



Centre for Connected
& Autonomous Vehicles

Safe Use of Automated Lane Keeping System (ALKS) Call for Evidence

Moving Britain Ahead



August 2020

The Department for Transport has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full on the Department's website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard please contact the Department.

Department for Transport
Great Minster House
33 Horseferry Road
London SW1P 4DR
Telephone 0300 330 3000
Website www.gov.uk/dft
General enquiries: <https://forms.dft.gov.uk>



© Crown copyright 2020

Copyright in the typographical arrangement rests with the Crown.

You may re-use this information (not including logos or third-party material) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence, visit <http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/> or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or e-mail: psi@nationalarchives.gsi.gov.uk

Where we have identified any third-party copyright information you will need to obtain permission from the copyright holders concerned.

Contents

- Foreword 5
- Executive summary 7
 - Contents 8
 - What will happen next 9
 - Glossary 9
- How to Respond 10
 - Freedom of Information 10
 - Privacy 11
- 1. Our world leading ambition 12
- 2. Overview of ALKS 15
 - Introduction 15
 - Transition demand 15
 - ALKS deactivation 16
 - Driver availability recognition system 17
 - System Override & Driver Attentiveness 17
 - Emergency manoeuvre 18
 - Data storage 18
 - Cybersecurity and Software-Updates 19
 - ALKS compared to ADAS 19
 - Driver education 19
- 3. Ensuring Safe Use 21
 - Automated and Electric Vehicles Act 2018 21
 - The Monitoring Test 23
 - The Control Test 23
 - The Minimum Risk Manoeuvre 24
 - Road Traffic Rules 24
 - Registration of automated vehicles 27
- 4. Fair Delegation & Residual Responsibility 28
 - Coming to a stop in lane 28
 - Relying on the system 29

Responding to a transition demand	30
Speeding	31
5. Performing other activities	32
Other activities	32
The Infotainment System	33
6. Use of ALKS up to 70mph	35
7. Consultation Questions	36
Annex A - Monitoring & Control Tests	39
Monitoring Test	39
Control Test	41
Annex B - Road Traffic Rules	43
'Must'/'Must not' Rules	43
'Should'/'Should not' Rules	45
Annex C - Consultation Principles	46

Foreword



Automated vehicle technology has the potential to transform the way we travel. It could improve connections for rural communities, help deliver essential goods to people's doors, and give everyone better access to education, to work or simply allow them to see friends and family more often.

It could also make our roads safer. In 2018, 85% of road collisions in Great Britain that resulted in injury involved human error. Automated vehicles could reduce these errors as they will not get tired or distracted.

I want the UK to be the first country to see these benefits and to encourage manufacturers to deploy this transformative technology on our roads by delivering the right environment for it to thrive. We are already familiar and comfortable with automation in aircraft and I am keen that we embrace it on our roads too.

The UK is working at both international and national level to accelerate the introduction of technology and deliver its benefits.

At an international level, the UK has been an active and influential member of the United Nations Economic Committee for Europe (UNECE) World Forum for Harmonization of Vehicle Regulations (WP29) that has developed an international standard to enable a driver – for the first time – to delegate the dynamic driving task to the vehicle. This is a step beyond current systems, which are designed to assist the driver, and is a significant step on the pathway to vehicles with more advanced automated vehicle capabilities.

At a national level, the UK's work on regulatory reform to support automated vehicle technology is world-leading, and this call for evidence explores how best to safely introduce the first step in automation in the UK. It also explores how the UK can safely take the next step, by supporting this early technology to go further.

In particular, the call for evidence explores the challenges associated with switching control of a vehicle between the driver and the vehicle system, and the changing role and responsibilities of a driver, including the potential for the driver to safely undertake other activities when the vehicle system is engaged. It explores the implications for insurance, data and cybersecurity as well as the potential challenges for the technology in meeting domestic road traffic rules. Finally, it explores the potential to safely use these vehicle systems at higher speeds.

More broadly, the UK has a unique opportunity to exploit the regulatory flexibilities that come with our position as an independent nation and we will explore how to use these flexibilities to build on our world class research base and open regulatory environment for automated vehicle technology. We can do this while continuing to support international efforts to improve road safety and progress innovation.

As with all new technologies, automated vehicle technology will raise new risks and challenges. But by managing these risks and challenges we can accelerate its

development and deployment to deliver the huge benefits it promises as quickly as it is safe to do so.

Grant Shapps

Secretary of State for Transport

Executive summary

Introduction

- 1 Automated vehicles offer the potential for huge benefits, such as helping to reduce the number of road deaths and casualties. The UK is keen to be the first country to see these benefits, offering an attractive place for manufacturers to deploy their technology. ALKS is one step along in that journey, which is designed to allow a driver to disengage from the driving task for the first time. The UK will continue to be an active participant in international fora like the UNECE, but leaving the EU offers opportunities to go further and faster. It is important therefore that the UK seizes the opportunity to make the most from automated vehicle technology.
- 2 The Government has identified the Future of Transport as a global trend that will transform our lives, improving people's journeys and the country's productivity. Connected and automated vehicle (CAV) technology is a central part of this global trend and could improve road safety and traffic flow, offer people better travel options, catalyse new business models and provide industrial opportunities.
- 3 The Centre for Connected and Autonomous Vehicles (CCAV) is a UK Government policy team which reports jointly to the Department for Transport (DfT) and the Department for Business, Energy and Industrial Strategy (BEIS). CCAV was established to secure the UK's position at the forefront of the safe development, production and use of CAV technology. The UK's open regulatory regime, world class research base, and industry and Government investment in CAV technologies have made it one of the global leaders in CAV technology development. We will ensure that the UK remains in the lead and benefits from the commercial deployment of transport automation - through better road safety, improved transport efficient and realising business opportunities.
- 4 The UK has played a key role in developing international regulations to support the introduction of increasing automation, in particular through DfT's work at the United Nations Economic Commission for Europe (UNECE). The Automated Lane Keeping System (ALKS) Regulation was endorsed in March 2020, starting the process to allow vehicles fitted with this technology to come to market. ALKS will be the first approved system designed to perform the dynamic driving task instead of the driver, under certain conditions. ALKS is an important first step towards the development of systems with higher levels of autonomy.
- 5 In July 2016, [CCAV consulted on the regulatory requirements of 'motorway pilots'](#), committing to consult further when these systems were ready for commercial deployment. We revisit some of those proposals in light of the agreed ALKS regulation.
- 6 It is important that ALKS technology is used safely by drivers. The responses received to this call for evidence may require secondary legislative amendments and Highway Code changes to ensure the safe use of ALKS. Government seeks views on those proposals, as well as evidence to inform policy development.

Contents

- 7 This document is split into six main parts:
- **Part 1** sets out the background to the introduction of automated vehicles, including on-going work by the Centre for Connected & Autonomous Vehicles, and the review of driving legislation by the Law Commissions of England and Wales and the Scottish Law Commission.
 - **Part 2** gives an overview of ALKS. It addresses:
 - The capability of ALKS and intended purpose;
 - The data and cyber-security requirements relating to ALKS;
 - The importance of driver education, especially in comparison to Advanced Driver Assistance Systems (ADAS).
 - **Part 3** addresses how to ensure the safe use of ALKS. It includes:
 - The Automated & Electric Vehicles Act (AEVA) 2018: if ALKS vehicles were to be listed as automated vehicles under this Act then it would need to be commenced;
 - An overview of the ‘Monitoring & Control Tests’, which have been used to make an initial assessment of the applicability of AEVA to ALKS;
 - An explanation of Government’s primary concerns having conducted these tests using input from members of the Law Commissions’ automated vehicle review team;
 - Questions around how to ensure that automated vehicles are appropriately registered.
 - **Part 4** explores the need to ensure ‘fair delegation’ of the driving task to an automated driving system (ADS) and addresses the ‘residual responsibility’ that remains with the driver after they have delegated the driving task. It asks:
 - Where the vehicle performs an unjustified emergency manoeuvre, where the vehicle may come to a stop in lane without driver input, how the driver can be protected from unfair prosecution;
 - How the driver can be incentivised to take back control when a transition demand is made in order to avoid the vehicle coming to a stop in lane.
 - **Part 5** seeks views on whether activities other than driving should be permitted, including the use of an ‘infotainment system’. It asks:
 - Should drivers of ALKS-capable vehicles be permitted to engage in activities other than driving when the ADS is engaged, and, in particular, to what extent should this include use of the infotainment system;
 - If ALKS-capable vehicles were not listed under AEVA, could any other activities be performed safely.
 - **Part 6** expresses the Government's commitment to ambitious innovation for automated vehicles. It asks:
 - Should the UK permit the use of ALKS up to 70mph.

What will happen next

- 8 The responses collected in this call for evidence will inform policy development. A public consultation is planned for late 2020 to consult on the detail of any changes to secondary legislation and the Highway Code that are proposed, which will include a summary of responses to this call for evidence.
- 9 The responses to this call for evidence will also inform the Law Commissions' third consultation paper due in late 2020.

Glossary

Advanced Driver Assistance System (ADAS) - Individual automation features such as adaptive cruise control or lane changing features which assist the driver. These can cover both SAE Level 1 features (which can perform either longitudinal or lateral vehicle motion control, but not both) and SAE Level 2 features (which can perform both longitudinal and lateral vehicle motion control).

Automated Driving System (ADS) - A vehicle system that uses both hardware and software to perform the dynamic driving task on a sustained basis.

Automated Lane Keeping System (ALKS) - A system for low speed application which is activated by the driver and which keeps the vehicle within its lane for travelling speed of 60 km/h or less by controlling the lateral and longitudinal movements of the vehicle for extended periods without the need for further driver input.

Automated Vehicle (AV) - A vehicle designed or adapted to be capable, in at least some circumstances or situations, of safely driving themselves, and that may lawfully be used when driving themselves, in at least some circumstances or situations, on roads or other public places in Great Britain. A vehicle is “driving itself” if it is operating in a mode in which it is not being controlled, and does not need to be monitored, by an individual.

Data Storage System for Automated Driving (DSSAD) - Records the interactions between the ALKS and the human driver.

Dynamic Driving Task (DDT) - The tactical functions (object and event detection and response) and operational functions (longitudinal and lateral motion control) which comprise the task of driving a vehicle.

Minimum Risk Manoeuvre (MRM) - A procedure aimed at minimising risks in traffic, which is automatically performed by the system after a transition demand without driver response or in the case of a severe ALKS or vehicle failure.

Operational Design Domain (ODD) - The domain within which an automated driving system can drive itself. An operational design domain may be limited by geography, in time, by type of road or in some other way.

Other activities - Activities other than driving undertaken by the driver in a vehicle when its automated driving system is engaged.

Transition Demand (TD) - A logical and intuitive procedure to transfer the Dynamic Driving Task (DDT) from the system (automated control) to the human driver (manual control). This request is given from the system to the human driver.

How to Respond

The consultation period will begin on 18 August 2020 and will run until 27 October 2020.

You can respond to this call for evidence via two options:

1. online, through a survey, a link to which can be found on the call for evidence's gov.uk webpage.
2. by emailing consultation@ccav.gov.uk.

The usual postal address for consultation responses is currently closed due to COVID-19.

When responding, please state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of a larger organisation, please make it clear who the organisation represents and, where applicable, how the views of members were assembled.

Please note that we do **not** expect you to submit evidence or views in response to every question listed if not applicable.

Please ensure that your response reaches us before the closing date. If you would like further copies of this consultation document, it can be found at <https://www.gov.uk/dft#consultations>

Freedom of Information

Information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the Freedom of Information Act 2000 (FOIA) or the Environmental Information Regulations 2004.

If you want information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a statutory Code of Practice with which public authorities must comply and which deals, amongst other things, with obligations of confidence.

In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information, we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the Department.

The Department will process your personal data in accordance data protection law and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties.

Privacy

If you do provide any information that allows an individual to be identified, we may use this information to notify you once the summary of responses is available.

The purpose of this call for evidence is to inform our work on the regulation of Automated Lane Keeping System (ALKS). Any personal information provided will only be kept for the purpose of this call for evidence and will not be shared with anyone else.

Your information will be kept securely within DfT and destroyed within 12 months after the call for evidence has closed. More information about DfT's privacy policy can be found at: <https://www.gov.uk/government/organisations/department-for-transport>

1. Our world leading ambition

- 1.1 Connected and automated vehicle technology is set to play a major role in the transport revolution happening today in the UK, helping to improve and level up transport across the nation by making every day journeys greener, safer, more flexible and more reliable. Driven forward by the UK Government's ambitious, clear and comprehensive Future of Transport strategy, the UK is developing regulation, investing in innovation and skills, and engaging the public to create a thriving connected and automated vehicle sector.
- 1.2 The UK's work to date has positioned us as one of the global leaders in developing connected and automated vehicle (CAV) technology thanks to our world class research base and open regulatory environment. The UK's ambition is to build on this, at pace, to set the UK ahead in its approach to accelerating the development and deployment of CAV technology, exploiting the regulatory flexibilities that come with our new position as an independent Britain.
- 1.3 The UK will support automated vehicle technology that is developing both through step-change technologies that will start to deliver fully automated passenger and delivery services, and through incremental changes to commercially available passenger cars. Both development routes hold the exciting prospect of delivering significant benefits to society, particularly when it comes to road safety.
- 1.4 Incremental development of automated vehicle technology in passenger cars could deliver road safety benefits. In 2018, 85% of road collisions in Great Britain that resulted in injury involved human error. Automated vehicle technology has the potential to reduce human error and reduce collisions and injuries on our roads. The technology also has the potential to improve the driving experience and give back productive time to the driver while travelling.
- 1.5 However, automated vehicle technology introduces new risks and challenges. It challenges our regulatory framework, which places significant responsibility on the driver, and which may require changes to ensure the safety of this new technology. It challenges manufacturers to develop the technology safely, and in a way that meets the varying requirements of domestic road traffic rules in addition to international technical requirements. It challenges Government and manufacturers to ensure a driver's responsibilities are set out and communicated clearly, and challenges the driver to understand and use new technologies safely. It challenges the insurance industry to develop new ways of assessing risk and build new business models. It is essential that Government, industry and academia come together to meet these challenges to accelerate the benefits that automated vehicle technology can bring.
- 1.6 The UK is now an independent nation and where appropriate we will take forward regulations as part of our domestic framework to enable new vehicle technologies. At the same time, we recognise the value of continuing to work with our international partners on global regulation where that is the best forum to resolve issues. The UK is an active and influential member of the United Nations Economic Committee for Europe (UNECE) working parties that consider the technical standards and use

requirements for road vehicles. These harmonised standards have supported improved safety standards for the global road vehicles market and will continue to do so, with UK support. The UNECE working parties have, in recent years, turned their focus to innovative technologies such as vehicle automation. The [UNECE Global Forum for Road Traffic Safety \(WP1\) published a Resolution on the deployment of highly and fully automated vehicles](#) in September 2018. This offers recommendations to ensure the safe interaction between automated vehicles, other vehicles and more generally all road users, and stresses the key role of human beings, be they drivers, occupants or other road users. The [UNECE World Forum for Harmonization of Vehicle Regulations \(WP29\) adopted an Advanced Lane Keeping Systems \(ALKS\) Regulation](#) in June of this year.

- 1.7 An ALKS is designed to enable the driver – for the first time ever in commercially available vehicles – to delegate the dynamic driving task to the vehicle under certain circumstances. This is distinct from driver assistance systems where the driver must remain in control of the vehicle and remains responsible for the driving task all times. This change in the role of the driver challenges existing law on the responsibilities of a driver and we believe secondary legislative amendments and changes to the Highway Code are needed to ensure ALKS can be safely used as anticipated on GB roads. This call for evidence explores the specific implications of the ALKS Regulation on the role of the driver and the safe use of ALKS in the UK, within the context of the current UK legal framework.
- 1.8 The call for evidence sets out the context within which decisions will need to be made on the safe use of ALKS and gives an overview of the requirements of the ALKS Regulation. It asks questions about the anticipated capability of ALKS, particularly in relation to its adherence to UK road traffic rules and the implications of coming to a stop in lane. It also sets out the data and cyber security requirements relating to ALKS and highlights the importance of driver education in the safe use of ALKS.
- 1.9 The Automated and Electric Vehicles Act 2018 sets out provisions to ensure that victims of a collision involving an automated vehicle receive quick and easy access to compensation. It includes a definition of an ‘Automated Vehicle’ for the purposes of insurance. This call for evidence sets out the Government’s initial assessment of the ability of ALKS to meet this definition and seeks further information on aspects of the definition and the relevant requirements in the ALKS Regulation.
- 1.10 Issues of driver responsibility are also considered, especially whether there are any dynamic driving task responsibilities on the driver when the ALKS is engaged, beyond responding to a transition demand. This is an important aspect to address when we turn to consider whether the driver should be permitted to undertake other activities when the ALKS is engaged, for example using a vehicle’s infotainment system.
- 1.11 Finally, the call for evidence explores the potential to safely support the use of ALKS vehicles at speeds higher than those specified in the ALKS Regulation.
- 1.12 Vehicle automation and the impact of this on the role of the driver and on UK law has significant implications for the UK’s legal framework as a whole. This is why the UK’s Centre for Connected and Autonomous Vehicles (CCAV) has asked the Law Commission for England and Wales and the Scottish Law Commission in 2018 to carry out a far-reaching review of the legal framework for automated vehicles. The project, which is due to complete in 2021, has published two consultations in November 2018 and October 2019 covering safety assurance, liability and issues relating to highly automated road passenger services (HARPS). A third consultation

in 2020 will draw on responses to both previous papers to formulate overarching proposals on the way forward, with final recommendations in 2021.

- 1.13 The Law Commissions' work on legislative reform supports the Department's broader work enabling the safe innovation of automated vehicle technology. Alongside this review, work is continuing in parallel to support safe innovation, including guidance and support for organisations wishing to trial or deploy CAVs in the UK. An update to the UK's Code of Practice for public trials of automated vehicle technology in 2019 provided clear guidance on conducting trials safely and responsibly, improving the transparency of trials and engaging with the public, authorities and other relevant bodies when planning trials. A [programme of work with the British Standards Institute is providing further detailed guidance through the development of Publicly Available Standards \(PAS\)](#). This includes a new standard on vehicle cyber security (PAS 1885) published in December 2018, which builds on the UK's Principles of Cyber Security for Connected and Autonomous Vehicles (2017), PAS 1880 on control systems, and PAS 1881 on assuring the safety of automated vehicles.
- 1.14 This work on safe innovation will provide a foundation for the development of a broader safety assurance process as part of the UK's CAVPASS programme (Connected and Automated Vehicles: Process for Assuring Safety and Security). This programme of work is identifying those aspects of CAV technology that are critical to safety and cyber security, and developing appropriate assurance processes for these. This work will progress in parallel with work on regulation and innovation to ensure that CAV technologies deliver benefits to road safety and cyber resilience.
- 1.15 Public understanding and acceptability are also essential to ensuring the safe use of automated vehicle technologies. The UK Government has conducted world-leading research into public understanding of automated vehicle technologies through the Public Dialogue project, which found that, overall, the majority of participants were positive about the potential impact of CAVs on themselves and on society.

2. Overview of ALKS

Introduction

- 2.1 An Automated Lane Keeping System (ALKS) is a traffic jam chauffeur technology designed to control the lateral and longitudinal movement of the vehicle for an extended period without further driver command. At such times, the system is in primary control of the vehicle, and performs the driving task instead of the driver, at low speeds on motorways. The system requirements are set out in a new United Nations Economic Committee for Europe (UNECE) Regulation that was adopted on 24th June 2020 and is expected to come into force early in 2021.
- 2.2 The scope of the regulation is limited to M1 category (light passenger) vehicles. ALKS technology is designed to keep the vehicle within its lane for extended periods without the need for further driver input on motorways at speeds up to 60 km/h (37 mph). It is therefore designed for situations of heavy, slow moving traffic on a motorway.
- 2.3 The ALKS Regulation requires that “the activated system shall comply with traffic rules relating to the dynamic driving task in the country of operation” (Para 5.1.2).
- 2.4 The following conditions must be met in order for the system to be activated':
 - A deliberate action by the driver (i.e. pressing the activation button);
 - The driver is in the driving seat and the driver’s seatbelt is fastened;
 - The driver is confirmed as being available (see ‘Driver availability recognition system’ below);
 - There is no failure affecting the safe operation or functionality of the ALKS;
 - The Data Storage System for Automated Driving (DDSAD) is operational;
 - Environmental and infrastructure conditions allow operation specific to the vehicle (i.e. the weather and surroundings are suitable);
 - The vehicle receives a positive confirmation of system self-check (i.e. the sensing system is operating correctly);
 - The vehicle is on roads where pedestrians and cyclists are prohibited and which, by design, are equipped with a physical separation that divides the traffic moving in opposite directions.

Transition demand

- 2.5 Since ALKS can operate only within certain circumstances, it will request the driver to take over the driving task – a so called ‘transition demand’ - if any one of the following events occurs:

- it can no longer perform the dynamic driving task (DDT);
 - any of the conditions for activation listed above are no longer met;
 - it detects that it is leaving its 'operational design domain' (ODD); or
 - it detects a severe vehicle or ALKS failure.
- 2.6 The transition demand will be made obvious to the driver via the user interfaces within the vehicle. The infotainment system (see Part 5), if engaged, will automatically be suspended as soon as a transition demand is issued. No more than four seconds after the start of a transition demand, if no response has been detected from the driver, the system will escalate its warnings with a mixture of auditory and haptic (e.g. vibration of the driver's seat) inputs. If at this point the driver retakes control (see below) then manual driving is resumed. The driver will have a minimum of 10 seconds to respond to a transition demand.
- 2.7 If the driver still does not respond to the transition demand, then the vehicle will perform a 'Minimum Risk Manoeuvre' (MRM), activating the hazard warning lights and decelerating at no quicker than 4 m/s^2 (unless in an emergency) to bring the vehicle to a stop in lane. Again, if the driver retakes control (see below) during the MRM, then manual driving is resumed.
- 2.8 Finally, upon completion of a MRM, the system will disengage and the vehicle will remain at standstill with the hazard warning lights on.
- 2.9 A severe vehicle or ALKS failure will cause the vehicle to issue a transition demand and start a MRM immediately, though the driver can override this, as stated above.

ALKS deactivation

- 2.10 Whilst the ALKS is engaged, the driver may deactivate the system to take over the driving task in the following ways:
- Placing hands on the steering wheel and pressing the ALKS button to disengage the system;
 - By steering while holding the steering wheel to override the system (see 'System Override and Driver Attentiveness' section);
 - Placing hands on the steering wheel and braking or accelerating to override the system;
 - In addition, during either a transition demand or the performance of a Minimum Risk Manoeuvre, the driver can deactivate the system by placing hands on the steering wheel and being detected by the system as an 'attentive driver'. This is assessed through checking driver gaze direction and/or head movement (see 'System Override and Driver Attentiveness' section).

Note: In the event that an override is applied to the accelerator/brake pedal prior to any system request and the driver does not have their hands on the steering wheel, the system will make a transition demand, rather than immediately enter manual driving.

Driver availability recognition system

- 2.11 ALKS is required to have a 'driver availability recognition system' that detects if the driver is present in a driving position with their safety belt fastened and is available to take over the driving task. If the driver is detected not to be in the seat for more than 1 second or if their safety belt is unbuckled, the system will issue a transition demand.
- 2.12 The system must monitor the driver to detect if they are available and in a position to respond to a transition demand. Driver availability must be determined by at least two criteria that are checked at least every 30 seconds. Examples of criteria include:
- Input to driver-exclusive vehicle controls;
 - Eye blinking;
 - Eye closure;
 - Conscious head or body movements.
- 2.13 As soon as the driver is unavailable, the system will provide a distinctive warning. If the driver fails to demonstrate that they are available within 15 seconds, the system will issue a transition demand. However, if the driver successfully demonstrates that they are available, on the basis of criteria above, the ALKS will continue to operate.

System Override & Driver Attentiveness

- 2.14 The driver can "override" either the lateral or longitudinal control of the vehicle, subject to measures put in place to protect against unintentional inputs. The manufacturer must create reasonable thresholds designed to prevent unintentional inputs. Inputs above these thresholds are considered to be overrides. During an override up until the point of deactivation, the ALKS will continue to operate and control the other aspects of the dynamic driving task. In this situation, the ALKS is considered to be in control of the vehicle until the system deactivates and control is resumed by the driver.
- 2.15 Measures used to protect against unintentional steering inputs are varied according to driver attentiveness. The driver is deemed to be attentive if at least one of the following criteria is met:
- Driver gaze direction is confirmed as primarily looking at the road ahead;
 - Driver gaze direction is confirmed as looking at the rear-view mirrors;
 - Driver head movement is confirmed as primarily directed towards the driving task;
 - Alternative criteria declared by the manufacturer have been met. A manufacturer may declare alternative criteria for determining driver attentiveness provided this is supported by evidence.
- 2.16 An override input to the accelerator or brake pedal will result in a transition demand being issued.

Emergency manoeuvre

- 2.17 In the event that the ALKS detects an imminent collision risk, the ALKS vehicle will carry out an emergency manoeuvre. The manoeuvre will decelerate the vehicle up to its full braking performance and/or may perform an automatic evasive manoeuvre, where appropriate. An automatic evasive manoeuvre involves exercising lateral control within the lane, for example, to avoid an obstacle that is partially obstructing the lane. Any deceleration above 5 m/s^2 is considered to be an emergency manoeuvre. The emergency manoeuvre will continue until either the imminent collision risk has disappeared, in which case the system will continue to operate, or until the driver deactivates the system.
- 2.18 If the emergency manoeuvre results in the vehicle being at standstill, the system will automatically apply the hazard warning lights. Activation of an emergency manoeuvre will be recorded in the data storage (DSSAD). ALKS may suppress the input from the driver to avoid a collision. ALKS will bring the vehicle to a standstill if it is involved in a detectable collision. Stopping in lane is discussed in more detail under Part 4.

Data storage

- 2.19 The regulation requires that ALKS vehicles are equipped with a Data Storage System for Automated Driving (DSSAD). This will enable relevant authorities to inspect the status of the vehicle to assist in reviewing road traffic offences. The DSSAD is required to record the following information with a date and timestamp:
- Activation of ALKS;
 - Deactivation of ALKS along with the cause;
 - Transition demand issued by ALKS along with the cause;
 - Reduction or suppression of driver input;
 - Start of emergency manoeuvre;
 - End of emergency manoeuvre;
 - Event Data Recorder (EDR) trigger input;
 - Involvement in a detected collision;
 - Minimum Risk Manoeuvre engaged by the system;
 - Severe ALKS failure;
 - Severe vehicle failure.
- 2.20 Data availability is subject to the requirements of national law.
- 2.21 Both manufacturers and insurers may set conditions on data recording, handling and sharing for use of ALKS and insurance, respectively. In addition, the police have the necessary powers to access data under Section 19 of the Police & Criminal Evidence Act 1984 and to seize evidence from the vehicle.

Question

Do you foresee any legal barriers to accessing data for incident investigation?

Question

If yes, what are those barriers?

Cybersecurity and Software-Updates

2.22 Additional UNECE regulations have been adopted at the same time regarding cybersecurity and software-updates. The ALKS regulation requires compliance with the cybersecurity regulation and the software-updates regulations. The latter only applies if software updates are permitted for the ALKS.

Software updating: <https://www.unece.org/fileadmin/DAM/trans/doc/2020/wp29/ECE-TRANS-WP29-2020-080e.pdf>

Cyber Security: <https://www.unece.org/fileadmin/DAM/trans/doc/2020/wp29/ECE-TRANS-WP29-2020-079e.pdf>

As amended by:

<https://www.unece.org/fileadmin/DAM/trans/doc/2020/wp29/ECE-TRANS-WP29-2020-097e.pdf>

ALKS compared to ADAS

- 2.23 Advanced Driver Assistance Systems (ADAS) are already available for use on UK roads. ADAS systems include technologies such as adaptive cruise control, lane keeping assistance and advanced emergency braking. Drivers are not permitted to rely on these systems or delegate the driving task to the vehicle at any time as this is not their intended purpose.
- 2.24 The UNECE regulation for ALKS has been written on the basis of allowing the driver to safely delegate the driving task to the vehicle, with important requirements put in place to maintain safety should the driver not take back control when requested.
- 2.25 Subject to the responses and evidence received, Government proposes to draw a clear distinction between the use of ALKS and the use of ADAS. This is explored further in Part 4 and Part 5. This approach received strong support in responses to the Law Commissions' first consultation paper.

Driver education

- 2.26 ALKS is designed to allow the driver to disengage from the driving task and places requirements on drivers that are likely to be new to them. For example, whilst ALKS

is engaged, applying pressure to the brake pedal won't slow the vehicle, but rather commence a transition demand. A driver is likely to expect that applying pressure to the brake pedal will slow the vehicle.

- 2.27 It is therefore important that drivers are appropriately educated on the abilities and limitations of the system, as well as their remaining responsibility (see Part 3).
- 2.28 We understand that some manufacturers may seek to provide training to new drivers. We seek views on how this may be approached.

Question

How do you think the driver should be educated and informed to understand the abilities and limitations of the system to ensure they use it safely?

Question

What role do you think manufacturers selling this system should play in providing this education and information?

Question

What role do you think Government and its agencies should play in providing this education and information?

3. Ensuring Safe Use

Introduction

- 3.1 As explained in Part 2, Automated Lane Keeping System (ALKS) is designed to perform the dynamic driving task (DDT) in a limited operational design domain (ODD). For the first time, responsibility for the driving task will be divided between the driver and the Automated Driving System (ADS). This requires consideration in the context of existing UK law and guidance regarding driver responsibility and therefore justifies Government intervention, as explained below.
- 3.2 The ALKS Regulation, being a technical regulation, specifies nothing about driver behaviour, and provides, at paragraph 5.1.2: "the activated system shall comply with traffic rules relating to the DDT in the country of operation".
- 3.3 On the basis of the ALKS Regulation, when the system is engaged, the driver should no longer be required to intervene in the driving task, except in the event of a transition demand.
- 3.4 In order to ensure that the system is used safely and fairly, Government considers the following aims to be paramount:
 - The driver must clearly understand what their responsibilities are when the automated driving system (ADS) is engaged (and when it isn't);
 - The driver must not be unfairly held responsible for the ADS not behaving appropriately (e.g. stopping unjustifiably without warning) when it is engaged;
 - The driver must take back control of the vehicle when requested thereby minimising occasions and duration when the vehicle stops in lane;
 - The legal responsibilities and expected behaviours of a driver and others in relation to ADAS and ALKS must be clear;
 - The process for listing a vehicle as automated under the Automated and Electric Vehicles Act 2018 (AEVA) is clear, and manufacturers understand how to appropriately register a vehicle on the DVLA database.

Automated and Electric Vehicles Act 2018

- 3.5 In 2018, the Automated and Electric Vehicles Act 2018 (AEVA) received Royal Assent. It ensures that victims of a collision involving an automated vehicle (AV) will receive compensation from the vehicle's insurer in the same way as they would from the insurer of a conventional vehicle. It also establishes a definition of 'automated vehicle' in Great Britain.
- 3.6 AEVA defines automated vehicles as motor vehicles that:

- “(a) are in the Secretary of State’s opinion designed or adapted to be capable, in at least some circumstances or situations, of safely driving themselves, and,
- (b) may lawfully be used when driving themselves, in at least some circumstances or situations, on roads or other public places in Great Britain.”

3.7 In section 8 on ‘Interpretation’ there is the following definition:

- “a vehicle is “driving itself” if it is operating in a mode in which it is not being controlled, and does not need to be monitored, by an individual...”

3.8 The definition found in sections 1 and 8 provide an important test for determining whether a given automated driving system technology is compliant with the definition of "automated vehicle" under AEVA. The vehicle must be capable in at least some situations of "safely driving itself"; and it needs to be capable of being "lawfully used" when doing so; and, given section 8's interpretation of "driving itself", the driver must not be required to monitor or control the vehicle.

3.9 In response to these requirements set out in AEVA, the Department for Transport has developed two tests (described below), which we propose to use when the Government decides whether a vehicle or type of vehicle is capable of driving itself safely. We have received input from members of the Law Commissions' review team on these tests.

3.10 The following sections will present both the Monitoring and Control Tests.

3.11 The Secretary of State has to take a decision as to whether to list a vehicle as an automated vehicle under AEVA. His decision is not discretionary, but will instead be a decision based on the facts and features of particular vehicles or vehicle types, when measured against the definition in AEVA. How the Government interprets the terms "monitored" and "controlled", which are used in section 8 of the AEV Act, will inform the decisions to be made as to whether to list a vehicle or vehicle type. We wish to hear views on the proposed 'monitoring test' and 'control test' as the basis for deciding whether vehicle types that satisfy the ALKS regulation are within the definition of an automated vehicle under AEVA.

3.12 One option being considered is the proposal that the Secretary of State's List might reference particular UNECE regulations, and that if the ALKS Regulation was included then this would mean that any vehicle approved the ALKS Regulation would be considered an AV.

Question

Subject to the outcome of this call for evidence and subsequent consultation, would you have concerns about a scenario where any vehicle approved to the ALKS regulation would be automatically considered to be an automated vehicle under AEVA?

Question

If yes, what are those concerns?

The Monitoring Test

3.13 The Monitoring Test is as follows:

An individual does not need to monitor the vehicle if the vehicle can safely achieve the following without human monitoring:

- 1 Comply with relevant road traffic rules;
- 2 Avoid collisions which a competent and careful driver could avoid;
- 3 Treat other road users with reasonable consideration;
- 4 Avoid putting itself in a position where it would be the cause of a collision;
- 5 Recognise when it is operating outside of its operational design domain.

The Control Test

3.14 The Control Test is as follows:

A vehicle is not being 'controlled' by an individual if the individual controls none of the following:

- 1 Longitudinal dynamics (speed, acceleration, braking, gear selection);
- 2 Lateral dynamics (steering).

3.15 Government's preliminary assessment of how ALKS complies with these monitoring and control criteria is set out in **Annex A**. This is subject to the Government's consideration of the responses to this call for evidence and the responses to the planned consultation on possible legislative and Highway Code changes to support safe use of ALKS vehicles.

Question

Do you agree that the criteria in the monitoring and control tests provide a reasonable framework for testing compliance with the AEVA definition of automation? Why?

Question

Do you agree with our preliminary assessment of how ALKS meets the criteria set out in Annex A? Why?

The Minimum Risk Manoeuvre

- 3.16 As described in paragraph 2.8, the MRM involves slowing to a stop in lane. Although ALKS will only operate in slow moving traffic, stopping in lane could cause congestion and has the potential to increase the risk of a collision, which would be contrary to criterion four of the Monitoring test.
- 3.17 If the Government were to take the decision to list some or all ALKS-approved vehicles under AEVA, then measures may be needed in order to mitigate against the likelihood of ALKS vehicles coming to a stop in lane. For example, Government could propose regulatory amendments under the concept of 'residual responsibility' (see Part 4). In response to the need to clearly divide a driver's responsibilities from that of the ADS, Government may also propose regulatory amendments under the concept of 'fair delegation' (see Part 4).
- 3.18 It will only be possible to determine whether ALKS is compliant with the definition of automation under AEVA (therefore requiring some or all vehicles approved to the ALKS regulation to be listed) after legislative and Highway Code changes proposed in Part 4 have been completed.

Road Traffic Rules

- 3.19 ALKS must comply with all relevant road traffic rules for the dynamic driving task (DDT) in the country of operation. In England, Wales and Scotland, road traffic rules are compiled as part of the Highway Code and in Northern Ireland the Highway Code for Northern Ireland.
- 3.20 Compliance with road traffic rules is ultimately decided by courts. Whilst compliance with some road traffic rules will be objective and simple to determine, other rules may be more challenging for an automated system to comply with. This is either because of technical capability or because compliance is more subject to interpretation.
- 3.21 In **Annex B** we have compiled a non-exhaustive list of rules that Government feels may be more complex to comply with.
- 3.22 We highlight three scenarios below where we would appreciate input from manufacturers on how they see their vehicle(s) complying with the relevant road traffic rules. We also seek views from other stakeholders, particularly enforcement and road safety organisations, on their reactions to these scenarios.

Responding to an enforcement vehicle

- 3.23 Vehicle A is ALKS-capable. It is proceeding along its lane in traffic. The automated mode is engaged and so the driver is not paying attention to the environment outside the vehicle. A police officer in a nearby vehicle has noticed that Vehicle A has a faulty brake light. The police officer pulls in behind Vehicle A and switches on his flashing blue lights.
- 3.24 Rule 106 says the following on drivers responding to a police officer:
- Police stopping procedures. If the police want to stop your vehicle they will, where possible, attract your attention by
- flashing blue lights, headlights or sounding their siren or horn, usually from behind

- directing you to pull over to the side by pointing and/or using the left indicator.

You **MUST** then pull over and stop as soon as it is safe to do so. Then switch off your engine.

- 3.25 Rules 107 and 108 make similar requirements for responding to DVSA and traffic officers. See Annex B for further details.
- 3.26 Whilst an ALKS-capable vehicle will not be able to pull over, it may be able to issue a transition demand to the driver. If listed under AEVA (as an automated vehicle), the driver would not be responsible for responding to the signalling of the police vehicle, only to a transition demand. However, there is no explicit requirement in the ALKS Regulation for the vehicle to possess rear-facing sensors. The vehicle may therefore struggle to 'know' to make a transition demand if it is being requested to stop by the police.
- 3.27 ALKS must also be able to respond to other signals from Police / DVSA / Traffic Officers, which may include flashing amber lights, flashing red lights, or flashing headlamps.

Question

How do you think ALKS will detect and respond to a police or other enforcement vehicle approaching from behind signalling for the vehicle to pull over?

- 3.28 The ALKS Regulation allows for the driver to respond to a transition demand up to 10 seconds after notification.

Question

Do you think that 10 seconds is fast enough in the foreseeable circumstances to comply with the rules on responding to enforcement vehicles? If not, why?

Stopping after an incident

- 3.29 Vehicle B is ALKS-capable. It is proceeding along in its lane in heavy traffic at low speed. Motorcyclist C is filtering between the lanes of traffic. As the traffic flow speeds up, Motorcyclist C is involved in a minor collision with by Vehicle B, which nevertheless causes her to lose balance and be knocked from her bike into the road.
- 3.30 Rule 286 requires a driver to stop if they involved in an incident. It says:
- If you are involved in a collision which causes damage or injury to any other person, vehicle, animal or property, you **MUST**
- stop
 - give your own and the vehicle owner's name and address, and the registration number of the vehicle, to anyone having reasonable grounds for requiring them
 - if you do not give your name and address at the time of the collision, report it to the police as soon as reasonably practicable, and in any case within 24 hours.

3.31 The ALKS Regulation requires a vehicle to stop if a collision is detected. Under paragraph 5.1.1., where a vehicle is involved in "a detectable collision", the vehicle shall be brought to a standstill. However, the Regulation sets no standards for collision detection systems. It is therefore not clear if the vehicle will detect the collision (in order to stop after Motorcyclist C has been knocked from her bike).

Question

How will ALKS detect a minor or low-energy collision, in order to come to a stop and alert the driver?

Question

Do you foresee any risks should ALKS vehicles not stop for low-energy impacts?

Question

Do you foresee any risks should ALKS vehicles not stop for low-energy impacts?

Reading GB road signage

3.32 Vehicle D is ALKS-capable. It is proceeding along its lane at low speed in heavy traffic. There has been an accident ahead. To manage traffic flow, a temporary speed limit has been set at 30 mph in Vehicle D's lane. This is communicated on a gantry sign above the road with the new speed limit inside a red ring.

3.33 Rule 261 requires drivers to obey temporary speed limits. It says:

You **MUST NOT** exceed 70 mph (112 km/h), or the maximum speed limit permitted for your vehicle (see [speed limits table](#)). If a lower speed limit is in force, either permanently or temporarily, at road works for example, you **MUST NOT** exceed the lower limit. On some motorways, mandatory motorway signals (which display the speed within a red ring) are used to vary the maximum speed limit to improve traffic flow. You **MUST NOT** exceed this speed limit.

3.34 The ALKS Regulation sets detailed requirements that the vehicle shall be verified to have a forward detection range of 46 meters and a lateral detection range of the full width of the lanes immediately to the left and right of the vehicle. The technical service is required to verify these detection ranges (paras 7.1.1 and 7.1.2). However, there is no requirement to verify the vehicle's ability to sense upwards, so as to detect information on a gantry.

Question

How will manufacturers ensure that ALKS vehicles deployed in the UK are able to recognise signage located above the road that may be unique to Great Britain?

Registration of automated vehicles

- 3.35 The Driver and Vehicle Licensing Agency (DVLA) maintains a database comprising more than 48 million driver records and more than 40 million vehicle records. Keeping driver and vehicle records up to date is essential to staying compliant with the law.
- 3.36 On first registration, subject to the compliance with AEVA, the vehicle will be registered as an automated vehicle, but the vehicle's ability to comply with the ALKS Regulation may change over its lifetime.
- 3.37 It is possible that a vehicle could be incorrectly registered on the DVLA database due to an inputting error. In this instance, it would remain the manufacturer's responsibility to contact DVLA to amend this.
- 3.38 However, we understand that manufacturers may offer automation as a subscription or as an option for a customer to choose at the point of purchase. If a vehicle were registered as an AV on the DVLA database - because it is listed on the Secretary of State's List - but the registered keeper had chosen not to purchase the 'AV package', it would nonetheless appear on the DVLA database as an AV.

Question

Do manufacturers intend to offer automation as an optional package for customers at the point of purchase? Please provide details.

Question

Do you have concerns about vehicles that are registered as AVs on the DVLA database but the keeper has chosen to have the functionality disabled so they are not capable of operating as an AV?

Question

If yes, what are they?

4. Fair Delegation & Residual Responsibility

Introduction

- 4.1 The Automated Lane Keeping System (ALKS) challenges the current application of responsibility of the driver. If a system is compliant with the definition of automation under AEVA, it is important that the driver is not held unfairly responsible for any action taken by that system which causes the vehicle to drive unlawfully and/or results in damages. Likewise, whilst the driver should be able to delegate the dynamic driving task (DDT) to the ALKS in a safe way, they must be aware that they retain responsibility for responding appropriately to a transition demand.
- 4.2 This section presents Government's aims for the safe use of ALKS in further detail and seeks views on how these aims can be achieved. Members of the Law Commissions' automated vehicle review have provided input on these concerns.

Coming to a stop in lane

- 4.3 A vehicle may come to a stop in lane due to perceiving a danger which requires an emergency manoeuvre of this nature. However, another potential reason for such behaviour is where the vehicle is performing a Minimum Risk Manoeuvre.
- 4.4 As discussed in Part 2, ALKS performs the Minimum Risk Manoeuvre (MRM) under the following circumstances:
 - The driver fails to respond to a transition demand,
 - In the event of a severe vehicle/system failure.
- 4.5 The MRM causes the vehicle to stop in a 'live' lane of traffic on the motorway. This is currently unlawful under Regulation 7 of the Motorway Traffic (England & Wales) Regulations 1982, and Regulation 6 of the Motorway Traffic (Scotland) Regulations 1995. Regulation 7 states that it is an offence for a driver of a vehicle to "stop or remain at rest on a carriageway". It provides for various exceptions to the offence, including "where it is necessary for a vehicle" to be stopped on a motorway...
 - a. by reason of a breakdown or mechanical defect or lack of fuel, oil or water, required for the vehicle; or
 - b. by reason of any accident, illness or other emergency...¹
- 4.6 Regulation 6 of the Motorway Traffic (Scotland) Regulations 1995 makes a similar statement.
- 4.7 If the vehicle comes to an unjustified stop in lane where no emergency or genuine mechanical defect was present, it seems unfair to hold the driver criminally

¹ Motorways Traffic (England and Wales) Regulations 1982/1163, reg 7(1).

responsible where the apparent cause of the problem has not prompted any transition demand.

- 4.8 Government therefore proposes an amendment to both of the Motorway Traffic Regulations, adding a further exception where ALKS has come to an unexpected stop in lane.
- 4.9 It would be for the courts to decide how long would be unacceptable for a driver to allow the vehicle to remain at rest if they had allowed the vehicle to come to a stop and were not incapacitated.

Question

Do you agree that it is appropriate to exempt the driver from prosecution – if the vehicle comes to an unjustified stop when ALKS is engaged – by creating a further exception in the Motorway Traffic Regulations? If not, why?

Relying on the system

- 4.10 Currently, drivers are responsible for maintaining sufficient attention to the driving task to ensure safety. Indeed, Rule 150 of the Highway Code warns the driver of distraction and to not rely on driver assistance systems. It says:

There is a danger of driver distraction being caused by in-vehicle systems such as satellite navigation systems, congestion warning systems, PCs, multi-media, etc. You MUST exercise proper control of your vehicle at all times. Do not rely on driver assistance systems such as motorway assist, lane departure warnings, or remote control parking. They are available to assist but you should not reduce your concentration levels. Do not be distracted by maps or screen-based information (such as navigation or vehicle management systems) while driving or riding. If necessary find a safe place to stop.

As the driver, you are still responsible for the vehicle if you use a driver assistance system (like motorway assist). This is also the case if you use a hand-held remote control parking app or device. You MUST have full control over these systems at all times.

- 4.11 Should ALKS comply with the definition of automation under AEVA, it will be the first automated driving system which is not classified as a driver assistance system. The expectation will be that the driver can rely on ALKS to carry out the driving task in certain circumstances. Similarly, ALKS or an infotainment system would not distract from the driving task, as this is being performed by ALKS, and may actually maintain the driver's attention. See Part 5 for a further discussion.
- 4.12 Government therefore proposes a change to Rule 150 to enable a driver to rely on ALKS as an automated vehicle.

Question

Do you agree that amending Rule 150 is sufficient to clarify that the driver may rely on the ALKS? If not, why?

Responding to a transition demand

- 4.13 Whilst it is important that drivers are able to safely and fairly delegate the dynamic driving task (DDT) to the system when it is engaged, this does not mean that they delegate all responsibility.
- 4.14 In fact, where the system is not designed to deal with a situation it encounters (e.g., exiting its ODD), or where the driver is found to be unavailable, the vehicle will issue a transition demand, and if the driver fails to take control in response, it will perform a minimum risk manoeuvre involving a stop in lane according to the ALKS Regulation.
- 4.15 As discussed in Part 3, Government is concerned that without some rules on use, the ALKS Minimum Risk Manoeuvre (MRM) may not allow a vehicle to avoid being the cause of a collision. For example, as a result of the driver failing to resume control on request by the vehicle, the vehicle comes to a stop in a live lane (an unexpected behaviour for other drivers), and is rear-ended by another vehicle. To mitigate against this concern, the driver should be incentivised to resume control in response to a transition demand. Should the driver fail to respond to the transition demand – and is not incapacitated – the Motorway Traffic Regulations would still apply, with the driver being potentially guilty of this offence. We propose to limit the scope of the exemption from the Motorway Traffic Regulations so that it covers only unjustified stops while the system is activated. This approach ensures that the MRM becomes a fail-safe which brings the vehicle to a stop only in rare cases where a driver is genuinely unable to take over the driving task, or in case of severe system failure.
- 4.16 Subject to the outcome of this consultation, the Government proposes to limit the scope of the exemption from the Motorway Traffic Regulations to cover only unjustified stops while the system is activated, so that the driver is incentivised to resume control in response to a transition demand.

Question

Do you agree that not changing the Motorway Traffic Regulations, except for unjustified stops, ensures the driver is suitably incentivised to take back control when requested? If not, why?

- 4.17 Government also proposes a change to the Highway Code to further clarify the driver's residual responsibility to respond to a transition demand.

Question

Do you agree that the Highway Code should be changed so that drivers of ALKS must be alert to a transition demand? If not, why?

Question

Do you think that amending the Highway Code is sufficient to communicate to drivers their responsibility? If not, why?

Speeding

- 4.18 Under section 89 of the Road Traffic Regulation Act 1984, it is an offence to drive “a motor vehicle on a road at a speed exceeding a limit imposed by or under any enactment to which this section applies”. This is a strict liability offence. Therefore, the driver has no clear defence.
- 4.19 When applied to ALKS equipped vehicles, if the system is activated, being used within its capability and requires no monitoring by the driver it might not be reasonable to expect they will notice either a variable speed limit or that the vehicle is exceeding it.
- 4.20 We recognise that this is difficult issue and we will work with enforcement authorities to find a way forward and would welcome views as part of this call of evidence.

5. Performing other activities

Other activities

- 5.1 If compliant with the definition of automation under AEVA, ALKS might present the opportunity, for the first time ever in Great Britain, to enable the driver to perform activities other than driving when the ADS is engaged.
- 5.2 It is important however, that the performance of any activities other than driving do not preclude the driver's ability to respond to a transition demand – and take over the dynamic driving task within ten seconds as required by the system.
- 5.3 Due to the reduced demand on driver attention, there is a risk that the driver will become so distracted as to be unable to respond to a transition request. ALKS includes driver availability and attentiveness monitoring to assist in managing this risk, and it can be argued that allowing the driver to perform other activities may help manage alertness by avoiding higher risk outcomes such as the driver falling asleep.
- 5.4 However, it is not clear to what degree performing other activities may hamper the driver's ability to respond to a transition demand. We seek views on whether ALKS can still be used safely if the driver performs other activities, and what these activities might be.

Question

Do you think the driver should be allowed to perform other activities when ALKS is activated if they must only be ready to respond to a transition demand? Why?

Question

What other activities do you think are safe when ALKS is activated?

- 5.5 It is possible that ALKS may not be found compliant with the definition of an automated vehicle under AEVA following legislative and Highway Code changes. This may be because the driver is still required to monitor the vehicle for some specific circumstances.

Question

Do you think that the driver should be allowed to undertake other activities if ALKS is not listed under AEVA? If not, why?

Question

If yes, what other activities could they safely perform?

The Infotainment System

- 5.6 One example of an activity other than driving that may be desirable for drivers to perform, is the use of a vehicle's in-built infotainment system.
- 5.7 This system is already present in many vehicles today, usually taking the form of a central display panel on the dashboard through which the driver can check information relevant to the driving task, such as satellite navigation and system performance.
- 5.8 Government understands that manufacturers wish to enable the driver to perform activities other than driving through the infotainment system. This could include activities like watching a film, checking emails or SMS, or accessing other audio, video or written content. A driver would also be able to tether their mobile phone to the system as is possible today.
- 5.9 Importantly, the system is required to cut out in the event of a transition demand. In this way, activities performed through the infotainment system should not preclude responding to a transition demand.
- 5.10 Regulation 109 of the Construction & Use Regulations 1986 prohibits a person from driving, or causing or permitting a vehicle to be driven on the road:
- if the driver is in such a position as to be able to see, whether directly or by reflection, a television receiving apparatus or other cinematographic apparatus used to display anything other than information—*
- (a) about the state of the vehicle or its equipment;*
- (b) about the location of the vehicle and the road on which it is located;*
- (c) to assist the driver to see the road adjacent to the vehicle; or*
- (d) to assist the driver to reach his destination.*
- 5.11 For a driver of an ALKS vehicle to be able to use the infotainment system as anticipated – for activities other than driving – it would be necessary to add an exception to Regulation 109.

Question

Do you agree that an exception should be added to enable the use of the infotainment system for activities other than driving? If not, why?

Question

Are there any activities you consider unsafe to perform through the infotainment system?

Question

If yes, what are they?

6. Use of ALKS up to 70mph

- 6.1 The primary purpose of this call for evidence is to seek views on how Government intends to ensure the safe use of vehicles with automated systems that meet the requirements of the ALKS Regulation.
- 6.2 We will have new flexibilities next year having left the European Union transition period and becoming an independent nation at the UNECE. This includes flexibilities in determining what we require for new vehicles in Great Britain. The ALKS Regulation defines requirements for operation up to 60 km/h (37mph) and we understand that some manufacturers may already have capability for higher speed operation.
- 6.3 The UK may set additional requirements on ALKS that operate up to 70 mph, but these must not conflict with the existing requirements in the ALKS Regulation.
- 6.4 The Government is considering allowing ALKS to operate at speeds up to 70 mph, provided the manufacturer declares that the system has the capability to do so safely and in compliance with other technical requirements of the ALKS Regulation not affected by this higher maximum speed.

Question

Do you agree with this approach? Why?

Question

Do you have any other comments you'd like to make?

7. Consultation Questions

- Do you foresee any legal barriers to accessing data for incident investigation?
- If yes, what are those barriers?
- How do you think the driver should be educated and informed to understand the abilities and limitations of the system to ensure they use it safely?
- What role do you think manufacturers selling this system should play in providing this education and information?
- What role do you think Government and its agencies should play in providing this education and information?
- Subject to the outcome of this call for evidence and subsequent consultation, would you have concerns about a scenario where any vehicle approved to the ALKS regulation would be automatically considered to be an automated vehicle under AEVA?
- If yes, what are those concerns?
- Do you agree that the criteria set out in the Monitoring and Control Tests provide a reasonable framework for testing compliance with the AEVA definition of automation? Why?
- Do you agree with our preliminary assessment of how ALKS meets the criteria set out in Annex A? Why?
- How do you think ALKS will detect and respond to a police or other enforcement vehicle approaching from behind signalling for the vehicle to pull over?
- Do you think that 10 seconds is fast enough in the foreseeable circumstances to comply with the rules on responding to enforcement vehicles? If not, why?

- How will ALKS detect a minor or low-energy collision, in order to come to a stop and alert the driver?
- Do you foresee any risks should ALKS vehicles not stop for low-energy impacts?
- If yes, what are these risks?
- How will manufacturers ensure that ALKS vehicles deployed in Great Britain are able to recognise signage located above the road that may be unique to Great Britain?
- Do manufacturers intend to offer automation as an optional package for customers at the point of purchase? Please provide details.
- Do you have concerns about vehicles that are registered as AVs on the DVLA database but the keeper has chosen to have the functionality disabled so they are not capable of operating as an AV?
- If yes, what are they?
- Do you agree that it is appropriate to exempt the driver from prosecution – if the vehicle comes to an unjustified stop when ALKS is engaged – by creating a further exception in the Motorway Traffic Regulations? If not, why?
- Do you agree that amending Rule 150 is sufficient to clarify that the driver may rely on the ALKS? If not, why?
- Do you agree that not changing the Motorway Traffic Regulations, except for unjustified stops, ensures the driver is suitably incentivised to take back control when requested? If not, why?
- Do you agree that the Highway Code should be changed so that drivers of ALKS must be alert to a transition demand? If not, why?
- Do you think that amending the Highway Code is sufficient to communicate to drivers their responsibility? Why?
- Do you think the driver should be allowed to perform other activities when ALKS is activated if they must only be ready to respond to a transition demand? If not, why?

- What other activities do you think are safe when the ALKS is activated?
- Do you think that the driver should be allowed to undertake other activities if ALKS is not listed under AEVA? If not, why?
- If yes, what other activities could they safely perform?
- Do you agree that an exception should be added to enable the use of the infotainment system for activities other than driving? If not, why?
- Are there any activities you consider unsafe to perform through the infotainment system?
- If yes, what are they?
- Do you agree with this approach? Why?
- Do you have any other comments you'd like to make?

Annex A - Monitoring & Control Tests

Monitoring Test

Test criterion	Relevant ALKS requirement(s) (Paragraph numbers relate to the paragraph in the ALKS adopted text)	Evidence and assessment methods
Comply with relevant road traffic rules	5.1.2. The activated system shall comply with traffic rules relating to the DDT in the country of operation.	<p>Audit of safety documentation (Annex 4).</p> <p>Manufacturer's declaration (Appendix to the Type Approval communication form).</p> <p>Real-world demonstration drive in the country in which the Technical Service and manufacturer conducts the real-world test (Annex 5).</p>
Avoid collisions which a competent and careful driver could avoid	<p>5.1.1. The activated system shall not cause any collisions that are reasonably foreseeable and preventable. If a collision can be safely avoided without causing another one, it shall be avoided. When the vehicle is involved in a detectable collision, the vehicle shall be brought to a standstill.</p> <p>5.2.4. The activated system shall be able to bring the vehicle to a complete stop behind a stationary vehicle, a stationary road user or a blocked lane of travel to avoid a collision. This shall be ensured up to the maximum operational speed of the system.</p> <p>5.2.5. The activated system shall detect the risk of collision in particular with another road user ahead or beside the vehicle, due to a decelerating lead vehicle, a cutting in vehicle or a suddenly appearing obstacle and shall automatically perform appropriate manoeuvres to minimize risks to safety of the vehicle occupants and other road users.</p> <p>For conditions not specified in paragraphs 5.2.4., 5.2.5. or its subparagraphs, this shall be ensured at least to the level at which a competent and careful human driver could minimize the risks. This shall be demonstrated in the assessment carried out under Annex 4 and by taking guidance from Appendix 3 to Annex 4.</p> <p>Annex 4 uses the following definition for "unreasonable risk" from which the system must be free:</p> <p>2.16. "Unreasonable risk" means the overall level of risk for the driver, vehicle occupants and other road users which is increased compared to a competently and carefully driven manual vehicle.</p>	<p>Audit of safety documentation (Annex 4).</p> <p>Physical testing (Annex 5) for 5.2.4.</p> <p>Real-world demonstration drive (Annex 5) insofar as situations may arise which require the system to avoid a collision.</p>

Treat other road users with reasonable consideration

5.1.2. The activated system shall comply with traffic rules relating to the DDT in the country of operation.

5.2.2. The activated system shall detect a vehicle driving beside as defined in paragraph 7.1.2. and, if necessary, adjust the speed and/or the lateral position of the vehicle within its lane as appropriate.

5.2.3.3. The activated system shall detect the distance to the next vehicle in front as defined in paragraph 7.1.1. and shall adapt the vehicle speed in order to avoid collision.

While the ALKS vehicle is not at standstill, the system shall adapt the speed to adjust the distance to a vehicle in front in the same lane to be equal or greater than the minimum following distance.

In case the minimum time gap cannot be respected temporarily because of other road users (e.g. vehicle is cutting in, decelerating lead vehicle, etc.), the vehicle shall readjust the minimum following distance at the next available opportunity without any harsh braking unless an emergency manoeuvre would become necessary.

Audit of safety documentation (Annex 4).

Physical testing to check the lateral and forward detection ranges (Annex 5).

Real-world demonstration drive (Annex 5) insofar as situations may arise which require the system to adjust to the presence of other road users.

<i>Present speed of the ALKS vehicle</i>		<i>Minimum time gap</i>	<i>Minimum following distance</i>
(km/h)	(m/s)	(s)	(m)
7.2	2.0	1.0	2.0
10	2.78	1.1	3.1
20	5.56	1.2	6.7
30	8.33	1.3	10.8
40	11.11	1.4	15.6
50	13.89	1.5	20.8
60	16.67	1.6	26.7

Avoid putting itself in a position where it would be the cause of a collision

5.1.1. The activated system shall not cause any collisions that are reasonably foreseeable and preventable. If a collision can be safely avoided without causing another one, it shall be avoided. When the vehicle is involved in a detectable collision, the vehicle shall be brought to a standstill.

5.4.1. The activated system shall recognise all situations in which it needs to transition the control back to the driver.

Types of situations in which the vehicle will generate a transition demand to the driver shall be declared by the vehicle manufacturer and included in the documentation package required in Annex 4.

5.4.2. The initiation of the transition demand shall be such that sufficient time is provided for a safe transition to manual driving.

5.4.4.1. In case the driver is not responding to a transition demand by deactivating the system (either as described in paragraph 6.2.4. or 6.2.5.), a minimum risk manoeuvre shall be started, earliest 10 s after the start of the transition demand.

5.4.4.1.1. Notwithstanding paragraph 5.4.4.1. a minimum risk manoeuvre may be initiated immediately in case of a severe ALKS or severe vehicle failure.

In case of a severe ALKS or vehicle failure the ALKS may no longer be capable of fulfilling the requirements of this Regulation, but it shall aim at enabling a safe transition of control back to the driver.

5.4.4.1.2. The manufacturer shall declare the types of severe vehicle failures and severe ALKS failures that will lead the ALKS to initiate a MRM immediately.

Audit of safety documentation (Annex 4).

Physical check of the HMI requirements (e.g. to validate 5.4.4.1.).

Real-world demonstration drive (Annex 5).

Recognise when it is operating outside of its operational design domain	<p>5.4.1. The activated system shall recognise all situations in which it needs to transition the control back to the driver. Types of situations in which the vehicle will generate a transition demand to the driver shall be declared by the vehicle manufacturer and included in the documentation package required in Annex 4.</p> <p>5.1.9. When the system can no longer meet the requirements of this Regulation, it shall not be possible to activate the system.</p> <p>The manufacturer shall declare and implement a process to manage the safety and continued compliance of the ALKS system over lifetime.</p> <p>6.2.3. The system shall become active only upon a deliberate action by the driver and if all the following conditions are met:</p> <ul style="list-style-type: none"> - The driver is in the driver seat and the driver's safety belt is fastened according to paragraphs 6.1.1. and 6.1.2.; - The driver is available to take over control of the DDT according to paragraph 6.1.3.; - No failure affecting the safe operation or the functionality of the ALKS is present; - DSSAD is operational; - The environmental and infrastructural conditions allow the operation; - Positive confirmation of system self-check; and - The vehicle is on roads where pedestrians and cyclists are prohibited and which, by design, are equipped with a physical separation that divides the traffic moving in opposite directions. <p>If any of the above conditions is no longer fulfilled, the system shall immediately initiate a transition demand unless specified differently in this Regulation.</p>	Audit of safety documentation (Annex 4). Real-world demonstration drive (Annex 5).
---	--	---

Control Test

Test criterion	Relevant ALKS requirement(s)	Evidence and assessment methods
Dynamic Driving Task, incorporating: longitudinal dynamics (speed, acceleration, braking, gear selection) lateral dynamics (steering)	<p>Introductory text: ALKS controls the lateral and longitudinal movement of the vehicle for extended periods without further driver command. ALKS is a system whereby the activated system is in primary control of the vehicle.</p> <p>2.1. "Automated Lane Keeping System (ALKS)" for low speed application is a system which is activated by the driver and which keeps the vehicle within its lane for travelling speed of 60 km/h or less by controlling the lateral and longitudinal movements of the vehicle for extended periods without the need for further driver input.</p> <p>5.1.1. The activated system shall perform the DDT shall manage all situations including failures, and shall be free of unreasonable risks for the vehicle occupants or any other road users.</p> <p>5.1.2. The activated system shall comply with traffic rules relating to the DDT in the country of operation.</p> <p>5.2. Dynamic Driving Task</p>	<p>Audit of safety documentation (Annex 4)</p> <p>Physical testing (Annex 5):</p> <p>Lane Keeping - the test shall demonstrate that the ALKS does not leave its lane and maintains a stable position inside its ego lane across the speed range and different curvatures within its system boundaries.</p> <p>Collision avoidance – avoid a collision with stationary road user blocking the lane</p> <p>Following a lead vehicle - The test shall demonstrate that the ALKS is able to maintain and restore the required safety distance to a vehicle in front and is able to avoid a collision with a lead vehicle which decelerates up to its maximum deceleration.</p>

5.2.1. The activated system shall keep the vehicle inside its lane of travel and ensure that the vehicle does not cross any lane marking (outer edge of the front tyre to outer edge of the lane marking). The system shall aim to keep the vehicle in a stable lateral position inside the lane of travel to avoid confusing other road users.

5.2.2. The activated system shall detect a vehicle driving beside as defined in paragraph 7.1.2. and, if necessary, adjust the speed and/or the lateral position of the vehicle within its lane as appropriate.

5.2.3. The activated system shall control the speed of the vehicle.

...

5.2.3.3. The activated system shall detect the distance to the next vehicle in front as defined in paragraph 7.1.1. and shall adapt the vehicle speed in order to avoid collision.

While the ALKS vehicle is not at standstill, the system shall adapt the speed to adjust the distance to a vehicle in front in the same lane to be equal or greater than the minimum following distance.

6.2.6. On deactivation of the system, there shall not be an automatic transition to any function, which provides continuous longitudinal and/or lateral movement of the vehicle (e.g. ACSF of Category B1 function).

After deactivation, Corrective Steering Function (CSF) may be active with the aim at accustoming the driver to execute the lateral control task by gradually reducing lateral support.

Notwithstanding both paragraphs above, any other safety system delivering longitudinal or lateral support in imminent collision situations (e.g. Advanced Emergency Braking System (AEBS), Electronic Stability Control (ESC), Brake Assist System (BAS) or Emergency Steering Function (ESF)) shall not be deactivated in case of deactivation of ALKS.

6.3.1. A driver input to the steering control shall override the lateral control function of the system when the input exceeds a reasonable threshold designed to prevent unintentional override.

This threshold shall include a specified force and duration and shall vary depending on parameters that include criteria used for driver attentiveness to be checked during the drivers input as defined in paragraph 6.3.1.1.

These thresholds and the rationale for any variation shall be demonstrated to the Technical Service during the assessment according to Annex 4.

Lane change of another vehicle into lane

Stationary obstacle after a lane change of a lead vehicle – avoid a collision with an object that appears as a result of a lead vehicle moving out of lane.

Annex B - Road Traffic Rules

'Must'/'Must not' Rules

1 **Rule 144**

You **MUST NOT**

- drive dangerously
- drive without due care and attention
- drive without reasonable consideration for other road users.

2 **Rule 261**

You **MUST NOT** exceed 70 mph (112 km/h), or the maximum speed limit permitted for your vehicle (see [speed limits table](#)). If a lower speed limit is in force, either permanently or temporarily, at road works for example, you **MUST NOT** exceed the lower limit. On some motorways, mandatory motorway signals (which display the speed within a red ring) are used to vary the maximum speed limit to improve traffic flow. You **MUST NOT** exceed this speed limit.

3 **Rule 270**

You **MUST NOT** stop on the carriageway, hard shoulder, slip road, central reservation or verge except in an emergency, or when told to do so by the police, traffic officers in uniform, an emergency sign or by flashing red light signals. Do not stop on the hard shoulder to either make or receive mobile phone calls.

4 **Rule 286**

If you are involved in a collision which causes damage or injury to any other person, vehicle, animal or property, you **MUST**

- stop
- give your own and the vehicle owner's name and address, and the registration number of the vehicle, to anyone having reasonable grounds for requiring them
- if you do not give your name and address at the time of the collision, report it to the police as soon as reasonably practicable, and in any case within 24 hours.

5 **Rule 226**

You **MUST** use headlights when visibility is seriously reduced, generally when you cannot see for more than 100 metres (328 feet). You may also use front or rear fog lights but you **MUST** switch them off when visibility improves (see Rule 236).

6 **Rule 236**

You **MUST NOT** use front or rear fog lights unless visibility is seriously reduced (see Rule 226) as they dazzle other road users and can obscure your brake lights. You **MUST** switch them off when visibility improves.

7 **Rule 258**

Red flashing lights. If red lights flash on a signal and a red “X” is showing, you **MUST NOT** drive in the lane shown as closed beyond the signal. This applies until you pass another signal indicating that the lane is no longer closed, by displaying the word “End” or a speed limit sign and you are sure that it is safe to proceed.

Red flashing lights. If red lights flash on a signal in the central reservation or on the side of the road and lane closed sign is showing, you **MUST NOT** go beyond the signal in any lane.

8 **Rule 106**

Police stopping procedures. If the police want to stop your vehicle they will, where possible, attract your attention by

- flashing blue lights, headlights or sounding their siren or horn, usually from behind
- directing you to pull over to the side by pointing and/or using the left indicator.
- You **MUST** then pull over and stop as soon as it is safe to do so. Then switch off your engine.

9 **Rule 107**

Driver and Vehicle Standards Agency officers have the power to stop vehicles on all roads, including motorways and trunk roads. They will attract your attention by flashing amber lights

- either from the front requesting you to follow them to a safe place to stop
- or from behind directing you to pull over to the side by pointing and/or using the left indicator.

It is an offence not to comply with their directions. You **MUST** obey any signals given (see ‘Signals by authorised persons’).

10 **Rule 108**

Traffic officers have powers to stop vehicles on most motorways and some ‘A’ class roads, in England and Wales. If traffic officers in uniform want to stop your vehicle on safety grounds (e.g. an insecure load) they will, where possible, attract your attention by

- flashing amber lights, usually from behind
- directing you to pull over to the side by pointing and/or using the left indicator.

You **MUST** then pull over and stop as soon as it is safe to do so. Then switch off your engine. It is an offence not to comply with their directions (see ‘Signals by authorised persons’).

11 **Rule 109**

Traffic light signals and traffic signs. You **MUST** obey all traffic light signals (see ‘Light signals controlling traffic’) and traffic signs giving orders, including temporary signals & signs (see ‘Traffic signs’). Make sure you know, understand and act on all other traffic and information signs and road markings (see ‘Traffic signs’, ‘Road markings’ and ‘Vehicle markings’).

12 **Rule 281**

Warning signs or flashing lights. If you see or hear emergency or incident support vehicles in the distance, be aware there may be an incident ahead (see Rule 219).

Police officers and traffic officers may be required to work in the carriageway, for example dealing with debris, collisions or conducting rolling road blocks. Police officers will use rear-facing flashing red and blue lights and traffic officers will use rear-facing flashing red and amber lights in these situations. Watch out for such signals, slow down and be prepared to stop. You **MUST** follow any directions given by police officers or traffic officers as to whether you can safely pass the incident or blockage.

‘Should’/‘Should not’ Rules

13 **Rule 227**

Wet weather. In wet weather, stopping distances will be at least double those required for stopping on dry roads (see ‘Typical stopping distances’). This is because your tyres have less grip on the road. In wet weather

- you should keep well back from the vehicle in front. This will increase your ability to see and plan ahead
- if the steering becomes unresponsive, it probably means that water is preventing the tyres from gripping the road. Ease off the accelerator and slow down gradually
- the rain and spray from vehicles may make it difficult to see and be seen
- be aware of the dangers of spilt diesel that will make the surface very slippery (see Annex 6: Vehicle maintenance, safety and security)
- take extra care around pedestrians, cyclists, motorcyclists and horse riders.

14 **Rule 231**

Drive extremely carefully when the roads are icy. Avoid sudden actions as these could cause loss of control. You should

- drive at a slow speed in as high a gear as possible; accelerate and brake very gently
- drive particularly slowly on bends where loss of control is more likely. Brake progressively on the straight before you reach a bend. Having slowed down, steer smoothly round the bend, avoiding sudden actions
- check your grip on the road surface when there is snow or ice by choosing a safe place to brake gently. If the steering feels unresponsive this may indicate ice and your vehicle losing its grip on the road. When travelling on ice, tyres make virtually no noise.

15 **Rule 233**

In very windy weather your vehicle may be affected by turbulence created by large vehicles. Motorcyclists are particularly affected, so keep well back from them when they are overtaking a high-sided vehicle.

Annex C - Consultation Principles

The consultation is being conducted in line with the Government's key consultation principles. Further information is available at <https://www.gov.uk/government/publications/consultation-principles-guidance>.

If you have any comments about the consultation process, please contact:

Consultation Co-ordinator
Department for Transport
Zone 1/29
Great Minster House
London
SW1P 4DR

Email consultation@dft.gsi.gov.uk