



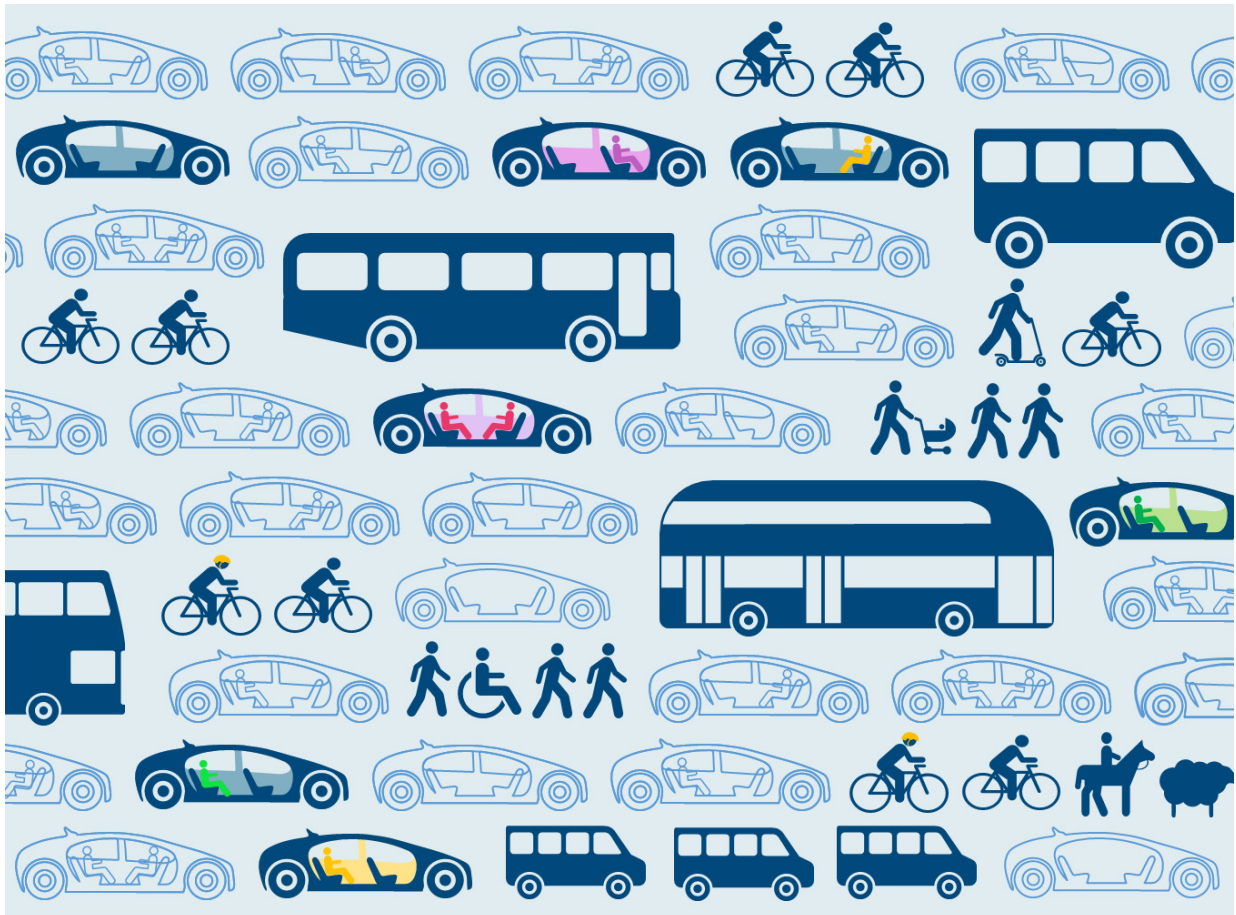
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Automated Vehicles:

Summary of Consultation Paper 3 – A regulatory framework for automated vehicles



Summary of LCCP No 253 / SLCDP No 171
18 December 2020

RESPONDING TO THIS PAPER

This is a summary of the full consultation paper, available on our websites at <https://www.lawcom.gov.uk/project/automated-vehicles/> and <https://www.scotlawcom.gov.uk/publications>.

We are committed to providing accessible publications. If you require the summary or consultation paper in a different format, please call 020 3334 0200 or email automatedvehicles@lawcommission.gov.uk.

We seek responses by 18 March 2021.

Comments may be sent:

Using an online form at:

<https://consult.justice.gov.uk/law-commission/automated-vehicles-regulatory-framework>

We have also produced a questionnaire in word format available on request. We are happy to accept comments in other formats. Please send your response:

By email to automatedvehicles@lawcommission.gov.uk

OR

By post to Automated Vehicles Team, Law Commission, 1st Floor, Tower, 52 Queen Anne's Gate, London, SW1H 9AG.

If you send your comments by post, it would be helpful if, whenever possible, you could also send them by email.

Responses may be made public

We may publish or disclose information you provide in response to our papers. Additionally, we may be required to disclose the information under the Freedom of Information Act 2000 and the Freedom of Information (Scotland) Act 2002.

If you want information that you provide to be treated as confidential please contact us first, but we cannot give an assurance that confidentiality can be maintained in all circumstances.

The Law Commissions will process your personal data in accordance with the General Data Protection Regulation.

Cover: Adapted from Department for Transport icon resources.

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1. Introduction

- 1.1 In 2018 the Centre for Connected and Autonomous Vehicles asked the Law Commission and Scottish Law Commission to review the law and regulation of automated vehicles (AVs). This is a summary of the third consultation paper in that review.¹ The full consultation paper is over 300 pages long and includes full references. When we refer to a chapter in this summary, it is a chapter in the full paper.
- 1.2 Our aim is to develop a regulatory framework to enable AVs to be deployed safely and effectively on Britain's roads. This third consultation focuses on the definition of self-driving; on an authorisation process "pre-deployment" (before vehicle are placed on the market); and on how to assure safety in use, on an ongoing basis. It builds on our two previous consultations to define three "key actors", with legal responsibility for different aspects of how an AV drives.
- 1.3 We seek responses by **18 March 2021**. Details of how to respond are set out on the inside cover.
- 1.4 Following consultation, we plan to publish a final report with recommendations for legislation by the end of 2021.

TERMINOLOGY

- 1.5 In the paper we refer to automated vehicles, automated driving systems and self-driving vehicles. Here we explain briefly what we mean by these phrases.
 - (1) We use the term "**automated vehicle**" (or more commonly AV) to refer in general terms to a vehicle with a system which is able to conduct the "**dynamic driving task**". In other words, the system must be able not only to steer, brake and accelerate but also respond to objects and events.
 - (2) An **automated driving system** (ADS) is the combination of software, hardware and sensors which is able (or purports to be able) to drive a vehicle. It is a system within a vehicle, not the vehicle itself.
 - (3) The Automated and Electric Vehicles (AEV) Act 2018 refers to vehicles which are capable of "safely driving themselves".² We describe a vehicle as "**self-driving**" if it meets the proposed tests and procedures set out in the paper.

¹ For the full paper, see Automated Vehicles: Consultation Paper 3 – A regulatory framework for automated vehicles (2020) Law Com Consultation Paper No 253; Scot Law Com Discussion Paper No 171. Available at <https://www.lawcom.gov.uk/project/automated-vehicles/> and <https://www.scotlawcom.gov.uk/law-reform/law-reform-projects/joint-projects/automated-vehicles/> Below, we refer to this paper as Consultation Paper 3.

² Part 1 of the Act is not yet in force.

THREE KEY ACTORS

1.6 This consultation builds on our previous papers to propose three legal actors to take legal responsibility for how an AV drives.

- (1) **The Automated Driving System Entity (or ADSE)** is the manufacturer or developer who puts the vehicle forward for categorisation as self-driving. It must register with the safety assurance regulator as the first point of contact if things go wrong.

Our proposals retain some flexibility about who the ADSE is: it may be a vehicle manufacturer, or software developer, or a partnership between the two. However, the ADSE must show that it was closely involved in assessing the safety of the vehicle. It must also have sufficient funds to respond to regulatory action and to organise a recall.

- (2) **The user-in-charge** can be thought of as the human in the driving seat of an AV while an ADS is engaged. Under our proposals, every AV will need a user-in-charge unless it is authorised to operate without one.

As automation develops, the idea of a traditional driving seat might change. We have therefore developed the idea of a user-in-charge to deal with new features, such those which park or summon a car automatically. In Chapter 12 we define the user-in-charge as an individual in the vehicle or in direct sight of the vehicle with access to the controls.

The user-in-charge must be qualified and fit to drive, as they may be called on to take over driving following a transition demand. They are not responsible for the dynamic driving task but they do retain other driver responsibilities.

- (3) **A licensed fleet operator** is responsible for the remote operating of vehicles with no user-in-charge. A fleet operator is an organisation rather than an individual, which supervises vehicles using connectivity rather than direct sight.

All operators will be subject to basic Tier 1 duties, such as maintaining and supervising vehicles and reporting incidents. They may also be subject to additional Tier 2 duties if, for example, they are running a passenger service or operating heavy goods vehicles.

1.7 The diagram below summarises how these legal actors fit together.

ADSE

Needed for all on-road AVs. Puts the ADS forward for legal categorisation as self-driving and is legally responsible for how the ADS performs dynamic control. The ADSE must have been closely involved in assessing safety and have sufficient funds (e.g. to organise a recall).

Path 1: AVs that can only be used with a

User-In-Charge

A UIC is a human in the vehicle or in sight of the vehicle, with access to the controls. The UIC must:

- (1) Be qualified and fit to drive
- (2) Be receptive to a transition demand
- (3) Maintain and insure the vehicle
- (4) Report accidents

Examples of use cases where a user-in-charge may be required:

Sub-trip features such as motorway chauffeur, or valet parking where an element of conventional driving is needed to complete a journey.

Path 2: Remote operation – AVs that can be used without a UIC. They must be associated with a

Licensed Fleet Operator

Tier 1 requirements apply to all AVs with No User-In-Charge (NUICs). The operator must:

- (1) Be qualified (of good repute, professionally competent)
- (2) Operate remote supervision
- (3) Maintain and insure the vehicle
- (4) Report accidents and near misses

Tier 2 requirements that apply to certain use cases

Requirements for passenger services (HARPS):

- (1) Accessibility
- (2) Safeguarding passengers
- (3) Price information

Example - ride hailing services

Requirements for goods deliveries use case:

- (1) Weight threshold
- (2) Type of goods
- (3) Securing loads safely

Example - freight truck

Simple use cases where fulfilment of Tier 1 requirements is sufficient. No additional Tier 2 requirements needed.

Example - snow plough

Figure 1.1 - Overview of the key legal actors

2. The definition of self-driving

THE DEFINITION OF SELF-DRIVING IN UK LAW

- 2.1 Under our proposed scheme, it will be crucial to distinguish between vehicles which can (and cannot) safely drive themselves. A definition is already set out in UK law. Under section 1 of the Automated and Electric Vehicles (AEV) Act 2018, the Secretary of State must prepare a list of all motor vehicles that are (in the Secretary of State's opinion) "designed or adapted to be capable, at least in some circumstances or situations, of safely driving themselves".
- 2.2 Section 8(1)(a) defines "driving itself" as "operating in a mode in which it is not being controlled, and does not need to be monitored, by an individual".
- 2.3 At present, the definition only affects civil claims. The AEV Act 2018 introduces a new form of liability by which an insurer becomes liable for damage caused by a listed vehicle "when driving itself". However, under our proposals, the definition would have more far reaching implications.

Why the definition of "safely driving itself" matters

- 2.4 Under our proposals, if a vehicle is classified as self-driving and the ADS is engaged, the person in the driving seat becomes a "user-in-charge" rather than a driver. This means that:
 - (1) The user-in-charge could lawfully undertake activities which drivers of conventional vehicles are not allowed to do as it would distract them from driving. Examples are watching a movie or reading emails.
 - (2) If there is a collision caused by a vehicle driving itself:
 - (a) the insurer would compensate the victim, irrespective of fault by either the user-in-charge or the ADSE;
 - (b) the user-in-charge could not be prosecuted for offences such as careless or dangerous driving.
 - (3) The user-in-charge could not be prosecuted for a wide range of other offences, such as exceeding the speed limit or running a red light.
 - (4) Instead, if the ADS acted in a way which would be criminal if done by a human driver, this would be dealt with as a regulatory matter. The issue would be resolved between the safety assurance regulator and the ADSE.

A conceptual leap

- 2.5 In our view, changes to criminal liability should go hand-in-hand with changes to distraction laws. One cannot tell people that they need not pay attention to the driving task and then find them guilty of criminal offences for failing to pay attention.

- 2.6 This leads to a conceptual leap between human driving and self-driving. On one side of the line, an advanced driver assistance system might give the impression of self-driving, as it acts to steer the car and control acceleration and braking. However, as the system cannot deal with all situations, the human behind the wheel is required to monitor the driving environment and respond to events. The human would be blamed for dangerous or careless driving – and, if they cause a death, they might spend years in prison.
- 2.7 On the other side of the line, the ADS is regarded as self-driving. The steering and acceleration may look similar. However, the human in the driving seat may relax, knowing that they are not responsible for anything that happens while the ADS is correctly engaged. The ADS itself monitors the driving environment and responds to events.
- 2.8 Under our scheme it would be crucial to distinguish between systems which can (and cannot) “safely drive themselves” without being “monitored by an individual”.

AUTOMATED LANE KEEPING SYSTEMS: THE FIRST TEST OF SELF-DRIVING

- 2.9 In June 2020, the United Nations Economic Commission for Europe (UNECE) adopted a regulation to permit Automated Lane Keeping Systems (ALKS). Essentially, ALKS technology is able to steer and control speed in lane for extended periods on motorways. ALKS are currently confined to cars operating at low speeds, up to 37 miles an hour. They allow drivers caught in motorway traffic jams to relax and possibly perform other activities through the infotainment system, such as looking at messages.
- 2.10 In August 2020, the UK Government issued a Call for Evidence, exploring whether ALKS met the test for self-driving. In Chapter 3 we use ALKS as a case-study, providing the first practical context to debates over the meaning of self-driving. Decisions about ALKS will also affect the way we regulate the next steps towards self-driving. These next steps may soon include motorway features which can change lane at up to 70 miles an hour.

ALKS: the continuing role of a human driver

- 2.11 The ALKS Regulation requires a human in the driving seat, described as a “driver”. In many situations, an activated system will need to “transition the control back to the driver”.¹ This may be a planned event, such as an exit from the motorway; an unplanned event (such as sudden bad weather); or a failure in the system.
- 2.12 In these cases, the system will issue a “transition demand”, using escalating warning signals to alert the driver that they have 10 seconds to take control. If the driver does not respond, the vehicle will perform a “minimum risk manoeuvre”, coming to a slow stop in lane, with its hazard warning lights on.

¹ ALKS Regulation, para 5.4.

Complying with traffic rules

- 2.13 The ALKS Regulation requires that the system complies with the traffic rules of the country of operation.² This principle is easy to state but difficult to implement, given the number and complexity of traffic laws, which differ from country to country.
- 2.14 The Call for Evidence raises three scenarios about compliance with traffic rules which are not covered by specific requirements in the regulation:
- (1) responding to a police vehicle signalling the car to pull over to the side of the road;
 - (2) stopping after a “soft-brush” collision with a motorcyclist, which may not register on the vehicle’s collision detection system; and
 - (3) reading temporary speed limits on overhead gantries.
- 2.15 Responses to the call for evidence indicated many ways in which ALKS-enabled vehicles might be able to deal with these scenarios. However, the Society of Motor Manufacturers and Traders (SMMT) pointed out that there is no explicit requirement within the ALKS Regulation to require systems to detect and respond to enforcement or emergency vehicles. Instead, the human in the driving seat (“the fallback ready user”) should notice such vehicles. The SMMT wrote:
- The Highway Code must be amended to clarify that the fallback-ready user should retain the **residual responsibility** of remaining **vigilant** to **extraordinary** external conditions where it is not appropriate to continue using the automated driving functionality.³ (emphasis in original)
- 2.16 Similarly, in an unavoidable low-energy collision, the SMMT said that “the braking force of the vehicle should draw the fallback-ready user’s attention to the situation”.
- 2.17 So although many ALKS will be able to recognise enforcement vehicles and low-energy impacts, it is uncertain whether all ALKS will be able to do so. In some cases, ALKS may rely on the person in the driving seat to notice and respond to the situation, even in the absence of a transition demand.
- 2.18 This raises important questions about the control and monitoring test, set out in the AEV Act 2018. If the human in the driving seat is not monitoring the vehicle, how far can they be expected to intervene?

SELF-DRIVING AND HUMAN INTERVENTION

- 2.19 A robust body of research shows that people find it more difficult to monitor a task passively than to be actively engaged in it. The less people are called on to do, the more likely they are to lose concentration and become drowsy, inattentive or distracted. Furthermore, after using machines for a while without incident, people tend

² ALKS Regulation, para 5.1.2.

³ SMMT response to the Call for Evidence, para 37.

to become over-confident. They will then rely on automation even if they are told that it is not safe to do so.

- 2.20 This means that increases in the sophistication of driving automation do not necessarily lead to increases in safety. Several commentators have pointed to a “dip” in safety between helpful assistance and true self-driving. There comes a point at which the system gives the appearance of self-driving without being good enough to cope with common scenarios. It then becomes highly problematic to rely on a human to intervene.
- 2.21 In Chapter 4 of the paper we consider how far it is realistic to expect the human in the driving seat to intervene in the driving task. We look first at responding to transition demands and then at responding to other “obvious” or “extraordinary” external conditions.

RECEPTIVITY TO A TRANSITION DEMAND

- 2.22 It is possible to remain receptive to a clear multisensory alert, even if one is not monitoring either the environment or the system. In our view, the user-in-charge can be expected to respond to a transition demand that:
- (1) cuts out any permitted non-driving related screen-use (through, for example, the onboard infotainment system);
 - (2) provides clear visual, audio and haptic signals; and
 - (3) gives sufficient time to gain situational awareness.

The need for multisensory alerts

- 2.23 The main reason why we consider it reasonable for a user to respond to a transition demand even if they are not “monitoring” the vehicle is that a demand will be communicated through multiple senses. Even if the user is not looking at the dashboard, they will still hear the noise - and even if they suffer from hearing loss, they will feel a haptic alert through touch (such as seat vibration or a tug on the seatbelt). However, this is not absolutely required by the ALKS Regulation, which suggests that either an acoustic or a haptic signal might be sufficient.
- 2.24 In our view, it is important that the transition demand can be received by a user who cannot hear and who is not monitoring the car dashboard. Hearing loss affects around 11 million people in the UK - or one in six of the population. At present, even people who are profoundly deaf can hold a car driving licence and we would not wish to put any obstacles in their way.

Sufficient time to gain situational awareness

- 2.25 Following a transition demand, the user must come out of any activity they have been engaged in and reposition their hands and feet on the controls. They also need to work out what is around them, referred to as gaining “situational awareness”. This takes time.

- 2.26 The ALKS Regulation provides that if the driver fails to respond to a transition demand, at least 10 seconds should elapse before the minimum risk manoeuvre is started. Although some studies indicate that 10 seconds is sufficient, the time may vary. In its response to the call for evidence, the ABI and Thatcham cite three studies suggesting that it may take between 15 and 40 seconds for the driver to become fully aware of traffic conditions.
- 2.27 We are not in a position to decide the minimum period between the transition demand and the need to take back control. This difficult issue will need to be monitored in practice.

Failure mitigation rather than a safe stop

- 2.28 If the user-in-charge fails to respond, the vehicle should carry out a failure mitigation strategy by, for example, coming to a gradual stop in lane.
- 2.29 In response to our first consultation, several consultees argued that a vehicle should do more than this. It should only be regarded as self-driving if it was able to come to a safe stop by the side of the road. We doubt this is realistic. There is currently debate over what conventional drivers should do if they encounter a problem on a motorway without a hard shoulder. Although ideally, drivers should exit the motorway or reach an emergency refuge area, the UK Government advises drivers who cannot do this to “move into the left-hand lane and put on your hazard lights”. This suggests that even careful and competent drivers cannot always be expected to move out of an active lane of traffic.

RESPONDING TO EVENTS IN THE ABSENCE OF A TRANSITION DEMAND

- 2.30 The full paper considers various suggestions that the human in the driving seat should take back control even without a transition demand. For example, the Society of Automotive Engineers International (SAE) envisages that a “fallback ready user” in a Level 3 system should respond to evident vehicle failures, such as a tyre blow-out. In German law, users must also respond to “obvious circumstances”, with debate over whether this includes important road signs or snow. The SMMT has suggested that emergency vehicles or soft-brush collisions are “extraordinary external conditions” to which the user should respond.
- 2.31 We have grave reservations about all these examples. A user who is engrossed in other activities and not monitoring the driving environment may not even notice a road sign. Some of the suggested circumstances involve a loud noise, so it is more credible that the user might notice them. However, requiring users to intervene in response to external noise would prevent the system from being used by those with hearing loss. It would also be necessary to stop users from listening to loud music. We doubt that users would understand such limitations.
- 2.32 More fundamentally, it will be difficult for users who emerge from other activities to gain sufficient situational awareness to respond appropriately. This is particularly true of a tyre blowout. Even those who are fully engaged in driving may find it difficult to react appropriately: drivers often panic by braking hard, even though this has been described as “the single worst thing that you can do”. We fear that the tendency to

panic and brake will be even more pronounced where a user is not concentrating on the road but suddenly finds that the vehicle is out of control.

- 2.33 The categories of “evident failure”, “obvious circumstances” and “extraordinary external conditions” are not based on research about what users are able to respond to. Instead, they have the potential to expand to include almost any circumstance which the ADS is unable to cope with.
- 2.34 We provisionally propose that to be classified as self-driving a vehicle must be sufficiently safe even if the human user does not respond to any event except a clear and timely transition demand.

Consultation Question 1.

- 2.35 We provisionally propose that:

- (1) a vehicle should not be classified as self-driving if, with the ADS engaged, the user-in-charge needs to monitor the driving environment, the vehicle or the way it drives;
- (2) it is nevertheless compatible with self-driving to require the user-in-charge to respond to a clear and timely transition demand which:
 - (a) cuts out any non-driving related screen use;
 - (b) provides clear visual, audio and haptic signals; and
 - (c) gives sufficient time to gain situational awareness.
- (3) to be classified as self-driving, the vehicle must be safe enough even if the human user does not intervene in response to any event except a clear and timely transition demand.

Do you agree?

Consultation Question 2.

- 2.36 We welcome views on whether self-driving features should be designed to ensure that they can be used by people with hearing loss.

HOW SAFE IS SAFE ENOUGH?

- 2.37 Under the AEV Act 2018, vehicles should only be listed as self-driving if they are “capable, at least in some circumstances or situations, of safely driving themselves”. The crucial word is “safely”. In Chapter 5 we ask what it means for AVs to be safe, or at least safe enough to be deployed on British roads.

PUBLIC ACCEPTANCE OF RISK

- 2.38 A standard definition is that a thing is safe “if its attendant risks are judged to be acceptable”. The risk must be acceptable to (and accepted by) those who bear it which, in the case of self-driving vehicles, is the road-using public. People do not assess risks in simple numeric terms. They are often happy to tolerate risks which are familiar, voluntary or accompanied by a clear benefit. They are less accepting of risks which are new, strange or imposed, or which have no clear benefit for them.

- 2.39 Where unacceptable risks result in harm, there is a strong desire to blame someone. At present, the criminal process acts as a channel for that blame. There are currently nine offences of causing death or serious injury by driving. Every year, several hundred people are given prison sentences for these offences. The trend is towards more offences and increased sentences for the existing offences.
- 2.40 The process of blame, trial and imprisonment is one way in which society copes with the current level of road casualties. AVs will involve a major shift away from using the criminal justice system in this way.

SETTING A SAFETY THRESHOLD

- 2.41 The RAND Corporation notes that “there is no consensus about what approaches should be used” to decide what is safe enough.⁴ Some people make comparisons with a safe human driver (referred to in the UK as a “competent and careful” driver). Others aim to improve on the current level of casualties caused by human drivers in general (average drivers). These two standards set very different thresholds. Drivers in general still have a lot of collisions, while competent and careful ones have very few.
- 2.42 In Chapter 5 we consider four possible standards for deciding how safe is safe enough. These are:
- (1) as safe as reasonably practicable;
 - (2) as safe as a competent and careful human driver;
 - (3) does not cause a fault accident;⁵
 - (4) a positive risk balance (so that, overall, AVs are safer than the average human driver).

As safe as “reasonably practicable”

- 2.43 Under the Health and Safety at Work etc Act 1974, risks should be as low as is “reasonably practicable”. This standard (often referred to as ALARP) is a commonly used across many industries. The courts have explained that it involves weighing the risk against the money, time and trouble to avert it. Any failure to reduce a risk must be justified - and, as lives are at stake, “it should not lightly be held that to take a practicable precaution is unreasonable”.⁶
- 2.44 This is a flexible test, which may be difficult to apply to a new technology which is not covered by existing good practice. Roads are inherently dangerous – much more dangerous than workplaces and the risks are widely distributed among the public.

⁴ RAND Corporation, Safe Enough: Approaches to Assessing Acceptable Safety for Automated Vehicles (2020) (“RAND Report”), p x, https://www.rand.org/pubs/research_reports/RRA569-1.html.

⁵ The test is: if a human driver had acted in this way, would the driver be held liable for causing the accident in the law of negligence?

⁶ *Marshall v Gotham Co Ltd* [1954] AC 360, at p 373.

Although lessons can be learnt from existing approaches to ALARP, it does not indicate what level of injury society is likely to accept from AVs.

As safe as a competent and careful human driver

- 2.45 The UNECE Regulation states that ALKS should minimise risks at least to the level of a competent and careful human driver. If applied in full, this is a high standard to meet. AVs may introduce significant improvements in some scenarios, while failing to be quite as good as humans in others. If regulators disallow automated driving until it is as good as (the best) humans in every situation, society might be deprived of the overall safety benefits for many years.

Does not cause a fault accident

- 2.46 An alternative standard is that an automated vehicle should not cause a fault accident. This draws on “the duty of care” as established in the law of negligence to compensate victims of accidents. Essentially, the test is as follows: if the behaviour had been performed by a human driver, would the driver be held liable for causing the accident under the law of negligence?
- 2.47 Considerable work is being carried out to capture legal standards in mathematical models. Mobileye (an Intel company) has proposed a mathematical model “to formalize an interpretation of the duty of care law”, which they term “Responsibility-Sensitivity Safety” (RSS). RSS takes common sense rules and converts them into algorithms which can be programmed into automated driving systems to form a “safety envelope”.
- 2.48 The idea of a “safety envelope” which converts good driving into transparent mathematical expressions is now gathering pace. The Institute of Electrical and Electronics Engineers (IEEE) have set up a working group to develop a standard based on the RSS approach. Similarly, EasyMile refers to a “safety corridor” and Nvidia have proposed a “Safety Force Field”. The ALKS Regulation also prescribes detailed separation distances and includes formulas for reacting to “cut-in” vehicles.
- 2.49 The approach has many advantages:
- (1) It is transparent. The logic of the decision making is easier to explain compared with systems that rely more heavily on deep neural networks and machine learning.
 - (2) It is robust. Once the safety parameters are set, they only change if a deliberate decision is taken to alter them.
 - (3) It is achievable. It does not require complex simulations or billions of miles of driving to establish safety.
- 2.50 However, it is not a guarantee of safety. There will always be circumstances that are not captured by the rules, even if one attempts to be comprehensive. And even if a scenario is captured, the mathematical rules will never catch all the contextual aspects which lead road users, lawyers and courts to blame a driver for what has happened.

A positive risk balance

- 2.51 The final standard by which safety can be measured is whether the AV is “safer than the average human driver”. An influential 2019 paper by a consortium of auto manufacturers talks of “a positive risk balance” compared to human driving performance.⁷ In other words, AVs must result in fewer overall casualties than human driving. This has an intuitive logic: if AVs produce fewer casualties, it would seem wrong not to allow them on the roads.
- 2.52 However, the idea of a “positive risk balance” encounters three issues. These relate to public perception, equity and measurement.

Public perception

- 2.53 People are more attuned to what has happened than to what has not happened. Eventually, someone will be killed or seriously injured by an AV. The victim will be a real person; their picture will appear in the media, inspiring considerable sympathy. By contrast, those who did not die (because AVs prevented the incident) are not identifiable people. They are faceless.
- 2.54 In these circumstances, developers, regulators and politicians will need to make the case for AVs, producing figures showing an overall decline in injury rates. This may not be an easy sell. As discussed below, robust data will be needed.

Equity

- 2.55 People are less prepared to accept risks if their distribution is seen as unfair. An overall reduction in risk may not be persuasive if the reduction is enjoyed by one group (such as car occupants) while the additional risks are experienced by another group (such as vulnerable road users).
- 2.56 Concern about unfair risk allocation is particularly acute if a group is adversely affected on the basis of race, sex, age, disability or other protected characteristics.⁸ The Equality Act 2010 prohibits imposing detriment on people on the basis of protected characteristics in various circumstances. Furthermore, regulators of AVs (as public authorities) are subject to the public sector equality duty. They must, in the exercise of their functions, have due regard to eliminating discrimination and advancing equality of opportunity for persons with protected characteristics.⁹
- 2.57 Bias has sometimes crept into the design of vehicles and automated systems. Air bags save many lives, but the first generation of air bags posed risks to smaller

⁷ Safety First for Automated Driving at: <https://www.daimler.com/innovation/case/autonomous/safety-first-for-automated-driving-2.html>.

⁸ The protected characteristics are set out in s 4 of the Equality Act 2010: age; disability; gender reassignment; marriage and civil partnership; pregnancy and maternity; race; religion or belief; sex; and sexual orientation.

⁹ Equality Act 2010, s 149.

passengers because they were developed with adult males in mind.¹⁰ Current facial recognition software may apply more accurately to white, male faces.¹¹

- 2.58 The redistribution of risk from one group to another raises ethical issues. The current law already obliges AV regulators to have due regard to eliminating discrimination and advancing equality. We welcome practical suggestions for how this can be done.

Measurement

- 2.59 To show a “positive risk balance”, the regulator will need to monitor collisions caused by self-driving vehicles compared with human drivers. This will not be an easy task. In Chapter 10 we provisionally propose that the in-service safety assurance regulator should be under a statutory duty to collect comparative data.

A political decision informed by technical expertise

- 2.60 There is no single or easy test for deciding whether a vehicle is safe enough. We welcome observations on all four standards.
- 2.61 The overarching question is: will the remaining risks be acceptable to the public? That question is quintessentially political. The AEV Act 2018 places the decision on whether a vehicle is capable of safely driving itself on the Secretary of State. It also affords the Secretary of State some discretion (“in the Secretary of State’s opinion”).
- 2.62 The Call for Evidence suggested that the Secretary of State’s list might simply reference a UNECE regulation. On this basis, if a system is approved under a listed UNECE regulation by a type approval authority within one of the 56 UNECE countries, it would be deemed safe enough for British roads.
- 2.63 In our view the decision over whether the risks of self-driving are acceptable to the public should be taken at national level. It will be difficult to take a blanket approach to all ALKS: some may be sufficiently safe while others may not be. Referring issues of safety to a UNECE regulation also risks confusing whether a system meets technical standards with a separate question: is the vehicle (together with the processes surrounding it) safe enough to be acceptable to the British public?
- 2.64 The Secretary of State’s decision can (and should) be informed by technical experts. However, there will always be some risk. Whether this remaining risk is acceptable is a political decision. We seek views on our provisional proposal that the decision whether a vehicle is sufficiently safe to “safely drive itself” should be made by the Secretary of State, as informed by advice from a specialist regulator.

¹⁰ See D Glassbrenner, *Estimating the Lives Saved by Safety Belts and Air Bags*, paper 500.

¹¹ See S Lohr, “Facial Recognition Is Accurate, if You’re a White Guy” (9 February 2018) *NY Times*, <https://www.nytimes.com/2018/02/09/technology/facial-recognition-race-artificial-intelligence.html>.

Consultation Question 3.

- 2.65 We provisionally propose that the decision whether a vehicle is sufficiently safe to “safely drive itself” should be made by the Secretary of State, as informed by advice from a specialist regulator.

Do you agree?

Consultation Question 4.

- 2.66 We welcome observations on which of the following standards is most appropriate when assessing the safety of automated vehicles:

- (a) as safe as a competent and careful human driver;
- (b) as safe as a human driver who does not cause a fault accident;
- (c) overall, safer than the average human driver.

Consultation Question 5.

- 2.67 We welcome observations on how automated vehicles can be made as safe as reasonably practicable.

Consultation Question 6.

- 2.68 We welcome practical suggestions for how AV regulators can fulfil their public sector equality duty.

3. Safety assurance before deployment

THE CURRENT LAW

- 3.1 Currently, all models of motor vehicles must receive regulatory approvals before they can be put on the market. The legal system has been based on three levels of decision making: the United Nations Economic Commission for Europe (UNECE); the European Union; and nation states. This is set to change. From 1 January 2021, Great Britain will follow UNECE vehicle standards and set national standards but will no longer be bound to follow EU law.
- 3.2 This is a major change, which we describe in detail in Chapter 6. It means that Great Britain now has more scope to set its own standards. In our first consultation paper we limited our proposal for a new national safety approval scheme to modifications and small series, to comply with EU law. That limitation is no longer necessary, and we now provisionally propose a wider scheme.

International obligations to accept systems with national competence on use

- 3.3 The UK remains a contracting party to the UNECE 1958 agreement to harmonise technical standards for vehicles and parts. This means that once the UK has “applied a UN regulation”, it is obliged to accept all systems approved under that regulation for “placement onto its market”.¹²
- 3.4 The UNECE, however, does not regulate traffic law. Nor does it affect the civil or criminal liabilities of drivers. Nation states have jurisdiction to decide whether to treat a system as self-driving for purposes of allowing other activities or of removing drivers’ criminal liability.
- 3.5 This point is made explicit in international resolutions. In December 2020, seven countries submitted a draft resolution on “activities other than driving” to UNECE Working Party 1. The draft resolution sets criteria for allowing users to undertake non-driving related tasks while an ADS is engaged. One criterion is that “the driver” complies with national traffic laws on activities other than driving. The point is also included with the ALKS Regulation which states that provisions about use of the onboard displays are “without prejudice to driver behaviour rules on how to use these systems in the Contracting Parties”.¹³
- 3.6 In September 2020 Working Party 1 amended the Vienna Convention on Road Traffic 1968 to deal with self-driving vehicles. The amendment (Article 34 bis on “automated driving”) clarifies that an ADS might be approved under either domestic or UN

¹² UNECE revised 1958 agreement, Art 3(2).

¹³ ALKS Regulation, Introduction.

regulations. In either case, the ADS must *also* comply with domestic legislation governing the way it operates.¹⁴

- 3.7 We therefore distinguish between two decisions. The first is whether to authorise a system for placement onto the market. The second is whether to classify the system as self-driving for purposes of civil and criminal liability and allowing the user to carry out activities other than driving.

METHODS FOR ASSESSING SAFETY PRE-DEPLOYMENT

- 3.8 In Chapter 7 we discuss testing methods, whether on a track or road or in simulation. There is no perfect method: a mix will be needed.
- 3.9 A key question is how far to rely on self-certification by manufacturers and how far to require testing by third parties. When we consulted on this issue in 2018, almost all consultees wanted some element of third-party testing. However, even with some external tests, much of the assessment is likely to rely on an audit of safety case documents submitted by the manufacturer or developer. Safety cases are widely used in other jurisdictions and in other high-risk industries in the UK. We see them as a crucial part of the approval process.
- 3.10 We also note the current emphasis on developing databases of scenarios to test in simulation. One challenge will be to include a sufficiently wide variety of scenarios. In response to Consultation Paper 1, many groups told us that AVs must be tested in their dealings with all possible road users. We seek views on whether road user groups should be consulted on the range of scenarios to be included.

Consultation Question 7.

- 3.11 We provisionally propose that:
- (1) safety assessment should use a variety of techniques;
 - (2) manufacturers/developers should submit a safety case to regulators showing why they believe that the automated driving system is safe;
 - (3) regulators should:
 - (a) provide guidelines for what is in the safety case;
 - (b) audit the safety case;
 - (c) prepare guidance for manufacturers and developers on preferred standards; and
 - (d) carry out at least some independent tests.

Do you agree?

Consultation Question 8.

- 3.12 We seek views on whether an approval authority that intends to use a scenario database as part of the testing procedure should consult road user groups on the range of scenarios to be included.

¹⁴ UNECE, Revised Amendment proposal to the 1968 Convention on Road Traffic (10 July 2020), ECE/TRANS/WP.1/2020/1/Rev.1, Explanatory Memorandum, para 8.

A TWO-STEP PROCESS

3.13 In Chapter 8 we provisionally propose a two-step process to approve an ADS and to categorise a vehicle as self-driving. To place an ADS onto the market, manufacturers would have a choice. They could either:

- (1) apply for type approval at international (UNECE) level; or
- (2) apply under the national ADS approval scheme for GB-only type approval.

3.14 However, ADS approval would not, of itself, decide whether a vehicle met the test of being able to safely drive itself without being monitored by an individual. Categorising a vehicle as self-driving would be a second, separate stage of the process.

3.15 This two-step process is set out in the following diagram:

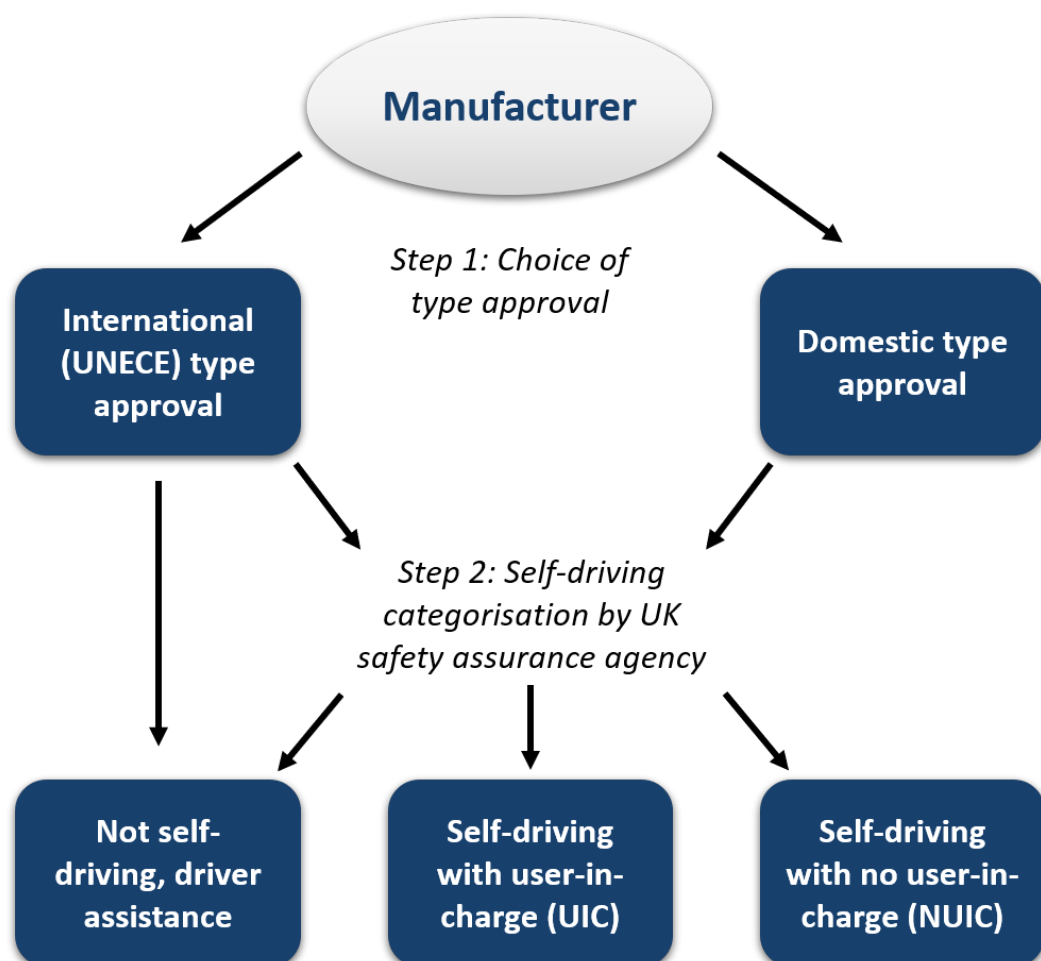


Figure 3.1: The two-step authorisation process

STEP 1: A CHOICE OF INTERNATIONAL OR NATIONAL TYPE APPROVAL

Every ADS must be approved

- 3.16 In Consultation Paper 1 we tentatively proposed a prohibition on unauthorised ADS. This received near universal support. We therefore repeat the proposal here, subject to an exemption procedure for trials.

Consultation Question 9.

- 3.17 We provisionally propose that:
- (1) unauthorised automated driving systems should be prohibited; and
 - (2) this should be subject to an exemption procedure by which the Secretary of State may authorise unauthorised systems to be used in tests and trials.
- Do you agree?

Establishing a national ADS approval scheme

- 3.18 It is likely that most manufacturers selling mass produced vehicles across borders will continue to seek international approval. However, where vehicles are deployed in limited local contexts, a national approval system could authorise systems without waiting for UNECE agreement. By developing its own scheme, Great Britain would be in position to pioneer the development of AVs in localised contexts, allowing new forms of highly automated passenger and freight services.
- 3.19 Under UN Regulations, system approval can only be sought by the manufacturer who assembles the whole vehicle. By contrast, we provisionally propose that national approval should also be open to software developers who install systems into existing vehicles.
- 3.20 In our view, setting up a national ADS approval scheme does not require primary legislation: it could be done through existing regulations. The scheme would approve the ADS rather than a vehicle: that is, it would approve the combination of hardware, software and sensors needed to drive the vehicle. However, the approval would need to be accompanied by specifications for the type of vehicle into which it can be installed, and the way it is installed in that vehicle. Both manufacturers and developers would need to submit an example vehicle to the regulator.
- 3.21 The scheme should be subject to an appeal procedure. We welcome observations on how the current appeal system works and whether it is suited to the proposed national ADS approval scheme.

Consultation Question 10.

3.22 We provisionally propose that:

- (1) the Government should establish a domestic scheme to approve automated driving systems (ADSs) for use on roads in Great Britain (a “national ADS approval scheme”);
- (2) manufacturers should have a free choice to apply for approval under either the UNECE system of international type approvals or through the national scheme;
- (3) developers should be able to submit an ADS for national approval, even if they are not responsible for manufacturing the whole vehicle.

Do you agree?

Consultation Question 11.

3.23 We provisionally propose that:

- (1) an ADS approval scheme should be established through regulation under the Road Traffic Act 1988, without further legislative reform;
- (2) an ADS should be defined as a combination of software, hardware and sensors, which can be installed in a “type” of vehicle;
- (3) when an ADS is approved, the approval should be accompanied by specifications for:
 - (a) the type of vehicle in which it can be installed; and
 - (b) how the ADS is installed within the vehicle;
- (4) where an ADS is installed in a pre-registered vehicle, an example vehicle should be submitted to the regulator for approval of the installation.

Do you agree?

Consultation Question 12.

3.24 We invite observations on the appeal process in regulation 19 of the Road Vehicles (Approval) Regulations 2020, including:

- (1) how it works in practice; and
- (2) how well it is suited to the proposed national ADS approval scheme.

STEP 2: CATEGORISING A VEHICLE AS ABLE TO DRIVE ITSELF SAFELY

3.25 Once an ADS has received type approval, the next step will be to assess whether the vehicle can safely drive itself without being monitored by an individual. As discussed, we see this as a decision for the Secretary of State, as informed by an expert evaluation by a regulator.

3.26 This would place the vehicle into one of three categories. The first is that it is not self-driving, in which case the ADS could be used as driver assistance. If the vehicle is self-driving, it would be categorised either as self-driving with a user-in-charge; or as self-driving without a user-in-charge.

Categorising the whole vehicle and its surrounding processes

- 3.27 While national or international type approval is largely concerned with verifying systems against technical specifications, the categorisation decision is wider and more holistic. It looks at the whole vehicle as embedded in safe processes. It involves considering every aspect of how the vehicle will be used, asking a range of questions. Can the vehicle comply with traffic laws? How will software and maps be updated? Are users' responsibilities clearly communicated? Do users understand their repair and maintenance obligations?

Assessing the ADSE

- 3.28 The ADSE is the manufacturer or developer who puts the vehicle forward for categorisation as safe self-driving. As well as assessing the vehicle, experts will also need to assess the ADSE.
- 3.29 The ADSE must put its name to a safety case which accompanies the application for categorisation. It will need to show that it has been sufficiently involved in assessing safety that it can vouch for the information in it. If the information is inaccurate, the ADSE or its senior managers might be guilty of a serious criminal offence, as discussed in Chapter 14.

Appropriate financial standing

- 3.30 The ADSE will be subject to regulatory sanctions if things go wrong. As discussed in Chapter 11, it could be required to update software, fined for continuing breaches or required to recall its vehicles. Therefore, an ADSE must have sufficient financial resources to meet these obligations, accessible within the UK to the regulator.
- 3.31 At this stage we do not prescribe the level of resources. The legislation should set out the principle, which could then be supplemented by regulations and guidance. This would allow the total amount to be linked to the number of vehicles and to be demonstrated in a variety of ways (such as bank guarantees or insurance policies).

A need for legislative change

- 3.32 The current system for listing a vehicle as self-driving is set out in section 1 of the Automated and Electric Vehicles Act 2018. There is much in the current legislation which we endorse. We think that the decision should be made by the Secretary of State; that the decision should relate to the vehicle as a whole; and that the vehicle must be able to safely drive itself even if it is not being monitored by an individual in the vehicle.
- 3.33 However, the simplicity of section 1 contrasts sharply with the statutory scheme for type approval, which contains many regulation-making powers. Given the complexities of the categorisation decision, we think that it would be useful to legislate for regulation-making powers to set standards and establish decision-making procedures. Regulations would bring some parliamentary oversight and formality to the process, while still allowing sufficient flexibility to learn from experience.
- 3.34 We also think that the decision is sufficiently important that an ADSE aggrieved by a decision should have a right of appeal. We ask if the legislation should include appeal

provisions similar to those in regulation 19 of the Road Vehicles (Approval) Regulations 2020.

Consultation Question 13.

3.35 We provisionally propose that:

- (1) once an ADS has received type approval at either international or domestic level, an Automated Driving System Entity (ADSE) would need to submit the vehicle to the UK safety regulator for categorisation as able to safely drive itself;
- (2) the safety regulator should make a recommendation to the Secretary of State for how the vehicle should be classified;
- (3) it should be open to the safety regulator to recommend that an ADS-enabled vehicle is classified in one of three ways: as not self-driving but driver assistance; as self-driving only with a user-in-charge; or as self-driving without a user-in-charge;
- (4) the safety regulator should only recommend classification as self-driving (either with or without a user-in-charge) if it is satisfied that:
 - (a) an ADSE is registered as taking responsibility for the system;
 - (b) the ADSE was closely involved in assessing safety and creating the safety case; and
 - (c) the ADSE has sufficient funds accessible to the regulator to respond to improvement notices, to pay fines and to organise a recall.

Do you agree?

Consultation Question 14.

3.36 We provisionally propose that a new legislative framework should provide regulation-making powers to specify:

- (a) who should assess whether a vehicle is capable of self-driving;
- (b) the procedure for doing so; and
- (c) criteria for doing so.

Do you agree?

Consultation Question 15.

3.37 We seek views on whether the new legislation should include provisions for appeals against a categorisation decision. If so, should these be similar to those in regulation 19 of the Road Vehicles (Approval) Regulations 2020?

A POWER TO ALLOW SELF-DRIVING VEHICLES IN LIMITED NUMBERS

3.38 In Consultation Paper 1, we discussed the RAND Corporation's proposal for a graduated approach to deploying AVs. At first, manufacturers would provide regulators with evidence from their own trials. The regulator could then allow a small number of vehicles to be deployed commercially, to gather more data. Once safety had been demonstrated, the number of vehicles would be increased.

- 3.39 In our second consultation we saw particular benefits in taking a phased approach to passenger services. Limited deployment would allow operators to show that the service could be managed safely, without disrupting traffic flow. A majority (64%) of respondents agreed that there should be a power to limit the number of vehicles for an initial period, though there was no consensus on how long this period should be.
- 3.40 Here we seek views on whether the regulator which classifies vehicles as self-driving should have similar powers to permit self-driving vehicles to be deployed, but only in limited numbers. The purpose would be to gather data to assess vehicles in real world conditions.

Consultation Question 16.

- 3.41 We seek views on whether the regulator that classifies vehicles as self-driving should have power to allow their deployment in limited numbers, so as to gather further data on their safety in real world conditions.

4. Assuring safety in use

- 4.1 Traditionally, the UNECE approach to vehicle standards has been to focus on approving vehicles before they are deployed. Fewer resources have been put into ensuring that vehicles are safe in use on the roads.
- 4.2 With AVs, safety assurance will be required on an ongoing basis. This is partly because AVs develop as their software is updated. It is partly because the technology is unknown: one cannot be sure that AVs are safe until they have been observed under real world conditions. Vehicles also have relatively long lifespans, during which roads, road users and laws change. The average car lasts just under 14 years, while buses, coaches and trucks last longer. Even if an AV complies with driving rules at the time it is approved, it may no longer do so several years later.

IS THE CURRENT LAW ADEQUATE?

- 4.3 In Chapter 9 we set out the current law on “market surveillance” (that is, actions by public authorities to assess products already on the market). Until 2016, there were no market surveillance provisions specifically for motor vehicles. Instead, vehicles were subject to the general provisions which applied to all consumer products.
- 4.4 The emissions scandal in 2015 illustrated weaknesses in how vehicles were assessed in-service. Since then, new measures have been implemented at both domestic and EU level. The measures focus heavily on emissions and have led to a complex legal landscape.
- 4.5 The Government has legislative authority under regulation 36 of the General Product Safety Regulations 2005 to establish a sectoral surveillance programme specifically for AVs. A surveillance authority could receive complaints and work with manufacturers to resolve problems. It would have formal powers to issue recall notices; to suspend or prohibit the supply of ADSs; and require warnings about how they are used. It could also bring criminal prosecutions against producers and distributors who supply unsafe products. This would provide the bare bones of a scheme to assure the safety of AVs while they are in-use on the road.
- 4.6 However, this would not deal with all the challenges of assuring that AVs are safe and law abiding while they are in-use. We therefore provisionally propose an enhanced scheme, with additional statutory responsibilities and powers.

NEW CHALLENGES

- 4.7 In Chapter 10 we discuss five challenges of assuring the safety of AVs while they are on the road. These are regulating software updates; cybersecurity; updating maps; communicating information to users; and collecting data to compare automated and conventional driving.

Software updates

- 4.8 In June 2020, the UNECE adopted a new regulation on software update processes. This requires manufacturers to have a clear system to assess and record software updates. It appears that where an update would affect a system's type approval, the manufacturer must return to the authority which provided the original type approval. However, the way this will work in practice is unclear. Furthermore, there are no specific provisions to require manufacturers to issue updates when laws and circumstances change.
- 4.9 In Chapter 10 we discuss an example where a manufacturer obtains type approval for an ADS from the Luxembourg type approval authority, certifying that the vehicle complies with UK laws. An aspect of UK law then changes. We think that UK regulators should have powers to require an update in these circumstances. When the update is produced, it may be simpler and quicker for the manufacturer to first deal with the UK regulator (who understands the legal change) rather than return to Luxembourg for approval.
- 4.10 In our view, an ADSE should be under a continuing duty to ensure that an ADS acts safely and in compliance with the law. If it is necessary to update software to achieve this goal, the ADSE should do so. We ask if regulators should have powers to compel software updates and to approve updates that apply only within Great Britain.

Cybersecurity

- 4.11 Cybersecurity for automated vehicles lies outside the remit of the Law Commissions' work. The UNECE recently adopted a new UN Regulation on cybersecurity management systems while the Centre for Connected and Autonomous Vehicles is leading on cybersecurity at the national level.
- 4.12 However, the new regulatory structure will need to assign responsibility for ensuring cybersecurity to an appropriate regulator. We therefore welcome views on where institutional responsibility for cybersecurity should sit.

Keeping maps up-to-date

- 4.13 Developers differ in their approach to maps. Some rely on high-definition maps which are completely different from those used by conventional cars. Typically, these maps are created using a vehicle to drive the route to collect data, which is then subject to both automated and human processing.
- 4.14 At present, in UNECE countries, there are no legal mechanisms to compel map updates. This differs from the Californian approach. When applying for a permit to deploy an AV in California, a manufacturer must certify that it will make available updates "pertaining to location and mapping" where this is necessary for the safe operation of the vehicle.
- 4.15 We provisionally propose that where maps are necessary for the safe and legal operation of an ADS, the ADSE should be under a duty to keep maps up-to-date. Again, regulators will need to enforce this obligation. We seek views.

Consumer information, marketing and training

- 4.16 There is growing evidence that drivers are already confused about the capabilities of advanced driver assistance features. In response to our first consultation, many respondents called for greater oversight of how automated features are marketed. Responses to the Call for Evidence on ALKS also emphasised the need for manufacturers to provide training, through (for example) high quality videos and online courses. There are existing powers to regulate consumer information and marketing, but the institutional structures for enforcing this obligation are diffuse.
- 4.17 Ensuring that users understand the limits of the system is often safety critical. We therefore provisionally propose that regulators should have powers to require an ADSE to communicate information about an ADS to users in a clear and effective way, including (where necessary) through training. Again, see seek views.

Collecting and comparing safety data

- 4.18 In Chapter 5 we describe measuring comparative safety as essential if the public are to have faith in AV technology. However, these comparisons are far from easy.
- 4.19 In Chapter 10 we explore a range of possible measures. These include “leading measures” of bad driving (such as traffic infractions) and “lagging measures” where harm has resulted (such as casualties). All have their strengths and weaknesses. Any system to compare safety will need to devise comparison measures and gather appropriate data for both automated and conventional driving.
- 4.20 In our view, this will require specialist, dedicated expertise over a period of time. We provisionally propose that scheme regulators should be under a statutory duty to devise measures to compare the safety of automated and conventional vehicles. Regulators will need sufficient powers to collect the required data.

AN ENHANCED LEGISLATIVE SCHEME

- 4.21 To respond to these challenges, we provisionally propose legislation to provide an enhanced scheme to assure AVs when they are in-use on the roads. In our view, the scheme requires additional statutory responsibilities and powers. We therefore seek views, both on the principle of an enhanced scheme and on what the additional responsibilities and powers should be.

Consultation Question 17.

- 4.22 We provisionally propose that legislation should establish a scheme to assure the safety of automated driving systems following deployment, giving scheme regulators enhanced responsibilities and powers.

Do you agree?

Consultation Question 18.

- 4.23 We provisionally propose that the enhanced scheme should give regulators the following responsibilities and powers:

- (1) scheme regulators should be responsible for comparing the safety of automated and conventional vehicles using a range of measures;
- (2) to do this the regulator should have power to collect information on:
 - (a) leading measures (instances of bad driving which could have led to harm) and
 - (b) lagging measures (outcomes which led to actual harm);
- (3) regulators should have power to require an ADSE:
 - (a) to update software where an update is needed to ensure safety and continued compliance with the law;
 - (b) to keep maps up-to-date, where an AV relies on maps to ensure safety and compliance with the law;
 - (c) to communicate information about an ADS to users in a clear and effective way, including where necessary through training.

Do you agree?

Consultation Question 19.

- 4.24 We welcome views on the following issues:

- (1) Should scheme regulators be empowered to approve software updates that apply only within the UK, without requiring the manufacturer to return to the original type approval authority?
- (2) Should the scheme should also deal with cybersecurity?
- (3) Are other powers needed? (Note that data is discussed in Chapter 17.)

Institutional arrangements: one body or two?

- 4.25 In our first consultation paper we asked if the scheme which authorised ADSs before deployment should also assure their safety when on the roads. Most consultees (73%) said that both responsibilities should be combined in a single body. It was thought that a single body would bring together expertise and would stop problems from falling between demarcation lines.

- 4.26 However, the most recent EU regulation on vehicle standards requires that approval authorities and market surveillance authorities should be kept separate “to avoid potential conflicts of interest”.¹⁵ The fear is that the authority which approved an ADS might be reluctant to accept that it is dangerous. It might have established a close

¹⁵ Regulation 2018/858, art 6(1).

working relationship with the manufacturer, and therefore be subject to “regulatory capture”.

- 4.27 Another argument is that a “two body” structure builds on the expertise that already exists. At present, in the UK, type approval is a matter for the Vehicle Certification Agency (VCA) while market surveillance is carried out by the Driver and Vehicle Standards Agency (DVSA). Several respondents praised the high reputation of these agencies and saw no compelling reasons for change.
- 4.28 Given the significant regulatory developments since 2018, we are reconsulting on this issue. We welcome views on whether all safety assurance duties should be combined in a single body, or whether pre-deployment safety assurance should be separated from the in-use safety assurance scheme.
- 4.29 We also welcome views on how to guard against regulatory capture by ensuring that regulators are open to wider views. This might include formal duties to consult or an advisory committee that brings in road user and safety groups.

Consultation Question 20.

- 4.30 Should the authority administering the scheme to assure safety while automated vehicles are in use be kept separate from type approval authorities (as is already the case)? Alternatively, should both functions be combined in a single body?

Consultation Question 21.

- 4.31 What formal mechanisms could be used to ensure that the regulator administering the scheme is open to external views (such as duties to consult or an advisory committee)?

A NEW SYSTEM OF REGULATORY SANCTIONS FOR BREACH OF TRAFFIC RULES

- 4.32 At present, drivers who break the law are subject to criminal and civil penalties. These are imposed on a large scale. In England and Wales in 2018, the police recorded 2.5 million motoring offences, mostly for exceeding speed limits. In addition, local authorities are estimated to have issued over two million penalty charge notices relating to bus lane, box junction and other moving traffic infringements.
- 4.33 AVs should be considerably more law abiding, so much of this enforcement may no longer be necessary. However, infractions may still occur. This leads to questions about how an ADSE should be sanctioned if an AV breaks traffic rules.
- 4.34 When we consulted on this issue in 2018, there was widespread agreement that if an offence appears to have been caused by an ADS, the police should refer the matter to a regulatory authority for investigation. Where the ADS had acted in a way which would be a criminal offence if done by a human driver, the regulatory authority should have powers to apply a range of regulatory sanctions to the ADSE, including improvement notices, fines and recalls.
- 4.35 This continues to be a central plank of our proposed scheme. Many infractions raise direct safety concerns: examples are speeding; running red lights; or observed

instances of dangerous driving. Other civil contraventions may be less safety critical, such as those related to box junctions or of bus lanes. However, they are still against the public interest and evidence that something has gone wrong.

- 4.36 We have considered whether an ADSE should, in some circumstances, face the same penalty as a human driver. If a human driver would receive a £130 fine for entering a box junction, should the ADSE also pay £130?
- 4.37 We think not, as human drivers and ADSEs do not respond to penalties in the same way. Often an ADSE would find it easier and cheaper to pay the fine than to address the underlying issue. However, we are aware of the desire for parity between human drivers and AVs and seek views.

Consultation Question 22.

- 4.38 We provisionally propose that a statutory scheme to assure AVs in-use should:
- (1) investigate safety-related traffic infractions (such as exceeding the speed limit; running red lights; or careless or dangerous driving);
 - (2) investigate other traffic infractions, including those subject to penalty charge notices;
 - (3) if fault lies with the ADSE, apply a flexible range of regulatory sanctions.
- Do you agree?

The range of regulatory sanctions

- 4.39 There has been a general move away from criminal prosecution towards regulatory sanctions in many industries. In Chapter 11 we consider the range of sanctions available in other regulatory regimes, including financial services, energy and consumer protection.
- 4.40 In addition to warnings, and fines, some regulators use redress orders to compensate those affected by an infraction. For example, following a power outage in August 2019, three energy firms agreed to pay £10.5 million into Ofgem's redress fund to compensate homes and businesses left without electricity. Redress orders would not be needed to compensate those injured by AVs, who would receive damages from the insurer. However, they could compensate for wider harms. For example, if AVs repeatedly misused bus lanes, the ADSE could make a payment to the bus company to compensate passengers for longer journey times.
- 4.41 Another new development is the use of restorative conferences. These bring together those most directly affected by an incident to discuss what needs to be done to repair a harm and prevent a reoccurrence. Restorative conferences are voluntary rather than mandatory. However, the regulator could recommend (for example) that following a serious injury, senior managers from the ADSE should meet the victim to discuss why the incident happened and what steps were being taken to ensure that it never happened again. We welcome views on these possibilities.

Consultation Question 23.

4.42 We provisionally propose that the regulator which assures the safety of AVs in-use should have powers to impose the following sanctions on ADSEs:

- (1) informal and formal warnings;
- (2) fines;
- (3) redress orders;
- (4) compliance orders;
- (5) suspension of authorisation;
- (6) withdrawal of authorisation; and
- (7) recommendation of attendance at a restorative conference.

Do you agree?

Consultation Question 24.

4.43 We provisionally propose that the legislation should provide the regulator with discretion over:

- (1) the amount of any monetary penalty; and
- (2) the steps which should be taken to prevent re-occurrence of a breach.

Do you agree?

COLLISION INVESTIGATION

4.44 The UK has specialised branches to investigate the causes of aviation, rail and maritime incidents, but does not have a specialist road investigation branch. In Consultation Paper 1 we asked if the new challenges of AVs required specialist expertise to identify patterns and investigate high-profile collisions.

4.45 Responses were mixed. Many safety groups called for a new “collision investigation branch”. They thought that a new body would have specialist expertise, be able to analyse trends and take a no-blame approach to investigations. Other respondents had reservations. Some cited the cost of setting up a standalone collision investigation branch and the risk of duplicating work already undertaken by the police.

4.46 Police stakeholders emphasised their existing expertise: they can, for example, attend the scene quickly and close roads. Nevertheless, some police stakeholders were cautiously supportive of a more limited unit to investigate the most high-profile collisions and to analyse trends.

4.47 Overall, we think that a specialist unit would be useful. It could develop expertise, share lessons learnt and make recommendations about safety both to ADSEs and to regulators. Publishing recommendations might even promote compliance without formal sanctions, promoting a no-blame culture of safety. This would feed into a learning culture, where AVs becomes safer as the technology matures.

Consultation Question 25.

4.48 We provisionally propose that a specialist collision investigation unit should be established:

- (1) to analyse data on collisions involving automated vehicles;
- (2) to investigate the most serious, complex or high-profile collisions; and
- (3) to make recommendations to improve safety without allocating blame.

Do you agree?

ADAPTING ROAD RULES

4.49 Our starting point is that AVs should abide by current road rules. However, blind obedience to rules can cause problems. It may be incompatible with safety, as where a car fails to swerve into a bus lane to avoid a child. In other cases, rule following could impede traffic to an unacceptable extent.

4.50 We do not think it would be possible for government agencies to turn the Highway Code into algorithms that can be programmed into an ADS. However, it is possible to provide a more structured dialogue between developers and regulators on road rules. Even if regulators cannot provide precise rules, they can set out broad principles for developers to follow. They can also ensure good information conduits with developers, so that systems can adapt to the many new initiatives in this area.

4.51 We propose that the UK Government should establish a forum to collaborate on the application of road rules to AVs. The forum could, for example, provide guidance on interpreting indeterminate terms. It could also reconsider rules that hold up traffic. In the paper we discuss the example of whether it is ever acceptable for an AV to cross double white lines to pass a cyclist travelling at 11 miles an hour.¹⁶

4.52 We seek views on this proposal. We also welcome views on the forum's composition, the issues it should consider and its processes for public engagement.

Consultation Question 26.

4.53 We provisionally propose that the UK Government should establish a forum for collaboration on the application of road rules to self-driving vehicles.

Do you agree?

Consultation Question 27.

4.54 We welcome views on:

- (1) the issues the forum should consider;
- (2) the composition of the forum; and
- (3) its processes for public engagement.

¹⁶ At para 5.101.

5. Responsibilities of the user-in-charge

THE CONCEPT OF THE USER-IN-CHARGE

- 5.1 Under our proposals, once a vehicle is classified as self-driving, the person in the driving seat would no longer be a driver while the ADS is engaged. In Consultation Paper 1, we provisionally proposed that they should assume a new role: that of “user-in-charge”. Most (79%) of respondents supported this idea.
- 5.2 However, some queried whether a user-in-charge needed to be in the vehicle. Might they be in a remote control centre instead? In Consultation Paper 2 we confirmed that we envisaged the user-in-charge as someone who was in the vehicle, or at least in direct sight of the vehicle (as with automated parking, for example). Remote operation raises difficult policy issues, which we discuss separately.
- 5.3 We now define as user-in-charge as an individual in a position to operate the controls of a vehicle while an ADS is engaged and who is either in the vehicle or in direct sight of the vehicle. Under our proposals, every AV will need a user-in-charge, unless it is authorised to operate without one.
- 5.4 The main role of the user-in-charge is to take over driving, either following a transition demand or through conscious choice. They therefore need to be qualified and fit to drive. However, while the ADS is engaged, they would not be a driver. They would not be liable for any criminal offence or civil penalty which arises out of dynamic driving. They would, however, be subject to other driver responsibilities, such as carrying insurance and reporting accidents.

Consultation Question 28.

- 5.5 We provisionally propose that the user-in-charge:
 - (1) should be defined as an individual in a position to operate the controls of a vehicle while an ADS is engaged and who is either in the vehicle or in direct sight of the vehicle; and
 - (2) is not a driver while the ADS is engaged, and would not be liable for any criminal offence or civil penalty (such as a parking ticket) which arises out of dynamic driving.
- Do you agree?

FAILING TO RESPOND TO A TRANSITION DEMAND

- 5.6 Earlier, we said that it was reasonable to expect a user-in-charge to respond to a transition demand that provided clear multisensory alerts and gave the user sufficient time to gain situational awareness. As the first generation of self-driving vehicles are likely to rely on transition demands to be safe, it is important that the user-in-charge responds appropriately.

- 5.7 We propose that, following the end of the transition demand period, the user-in-charge would re-acquire the full legal obligations of a driver. Even if they have not taken control of the vehicle, they would be deemed to be a driver and their immunity for dynamic driving offences would cease. This does not mean that failing to respond to a transition demand would automatically be an offence. If the vehicle is able to park itself safely and legally at the side of the road, no offence will be committed.
- 5.8 Our aim is to provide a flexible penalty which depends on what happens after the demand period has ended. Initially, failing to respond is likely to lead to a serious criminal offence. As the sophistication of the ADS increases, the effect of such failure will become less significant. We seek views.

Consultation Question 29.

- 5.9 We provisionally propose that following the end of the transition demand period:
- (1) the user-in-charge should re-acquire the legal obligations of a driver, whether or not they have taken control of the vehicle; and
 - (2) if, following a failure to respond to a transition demand, the vehicle stops in a manner which constitutes a criminal offence, the user-in-charge should be considered a driver and should therefore be liable for that offence.
- Do you agree?

CRIMINAL LIABILITY FOR BEING UNQUALIFIED OR UNFIT TO DRIVE

- 5.10 A user-in-charge must be qualified and fit to drive. In Consultation Paper 1 we provisionally proposed that it should be a criminal offence for the user-in-charge not to hold a driving licence; to be disqualified; to be unfit to drive through drink or drugs; or to have alcohol levels over the prescribed limits. We also thought that existing driving licence rules regarding eyesight and disability should apply. Although AVs have the potential to benefit people who currently cannot drive for reasons of disability, this will be through vehicles authorised for use without a user-in-charge.
- 5.11 Consultees supported this offence and it now forms part of our proposed scheme. However, two further issues arise, relating to provisional licences and “causing or permitting” the offence.

Could a user-in-charge hold a provisional licence?

- 5.12 Should the user-in-charge hold a full licence, or would a provisional licence suffice? The argument for allowing a person with a provisional licence to engage an ADS is that it would enable new drivers to be trained in how to use these systems. The argument against is that responding to a transition demand could be difficult even for experienced drivers. It might be exceptionally challenging for a learner driver.
- 5.13 Until recently, those with provisional licences were not allowed to drive on motorways. In 2018, the law changed. Learner drivers are now able to take driving lessons on motorways, provided that they are accompanied by an approved driving instructor and

the car is fitted with dual controls.¹⁷ We seek views on whether the same compromise should apply to AVs.

Consultation Question 30.

- 5.14 We seek views on whether a person with a provisional licence should be allowed to act as a user-in-charge, if accompanied by an approved driving instructor in a vehicle with dual controls.

Causing or permitting

- 5.15 “Cause or permit offences” are common in road traffic law. We provisionally propose that it should also be a criminal offence to cause or permit an unfit or unqualified user-in-charge to use an AV.
- 5.16 A person would “cause” an unfit user-in-charge to use a vehicle if, for example, they opened the driving seat door, encouraged their inebriated friend inside and told them to switch on the ADS. An employer would “permit” the offence if they suspected that a worker had lost their licence but nevertheless allowed them to use an automated van that required a user-in-charge.

Consultation Question 31.

- 5.17 We provisionally propose that legislation should create new offences of:
- (1) using an automated vehicle as an unfit or unqualified user-in-charge; and
 - (2) causing or permitting the use of an automated vehicle by an unfit or unqualified user-in-charge.
- Do you agree?

A NEW OFFENCE: BEING CARRIED WITHOUT A USER-IN-CHARGE

- 5.18 In Consultation Paper 1, we proposed a new offence of allowing oneself to be carried without a user-in-charge. This offence targets situations where no one has access to the controls. We proposed that in such cases, all passengers would be guilty.
- 5.19 There was widespread agreement that this should be an offence. However, some consultees were concerned that the offence could apply to passengers who did not know that a user-in-charge was required in law or that there was no user-in-charge in fact. They may, for example, be blind or asleep.
- 5.20 In the light of these concerns, we seek views on whether it should be an offence to be carried in a vehicle without a user-in-charge knowing that there was no user-in-charge, in circumstances when the passenger knew or ought to have known that a user-in-charge was required.

¹⁷ The Highway Code, Rule 253.

Consultation Question 32.

- 5.21 We provisionally propose that persons carried without a user-in-charge should be guilty of a criminal offence. Do you agree?

Consultation Question 33.

- 5.22 We seek views on whether the new proposed offence of being carried without a user-in-charge should only apply if the person:
- (1) knew that the vehicle did not have a user-in-charge; and
 - (2) knew or ought to have known that a user-in-charge was required.

CRIMINAL LIABILITY FOLLOWING HANDOVER

- 5.23 Under our proposals, once a user-in-charge takes back control, they would become a driver and liable for any driving offences committed. In Consultation Paper 1, we consulted on whether this should be subject to a limited exception where the user-in-charge takes control to mitigate a risk caused by the ADS.
- 5.24 An example is an AV which mistakenly turns into a one-way street in the wrong direction. When the user-in-charge takes over, they should not be found guilty of driving in the wrong direction when there is little that the user-in-charge can do about it at that stage.
- 5.25 This caused some debate. Some consultees were keen to distinguish the above example from a situation where the ADS is about to take evasive action, but the user-in-charge's inappropriate intervention causes a collision.
- 5.26 Having reviewed several possible approaches to this issue, we favour a general rule that the person exercising control should be considered a driver. However, this would be subject to a limited defence to a criminal charge if, given the actions of the ADS, a competent and careful driver could not have avoided the offence.

Consultation Question 34.

- 5.27 We provisionally propose that a user-in-charge who takes over control of the vehicle:
- (1) should be considered a driver; but
 - (2) should have a specific defence to a criminal offence if, given the actions of the ADS, a competent and careful driver could not have avoided the offence.
- Do you agree? If not, we welcome views on alternative legal tests.

OFFENCES THAT DO NOT ARISE FROM THE DYNAMIC DRIVING TASK

- 5.28 The user-in-charge would not be a driver for the purpose of any criminal offence where the act (or failure to act) concerned use of the driver controls. However, the user-in-charge would bear criminal responsibility for other offences, such as those relating to insurance, parking, reporting accidents and ensuring that children wear seat belts.

- 5.29 The Road Traffic Act 1988 contains several offences of using a vehicle in an unroadworthy condition. In response to Consultation Paper 1, consultees pointed out that a user-in-charge may find it hard to know if an AV is unroadworthy, particularly if the problem lies with a software update.
- 5.30 At this stage, we think that the roadworthiness offences in the Road Traffic Act 1988 should continue to apply to users-in-charge. When self-driving features are used for only part of a journey, it would appear arbitrary to make a distinction depending on when the problem was observed. If it is an offence to drive the vehicle with a broken indicator, we think it should also be an offence to have the ADS engaged in that condition.
- 5.31 However, we are aware that ways to ensure roadworthiness are changing, as the sophistication of vehicles develops. We provisionally propose that the legislation should include a regulation-making power to adapt these offences for users-in-charge.

Consultation Question 35.

- 5.32 We provisionally propose that the user-in-charge should be liable for criminal offences which do not arise from the dynamic driving task, including those related to:
- (1) insurance;
 - (2) maintaining the vehicle in a roadworthy condition (including installing safety critical software updates);
 - (3) parking;
 - (4) duties following accidents to provide information and report accidents to the police; and
 - (5) ensuring child passengers wear seatbelts.
- Do you agree?

Consultation Question 36.

- 5.33 We provisionally propose that the legislation should include a regulation-making power to clarify those roadworthiness failings which are (and those which are not) the responsibility of the user-in-charge.
- Do you agree?

6. Remote operation: no user-in-charge vehicles

- 6.1 Some automated vehicles will not need a human to drive at any stage to complete a trip. In the absence of an agreed terminology, we refer to these as “no user-in-charge” vehicles, or NUICs. The defining feature of a NUIC is that it can travel without people in it. Alternatively, if there are people in the vehicle, they are merely passengers. They have no legal responsibility for the way that the vehicle drives and are under no obligation to take over the driving.
- 6.2 At the present stage of development, it appears that NUICs will require some level of supervision from a remote operation centre. In Chapter 13 we look at how remote operation might work and the challenges it brings. We provisionally propose that all NUICS should be supervised by a licensed fleet operator.

THE DIFFERENT MEANINGS OF “REMOTE OPERATION”

- 6.3 The term “remote operation” is used to mean different things. Recent work by the SAE and ISO distinguishes between three remote functions:¹⁸
- (1) **fleet operations** refers to essential non-dynamic driving tasks such as managing emergencies, dealing with the police, maintenance and insurance. We have adopted the term “fleet operations”, though these functions would also be needed for single, privately-owned vehicles.
 - (2) **remote driving** involves a remote human operator controlling the braking, steering, and acceleration. This is not regarded as automated driving.
 - (3) **remote assistance** allows a remotely-located human to tell an AV what to do next. The SAE/ISO give the example of an AV that “detects an object in its lane that seems too large to drive over” and stops. A human could use the vehicle’s cameras to identify the object as an empty bag and tell the AV to proceed.
- 6.4 We do not regard remote driving as self-driving and have not included it within our review. However, we view remote assistance as part of self-driving, even if some of the functions may appear to involve an element of monitoring. We ask if the definition of self-driving needs to be amended to include remote assistance.

¹⁸ The work is based on a joint working party between the Society of Automotive Engineers International and the International Organization for Standardization. See ISO/SAE Approved Working Item DPAS 22736/SAE J3016, *Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles* (November 2020 Draft). We are grateful to Steven Shladover and Siddhartha Khastgir for allowing us to use this not yet published draft.

Consultation Question 37.

- 6.5 We provisionally propose that:
- (1) where an individual is exercising lateral and longitudinal control (steering and braking) over a vehicle remotely, that should not be regarded as a form of “self-driving”; and
 - (2) where lateral and longitudinal control are exercised by an ADS, all other forms of remote operation should be regulated as “self-driving”.
- Do you agree?
- 6.6 We welcome views on whether the current definition of when a vehicle “drives itself” under the Automated and Electric Vehicles Act 2018 should be amended to deal with some forms of remote operation which may involve a degree of “monitoring”.

THE CHALLENGE OF REMOTE OPERATION

- 6.7 Remote operation of vehicles is a step into the unknown. Despite several trials and increased interest in the subject, there is little public information about how it might work.
- 6.8 In Chapter 13 we explore a variety of challenges, including connectivity; how to maintain situational awareness through a screen with no sense of motion; and how to combat boredom, distraction and inattention. We note regulations on rest periods for air traffic controllers and safety critical work in railway operation centres.
- 6.9 At this stage, we are not attempting to suggest how many vehicles can be supervised at once, what information should be displayed or what hours remote assistants might work. However, any legislation should be sufficiently flexible to deal with such issues.

A NEW SCHEME OF OPERATOR LICENSING

- 6.10 In Consultation Paper 2 we considered an operator licensing scheme for highly automated road passenger services (HARPS). Although our proposals were broadly welcomed, several consultees were concerned that the safeguards were confined to passenger services. They thought that a similar licensing system should apply to all self-driving vehicles which did not have a user-in-charge, including those which are privately owned. This has led us to rethink our proposals.

All NUICs should be covered by a licensed operator

- 6.11 We now propose a more streamlined scheme. Initially, all NUICs should be supervised and maintained by a licensed operator, irrespective of whether they are used for private or business purposes, and whether or not they carry passengers.
- 6.12 A private individual may still own a NUIC vehicle, but they must contract with a licensed operator for supervision and maintenance services, including installing software and maintaining cybersecurity. It would be a criminal offence to use a NUIC which is not covered by a licensed operator.

The distinction between and ADSE and the operator

- 6.13 Our scheme draws a distinction between the ADSE and the operator. The ADSE is responsible for the ADS design; the operator for day-to-day use. This dual approach contrasts with the position taken by the Uniform Law Commission in the USA. It proposes that a single “Automated Driving Provider” should covers all aspects of complying with the technical and legal requirements for AVs.
- 6.14 An advantage of taking an integrated approach is that a single organisation would take responsibility for all aspects of safety. If something goes wrong, the ADSE and operator could not blame each other. A disadvantage is that it would reduce competition. It could give a few major developers a monopoly of all automated passenger and freight services, reducing innovation in how these services are provided and increasing prices. We ask for views.

Consultation Question 38.

- 6.15 We provisionally propose that:
- (1) the regulation of self-driving vehicles should distinguish between an Automated Driving System Entity (which vouches for the design of the system) and an operator (responsible for the operation of individual vehicles);
 - (2) all vehicles authorised for use on roads or other public places with no user-in-charge should either:
 - (a) be operated by a licensed operator; or
 - (b) be covered by a contract with a licensed operator for supervision and maintenance services;
 - (3) it should be a criminal offence to use a NUIC vehicle on a road or other public place unless it is operated by a licensed operator or is covered by a contract with a licensed operator for supervision and maintenance services.

Do you agree?

Operator requirements

- 6.16 The requirements for NUIC operators would mirror the proposals we originally made for HARPS operators. A strong majority of consultees (76%) agreed that HARPS operators should be of good repute; have appropriate financial standing; have an effective and stable establishment in Great Britain; and be professionally competent. We think these requirements should also apply to NUIC operators.
- 6.17 In Consultation Paper 2 we proposed that professional competence should be demonstrated by having a suitable transport manager, as with public service vehicle licensing. Many consultees supported the idea, pointing out that many of the current transport management skills would continue to be relevant. Others, however, stressed the need for new skills in remote operation, software installation and technology. Developers thought we should move away from the idea of a single qualified individual. Instead organisations should demonstrate competence through a safety management system. We ask for views.

Consultation Question 39.

- 6.18 We welcome views on whether NUIC operators should be required to demonstrate professional competence through a safety management system, as set out in a safety case.

Operator duties: Tier 1

- 6.19 Under our new scheme, all licensed operators would need to comply with basic “Tier 1 duties”. Operators must take action if their vehicles are causing a danger or obstruction (which we refer to as “supervision”). They must also maintain and insure vehicles, install safety-critical updates and report accidents. We think that their duty to report accidents should go beyond the duty of all drivers under section 170 of the Road Traffic Act 1988. It should include responding to the regulator’s requests for information on other untoward events, together with background information about miles travelled.
- 6.20 The obligation to use a licensed operator would be subject to a regulation-making power. Regulations could be made to transfer some responsibilities (such as insurance) to those who own or use vehicles for private purposes, if it is safe to do so.

Consultation Question 40.

- 6.21 We provisionally propose that, irrespective of the nature of the vehicle, a licensed operator should be under a duty to:

- (1) supervise the vehicle;
- (2) maintain the vehicle;
- (3) insure the vehicle;
- (4) install safety-critical updates and maintain cybersecurity; and
- (5) report accidents and untoward events (as defined by the regulator).

Do you agree?

Consultation Question 41.

- 6.22 We provisionally propose that legislation should include a regulation-making power by which some or all of these duties could be transferred to the registered keeper or owner, if it was shown that it was appropriate to do so.

Do you agree?

Operator duties: Tier 2

- 6.23 Although supervision, maintenance, insurance and reporting would apply to all those who operated NIUCs, other duties would only apply to HARPS operators, who carry passengers as a commercial service. These include accessibility, safeguarding passengers and giving price information.
- 6.24 We envisage that other “Tier 2” duties may also apply to freight services, covering (for example) loading and coupling/uncoupling cabs and trailer. However, we have not

consulted on freight-specific requirements because our terms of reference focus on passenger transport. This issue will require further consideration.

National minimum accessibility standards for HARPS

- 6.25 Responses to our second consultation supported national minimum accessibility standards for automated passenger services, both for vehicle design and the whole HARPS user experience.
- 6.26 We wish to ensure that these minimum standards take account of the lived experience of disabled and older persons. We provisionally propose that, before setting standards, the Secretary of State should consult the Equalities and Human Rights Commission and disabled representative groups. The panel should also be re-consulted at set intervals to ensure requirements keep pace with technical advancements and changing needs. We seek views.

Consultation Question 42.

- 6.27 We welcome views on how accessibility standards for Highly Automated Road Passenger Services (HARPS) might be developed.
- 6.28 We provisionally propose that:
- (1) an accessibility advisory panel should be formed to include:
 - (a) the Equalities and Human Rights Commission; and
 - (b) representative groups for disabled and older persons;
 - (2) the Secretary of State should be obliged to consult with the accessibility advisory panel prior to setting any national minimum standards on HARPS;
 - (3) there should be a duty to periodically re-consult the accessibility advisory panel at set intervals to ensure requirements keep pace with developing evidence of technical feasibility and changing needs.
- Do you agree?
- 6.29 We welcome views on what the set interval for periodically re-consulting the accessibility advisory panel should be.

Who should administer the operator licensing scheme?

- 6.30 In Consultation Paper 2 we asked who should administer the scheme for HARPS operator licensing. This drew a variety of responses. Some consultees saw the Traffic Commissioners as the natural fit, as they have considerable experience of licensing passenger and freight operators. It would also mean that an operator which ran both automated and conventional services would only need to deal with one body.
- 6.31 Alternatively, responsibility could be placed on the in-use safety assurance regulator. This agency could develop expertise in the challenges of automated driving and would be able to resolve demarcation issues between the two schemes. Some consultees argued for a new body. Others mentioned bringing a variety of expertise together within new collaborative structures.
- 6.32 It is difficult to evaluate the strength of these approaches without a greater understanding of how NUICs will be used, or how far remote operation raises new

challenges. We continue to have an open mind on this issue and would welcome further observations.

Consultation Question 43.

6.33 We welcome views on who should administer the operator licensing scheme.

7. Criminal offences by ADSEs and their senior managers

- 7.1 In Consultation Paper 1 we asked whether we should “review the possibility of one or more new corporate offences, where wrongs by a developer of automated driving systems result in death or serious injury”. The great majority of consultees thought that we should carry out such a review. We therefore considered the existing offences which might apply in such circumstances: the results are set out in Appendix 3 of the full paper and discussed in Chapter 14.
- 7.2 Generally, we wish to encourage a no-blame safety culture. The emphasis is on resolving issues through regulatory action and learning for the future. However, criminal offences are appropriate for serious wrongdoing. As the regulatory system depends crucially on the ADSE’s safety case, the system would be vulnerable to dishonest behaviour. It would be extremely concerning if an ADSE:
- (1) misreported test results;
 - (2) suppressed poor test results;
 - (3) claimed to have carried out tests it did not carry out;
 - (4) installed defeat devices, so that the system responded differently in tests than in real life; or
 - (5) obtained confidential information about test scenarios, and then gamed the system by training only for the test and not for real life.
- 7.3 We have considered how such behaviour is dealt with in other high-risk industries. In most, there are specific criminal offences covering misrepresentations or non-disclosures to the regulator.
- 7.4 For example, the Human Medicines Regulations 2012 set out the UK framework for authorising medicinal products. Under regulation 95, it is an offence to “fail to provide” information “relevant to the evaluation of the safety, quality or efficacy of the product” to the regulator. It is also an offence to provide relevant information that is “false or misleading” in a material particular. This is subject to a defence if the defendant can show that they “took all reasonable precautions and exercised all due diligence to avoid commission of that offence”.

PROPOSED NEW OFFENCES

- 7.5 We provisionally propose new offences to apply where an ADSE omits relevant information or includes misleading information in its safety case, or in responding to the regulator’s requests for information.
- 7.6 As with the Human Medicines Regulations 2012, it would not be necessary to show that an individual knew or suspected that information was misleading or omitted.

Instead, the organisation would have a defence if it could show that “it took all reasonable precautions and exercised all due diligence to avoid commission of that offence”.

Aggravated offence for death or serious injury

- 7.7 Where the offence leads to death or serious injury, it would be aggravated and would carry higher penalties. This follows the approach in the United States aviation industry, where falsifying or concealing a material fact attracts higher penalties depending on the harm caused. If the wrongdoing results in death, the maximum penalty is life imprisonment.
- 7.8 One difficult issue is how to establish a causal relationship between the wrong (the misrepresentation or non-disclosure) and the harm (the serious injury or death). We do not wish to be over-inclusive: if, for example, an ADSE suppressed poor test results about how its technology performed at night, it would be wrong to hold the ADSE responsible for a death during the day.
- 7.9 However, it would be too narrow to require that the suppressed test result deal with exactly the same scenario as the one that caused the death. If, for example, the poor test result involved two scenarios (with a cyclist and a pedestrian) where the vehicle’s sensors performed poorly at night, this might indicate a more general problem with night driving. The aggravated offence should apply if the vehicle struck a tree during the night, and the vehicle occupants died.
- 7.10 We provisionally propose that the aggravated offence should apply if the representation or non-disclosure related to an increased risk of an adverse incident of the type that caused the death or serious injury.

Accountability of corporations and senior management

- 7.11 The proposed offence would apply to the ADSE as a corporate body. However, senior managers should also be liable if they fail to exercise due diligence to prevent the misrepresentation or non-disclosure from taking place. This would focus the minds of senior managers on implementing an open, transparent, safety-first culture.
- 7.12 In the UK aviation, nuclear and pharmaceutical industries, senior management is liable for offences attributable not only to their “consent or connivance” but also to their neglect. In our view, a similar provision should be included in the new offence. We envisage that a senior manager will sign the safety case to state that the information given is complete and accurate. When they do so, they must take care to ensure that the statement is true.

Accountability of individual employees and agents

- 7.13 Existing criminal offences already cover some cases where junior staff suppress information or mislead. For example, a team leader who deliberately lied for material gain could be prosecuted under the Fraud Act 2006. However, this might not apply to those who simply act under pressure.
- 7.14 In the pharmaceutical industry, the regulation 95 offence applies not only to corporations and senior managers but also to individual employees and agents. We have concerns about imposing liability on lower level employees in this way. We wish

to encourage an open and transparent culture, which relies on safe systems - not to criminalise junior staff who act under pressure.

- 7.15 On the other hand, we recognise the difficulty of treating two people differently, even though they did the same thing (concealing poor results), simply because one is a senior manager and one is not. We ask for views.

Avoiding “data-dumps”: presenting the safety case

- 7.16 We also wish to deter ADSEs from overwhelming the regulator with large quantities of undigested information. We seek views on whether an ADSE should be under a duty to present information in a clear and accessible form. This would require an ADSE to structure, index and signpost crucial safety information so that it was not lost in thousands of pages of appendices.
- 7.17 However, we see failures to structure, index or signpost information as less serious than non-disclosures or misrepresentations. For example, the offence could be subject to a maximum penalty of one year’s imprisonment.

Enforcement powers

- 7.18 Enforcement of the new offences should be primarily the role of the safety assurance regulator. However, we think that the Crown Prosecution Service (CPS) in England and Wales, and the Procurator Fiscal in Scotland, could also have the power to bring prosecutions.

Consultation Question 44.

7.19 We provisionally propose that:

- (1) it should be a criminal offence for an ADSE to omit safety-relevant information or include misleading information when putting a vehicle forward for classification as self-driving or responding to information requests from the regulator;
- (2) the offence should apply to senior managers (where it was attributable to the manager's consent, connivance or neglect);
- (3) the offence should not apply to more junior employees;
- (4) the offence should carry a higher sentence if it is associated with a death or serious injury;
- (5) the offence should be prosecuted in England and Wales by either the regulator or the Crown Prosecution Service and in Scotland by the Procurator Fiscal.

Do you agree?

Consultation Question 45.

7.20 We seek views on the following proposed offences.

Offence A: non-disclosure and misleading information in the safety case

When putting forward a vehicle for classification as self-driving, it would be a criminal offence for the ADSE to

- (1) fail to provide information to the regulator; or
- (2) provide information to the regulator that is false or misleading in a material particular

where that information is relevant to the evaluation of the safety of the ADS or the vehicle.

The ADSE would have a defence if it could show that it took reasonable precautions and exercised all due diligence to prevent the wrongdoing.

The penalty would be an unlimited fine.

Offence B: non-disclosure and misleading information in responding to requests

When a regulator requests specific information from an ADSE (whether before or after deployment), it would be a criminal offence for the ADSE to

- (1) fail to provide information to the regulator; or
- (2) provide information to the regulator that is false or misleading in a material particular

where that information is relevant to the evaluation of the safety of the ADS or the vehicle.

The ADSE would have a defence if it could show that it took reasonable precautions and exercised all due diligence to prevent the wrongdoing.

The penalty would be an unlimited fine.

Offence C: offences by senior management

Where offence A and/or offence B committed by a body corporate is proved—

- (1) to have been committed with the consent or connivance of an officer of the body corporate; or
- (2) to be attributable to neglect on the part of an officer of the body corporate, then that officer is guilty of the offence.

An officer includes any director, manager, secretary or other similar officer or any person who was purporting to act in any such capacity.

We see this as equivalent to offences under the Human Medicines Regulations 2012 and General Product Safety Regulations 2005, which carry a penalty of a fine and/or a maximum two years' imprisonment.

Offence D: aggravated offences in the event of death or serious injury following non-disclosure or provision of misleading information to the AV safety regulator

Where a corporation or person commits Offences A to C, that offence is aggravated where the misrepresentation or non-disclosure:

- (1) related to an increased risk of a type of adverse incident; and
- (2) an adverse incident of that type occurred; and
- (3) the adverse incident caused a death or serious injury.

We see this as equivalent to the offence of causing death by dangerous driving, which carries a penalty of an unlimited fine and/or a maximum of 14 years' imprisonment.

A duty to present information in a clear and accessible form

Consultation Question 46.

- 7.21 We welcome views on whether an ADSE should be under a duty to present information in a clear and accessible form, in which safety-critical information is indexed and signposted.

8. New wrongful interference offences

- 8.1 There is great public concern that people could interfere with AVs. In Consultation Paper 1, we reviewed current offences. We concluded that they covered most conceivable actions, from sophisticated computer hacking to spray painting sensors. We proposed only minor adjustments.
- 8.2 We now ask about two issues: extending the offence of tampering; and a new aggravated offence where wrongful interference causes death or serious injury.

TAMPERING

- 8.3 Under section 25 of the Road Traffic Act 1988, it is an offence to tamper with a vehicle's brake or "other part of its mechanism". The legislation does not define "mechanism", which could be interpreted restrictively.
- 8.4 We propose amending the legislation to clarify that it applies to anything that is physically part of a vehicle and any software installed within it. We also seek views on whether the tampering offence should apply to external infrastructure required for the operation of the AV, such as networks.

Consultation Question 47.

- 8.5 We provisionally propose that legislative amendment should clarify that the tampering offence in section 25 of the Road Traffic Act 1988 applies to anything that is physically part of a vehicle and any software installed within it.
- Do you agree ?

Consultation Question 48.

- 8.6 We welcome views on whether the tampering offence should apply to external infrastructure required for the operation of the AV.

CAUSING DEATH OR SERIOUS INJURY BY WRONGFUL INTERFERENCE

- 8.7 In England and Wales, section 22A of the Road Traffic Act 1988 makes it an offence to interfere with a vehicle, road or traffic equipment in a way which is obviously dangerous. We provisionally propose an aggravated offence where a breach of section 22A causes death or serious injury and the chain of causation involves an AV. This would deter potentially dangerous behaviour such as interfering with white lines, road signs or traffic lights. We remain of the view that section 22A should be extended to Scotland and propose that the aggravated offence should also extend to Scotland.
- 8.8 The aggravated offence would be based on section 22A and subject to the same safeguards. It would not apply where the interference has "lawful authority" or "reasonable cause". It must be obvious to a reasonable person that the act is dangerous. The mental standard of our proposed offence also mirrors that of section 22A: the act of interference must be intentional, but there need not be an intent to

bring about the consequences of that act, nor a subjective appreciation of the consequences.

- 8.9 Since “lawful excuse” and “reasonable cause” have not been defined by case law, we seek views on whether the proposed aggravated offence should have an “approved work” defence for repair or other work authorised by a vehicle manufacturer or ADSE.

Consultation Question 49.

- 8.10 We provisionally propose that there should be an aggravated offence of wrongfully interfering with an AV, the road, or traffic equipment contrary to section 22A of the Road Traffic Act 1988, where the interference results in an AV causing death or serious injury, in:

- (1) England and Wales; and
- (2) Scotland.

Do you agree?

Consultation Question 50.

- 8.11 We provisionally propose that the appropriate mental element for the aggravated offence is intent to interfere with a vehicle, the road or traffic equipment.

Do you agree?

Consultation Question 51.

- 8.12 We seek views on whether an approved work defence for repair or maintenance operations authorised by a vehicle manufacturer or Automated Driving System Entity is desirable.

9. Civil liability

- 9.1 The Automated and Electric Vehicles Act 2018 (AEV Act) introduced reforms to smooth the path to compensation for those injured by self-driving vehicles. Broadly speaking, the Act requires the insurer to pay a victim for any damage caused by a vehicle when driving itself. The insurer may then bring a secondary claim against anyone else responsible for the accident.
- 9.2 Responses to our first consultation paper showed significant support for the principles behind the AEV Act 2018, coupled with concerns about specific aspects.

CONTRIBUTORY NEGLIGENCE AND CAUSATION

- 9.3 In Consultation Paper 1, we explored potential issues in applying the legal concepts of contributory negligence and causation to claims under the AEV Act. On contributory negligence, most insurers thought that the sections were fit for purpose. Other respondents, however, considered the sections to be overly complex. On causation, most insurers felt there was a need for guidance while many lawyers wished to leave the issue to the courts.
- 9.4 Our provisional conclusion is that while there may be a need for review and clarification, the decision should not be taken now. Instead, these issues should be reconsidered after AVs have been deployed, to take account of practical experience. We ask consultees if they agree.

Consultation Question 52.

- 9.5 We provisionally propose that the way the Automated and Electric Vehicles Act 2018 deals with contributory negligence and causation is:
- (1) adequate at this stage; and
 - (2) should be reviewed by the UK Government in the light of practical experience.
- Do you agree?

UNINSURED VEHICLES

- 9.6 Liability under section 2 of the AEV Act only arises where the vehicle is insured or does not need to be insured. This leads to a potential gap where a vehicle should be insured but is not.
- 9.7 For collisions involving conventional vehicles, the Motor Insurers' Bureau (MIB) steps in as an insurer of last resort. However, for the MIB agreements to apply, there must be a claim against the untraced or uninsured person, which the MIB then pays. This cannot apply to the AEV Act, since the liability does not arise at all where the vehicle is uninsured when it should have been.

- 9.8 The UK Government and the MIB are in ongoing discussions about how to compensate victims of accidents caused by uninsured AVs. In our provisional view, measures should be put in place to ensure that victims of uninsured AVs receive compensation.

Consultation Question 53.

- 9.9 We provisionally propose that measures should be put in place to compensate the victims of accidents caused by uninsured AVs.
Do you agree?

CLAIMS AGAINST PRODUCERS UNDER THE CONSUMER PROTECTION ACT 1987

- 9.10 Once an insurer has paid a victim, it may then bring a secondary claim against others responsible for the damage. One possibility is that the insurer could claim against the “producer” under the Consumer Protection Act 1987.
- 9.11 The way that the Consumer Protection Act 1987 applies to new technology is far from clear. One particularly difficult question is whether it applies to defective software supplied over-the-air, without a physical medium. In Consultation Paper 1 we asked if there was a need to review the way that that product liability law applies to defective software within AVs. Most consultees (61%) thought there was. However, many consultees pointed out that issues about software liability are not confined to vehicles but arise in many different industries.
- 9.12 Product liability law is not essential for the safe introduction of AVs. However, a clear law of product liability for software is desirable, not only for AVs but across many industries. We would urge the UK Government to initiate a more general review to reform this area of law.

Consultation Question 54.

- 9.13 We provisionally propose that:
- (1) product liability law should be reviewed to take account of the challenges of emerging technologies;
 - (2) any review should cover product liability as a whole, rather than be confined to automated vehicles; it should not, therefore, form part of this project on automated vehicles.
- Do you agree?

10. Access to data

- 10.1 Most issues of “data protection and privacy” are outside our terms of reference. However, in some cases access to data is integral to our proposals.
- 10.2 In Chapter 17, we list six instances where our proposals rely on access to the appropriate data. In particular, the police need to know whether the ADS was engaged at the time of an incident. Similarly, insurers need to know whether the vehicle was present at the alleged time and place, whether the ADS was engaged and how the incident occurred. We are keen to ensure that the required information is available.

CURRENT INITIATIVES

- 10.3 In Chapter 17 we describe initiatives within the EU and UNECE for data recording. These include event data recorders for all vehicles and additional “data storage systems for automated driving”.

Event data recorders (EDRs)

- 10.4 EDRs will be required for both conventional and self-driving vehicles. The data are likely to be particularly useful in analysing patterns of problems and in comparing metrics between AVs and human drivers. However, under the current state of technology, EDRs will not record collisions between a vehicle and something of much lower mass, such as a motorcycle or pedestrian.
- 10.5 Furthermore, as currently conceived, EDRs will not record details of individual vehicles. They cannot be used to investigate individual incidents.

Data storage systems for automated driving (DSSAD)

- 10.6 AVs will need to store more data than is captured by EDRs alone. The ALKS Regulation requires vehicles to have an additional system to store data, referred to as the data storage system for automated driving (or “DSSAD”).
- 10.7 The DSSAD records each time the ALKS is activated/deactivated or issues a transition demand. It also records when the vehicle is involved in “a detected collision”. However, there are no requirements about which collisions should be detected. Initially, collision detection systems in ALKS are likely to be similar to those in conventional cars, so may not record collisions with vulnerable road users.
- 10.8 For each of the recorded elements, the DSSAD must record “at least” a date and time stamp. Significantly, the DSSAD is not required to record location. We understand that adding GPS co-ordinates to the time stamp is technically feasible but was omitted due to privacy concerns.

THE NEED FOR LOCATION DATA

- 10.9 In Chapter 17 we explain why location data is needed to make our proposals work. We also look in depth at privacy law and conclude that recording locating data is

compatible with the law. The need for location data can be explained by two examples, one involving the police and one an insurance company.

Example 1: a police investigation

- 10.10 A vehicle with self-driving capability gives a glancing blow to a motorcyclist. The motorcyclist is knocked from her bike and seriously injured. The vehicle then proceeds on its way, failing to stop. The police need to know whether the ADS was engaged at the time of the blow. If so, the issue will be subject to regulatory sanctions. If not, the driver is likely to be guilty of serious criminal offences.
- 10.11 The collision itself is unlikely to have been detected. Therefore, the only indication of whether the ADS was engaged at the time of the blow will be from the DSSAD. When the police attend the scene they know *where* the incident occurred, but may have only a general indication of *when* it took place. Witnesses are notoriously unreliable in giving precise times. The first call to the emergency services will be logged, but any delay in making the call gives a window of uncertainty, during which it will be difficult to know who was driving.
- 10.12 This allows for the possibility of dishonesty. A driver facing imprisonment could engage the ADS immediately and leave the scene. To prove beyond reasonable doubt that a human was driving would require both a time stamp and GPS co-ordinates.

Example 2: an insurance claim

- 10.13 The insurer receives a claim alleging that a self-driving vehicle stopped for no reason. The vehicle behind was shunted by a third vehicle behind it, causing six people to suffer whiplash injuries. The claim is made after considerable delay and the owner cannot recall that the vehicle was ever at the scene.
- 10.14 Insurers have expressed concern about the risk of fraud in these circumstances. When victims make claims, they are unlikely to be exact about the time, but can be expected to be more accurate about the location. We would be concerned that without location data to show whether the vehicle was at the scene it might be difficult to distinguish between genuine and fraudulent claims.
- 10.15 At present, insurers rely heavily on evidence from the insured driver. However, users-in-charge may provide less evidence to help defend claims. They may be the victim making the claim; they may not have noticed what occurred; and more generally, they will have less incentive to defend claims, as their reputation and no-claims bonuses are not at stake. Insurers will therefore rely on data from the vehicle.
- 10.16 In our view, before a vehicle can be classified as self-driving it will need a data storage system that records whether the ADS was engaged with both a time stamp and location.

Consultation Question 55.

10.17 We provisionally propose that:

- (1) for a vehicle to be classified as self-driving, it needs to record the location as well as the time at which the ADS is activated and deactivated;
- (2) the Government should work within the UNECE to ensure data storage systems for automated driving record these data; and
- (3) any national system to approve an ADS should require these data to be collected, subject to safeguards.

Do you agree?

SHARING DATA WITH INSURERS

10.18 In our view, ADSEs should be under a legal duty to disclose information to insurers that is necessary to decide claims. This would provide the ADSE with a clear legal basis for sharing data: it would bring the issue within Article 6(1)(c) of the General Data Protection Regulation, which applies where “processing is necessary for compliance with a legal obligation”. It would also prevent a potential abuse of the market, in which ADSEs only co-operated with their own nominated insurers.

Consultation Question 56.

10.19 We provisionally propose that legislation should impose a duty on those controlling AV data to disclose data to insurers, where the data is necessary to decide claims fairly and accurately.

Do you agree?

RETAINING DATA

10.20 Under the ALKS Regulation, the issue of how long data is retained is left to national law. This raises difficult issues. AVs generate huge quantities of data, making storage expensive and difficult. Germany has therefore set a retention period of six months. However, the limitation period for civil claims is usually three years and can be much longer in some circumstances.

10.21 For now, we think that the UK Government should err on the side of caution. If data is stored for too long, it can be deleted. But if data is stored for too short a time, it cannot be regained. We would not wish problems to arise from the initial deployment of AVs simply because data was not available to resolve disputes.

10.22 In our view, initially ADSEs should work on the basis that DSSAD data will be stored for three years. The issue should be reviewed in the light of experience. We seek views.

Consultation Question 57.

10.23 We provisionally propose that:

- (1) initially, DSSAD data from self-driving vehicles should be stored for three years; and
- (2) the issue should be reviewed in the light of experience.

Do you agree?

PROTECTING PRIVACY

10.24 Collecting location data clearly raises significant privacy concerns. There is a danger that it might be used inappropriately for commercial practices, such as microtargeting of advertisements, or fall into the wrong hands.

10.25 Given the scale and sensitivity of AV data, it is crucial that ADSEs take care of it. In our view, when an ADSE applies for categorisation of an AV as self-driving, it should include a section on data protection in their safety case. This should spell out in detail how data will be recorded, stored and accessed.

Consultation Question 58.

10.26 We provisionally propose that:

- (1) when an ADSE applies for categorisation of its vehicle types as self-driving, it should present the regulator with details on how data will be recorded, stored, accessed and protected;
- (2) the regulator should only categorise a system as self-driving if it is satisfied that the ADSE has systems to abide by its obligations under the GDPR.

Do you agree?

We invite responses from 18 December 2020 to 18 March 2021

- Comments may be sent using an online form at:
<https://consult.justice.gov.uk/law-commission/automated-vehicles-regulatory-framework>
- We have also produced a questionnaire in word format available on request.
- We also accept comments in other formats. Please send your response:

By email to: automatedvehicles@lawcommission.gov.uk

OR

By post to : Automated Vehicles Team, Law Commission, 1st Floor, Tower,
52 Queen Anne's Gate, London, SW1H 9AG.

If you send your comments by post, it would be helpful if, whenever possible, you could also send them by email.

For more information on how we use your responses and accessibility please see page ii of this summary.