "shortcomings in the area of emerging digital technologies".[250]

1.16 The draft therefore proposes reforms to respond to the nature of products in the digital age. These include amending the definition of a product to include software and to clarify that when a digital service is integrated into a product it should be treated as a component of the product.[251]

1.17 The draft directive also aims to ease the burden of proof on the claimant through a rebuttable presumption of defectiveness. The presumption applies where any of these three conditions is satisfied:[252]

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247 European Commission, Proposal for a Directive of the European Parliament and of the Council on liability for defective products COM(2022) 495 final, 28.09.2022, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022PC0495&from=EN.

248 European Commission, Proposal for a Directive of the European Parliament and of the Council on adapting non-contractual civil liability rules to artificial intelligence (AI Liability Directive) COM(2022) 496 final 28.09.2022, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022PC0496&from=EN.

249 European Commission, Proposal for a Directive of the European Parliament and of the Council on liability for defective products COM(2022) 495 final, 28.09.2022, p 1, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022PC0495&from=EN.

250 Evaluation of Product Liability Directive, SWD(2018)157, 07.05.2018, which accompanied the Report on the Application of the Council Directive on the approximation of the laws, regulations, and administrative provisions of Member States concerning liability for defective products COM(2018) 246 final, 07.05.2018, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018SC0157&rid=1; White Paper on Artificial Intelligence COM(2020) 65 final, 19.02.2022, https://commission.europa.eu/system/files/2020-02/commission-white-paper-artificial-intelligence-feb2020_en.pdf; accompanied by the Report on the safety and liability implications of Artificial Intelligence, the Internet of Things and robotics COM(2020) 64 final, 19.02.2020, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0064&from=en.

251 European Commission, Proposal for a Directive of the European Parliament and of the Council on liability for defective products COM(2022) 495 final, 28.09.2022, pp 11 to 12 and art 4, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022PC0495&from=EN.

252 This has been regarded by commentators as the most significant of the changes proposed. See Sarah Moore and Stuart Warmington, "The new Product Liability Directive: fireworks or fizzle" (2022) *New Law Journal* p 15.

(1) the defendant has failed to comply with an obligation to disclose relevant evidence at its disposal;

(2) the claimant establishes that the product does not comply with mandatory safety requirements in EU or national law intended to protect against the damage which occurred; or

(3) the claimant establishes that the damage was caused by an obvious malfunction of the product during normal use or under ordinary circumstances.[253]

1.18 In addition, a causal link between the defectiveness of the product and the damage is presumed where it is established that the product is defective and "the damage caused is of a kind typically consistent with the defect in question."[254]

The proposed AI Liability Directive

1.19 The draft AI Liability Directive is designed to complement other EU legal instruments and policy measures on artificial intelligence, including the Artificial Intelligence Act.[255] It introduces moderate changes to civil liability which seek to balance the interests of victims injured by artificial intelligence with the interests of businesses.[256] The Directive employs two legal tools, similar to those proposed for defective products: disclosure and rebuttable presumptions.

1.20 Article 3 of the draft Directive requires member states to ensure that national courts have powers, at the requests of claimants or potential claimants, to order the disclosure of relevant evidence about specific high-risk AI systems from specified persons.[257]

1.21 Article 4 introduces a targeted rebuttable presumption of a causal link between non-compliance with a duty of care and the output of the AI system (or the failure of the AI system to produce an output) which gave rise to the damage that occurred. The presumption can be applied where the claimant demonstrates that three criteria are met:

(1) a fault on the part of the defendant, consisting of non-compliance with a duty of care under EU or national law directly intended to protect against the damage that occurred;

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253 European Commission, Proposal for a Directive of the European Parliament and of the Council on liability for defective products COM(2022) 495 final, 28.09.2022, art 9(2), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022PC0495&from=EN.

254 Above, art 9(3).

255 Proposal for a Regulation of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (Artificial Intelligence Act) COM(2021) 206 final, 21.04.2021, https://digital-strategy.ec.europa.eu/en/library/proposal-regulation-laying-down-harmonised-rules-artificial-intelligence.

256 AI Liability Directive, Explanatory Memorandum.

257 Systems which qualify as "high-risk" are listed in Annex III of the AI regulation.

(2) it can be considered reasonably likely that the fault has influenced the output produced by the AI system or the failure of the AI system to produce an output; and

(3) the output produced by the AI system, or the failure of the AI system to produce an output, gave rise to the damage.

1.22 There are specified exceptions to the rebuttable presumption, which rely upon a distinction between "high-risk" and "low-risk" AI systems:

(1) The first exception applies to high-risk AI systems.[258] Here the court should not apply the presumption of causality where a defendant demonstrates that "sufficient evidence and expertise is reasonably accessible for the claimant to prove the causal link".[259] This is designed to incentivise defendants to comply with their disclosure obligations, measures introduced in the Artificial Intelligence Act to ensure transparency,[260] and documenting and recording requirements.[261]

(2) The second exception applies to low-risk AI systems. Here the presumption of causality only applies if a court decides that it would be excessively difficult to prove the causal link described above.[262]

NO-FAULT LAIBILITY FOR ROAD TRAFFIC COLLISIONS

1.23 Some respondents to the Issues Paper argued strongly for wider reforms to the determination of civil liability for road traffic collisions, beyond the specific issues raised by remote driving.

Presumed liability

1.24 Sustrans argued for the introduction of presumed liability for road traffic collisions, to reflect the hierarchy of road users introduced in recent changes to the Highway Code.

1.25 In January 2022 new changes to the Highway Code included the introduction of three new rules concerning a new "hierarchy of road users".[263] Road users who are most at

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258 Systems which qualify as "high-risk" are listed in Annex III of the AI regulation.

259 European Commission, Proposal for a Directive of the European Parliament and of the Council on adapting non-contractual civil liability rules to artificial intelligence (AI Liability Directive) COM(2022 496 final 28.09.2022, p 13, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022PC0496&from=EN.

260 Proposal for a Regulation of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (Artificial Intelligence Act) COM(2021) 206 final, 21.02.2021, https://digital-strategy.ec.europa.eu/en/library/proposal-regulation-laying-down-harmonised-rules-artificial-intelligence.

261 Art 4(4) and AI Liability Directive, Explanatory Memorandum.

262 Art 4(5).

263 Department for Transport and Driver and Vehicle Standards Agency, *The Highway Code: 8 changes you need to know from 29 January 2022* (January 2022), https://www.gov.uk/government/news/the-highway-code-8-changes-you-need-to-know-from-29-january-2022.

risk in the event of a collision are placed at the top of the hierarchy.[264] The first of these rules states the principle that "those in charge of vehicles that can cause the greatest harm in the event of a collision bear the greatest responsibility to take care and reduce the danger they pose to others".[265] The second and third prescribe who should be given priority at junctions and pedestrian crossings.[266]

1.26 Sustrans argued that the introduction of presumed liability would complement these changes. Pedestrians and cyclists injured by motor vehicles would no longer need to prove that the driver was negligent, because the driver would be automatically presumed to be liable. Sustrans argued that presumed liability would encourage more people to walk and cycle.

No-fault liability for all road traffic collisions

1.27 APIL argued for the introduction of no-fault strict liability for all road traffic collisions in the UK. Such reform is necessary, they argued, in response to the increasing complexity of modern technology and the likelihood of road traffic collision claims involving vehicles subject to different civil liability regimes:

> *From our members' experience, proving liability in road traffic collisions can take a lot of time and cause undue delay in obtaining compensation while in no-fault strict liability regimes compensation is awarded if certain objective conditions are established. We believe that the introduction of a similar provision in the UK would be a valuable change in road traffic collisions. If there is a strict liability regime for remote driving and automated vehicles only, there would be two different processes running side by side, which could become quite complicated in collisions with more than a vehicle. For instance, in a collision involving a normal motor vehicle and a remotely driven vehicle, the strict liability regime would only apply to the second…. There are fundamental problems with the existing justice process that without a strict liability regime for new vehicles, or all road traffic collisions, will make claims impossible to pursue.*

1.28 APIL argued that a strict liability regime would reduce the cost to the police of preserving data and make data more accessible to lawyers instructed in road traffic collision claims.

Road traffic liability in other European jurisdictions

1.29 Many European jurisdictions have departed from purely fault-based liability for road traffic collisions. These provide further insight into the strengths and weaknesses of different types of liability regime. We outline a few examples below.

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264 The Highway Code (October 2015), "Hierarchy of Road Users", https://www.gov.uk/guidance/the-highway-code/introduction.

265 The Highway Code (October 2015), Rule H1, https://www.gov.uk/guidance/the-highway-code/introduction.

266 The Highway Code (October 2015), Rules H2 and H3, https://www.gov.uk/guidance/the-highway-code/introduction.

Sweden

1.30 In Sweden the *Trafikskadelagen* no.1410 ("the Traffic Damage Act" or "TDA") came into force in 1976. The TDA introduced no-fault insurance for certain victims of road traffic collisions, following the introduction of this in parts of the United States and Canada.[267] It is still in force today.

1.31 The TDA provides for:

(1) strict liability for personal injury;

(2) strict liability for property damage which has not occurred in connection with a collision with other motor vehicles;

(3) retention of fault liability in respect of property damage arising from collisions with other vehicles;

(4) a duty on the vehicle's insurer to pay compensation for all three categories of damage.[268]

1.32 In respect of personal injury, the overriding principle is that everyone injured by a vehicle in a road traffic collision is entitled to compensation. The TDA restricted the grounds on which contributory negligence could be pleaded in respect of personal injury to intention and gross negligence, and intention alone where personal injury causes death.

1.33 Finally, the TDA permits some recourse actions between insurers, with the result that the burden of compensation is not always borne by the insurer who initially paid it to the victim. The grounds on which recourse actions may be brought include liability under the Product Liability Act.[269]

France

1.34 The law in France dates from an Act of 5 July 1985, informally named the "Loi Badinter". Essentially, it enables the victim of a traffic collision involving a vehicle to obtain compensation for personal injury without showing that the driver or custodian of the vehicle is at fault.[270]

1.35 Article 3 abolishes the defence of contributory negligence in respect of personal injury claims by victims of road traffic collisions who are not drivers. The defendant can only

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267 Sandra Friberg and Bill W Dufwa, "The development of traffic liability in Sweden" in Wolfgang Ernst (ed) *The Development of Traffic Liability* (Volume 5, CUP, 2010) p 190 at p 210.

268 Above at p 211.

269 Above at p 225.

270 British Institute of International and Comparative Law, *The specific regime for the victims of road traffic accidents,* p 2, https://www.biicl.org/files/733_compensation_-_traffic_road_accidents_.pdf.

rely on the fault of such persons as a defence where "inexcusable fault" was the "sole cause of the accident".[271]

Germany

1.36 In Germany, strict liability for personal injury arising from road traffic collisions was introduced in 2002, through reforms to the Road Traffic Act (the *Straßenverkehrsgesetz* or StVG).[272]

1.37 Previously, the courts had tended to interpret the law broadly to enable victims of personal injury to obtain compensation. However, driver fault was still relevant in some areas. Perhaps the most significant flaw, perceived as the catalyst for further reform, was that a driver was not liable for a collision caused by a child running into the road if the child had not been visible to them.[273]

1.38 In 2002, a strict liability regime was formally introduced through amendments to the Road Traffic Act. Now the custodian of a vehicle involved in a road traffic collision is liable to the victim in all cases except *vis maior* (acts of God). The reforms guaranteed compensation not only in respect of injuries to children running into the road but also to passengers of a vehicle involved in a collision, who were previously forced to prove the driver's fault under ordinary rules of tort.[274]

The Netherlands

1.39 In the Netherlands, the owner or keeper of a vehicle is strictly liable for personal injury caused to pedestrians and cyclists in a road traffic collision, unless the collision resulted from *overmacht* for the driver.[275]

1.40 One meaning of *overmacht* is *force majeure*. *Overmacht* includes situations where a road traffic collision was caused by someone for whom the owner or keeper of a vehicle was not liable. The burden of proof to establish *overmacht* is on the owner or keeper of the vehicle involved in a collision.

1.41 Since the 1980s, the Hoge Raad (or Supreme Court) has applied a restrictive interpretation of *overmacht*. The defence is only established if: (i) a driver cannot be legally blamed for their conduct; and (ii) the collision was solely due to the fault of another person (including the victim), that was "so improbable" that the driver "could not reasonably" have taken it into account whilst driving. This sets a high threshold: for

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271 See also Geneviève Viney and Anne Guégan-Lécuyer, "The development of traffic liability in France" in Ernst Wolfgang (ed), *The Development of Traffic Liability* (Volume 5, CUP, 2010) p 50 (translation by Sandy Steel, University of Cambridge), pp 67-68.

272 The 'Zweite Gesetz zur Änderung schadensersatzrechtlicher Vorschriften': see Sebastian Lohsse, "The development of traffic liability in Germany" in Ernst Wolfgang (ed), *The Development of Traffic Liability* (Volume 5, CUP, 2010) p 75 at p 101.

273 Sebastian Lohsse, "The development of traffic liability in Germany" in Ernst Wolfgang (ed), *The Development of Traffic Liability* (Volume 5, CUP, 2010) p 75 at p 101.

274 Above at pp 101 to 102 and 109 to 110.

275 Art 185 of the *Wegenverkeerswet* 1994 (Road Traffic Act). The rule is almost identical to the law in which it was first introduced in 1924. See Cees van Dam and Gerrit van Maanen, "The development of traffic liability in the Netherlands" in Ernst Wolfgang (ed), *The Development of Traffic Liability* (Volume 5, CUP, 2010) p 112 at p 131.

example, case law has established that drivers must anticipate that pedestrians and cyclists make mistakes and regularly violate traffic regulations.[276]

1.42 The courts have also reduced defendants' ability to plead contributory negligence. Where an injured pedestrian or cyclist is under the age of 14, the courts have restricted the defences of contributory negligence to circumstances in which the child had acted intentionally or with intention approaching recklessness.[277] For older pedestrians and cyclists, if the driver cannot establish *force majeure,* the victim is entitled to at least 50% of their damages unless they acted intentionally or with intention approaching recklessness.[278]

1.43 The strict liability regime only applies to injuries caused by motor vehicles to pedestrians and cyclists in road traffic collisions. The liability of an owner or driver of a vehicle for injury caused to the drivers and passengers of other vehicles in a road traffic collision is contingent upon fault.[279]

Spain

1.44 In Spain, the 1962 Road Traffic Act introduced a strict liability regime for death or personal injury caused by road traffic collisions. Under the Act, the driver of a vehicle is strictly liable in the case of death or personal injury to any other person.[280]

1.45 The regime retains two defences which may exclude a driver's liability: *force majeure* and the sole fault of the victim. If neither is established, contributory negligence may reduce the damages recoverable by the injured party.[281]

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276 Cees van Dam and Gerrit van Maanen, "The development of traffic liability in the Netherlands" in Ernst Wolfgang (ed), *The Development of Traffic Liability* (Volume 5, CUP, 2010) p 112 at p 138.

277 HR 1 June 1990, NJ (1991), 720, note CJHB (Ingrid Kolkman); HR 31 May 1991, NJ (1991), 721, note CJHB (Marbeth van Uitregt).

278 HR 24 December 1993, NJ (1995), 236, note CJHB (Anja Kellenaers).

279 Under the general fault liability rule in article 6:162 of the Dutch Civil Code (the *Burgerlijk Wetboek*): see Cees van Dam and Gerrit van Maanen, "The development of traffic liability in the Netherlands" in Ernst Wolfgang (ed), *The Development of Traffic Liability* (Volume 5, CUP, 2010) p 112 at pp 131 and 141-43.

280 Isabel González Pacanowska, "The development of traffic liability in Spain" in Ernst Wolfgang (ed), *The Development of Traffic Liability* (Volume 5, CUP, 2010) p 151 and p 174.

281 Above, at p 185.

Appendix 2: Motor insurance and terrorism risk

2.1 Here we consider whether motor insurers are required to compensate victims of acts of terrorism involving the use of a vehicle on a road or other public place. This is a difficult issue, which has been subject to several changes over the last decade.

2.2 We start by providing a definition of terrorism, before providing a short history of how the issue has been dealt with. We then explain the current position of a victim who suffers personal injury through a terrorist attack arising out of the use of a vehicle on a road or public place. The victim must make a claim to the Motor Insurers' Bureau (MIB). The cost is unlimited and falls on all motor insurers collectively.

2.3 We then consider the Pool Reinsurance (Pool Re) Scheme, which provides insurance cover against damage to commercial property arising from terrorism. The Pool Re scheme allocates costs in slices. The first slice is borne by the individual insurer; the next by a mutual scheme; while the Government acts as an insurer of last resort. We were interested to see if the Pool Re model might be helpful in the context of remote driving.

WHAT DO WE MEAN BY "TERRORISM"?

Terrorism Act 2000

2.4 Under section 1 of the Terrorism Act 2000, "terrorism" is defined to cover the use or threat of actions where the following conditions are met:

(1) the action:

(a) involves serious violence against a person;

(b) involves serious damage to property;

(c) endangers a person's life, other than the person committing the action;

(d) creates a serious risk to the health or safety of the public or a section of the public; or

(e) is designed seriously to interfere with or seriously disrupt an electronic system;

(2) the use or threat is designed to influence the government or an international governmental organisation or to intimidate the public or a section of the public; and

(3) the use or threat is made for the purpose of advancing a political, religious, racial or ideological cause.[282]

[282] Terrorism Act 2000, s 1(1) to (2).

2.5 In addition, the use or threat of an action listed above which involves the use of firearms or explosives is terrorism without needing to satisfy the second criterion.[283]

2.6 We use this definition for the purposes of this advice.

Previous definitions

2.7 The definition under the Terrorism Act 2000 is more extensive than some previous definitions. In particular, the Reinsurance (Acts of Terrorism) Act 1993 defines acts of terrorism as:

> acts of persons acting on behalf of, or in connection with, any organisation which carries out activities directed towards the overthrowing or influencing, by force or violence, of Her Majesty's government in the United Kingdom or any other government de jure or de facto.[284]

2.8 Concerns have been raised that this definition would not apply to a lone individual, acting independently of an organisation. Furthermore, it would only apply to acts directed towards overthrowing or influencing a government. It would not apply, for example, to actions designed to intimidate a particular racial group.

2.9 Some documents used by the MIB refer to the definition under the Reinsurance (Acts of Terrorism) Act 1993. However, we have been told that the MIB intends to standardise their procedure to refer to the definition in section 1 of the Terrorism Act 2000.

A HISTORY OF THE CURRENT LAW

Compulsory motor insurance

2.10 It is compulsory for motor vehicles to be insured. Section 143(1) of the Road Traffic Act 1988 forbids the use of a "motor vehicle" on a "road or other public place" without insurance.[285] Section 145(3) requires the policy to cover liability for death, injury or property damage "caused by, or arising out of, the use of the vehicle on a road or other public place".

2.11 Section 151 then requires an insurer to meet claims where the liability is within section 145 and covered by the terms of the policy.

2.12 This raises the question about whether a motor insurer is required to compensate a victim for personal injury caused by an act of terrorism "caused by, or arising out of, the use of the vehicle on a road or other public place". The answers to this question are complex and have been subject to several recent changes.

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283 Terrorism Act 2000, s 1(3).

284 Reinsurance (Acts of Terrorism) Act 1993, s 2(2).

285 There are limited exceptions applying to vehicles owned or used by certain public bodies and where owners have deposited funds in place of taking out insurance.

Policy exclusions

2.13 Most insurance policies do not cover deliberate acts. The MIB explains that:

> many policies contain express deliberate act exclusions (excluding the deliberate causing of injury or damage) but, even where the policy wording is silent, it will inevitably only provide cover for liability arising from certain uses of the vehicle specified by the certificate.[286]

2.14 In 2012, the Court of Appeal found that it was lawful to limit the permissible use of a vehicle under the policy and to exclude other types of use.[287]

2.15 The effect of policy exclusions is that insurers are not generally liable for terrorist acts under the terms of the policy. However, this is not the end of the matter. As we explore below, victims have a right to claim against the MIB, which acts as an insurer of last resort.

The MIB terrorism exclusion

2.16 Where insurance is not covered by the terms of the policy, liability will normally fall on the MIB under agreements made between the MIB and the Government covering liability for damage caused by untraced or uninsured drivers. Every insurer providing compulsory motor insurance must be a member of MIB and contribute to its funding.

2.17 For many years, terrorism was specifically excluded from the MIB Agreements. In 2003, the Untraced Drivers Agreement introduced an exclusion for claims arising out of acts of terrorism on the understanding that victims would be fully compensated by the State. The version of the Uninsured Drivers Agreement which came into force in July 2015 introduced a similar exclusion.

2.18 State compensation for victims of domestic terrorism is provided for under the Criminal Injuries Compensation Scheme.[288] However, complaints have been raised about many aspects of the scheme, including the low level of compensation.[289] In particular, compensation is limited to a maximum award of £500,000. By contrast, motor insurers provide unlimited personal injury compensation. For serious injuries involving long-term care, awards made against motor insurers will be much higher than compensation under the Criminal Injuries Compensation Scheme.

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286 MIB, *MIB Members' consultation: Terrorism Liabilities* (February 2018), p 4, https://www.mib.org.uk/media/398358/mib-members-consultation-terrorism-liabilities.pdf.

287 *EUI v Bristol Alliance* [2012] EWCA Civ 1267, [2013] QB 806; *Sahin v Havard* [2016] EWCA Civ 1202, [2017] 1 WLR 1853.

288 Criminal Injuries Compensation Scheme 2012 (amended) (the Scheme): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/808343/criminal-injuries-compensation-scheme-2012.pdf.

289 A 2020 review of the Scheme included a review of the impact on victims of the scheme on specific victim groups, including victims of terrorism: see Criminal Injuries Compensation Scheme Review 2020, paras 76 to 82: https://consult.justice.gov.uk/digital-communications/criminal-injuries-compensation-scheme-review-2020/supporting_documents/cicsreview2020.pdf.

2.19 In 2015, RoadPeace issued judicial review proceedings against the Secretary of State for Transport,[290] arguing, amongst other things, that a blanket exclusion for terrorism was unlawful and fell short of EU Directive 2009/103.[291] The Agreements were amended to remove the terrorism exclusions for incidents occurring on or after 1 March 2017.

Responsibilities of an "Article 75 insurer"

2.20 All motor insurers are bound by the MIB's Articles of Association (the Articles). The Articles define an "Article 75 Insurer". In broad terms, this refers to the insurer who, at the time of an incident, was providing insurance in respect of the vehicle involved.[292]

2.21 An Article 75 insurer must pay some uninsured cases from its own funds in specific circumstances. One of these circumstances is where "the use of the vehicle is other than that permitted by the policy".[293] The general effect of this provision is that, even if an insurer excludes deliberate acts under the policy, the insurer must still pay the claim under the MIB agreement as an Article 75 insurer.

2.22 Therefore, the effect of the 2017 change to remove the terrorism exclusion was that claims arising out of an act of terrorism fell on the Article 75 insurer to pay out of their own funds. This caused considerable concern, given the unlimited and unquantifiable nature of terrorism risk.

Mutualising the risk

2.23 In 2018, the MIB launched a consultation on mutualising the cost of terrorism following recent terrorist attacks.[294] The result was that insurers voted by over 75% to change the Articles so that claims from terrorism would be borne by the MIB as a whole.

2.24 Therefore, as of January 2019, the cost of terrorism claims "caused by, or arising out of, the use of the vehicle on a road or other public place" falls on the MIB and thus on all motor insurers collectively.

THE POOL RE SCHEME

History

2.25 At the end of 1992, insurers of commercial and industrial buildings announced that they would be withdrawing terrorism cover from their policies with effect from their next renewal.[295] This had been prompted by the St Mary Axe bomb in April 1992,

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290 *RoadPeace v Secretary of State for Transport* [2017] EWHC 2725 (Admin), [2018] 1 WLR 1293.

291 Directive 2009/103/EC of the European Parliament and of the Council of 16 September 2009 relating to insurance against civil liability in respect of the use of motor vehicles, and the enforcement of the obligation to insure against such liability.

292 MIB Articles of Association (July 2020), Art 75(2)(a).

293 Art 75(2)(a)(1)(iii).

294 MIB, *MIB Members' consultation: Terrorism Liabilities* (February 2018), https://www.mib.org.uk/media/398358/mib-members-consultation-terrorism-liabilities.pdf.

295 *Colinvaux & Merkin's Insurance Contract Law* (Release 65, 2022) para B-1006.

which caused widespread damage in London's commercial centre. The decision was reinforced by the Bishopsgate bomb in April 1993, which caused similar damage.

2.26 This raised difficulties for the owners and operators of commercial buildings, and those managing funds which had been invested in the commercial property market. Negotiations between the Government and commercial property insurers resulted in the passing of the Reinsurance (Acts of Terrorism) Act 1993, which provides for government involvement in the provision of commercial buildings cover, and led to the creation of the Pool Reinsurance Company Ltd.

2.27 In the aftermath of the 9/11 terrorism attack, the Pool Re approach was replicated, in different forms, in many G20 countries.[296]

How the scheme works

2.28 Insurers are entitled to exclude terrorist risk, but they must offer commercial policyholders the opportunity to join the Pool Re scheme. As a leading insurance textbook explains:

> Those who do participate include in their policies a terrorist acts exclusion, but cover is reinstated on payment of an additional premium, to be determined on commercial rates. An assured who is not prepared to pay the additional premium will not be protected by the statutory scheme.[297]

2.29 Liability for terrorist acts is in allocated in slices. The insurer pays the first slice.[298] The second slice is paid by the Pool Reinsurance Company. The textbook explains:

> The surplus liability may be reinsured with Pool Re, a company established by participating insurers. Pool Re is funded by premiums paid by the insurers, and it may also raise a 10 per cent levy on participating insurers in the event that its reinsurance funds prove to be inadequate.[299]

2.30 The third layer is met by the Government. In effect, the Government reinsures the reinsurer (referred to as "retrocession").

> Pool Re's liability is retroceded to the government, which acts as insurer of last resort. The government is obliged to indemnify Pool Re if Pool Re is unable to indemnify original insurers from its own funds and investment incomes, and from any other retrocession arrangements which Pool Re has been able to establish in the market. Premiums are paid by Pool Re to the government, but only at the point at which Pool Re's assets exceed £1 billion.[300]

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296 *Riley on Business Interruption Insurance* (11th edn), para 2.29.

297 *Colinvaux & Merkin's Insurance Contract Law* (Release 65, 2022) para B-1006.

298 Above, para B-1007.

299 Above.

300 Above.

2.31 Through retained surplus and the purchase of retrocession, Pool Re has built a claims paying ability in excess of £11bn. Should terrorism claims exceed these reserves, Pool Re will be able to draw funds from its government loan facility to meet its obligations in full, regardless of the scale of losses.[301]

Scope of cover

2.32 Pool Re's cover to insurers currently only relates to damage to commercial buildings (and associated business interruption). It was originally restricted to damage caused by fire or explosion, with the conventional insurance and reinsurance market covering other types of terrorism.

2.33 However, the scope of the scheme has been extended. Following 9/11, Pool Re's cover was extended to chemical, biological, radiological and nuclear (CBRN) attack.

2.34 In response to terrorist attacks in the UK in 2017, separate cover was introduced to include non-damage business interruption losses (for example, following restriction of access by a competent authority in response to a terrorist attack). This required primary legislation – the Counter Terrorism and Border Security Act 2019.

2.35 In 2018, the Government also agreed to extend cover to cyberterrorism after being lobbied by Pool Re to include damage to tangible property caused by remote digital interference.

2.36 Pool Re therefore currently covers an act of terrorism involving:

(1) CBRN;

(2) remote digital interference;

(3) non-damage business interruption; and

(4) fire and explosion.[302]

2.37 The only exclusions that now apply to the terrorism cover are in respect of war and related risks, and non-tangible electronic risks, such as stolen data.

HM Treasury review

2.38 HM Treasury is committed to reviewing its relationship with Pool Re regularly. The most recent review was announced in September 2020 and its Final Report was published in March 2022.

2.39 HM Treasury's Final Report recognised that Pool Re has been a success and "continues to be of critical importance for the bulk of the UK terrorism insurance market".[303] However, it concluded that the current unlimited guarantee of Pool Re by

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301 *Riley on Business Interruption Insurance* (11th edn, 2021), Ch 2, para 2.29.

302 https://www2.poolre.co.uk/cover/.

303 HM Treasury, *HM Treasury's review of Pool Reinsurance Company Limited: Final Report* (March 2022), p 2, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1061805/Final_report_HMT_review_of_Pool_Re_V2.pdf.

HM Treasury "poses a significant fiscal risk to the government, making it essential that taxpayer interests are protected".[304] This concern was reflected in two central conclusions of the review: that the risk of the unlimited guarantee to the taxpayer must be mitigated and that risk should be transferred back to the market.[305]

2.40 HM Treasury concluded it would continue to provide an unlimited guarantee of Pool Re subject to:

(1) Pool Re proactively returning more risk to the market. Members would be expected to cover more of the risk arising from conventional "blast" terrorism. By contrast, HM Treasury would continue to intervene and limit members' exposure to "non-conventional" terrorism risk (chemical, biological, radiological and nuclear (CBRN) or cyber terrorism);[306]

(2) Pool Re not paying special dividends or otherwise reducing its reserves without HM Treasury's permission;

(3) amendment of the Reinsurance (Acts of Terrorism) Act 1993 to give HM Treasury power to "direct any public sector body extended a guarantee, or benefitting from an arrangement" under the Act to comply with relevant controls aimed at ensuring that funds on the public accounts are used appropriately.[307]

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304 HM Treasury, *HM Treasury's review of Pool Reinsurance Company Limited: Final Report* (March 2022), para 1.1, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1061805/Final_report_HMT_review_of_Pool_Re_V2.pdf.

305 Above, pp 3, 6 to 8 and 11.

306 In addition, HM Treasury advocated for the need to "modernise" Pool Re's system of reinsurance by providing members with portfolio pricing and access to a model of terrorism risk based on more detailed and accurate geospatial data pursuant to a "treaty system" of reinsurance. See HM Treasury, *HM Treasury's review of Pool Reinsurance Company Limited: Final Report* (March 2022), pp 9 to 11, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1061805/Final_report_HMT_review_of_Pool_Re_V2.pdf.

307 The third HM Treasury condition responded to a decision by the Office for National Statistics in early 2020 to classify Pool Re as Central Government Subsector. See Office for National Statistics, "Statement on the classification of Pool Re" (February 2020), https://www.ons.gov.uk/news/statementsandletters/statementontheclassificationofpoolrefebruary2020#:~:text=The%20Office%20for%20National%20Statistics,effects%20of%20acts%20of%20terrorism.

Appendix 3: Criminal liability of remote assistants and remote drivers: a comparison

3.1 In this advice we draw a distinction between a remote driver and a remote assistant.[308] A remote driver exercises lateral or longitudinal control over the vehicle or monitors it with a view to intervention. By contrast, a remote assistant merely advises an authorised vehicle, and the authorised driving system makes the final decision about what to do.[309] The difference can become blurred at the edges and will be a matter of fact and degree.

3.2 For the purpose of proposed schemes for regulatory sanctions[310] and civil liability,[311] it will not matter whether an employee was working as an assistant or as a driver at any given time. However, it will make a difference for the purpose of criminal liability. The criminal liability of drivers is greater than that of other employees.

3.3 Here we outline the charges that could be brought against a remote assistant who is not a driver but acts in a negligent or grossly negligent way by giving bad advice to an automated driving system. We compare this to the greater liability that would be faced by a driver, in similar circumstances.

Gross negligence manslaughter

3.4 If a remote assistant were to act in a grossly negligent way, and the action caused a death, the assistant could be charged with gross negligence manslaughter. In *Broughton*,[312] Lord Burnett CJ summarised that there are six elements which the prosecution must prove before a defendant can be convicted of gross negligence manslaughter. The six elements are:[313]

(1) the defendant owed an existing duty of care to the victim;

(2) the defendant negligently breached that duty of care;

(3) at the time of the breach there was a serious and obvious risk of death […];

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308 See Ch 3, paras 3.27 to 3.42.

309 For example, a remote assistant may help identify an object, or look out for roadworks. But the vehicle's self-driving needs to be safe enough and lawful even without such input (although it may not be able to complete its journey). In our AV Report we also referred to the need for oversight of fleets of vehicles with no responsible person on board. This is to ensure fleet operators always know the whereabouts of their vehicles and have remote assistants to help resolve situations where the vehicle may get stuck.

310 See Ch 8, paras 8.54 to 8.59.

311 See Ch 9.

312 *R v Broughton* [2020] EWCA Crim 1093, [2021] 1 WLR 543.

313 Above at [5].

(4) it was reasonably foreseeable at the time of the breach of the duty that the breach gave rise to a serious and obvious risk of death;[314]

(5) the breach of the duty caused or made a significant (ie more than minimal) contribution to the death of the victim; and

(6) in the view of the jury, the circumstances of the breach were truly exceptionally bad and so reprehensible as to justify the conclusion that it amounted to gross negligence and required criminal sanction.

3.5 We think it likely that a remote assistant of an automated vehicle would be under a duty of care to other road users sufficient to meet element 1. However, the other criteria suggest that the offence would only apply in very serious cases.

A serious and obvious risk of death

3.6 Under elements 3 and 4, the offence requires a serious and obvious risk of death.[315] This is a high threshold. "Serious" in this context means "much more than minimal or remote", whereas "obvious" requires the risk of death to be "present, clear, and unambiguous… immediately apparent, striking and glaring rather than something that might become apparent on further investigation".[316]

3.7 In two recent medical cases, medical professionals were acquitted after failing to carry out tests that would have revealed life-threatening conditions.[317] The Court of Appeal held that "an obvious risk is a present risk which is clear and unambiguous, not one which might become apparent on further investigation".[318] On this basis, a remote assistant is very unlikely to be found guilty simply because they failed to carry out checks, even if those checks would have shown safety-critical failings.

A significant contribution to the death of the victim

3.8 The prosecution must prove that death would not have occurred but for the breach of duty.[319] This can be a high threshold. In *Broughton,*[320] there was a 10% chance that the victim would have died anyway. The Court of Appeal overturned the conviction on the grounds that the evidence was incapable of proving causation to the criminal standard of proof.

3.9 In *R v Wood Treatment Ltd,*[321] a managing director was charged with gross negligence manslaughter following an explosion at a wood mill that killed four people.

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314 The difference between elements 3 and 4 is explained in *Blackstone's Criminal Practice (*2023) at paragraph B.73.

315 *R v Misra and Srivastava* [2004] EWCA Crim 2375, [2005] 1 Cr App R 21 at [49], by Judge LJ.

316 *R v Broughton* [2020] EWCA Crim 1093, [2021] 1 WLR 543 at [5], by Lord Burnett CJ.

317 *R v Rudling* [2016] EWCA Crim 741, (2016) 151 Butterworths Medico-Legal Reports 79 and *R v Rose* [2017] EWCA Crim 1168, [2018] QB 328.

318 R v *Rudling* [2016] EWCA Crim 741, (2016) 151 Butterworths Medico-Legal Reports 79 at [40].

319 *Blackstone's Criminal Practice* (33rd edn, 2023), section B1.74.

320 *R v Broughton* [2020] EWCA Crim 1093, [2021] 1 WLR 543.

321 [2021] EWCA Crim 618, [2021] Criminal Law Review 872.

The expert evidence showed four potential causes, three of which related to the large quantities of wood dust settled in the mill, for which they were clearly responsible. However, the fourth potential cause was a possible malfunction of the company's machinery, independent of the settled dust. The Court of Appeal upheld the judge's ruling of no case to answer because the jury could not have ruled out the possibility that the defendant's negligence did not cause of the explosion.

3.10 The requirement to show causation could be an obstacle where it is not clear whether the collision was caused by the automated driving system or the negligent input of a remote assistant. If the cause of death could have been a problem with the technology, the remote assistant would not be guilty of gross negligence manslaughter, even if they had acted in a grossly negligent way.

"Truly exceptionally bad"

3.11 The most difficult element to prove is element 6. A jury must find that the behaviour is "truly exceptionally bad": that is, sufficiently bad to be criminal. As the court stated in *R (Oliver) v DPP*:[322]

> The bar is thus set high: perhaps unsurprisingly so, given that such cases ordinarily involve no criminal intent.

3.12 The high threshold set by the courts for conduct to amount to gross negligence means that even serious, or very serious, mistakes or lapses by a remote assistant may not amount to gross negligence.[323]

Causing death by dangerous or careless driving

3.13 By contrast, a remote driver could be charged with several "causing death by driving" offences, including causing death by dangerous driving,[324] or causing death by careless driving.[325]

3.14 A charge of causing death by dangerous driving can be brought against a remote driver if:

(1) the defendant drives in a way which "falls far below what would be expected of a competent and careful driver";[326]

(2) it would be obvious to a competent and careful driver that driving in that way would be dangerous;[327] and

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322 [2016] EWHC 1771 (Admin).

323 See *R v Sellu* [2016] EWCA Crim 1716, [2017] 4 WLR 64 at [152], by Sir Brian Leveson P.

324 Road Traffic Act 1988, s 1.

325 Above, s 2B. Other offences are causing death by driving while unlicensed or uninsured (s 3ZB); causing death by driving while disqualified (s 3ZC); and causing death by careless driving while under the influence of drink or drugs (s 3A).

326 Road Traffic Act 1988, ss 1 and 2A(1)(a).

327 Above, ss 1 and 2A(1)(b).

(3) the driving caused the death.[328]

3.15 A person would also drive dangerously if "it would be obvious to a competent and careful driver that driving the vehicle in its current state would be dangerous".[329] Again, where this caused a death, the offence would be committed.

3.16 There is no need to show a serious or obvious risk of death, or that the driver's behaviour is exceptionally bad. Yet the maximum penalty for causing death by dangerous driving is the same as for gross negligence manslaughter: life imprisonment.[330]

3.17 For causing death by careless driving, it is only necessary to show that the driving falls below what would be expected of a competent and careful driver and caused a death. The maximum penalty is five years' imprisonment.[331]

Causing serious injury through negligence

3.18 A remote driver who causes serious injury could face possible charges of causing serious injury by dangerous driving,[332] or by careless driving.[333]

3.19 By contrast, there is no general offence in English law of causing serious injury through negligence, or even gross negligence. We have considered the offence of "wounding or inflicting grievous bodily harm", contrary to section 20 of the Offences Against the Person Act 1861. Here the injury must be inflicted through deliberate, non-accidental conduct on the defendant's part. There must be intent to cause grievous bodily harm to another person or recklessness as to whether such harm might be caused.

3.20 Assuming no intent to injure, section 20 would only apply where a remote assistant acts "recklessly". It must be established that the remote assistant knew that the risk existed or would exist and that it was, in the circumstances known to the remote assistant, unreasonable to take that risk.[334]

3.21 We think that it may be difficult to establish recklessness where a remote assistant did not foresee that giving particular information or advice to an automated driving system (ADS) would involve a risk of injury so great that it would be unreasonable to take such action. To a degree, society accepts the ordinary risks of injury associated with driving: the benefits of driving are perceived to justify the risk of injury which the activity incurs.

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328 Road Traffic Act 1988, s 1.

329 Above, s 2A(2).

330 Road Traffic Offenders Act 1988, sch 2.

331 Road Traffic Offenders Act 1988, sch 2.

332 Road Traffic Act 1988, s 1A.

333 Above, s 2C. There is also an offence of causing serious injury by driving while disqualified (s 3ZD).

334 *R v G* [2003] UKHL 50, [2004] 1 AC 1034 at [41].

Section 7 of the Health and Safety at Work etc Act 1974

3.22 Under section 7 of the Health and Safety at Work etc Act 1974, every employee has a duty to take reasonable care for the health and safety of other persons who may be affected by their acts or omissions at work.[335] The maximum penalty is two years' imprisonment.[336]

3.23 This is a very general offence. It applies to all employees. A lack of care (negligence) is sufficient. There does not need to be gross negligence. Nor is there a need to prove that the lack of care caused an injury.

3.24 The offence is normally enforced by the Health and Safety Executive (HSE) and local authorities. The HSE publishes guidance information on the nature of the duty.[337] This explains:

> Where the employer appears primarily responsible for the circumstances giving rise to a potential prosecution, action should normally be taken against the employer alone. However, where the employer has taken all reasonably practicable steps to ensure compliance then action against the employee should be considered.[338]

3.25 Before prosecuting, "consideration should be given to whether employees in practice followed the systems of work alleged by the employer to be in force".[339] Conversely "consideration should be given to any previous warnings to the employee, and whether the offence by the employee created an obvious risk".[340]

3.26 Prosecutions are not brought lightly. The reported cases we have found all concern fatal incidents. However, a note in Consumer Trading Standards Law and Practice suggests that prosecutions are increasing:

> In recent years, there has been an increase in prosecutions of employees under s 7. While it remains the case that the focus is largely on the employer and the discharge of its duties, the HSE and local authorities look at the entire management chain when assessing breaches of health and safety legislation.[341]

3.27 Prosecutions under section 7 can also be brought alongside prosecutions of the employer under section 2 ("the duty of every employer to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his

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335 Breach of this duty is an offence under Health and Safety at Work etc Act 1974, s 33.

336 Health and Safety at Work etc Act 1974, sch 3A.

337 Health and Safety Executive, "Proceedings against employees HSWA s7", https://www.hse.gov.uk/enforce/enforcementguide/investigation/identifying-employees.htm.

338 Above, para 9.

339 Above, para 10.

340 Above, para 11.

341 *Consumer Trading Standards Law and Practice 2022,* para [23.49].

employees").[342] For example, the driver in a warehousing company failed to apply the handbrake to his tractor unit when he sought to couple it with a trailer. It rolled back and killed another driver. The defendant driver pleaded guilty. He was fined £1,000 and ordered to pay £2,000 in costs. The company also pleaded guilty and was fined £325,000, reduced to £275,000 on appeal.[343]

Section 14(1) of the Management of Health and Safety at Work Regulations 1999

3.28 Finally, remote assistants might face prosecution under regulation 14(1) of the Management of Health and Safety at Work Regulations 1999. This requires every employee to use any machinery, equipment, transport equipment or safety device provided by their employer in accordance with any training or instructions they have received in the use of that equipment.

3.29 A prosecution under regulation 14 would focus on the training and instructions that remote assistants have been given. A remote assistant who blatantly failed to follow that training may be found guilty of a criminal offence.

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342 Health and Safety at Work etc Act 1974, s 2(1).

343 *R v TDG (UK) Ltd* [2008] EWCA Crim 1963, [2009] 1 Cr App R (S) 81.