Centre for Connected
& Autonomous Vehicles

Safe Use of Automated Lane Keeping System (ALKS)

Summary of Responses and Next Steps

Moving Britain Ahead

April 2020

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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

1. Introduction

Background

Automated vehicle technology is set to play a major role in the transport revolution happening today across the UK, helping to improve transport across the nations by making everyday journeys safer, more flexible and more reliable. The UK's support for automated vehicle technology has made it one of the global leaders in its development. The UK also plays an active 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 UNECE Automated Lane Keeping System (ALKS) Regulation was was approved in June 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.

The ALKS Regulation sets out the technical requirements for ALKS, but certain aspects of its use requires further consideration at a national level. The Government's Call for Evidence on the Safe Use of Automated Lane Keeping System, launched in August 2020, sought views on these issues and this document summarises the responses to the Call for Evidence.

Structure of this document

This document summarises the responses to the Call for Evidence and sets out the Government's response. In particular, this document sets out the Government's process for listing automated vehicles under the Automated and Electric Vehicles Act 2018 (AEVA). This includes applying the Monitoring and Control Tests, as set out in the Call for Evidence, which have been amended to take account of the responses received. It also highlights several policy areas, for example driver education, where further work is needed and sets out next steps.

The structure is as follows:

- Summary of responses:
    1. Overview of ALKS.
    2. Ensuring Safe Use.

3. Fair Delegation and Residual Responsibility.
4. Performing Other Activities.
5. Use of ALKS up to 70mph.

- Outcomes from the Call for Evidence and next steps
- Listing methodology for Automated Vehicles

For further background and context on each of these areas, please refer to the Call for Evidence document.

2. Summary of Responses

Overview of respondents

Responses to the consultation were received via email and Smart Survey (an online survey platform). In total, **186** responses were received: 104 responses from individuals and 82 from organisations. A wide variety of organisations responded including:

- Local transport authorities
- Component supplier or technology developers
- Trade associations and transport interest groups
- Legal firms
- Cyber security organisations
- Academia and research institutes
- Research and consultancy professionals
- Insurers
- Manufacturers
- Emergency services and Police

We are very grateful for the significant engagement and detailed feedback that we received from many organisations and individuals.

Overview of ALKS

Question 1

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

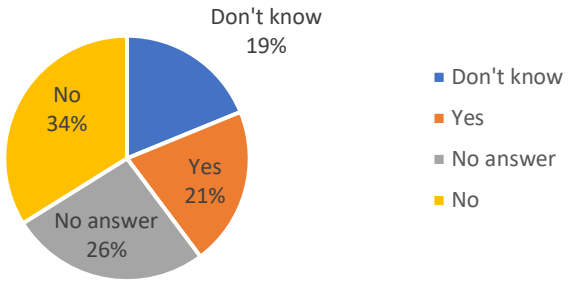

Figure 1 – 34% of the respondents said “No”, 21% said “Yes”, 19% said “Don’t know” and 26% did not answer the question.

Question 2

If yes, what are those barriers?

62 respondents provided comments to this question.

1. There were several comments around who should have access to the Data Storage System for Automated Driving (DSSAD) data. The most common response was that insurers should have access to the data. A small proportion said that regulators/government and or the driver/registered keeper should have access. Other suggestions included injured third parties and vehicle manufacturers.

2. Several responses highlighted that DSSAD data would or could be classified as personal data under the General Data Protection Regulation (GDPR) and the Data Protection Act 2018. This would require consideration of all the measures in place for handling personal data such as the need for a lawful basis for processing and sharing with third parties. There were also comments that ‘ownership’ of DSSAD data is unclear.

3. There were several concerns raised about the data elements in the DSSAD specification. For example, the Forensic Collision Investigation Network stated that the data must allow accurate understanding of collision dynamics and suggested that it should be extended to cover driver attentiveness and availability. There were also concerns that the data storage period is unspecified and that current triggers for ‘detectable collisions’ are inadequate.

4. The respondents also commented on the enforcement of the policy. Some respondents thought the Police and Criminal Evidence Act 1984 was inadequate for police to access the DSSAD data. One respondent commented that the three ‘legal safeguards’ in the Act might not be applicable if the police are investigating non-fatal accidents or product failures. There were also suggestions that the police would need additional training, and that this might place an unnecessary burden on them.

Question 3

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?

152 respondents provided comments to this question.

5. The large majority of respondents stressed the importance of ensuring that drivers using ALKS technology know how to use it appropriately and that other road users also be informed of ALKS technology. There were common concerns raised about the need to ensure that the driver is clear on ALKS capability. Some respondents suggested that the driver may overestimate the capability of the system, while others suggested that it is not intuitive.

6. Just over a quarter of respondents proposed mandatory training for drivers. However, several mentioned that systems type-approved to ALKS will have different capabilities and require specific training, so national approaches would not be appropriate. Incorporation of addition training in new driver training was proposed by over one-fifth of respondents, as this could raise awareness about rules on use and the need to understand system capability.

7. Some responses suggested that drivers should be required to sign a disclaimer to certify they understand how to use ALKS. Others suggested that insurers could require specific training by drivers to insure AVs or that the ALKS system should provide training and only activate for drivers who have completed it.

8. A few respondents considered it important for drivers to have some practical experience to use ALKS. However, a few also pointed out that this may be difficult given the limited Operational Design Domain (ODD). The most commonly proposed approaches to educate ALKS users were: incorporating guidance and training modules into the system; explanation/demonstration at the point of sale; provision of leaflets, quick guides and user manuals which make clear the driver responsibilities and system limitations; and publication of material online including videos, training courses and simulators.

9. Several respondents pointed out the need for trained staff at the point of sale, who could provide sufficient guidance/training for buyers, and that training materials must be available for second-hand, rented and shared vehicles. Some respondents suggested that the manufacturers should take responsibility for providing training for their clients, and design systems which explain new capability when added through over the air updates. To reach existing drivers and road users, several respondents suggested media campaigns, which could be used to communicate changes to The Highway Code.

Question 4

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

142 respondents provided comments to this question.

10. The majority of respondents agreed that manufacturers should provide education and information on ALKS technology which is easily understood and gives safety warnings, and that manufacturers should provide full vehicle documentation such as manuals and brochures as softcopies and hardcopies so that drivers can easily obtain information on how to operate ALKS. Another suggestion was to have in-car messages (HMI) / videos to confirm drivers understand the capability of the ALKS.

11. Many respondents were concerned that drivers may not operate ALKS vehicles properly without training or demonstration. Therefore, a few respondents recommended that manufacturers should train retailers/dealers and instructors for them to provide training on ALKS to drivers/buyers. It was also suggested that manufacturers should provide car specific demonstrations and training on capabilities and limitations of the system before the ALKS vehicle is purchased. Manufacturers should provide online videos, audio, tutorials, materials and on features, which cater for all languages and disabilities.

12. Many respondents were concerned that manufacturers would not provide sufficiently accurate information on ALKS and therefore recommended that government should make sure communications, marketing and advertising is factual and clear and does not mislead consumers with respect to ALKS capabilities.

Question 5

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

138 respondents provided comments to this question.

13. Many respondents commented that the government should develop and educate the public via awareness campaigns about the new ALKS technology using different media such as social media / TV.

14. Many respondents also felt that government and/or government agencies should set a framework that provides standards/guidelines for ALKS training and education material, and for the driving test, on how to use ALKS vehicles effectively. This would be to provide a common approach by manufacturers on ALKS education and information.

15. Many respondents commented that before drivers use an ALKS vehicle the government should ensure drivers are ALKS trained by making sure they have a driving and theory awareness assessment, which would provide a pass certificate. To enable this to happen DVSA would need to develop an additional test for ALKS and provide information on Highway Code changes.

Ensuring Safe Use

Question 6

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?

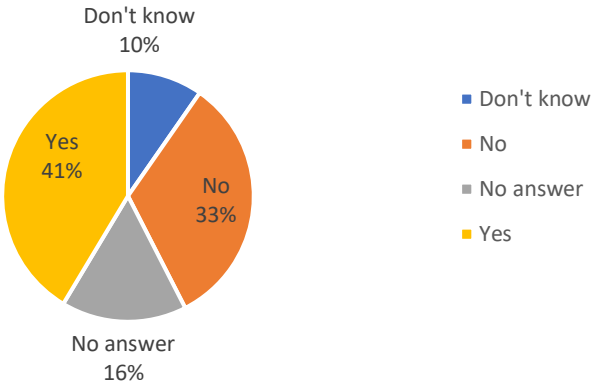

Figure 2 - 33% of the respondents said “No”, 41% said “Yes”, 10% said “Don’t know” and 16% did not answer the question.

Question 7

If yes, what are those concerns?

80 respondents provided comments on this question.

16. The majority of respondents had concerns that ALKS does not meet the definition of Automated Vehicle and should be considered as an Advanced Driver Assistance System (ADAS). Some quoted the position paper published by Thatcham and the Association of British Insurers (ABI).

17. There were also concerns that the ALKS technology would have limited capability and could fail. Therefore, it is not yet ready to encounter every situation or meet UK road traffic rules, which would require being able to respond to unforeseen situations such as falling debris. If listed as automated, the driver would not have to remain attentive and so would be unable to take control in a timely and safe manner.

18. Many of the respondents had concerns that the ALKS vehicle did not have the right driver attention monitoring technology to comply with GB legal requirements. Therefore, they would like the ALKS vehicle to go through some assessment to make sure vehicles have a driver monitoring system or other functions installed that are compliant with GB road rules.

19. Many of the respondents commented that they would like government to examine this policy further to provide greater clarity.

Question 8a

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?

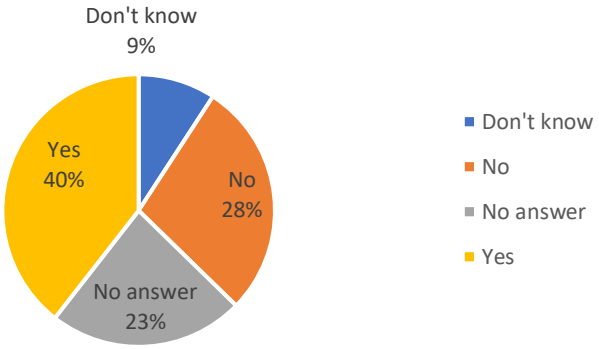

Figure 3 - 28% of the respondents said “No”, 40% said “Yes”, 9% said “Don’t know” and 23% did not answer the question.

Question 8b

Why?

109 respondents provided comments on this question.

20. The majority of comments from individuals were: that the driver should be required to be alert at all times and be monitored by the system; that there are too many variables to enable determination of system safety in a test; that ALKS should not be considered automation; that the criteria are too vague; and that the test needs to consider the human-machine interface.

21. The majority of comments from organisations were: that the test criteria were too vague and open to interpretation, particularly the criterion on collision avoidance; that ALKS should not be considered automation; that the tests should consider interaction with other road users, for example signalling; that the tests should consider UK driving conditions; that the vehicle must be capable of reaching a safe condition to be considered automated; and that the UK should not be setting such criteria unilaterally without international discussions.

22. The criterion to “avoid collisions which a competent and careful driver could avoid” attracted most comments, primarily because of the difficulty in objectively assessing it – some asked for ‘competent and careful driver’ to be defined. Some suggested automated vehicles should be safer than human drivers, with a suggested amendment to “avoid collisions which a competent and careful driver exercising reasonable care could avoid”. Others pointed out that the criterion is unachievable or incompatible with ensuring compliance with road traffic rules, with one suggestion to amend it to “avoiding putting itself in a position where it could be the cause of a collision”. Some responses suggested drawing on the 12 criteria for safe automation proposed by Thatcham.

23. Several responses also suggested the test should assess the safety of the minimum risk manoeuvre, consider safety for vulnerable road users, safety of use by disabled drivers (for example timescale for the transition demand), performance under adverse weather, if the system would prevent acceleration when being overtaken by another vehicle and if the system would maintain the vehicle in a state as to enable takeover by the driver (for example windscreen wipers on in rain or snow, preventing fogging of windows).

24. Some respondents considered the monitoring and control tests to be too subjective or that they lacked enough detail on which to make a decision on safety. Similarly, respondents wanted greater clarity on how these criteria would be used in practice to judge the safety of automated vehicles in future.

Question 8a

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

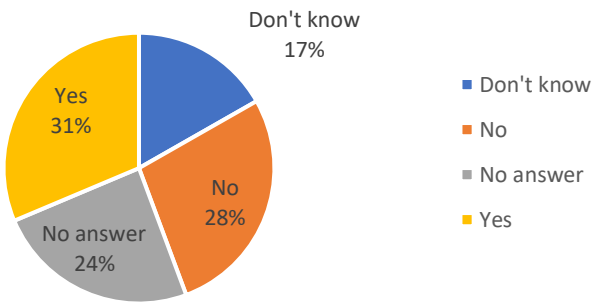

Figure 4 - 28% of the respondents said “No”, 31% said “Yes”, 17% said “Don’t know” and 24% did not answer the question.

Question 8b

Why?

152 respondents provided comments on this question.

25. Many respondents did not feel that the requirements in the ALKS Regulation and the approach for assessing whether they are met in the type-approval process will be adequate, with a particular concern that practical tests will not be a good demonstration of overall safety. Respondents also raised concerns about the lack of testing of machine learning components, and several respondents felt the road rule compliance tests will have to rely on self-certification.

26. Many respondents also felt that judging ALKS against the criterion of a competent & careful driver was either not a useful measure or that ALKS could not meet this criterion on the basis of the requirements set out in the ALKS Regulation. Several

respondents cited its inability to change lane and the minimal risk manoeuvre as incompatible with this criterion.

27. A sizeable number of respondents, namely manufacturers, considered the tests to be adequate and a good representation of the requirements set out in the ALKS regulation.

28. A number of respondents expressed scepticism about the overall safety of 'Level 3 automation', citing 10 seconds as too short a period to expect a driver to resume control, and felt ALKS needed to be monitored by the driver at all times to ensure safety. Several respondents called on Government to clearly set out how it would use market surveillance to check whether ALKS complies with the UNECE Regulation.

Question 9

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?

146 respondents provided comments on this question.

29. One of the strongest themes among responses was that ALKS will not be able to detect or respond to an enforcement vehicle or that ALKS will be unreliable in this instance and some form of driver intervention will be required.

30. Many respondents suggested that rear audio sensors should be mandated and compulsory for all ALKS vehicles. Along the same lines, detecting the enforcement vehicle using cameras was another popular suggestion, or that the vehicle should be connected to other vehicles or to everything, or have transponder technology which would allow it to detect other vehicles and cause the vehicle to engage in a transition demand.

31. Many respondents stated that the driver should remain fully accountable and responsible for the vehicle – and so remain aware of their surroundings and not be allowed to engage in other activities.

32. A minority of respondents held the view that ALKS should not be relied on for detecting an enforcement vehicle and so there should be exogenous means of alerting the driver, such as noticing the blue flashing lights or a warning on the dashboard.

33. The importance of international harmonisation was discussed by a few respondents who believed that it is important for police signals and warnings to be consistent across countries and regions so that ALKS can detect and respond correctly.

Question 10a

Do you think that 10 seconds is fast enough in the foreseeable circumstances to comply with the rules on responding to enforcement vehicles?

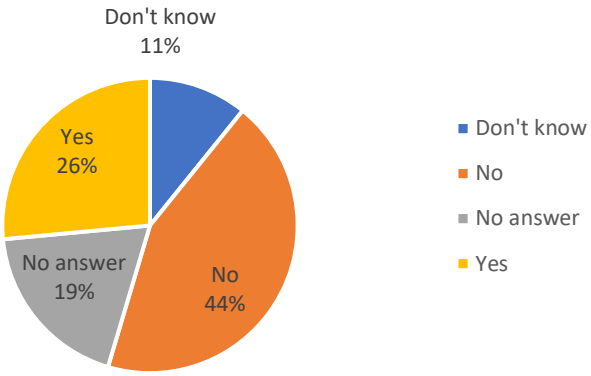

Figure 5 - 44% of the respondents said “No”, 26% said “Yes”, 11% said “Don’t know” and 19% did not answer the question.

Question 10b

If not, why?

92 respondents provided comments on this question.

34. Many of the responses expressed concerns that ALKS would increase driver reaction times. A number of respondents felt that driver reaction times could be between 10 and 30 seconds, particularly if drivers were allowed to perform other activities until there is a transition demand. Some responses suggested that driving quality would be poor for a period of time after the driver had regained control and this would negatively affect safety.

35. There were many responses suggesting 10 seconds is too long for a safe transition period, implying or explicitly stating that a shorter time was required – namely where enforcement vehicles may be trying to warn of imminent danger. A minority explicitly stated that ALKS should be able to respond to enforcement vehicles as quickly as human drivers.

36. Several responses stated that 10 seconds was too little time for a safe transition period, the main comments were that there was a significant time needed for the driver to notice and act upon the enforcement vehicles signals. Four respondents felt that enough time was also needed to assess the road before control was regained safely and a few responses suggested times of 12-20 seconds instead.

37. Many responses suggested that the correct time to comply with rules on responding to enforcement vehicles was context dependent, with a few responses suggesting that 10 seconds would be appropriate in some cases and not in others. Other responses stated that it depended on the response required as well as on road and weather conditions.

38. Some of the responses raised doubts about the ability of ALKS to respond appropriately, with a few suggesting that ALKS would not be able to recognise the emergency vehicle quickly enough or would not issue a transition demand at all. Others were concerned about the minimum risk manoeuvre (MRM) if the driver does not regain control, expressing that stopping in lane would be dangerous or that a transition demand could force an unsafe transition.

Question 11

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

137 respondents provided comments on this question.

39. Sensors were most frequently mentioned suggesting that sensor technology in some form is widely viewed as the most appropriate technology to detect collisions. A number of respondents provided additional detail in suggesting either collision/impact sensors or proximity/parking sensors, and a small number suggested a sensor mesh to cover the whole surface area of the vehicle.

40. Another frequent technology suggested for detecting collisions were cameras or camera systems to visually detect vehicles or other objects in close proximity, although few answers gave details on the operation or specifications of a camera system.

41. Other technical suggestions by a small number of respondents included radar or acoustic system, vehicle-to-vehicle communications and speed monitoring systems.

42. However, a number of respondents expressed scepticism that it would be possible to distinguish incidents warranting driver involvement. These respondents believed it would be possible to build systems to detect collisions but were concerned about the systems' ability to detect which collisions required alerting the driver to stop. Several respondents mentioned minor collisions with potholes or road debris, which do not require a stop, but which may be indistinguishable from more serious but equally low-energy collisions with animals or motorcycles. This leads to potential for "false positives" if the system is too sensitive, but potential failure to comply with regulations if the system is not sensitive enough.

43. The most frequent comment on how the system would make a vehicle stop after detecting a collision was that the system should ask the driver to take over control. A significant number of respondents suggested that the driver should remain engaged at all times, and a small number stated that drivers should be held responsible for damage at all times. However, a larger number of responses stated either that manufacturers should be held responsible, or that it is up to manufacturers to ensure the functionality works as required.

Question 12a

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

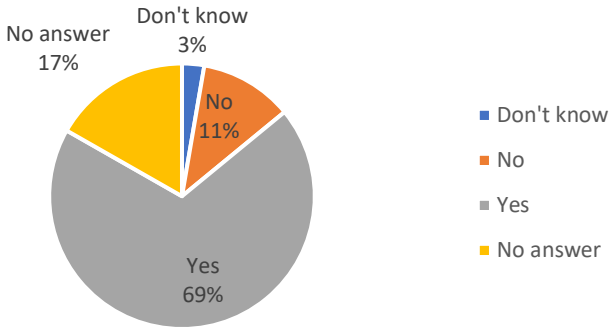

Figure 6 - 11% of the respondents said “No”, 69% said “Yes”, 3% said “Don’t know” and 17% did not answer the question.

Question 12b

What are these risks?

128 *respondents provided comments on this question.*

44. The majority of responses stated that there was risk of injury to the involved parties in low energy impacts. Many responses specifically mentioned that there could be serious injury to vulnerable road users (the motorcyclist in the given example), suggesting that low energy impacts did not necessarily translate to low injury. Other comments mentioned that if an injured person is left in the road and the ALKS vehicle does not stop, other vehicles could potentially run them over. Responses also expressed that by not stopping or alerting the driver, there would be a delay in summoning help for the injured party, who may require immediate assistance.

45. The majority of responses made reference to legal and liability risks if the ALKS vehicle does not stop. Many raised concerns that the vehicle would not be adhering to legal requirements if it drove off after the collision without providing contact details, with some even comparing this situation to a ‘hit and run’. Several responses commented that the vehicle driving off would make it difficult to determine liability for the incident and some suggested this could even lead to avoiding responsibility for the incident. Other responses suggested that many low energy collisions would go unrecorded (illegally) since drivers may not even realise they took place.

46. Many responses raised general safety concerns as a risk. The collision may cause the vehicle to incur damage that would render it dangerous or illegal to drive or generate debris which is a danger to other road users. Some noted that hitting animals or pedestrians could represent a low energy collision. Others mentioned that slowing alerts others to collisions and that a low-energy impacts might precede (and in-fact cause) larger accidents.

47. Many of responses suggested that ALKS did not have the capacity to operate effectively and would have difficulties in distinguishing between road user collisions for which the vehicle should stop from stopping for irregularities in the road surface

(speed bumps or pot-holes for example). Some suggested ALKS would not have the technical capacity to detect low energy impacts at all.

48. Other risks mentioned that did not fit into themes included increased aggression from other road users, a reduced public trust in ALKS if it did not stop and higher insurance costs if these collisions go unrecorded.

Question 13

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?

126 respondents provided comments on this question.

49. A significant number of responses suggested that, before being allowed on UK roads, ALKS-equipped vehicles must be able to recognise signage: in particular temporary signage overruling permanent signage, and signage located above the road. Some suggested that the vehicle should handover to the driver where signage could not be read. Several respondents were concerned that ALKS-equipped vehicles should be able to detect closed lanes.

50. Several respondents suggested a need for an approvals process that would verify this capability before the sale of ALKS. Several responses did not believe current technology was capable of this.

51. The most common suggestion in responses was that real time external data can be used to communicate signage information to ALKS-equipped vehicles and ensure vehicles obeyed instruction from road signage. Suggestions included roadside or gantry transmitters, a GPS or 4G-based solution and transmission of information directly from signage to vehicles. Several respondents suggested digital mapping of GB roads and a centralised database of real-time traffic information and speed limits to communicate the required information to ALKS-equipped vehicles.

52. Several respondents did not believe that currently available technology was capable of detecting road signage reliably or adequately, with some concerned that certain weather could reduce the effectiveness of camera-based systems and that further validation was needed to ensure reliability.

53. Only a small number of responses discussed the angles of detection that would be needed, some specifically suggested that upward detection should be required, while others referred to “all relevant angles”.

54. Ensuring appropriate brightness and legibility of signage was referenced by several respondents. It was also suggested that to ensure ALKS-equipped vehicles could recognise any GB-specific signage, a database should be compiled of all relevant signage these vehicles would be required to recognise.

Question 14a

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

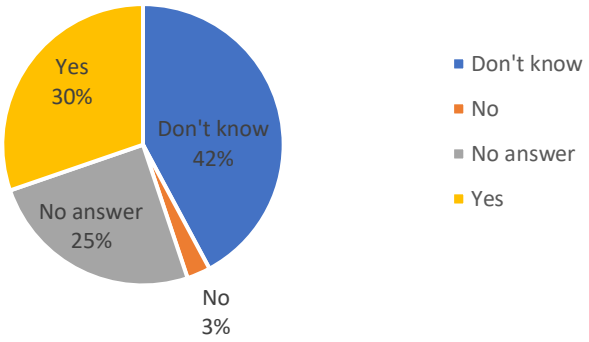

Figure 7 - 3% of the respondents said “No”, 30% said “Yes”, 42% said “Don’t know” and 25% did not answer the question.

Question 14b

Comments:

73 respondents provided comments on this question.

55. Several of the responses made reference to the ALKS installation being up to the driver of the vehicle. Some mentioned that ALKS will likely be a high-cost luxury optional extra that will only be adopted by high-mileage drivers at first. Others felt that ALKS adoption will depend on consumer demand for this technology.

56. Several responses highlighted the need for better monitoring and regulation from transport authorities if the ALKS technology is optional. There were concerns over how to monitor whether the vehicle had an automated capability or not, especially if models that do and do not have the technology look identical. Specific mention was given to the DVLA database, with suggestions that there needs to be real time monitoring of each vehicle’s ALKS capability. This was suggested to be especially important if the ALKS package is sold as a service and can thus be removed after the point of purchase.

57. A few responses also mentioned that the choice of automation might be available after the point of purchase. Specific focus was on AV technology as a service (a subscription model) and aftermarket upgrades from 3rd party suppliers.

58. Other responses included that there would be policing consequences if it was hard to tell whether vehicles had automated capabilities or not, with some respondents calling for a clear way to differentiate between automated and non-automated vehicles. One respondent felt that ALKS should only become mandatory at point of sale when it has proven its worth over several years.

Question 15a

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?

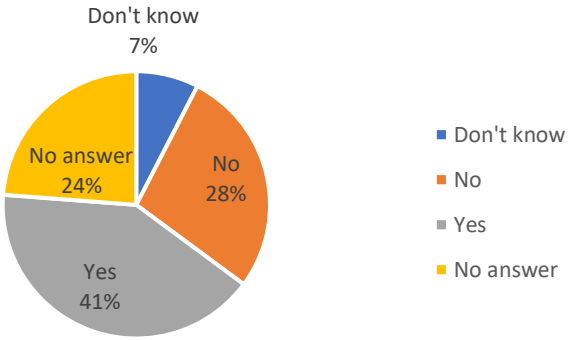

Figure 8 - 28% of the respondents said “No”, 41% said “Yes”, 7% said “Don’t know” and 24% did not answer the question.

Question 15b

If yes, what are they?

85 respondents provided comments on this question.

59. Respondents suggested that an inaccurate database may cause difficulties when insurers assess the level of risk as they design policies. They also felt there should be clarification as to whether a vehicle is operating as an AV or not. A majority of respondents suggested the possibility of the database being extended to include whether vehicles are ‘ALKS capable’, or if ALKS is present but faulty.

60. Many comments were related to liability in case of an incident, and generally worried that it would be difficult to determine liability if the functionality is disabled but the vehicle is recorded as automated on the database. It was also commented that incorrectly being registered as an AV may invalidate the driver’s insurance and may result in insurance fraud. A further related concern was that drivers may register the vehicle as an AV after an incident to attempt escaping liability by blaming the automated system.

61. A number of respondents mentioned that the database should be updated in real time if the AV status of a vehicle changes. However only a minority of respondents provided suggestions regarding who should be responsible in updating this database. Onene suggested that drivers should be responsible, whereas a few believed that manufacturers should hold the responsibility for updating the database.

62. There were concerns that remaining on the database with the AV functionality disabled could confuse drivers as they may rely on the technology even if AV capability is disabled, resulting in huge safety implications.

63. A minority of insurers explained that drivers may be more likely to illegally perform other tasks while driving if their vehicles are registered as automated.

64. The implications for enforcement vehicles and other road users was also discussed. A mix of respondents emphasised that enforcement vehicles must have access to an up-to-date database to avoid unnecessarily pulling drivers over or to avoid failing to pull over drivers who are illegally engaging in other activities.

65. Possible implications for the second-hand car market were discussed by a few respondents who were generally worried that new owner may not be fully aware of a vehicles AV status. Similarly, there were concerns about drivers who may illegally modify their vehicles or tinker with the vehicles AV status since this can affect how vehicles are recorded on the database.

Fair Delegation and Residual Responsibility

Question 16a

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?

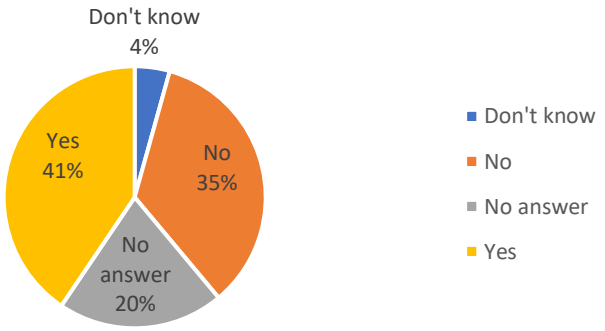

Figure 9 - 35% of the respondents said “No”, 41% said “Yes”, 4% said “Don’t know” and 20% did not answer the question.

Question 16b

If not, why?

91 respondents provided comments on this question.

66. The main objections to creating an exemption were that drivers should be responsible for preventing stopping in lane at all times and for responding to transition demands. Some responses suggested that the exemption risked creating a loophole, that the driver should still be responsible for resuming driving after a

stop, and that the driver should be held responsible if the stop was caused by poor vehicle maintenance (including failure to install software updates). Others suggested such stops in lane would be covered by an existing exemption for mechanical failures, or that manufacturers should be made responsible for the consequences of such stops.

67. Some respondents pointed out that stopping on an active lane is dangerous and raised concerns about the safety of ALKS-compliant AVs, suggesting they should not be treated as automated.

68. A response suggested that the system should activate warning lights when coming to a stop in an active lane. Two responses suggested the exemption should only be applied if systems are listed as automated under AEVA. One response pointed out that a driver should not be criminally liable if they had attempted to prevent a stop, but the vehicle did not allow them to take over.

Question 17a

Do you agree that amending Rule 150 is sufficient to clarify that the driver may rely on the ALKS?

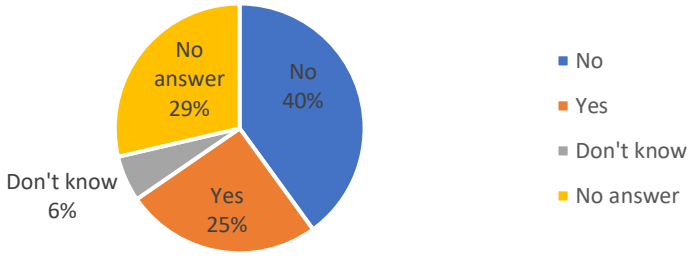

Figure 10 - 40% of the respondents said “No”, 25% said “Yes”, 6% said “Don’t know” and 29% did not answer the question.

Question 17b

If not, why?

96 *respondents provided comments on this question.*

69. Many respondents highlighted that the driver should be responsible for the vehicle and monitoring the ALKS system even when ALKS is engaged. Some felt that ALKS is not an automated driving system and that until further technological developments were made with increased evidence of safety, ALKS should be treated as driver assistance where the driver is responsible at all times. A couple of respondents commented that ALKS should be analogous to autopilot in an aircraft, where the aircraft pilots retains overall responsibility for the flight.

70. However, some suggested that the driver should not be held responsible if the system develops a fault or is tampered with in some way. In instances of faults, it is manufacturers who could be held responsible (depending on the system fault and circumstances of the individual case).

71. Responses stressed the need for increased communications to drivers around responsibilities and legal liabilities when the ALKS is engaged. Some respondents mentioned that many drivers do not regularly review the Highway Code for updates, and therefore a targeted public information campaign may be required to raise awareness, either led by Government or via manufacturers.

Question 18a

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?

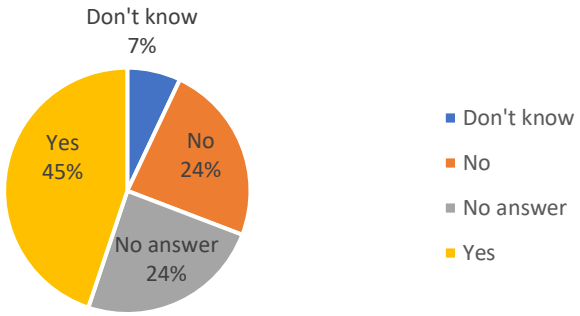

Figure 11 - 24% of the respondents said “No”, 45% said “Yes”, 7% said “Don’t know” and 24% did not answer the question.

Question 18b

If not, why?

65 respondents provided comments on this question.

72. A number of respondents agreed the driver should retain a monitoring responsibility, but some respondents called for better education otherwise drivers won't understand system limits/expectations.

73. Some respondents were sceptical that incentivising drivers is enough on its own as they would likely come to overly rely on the system causing reckless behaviour, based on evidence from ADAS usage. Some suggested that to avoid this, The Motorway Traffic Regulations would need to contain a more explicit indication of the need to resume control. Some respondents called for more research of driver behaviour to understand how best to incentivise drivers.

74. Manufacturers felt drivers should retain some awareness to respond to 'extraordinary external conditions', which would seem to indicate a remaining monitoring role. Some manufacturers suggested the concept of 'residual responsibility' be expanded

to include 'vigilance'. However, some respondents expressed a concern that the driver was being put in an impossible situation due to the nascence of the technology and would be prosecuted for its failure.

75. Some respondents mentioned the need for vehicles to be more proactive in managing risk: keeping the driver engaged; alerting other drivers to a transitions demand; and activating eCall in the event of remaining at rest too long.

76. Some respondents asked for greater clarity on what Government meant by 'unjustified' and 'justified' stops.

Question 19a

Do you agree that the Highway Code should be changed so that drivers of ALKS must be alert to a transition demand?

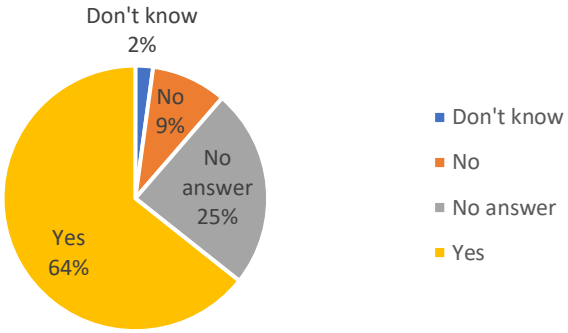

Figure 12 - 25% of the respondents said “No”, 64% said “Yes”, 2% said “Don’t know” and 25% did not answer the question.

Question 19b

If not, why?

37 respondents provided comments on this question.

77. Many respondents agreed that the Highway Code should be changed to make clear that the driver must remain sufficiently alert in order to respond to a transition demand. However, some respondents expressed a concern the Highway Code was merely advisory rather than a legal instrument, and many drivers often ignore amendments or do not refresh their knowledge after passing their driving test.

78. Some respondents emphasised that the driver must be alert and able to respond to a transition demand and take back control when required to do so. Some respondents suggested that the driver must also be warned against deliberately ignoring a transition demand or performing activities other than driving that would prevent them responding to a transition demand. Some respondents commented it should be made clear to drivers what non-driving activities they are able to or forbidden from doing whilst ALKS is engaged.

79. Some respondents raised a concern about how drivers would be able to respond to transition demands if they are disengaged and questioned whether 10 seconds is long enough for a driver to respond.

80. Some respondents commented that the wording of the Highway Code should be future-proofed as much as possible to avoid creating inadvertent loopholes or a need for continual updates as the technology evolves. The amendments should therefore include consideration of future use of automated vehicle technologies in all road environments rather than motorway low speed traffic.

Question 20a

Do you think that amending the Highway Code is sufficient to communicate to drivers their responsibility?

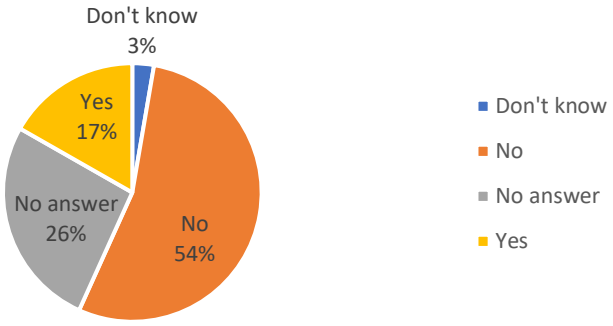

Figure 13 - 54% of the respondents said “No”, 17% said “Yes”, 3% said “Don’t know” and 26% did not answer the question.

Question 20b

If not, why?

128 respondents provided comments on this question.

81. Many respondents mentioned that drivers do not often, or indeed ever, check the Highway Code after passing their test, despite it being an important guidance document and so a simple amendment to the code will not be enough to reach them.

82. Respondents suggested a Government communication campaign could ensure drivers are aware of the changes made due to ALKS, as well as emphasise a wider responsibility of drivers to review and refresh their knowledge and understanding of The Highway Code.

83. Some respondents suggested that driving tests should be updated for new drivers to include ALKS and automated technologies, with particular focus on responding to transition demands and what is and isn’t permitted when the ALKS is engaged.

84. Several respondents mentioned that further driver education and training should not just be the responsibility of the DVSA and the Government. Manufacturers and car dealers should also have a responsibility to provide manuals, explanations and

demonstrations of the technology when selling a vehicle with ALKS technology. Driver responsibility and legal liability could also be communicated to customers before purchasing, while some suggested that insurance contracts should also explain driver responsibility and liabilities.

85. A few respondents emphasised that the vehicle itself should have clear prompts to take back control and should monitor the driver to ensure they are ready to take back control. They suggested that these prompts should be standardised across different vehicle types and manufacturers, so that drivers can easily drive different vehicles.

Performing Other Activities

Question 21a

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?

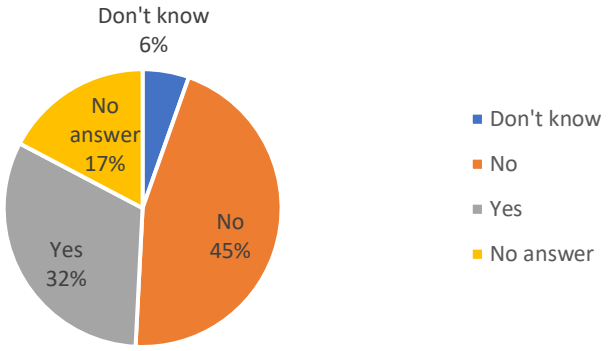

Figure 14 - 45% of the respondents said “No”, 32% said “Yes”, 6% said “Don’t know” and 17% did not answer the question.

Question 21b

Why?

97 respondents provided comments on this question.

86. Many respondents stated that performing other activities may distract the driver, who must be ready to take back control. These respondents suggested that the driver must always remain alert, should have their eyes on the road and be aware of their surroundings.

87. Many responses also suggested that the driver should only be allowed to perform other activities through the vehicle’s infotainment system since it turns off following a transition demand, or only perform activities that they are permitted to do in a conventional vehicle. The respondents highlighted that the driver must be able to safely resume control of the vehicle at all times.

88. Respondents were generally worried that drivers might engage in activities that physically increase their response time and that drivers' reaction times might be slower if they are doing other activities. It was also pointed out that all drivers are different and by using the average driver as the unit of analysis there may be severe, negative outcomes.

89. Insurers, legal firms and safety and road user groups generally had concerns about ALKS capability, stating that it should not be considered as level 3 or should be treated as ADAS with only activities permitted under this category allowed to be undertaken by the driver.

90. A minority of respondents noted that performing other activities may help to keep the driver alert and can reduce passive fatigue, hence allowing them to respond more effectively to a transition demand which would have positive implications for road safety.

91. Many respondents stated that real world evidence was required to prove that it is safe for drivers to perform other activities. They felt more research into the driver's behaviour and the vehicles performance is necessary. One respondent from a safety and road user group suggested that it would be beneficial to study international examples as well as UK-specific cases.

92. Lastly, some respondents expressed concerns that the system has not yet been proven to be safe due to lacking a fully developed driver monitoring system, a requirement for sensors, and no requirement for the system to be resilient against errors.

Question 22

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

80 respondents provided comments on this question.

93. The most common suggestion was that activities provided by the vehicle's infotainment system were safe. These were followed by reading books, using social media and responding to emails. Some respondents also suggested eating and drinking were safe activities or watching movies and TV shows.

94. There was a mixed consensus about using a phone. The majority of answers to this question stated that phone use is acceptable, but a minority suggested that drivers should only make hands-free phone calls.

95. Many respondents specified that the driver should not be allowed to perform any activities that physically hinder their response to a transition demand such as sleeping or using a laptop. Similarly, they also commented that drivers should not

perform any activities that require too much concentration or that takes more than 10 seconds to stop doing.

96. Others considered reading, use of mobile phones and tablets to be dangerous, and that drivers should only be allowed to perform other activities which switch off when there is a transition demand. A minority of respondents believed that a driver monitoring system is important to ensure drivers are not overly distracted and are able to take over control. Similarly, a minority of respondents stated that more research was required to correctly answer this question.

Question 23a

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

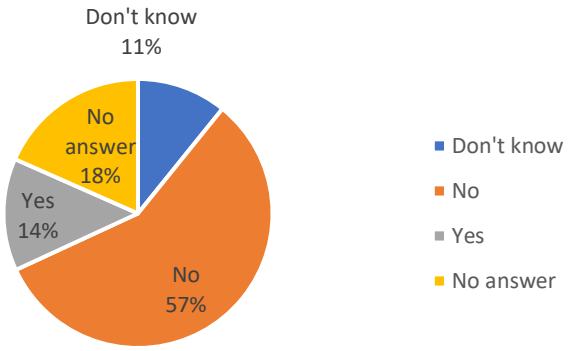

Figure 15 - 57% of the respondents said “No”, 14% said “Yes”, 11% said “Don’t know” and 18% did not answer the question.

Question 23b

If not, why?

97 respondents provided comments on this question.

97. The most common issue raised was the risk to road safety if a driver is not paying full attention to the road when the vehicle cannot safely driver itself. Respondents mentioned that drivers could be slow to respond to a transition demand, and that responding quickly and garnering sufficient situational awareness to act as a safe and responsible driver would be challenging.

98. Respondents noted that if ALKS-equipped vehicles were not listed as automated vehicles under AEVA then ultimately the driver remained liable and responsible for monitoring the road environment and the driving of the vehicle at all times. As such,

respondents commented that carrying out additional activities would not be compatible with driver responsibilities and might not be legal.

99. A small number of responses suggested that providing an exemption for ALKS, when not listed under AEVA, could be misinterpreted to suggest the system is more capable of ensuring safety and carrying out the driving task than is actually possible. Further, it could increase confusion among members of the public as to what drivers are allowed to do when using advanced driver assistance systems. Respondents also suggested that providing this exemption for ALKS-equipped vehicles without being classified as automated vehicles under AEVA could reduce the incentive in industry to develop more advanced and capable systems.

100. Lastly, some respondents suggested that the driver of an ALKS-equipped vehicle should have to remain alert while other vehicles were not running ALKS as they may act in a way not expected by the ALKS-equipped vehicle with the system engaged.

Question 23c

If yes, what other activities could they safely perform?

30 respondents provided comments on this question.

101. Few respondents proposed that any activity may be performed, aside from sleeping and other activities that may reduce the ability of the driver to monitor the driving environment.

102. Some of the suggested additional activities a driver may perform safely while ALKS is engaged in a vehicle not listed as automated under AEVA included: phone calls, eating/drinking, talking to other passengers, using an infotainment system, checking vehicle and ALKS system status, watching television, reading, playing video games, reading and writing emails or otherwise working on an electronic device, listening to and changing music.

Question 24a

Do you agree that an exception should be added to enable the use of the infotainment system for activities other than driving?

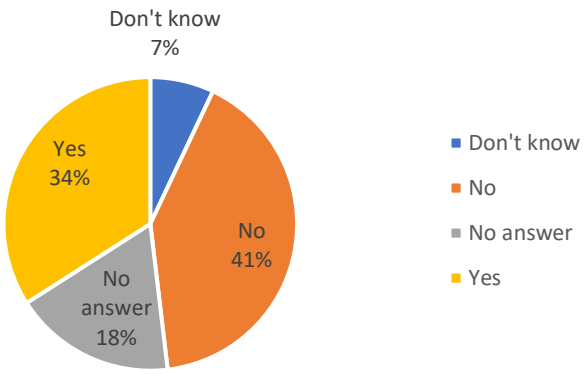

Figure 16 - 41% of the respondents said “No”, 34% said “Yes”, 7% said “Don’t know” and 18% did not answer the question.

Question 24b

If not, why?

85 *respondents provided comments on this question.*

103. Many responses suggested that an exception to enable use of the infotainment systems would distract the driver from the driving task. Most comments suggested that infotainment would increase the time it takes for the driver to resume control of the vehicle as it reduces driver alertness and impacts upon thinking and assessment abilities. Respondents also felt that the risks of not being alert to danger was too high and that even brief distractions could lead to incidents. Several responses went as far as suggesting that infotainment systems should not be permitted at all.

104. Some of the respondents felt that only specific activities should be added as an exception, whilst others should not be permitted. Specifically, some respondents felt that the driver should not be allowed to fall asleep at the wheel and that cognitively demanding activities, such as watching films, gaming and texting should not be allowed. Two responses suggested that only the vehicle’s own infotainment system should be allowed as an exception, while two responses stated that activities through tethered devices should also be allowed.

105. Several respondents expressed doubts about ALKS’ capacity as an automated driving system. These responses often stated that ALKS should not be considered as a fully automated system, but rather treated as ADAS. Specific comments mentioned that the transition period was too short so secondary activities should not be permitted at all and there were concerns over the system’s ability to determine the driver’s state of attentiveness.

106. Many responses noted that the driver still had ultimate responsibility for operation of the vehicle and as a result should always remain attentive because decisions on the road are often split second. Specific comments included that there is ‘no need’ to

complete secondary tasks whilst driving and that autopilot in other industries, such as aviation, does not permit reduced attention.

107. Several responses commented that more needed to be known about ALKS' operational abilities before exceptions are allowed. These respondents felt that more research needed to be carried out on how performing other activities would affect drivers' capacity to reassume control of the vehicle. Specific comments included that there should be an initial period where ALKS is proven safe and reliable before the exception is added and that a stepped approach should be taken to allowing reductions in driver attentiveness.

108. Lastly, one respondent considered that the current laws on use of infotainment systems were unclear and needed to be amended before an exception was granted while another felt that technology advances so quickly that an exception could create legal loopholes that would be exploited.

Question 25a

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

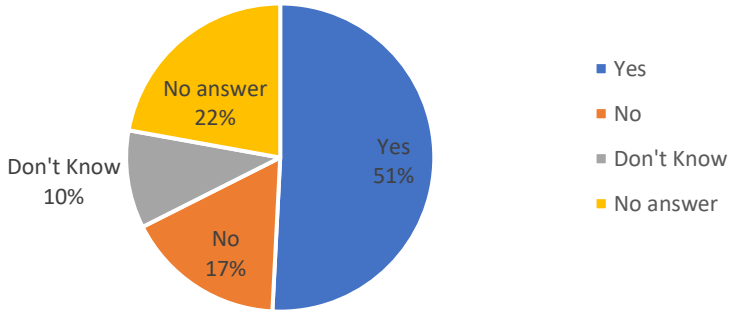

Figure 17 - 17% of the respondents said "No", 51% said "Yes", 10% said "Don't know" and 22% did not answer the question.

Question 25b

If yes, what are they?

102 respondents provided comments on this question.

109. The area of most concern related to watching TV and videos, films/movies, video games, texting/messaging and emails. Other responses included internet browsing; social media; phone calls; video calls; programming a satellite navigation; scrolling through a menu; reading; writing; "working"; online learning; viewing still images; meditation and use of headphones.

110. By far the most common area of concern was the impact on driver concentration and drivers taking their eyes off the roads, with nearly half of responses mentioning activities requiring concentration, activities which distract the driver, or activities which make the driver unaware of their surroundings.

111. A few respondents focused on the time it would take for drivers to disengage from other activities. A small number of responses said activities would be unsafe if they took 3 seconds, others as low of 1 second or less of driver attention.

112. The most common suggestion made was testing of which activities are safe; and to keep a list of safe activities under review pending further research.

113. Another common response was that all activities through the infotainment system are unsafe. Several respondents suggested that everything "except minor" activities is unsafe; or that "most" activities are unsafe. A small number of respondents replied that some activities would be unsafe but were unable to specify which ones.

Use of ALKS up to 70mph

Question 26a

Do you agree with this approach?

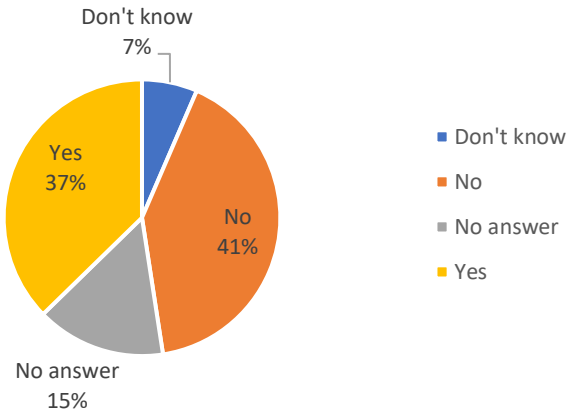

Figure 18 - 41% of the respondents said "No", 37% said "Yes", 7% said "Don't know" and 15% did not answer the question.

Question 26b

Why?

147 respondents provided comments on this question.

114. Those responding in favour felt that a system limited to 60km/h would be too restrictive. A few suggested that they still wanted additional safety assurance beyond simply a manufacturer declaration.

115. From those against the proposal, several were against the idea of automation with a few strongly suggesting that the driver should be responsible for the vehicle at all times. A minority of respondents did not trust a manufacturer's declaration, and a few had concerns about the capabilities of a system that was designed for operation at 60 km/h.

116. A majority of respondents cited safety concerns around the technical capability of the system for example around how the handover would be handled, whether the system would be able to cope with 10 seconds of transition time and other HMI concerns. Several raised concerns about ALKS not being able to change lane, especially during an MRM.

117. Vehicle manufacturers responded in support of enabling operation at higher speed, although preferring this to be done through amendments to the UNECE Regulations.

118. Nine out of the twelve insurance companies that responded were against the proposal, two said they did not know whether they could agree the approach and one raised concerns but did not state a direct position. Around half detailed technical safety concerns about issues such as the ability of the system to change lanes, transition times and problems with driver engagement.

Question 27

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

140 respondents commented on this question.

119. A range of additional issues were raised, notably:

a. The metropolitan police were concerned that sudden changes in weather conditions might confuse the systems.

b. Highways England commented that evidence suggests a high standard of road marking is necessary for successful lane recognition by ALKS.

c. Assuring Autonomy mentioned that no test of the machine learning involved was required by ALKS regulation.

d. Transport Scotland mentioned that current road standards and guidance for live lane works have no mention of AVs.

e. The Disabled Persons' Transport Advisory Council (DPTAC) asked what consideration has been made for people with limited impairments who are able to drive today using adapted vehicles. Disability may be a factor to take into account when considering the residual legal responsibility of drivers.

f. A few respondents identified potential risks from other drivers being careless and unpredictable – pointing out that ALKS may not be able to respond to rare and challenging scenarios.

g. Two respondents stated their dissatisfaction with smart motorways in the UK and highlighted that ALKS may cause further safety implications.

3. Outcomes from the Call for Evidence and next steps

- This section summaries the main findings from the call for evidence, by theme, and our planned next steps.

Overview of ALKS

Main findings

- The majority of respondents did not foresee legal barriers to the police accessing data for incident investigation, however some respondents expressed concern about the ability of the police and insurers to have access to the data when needed, and the suitability of the recorded data to enable incident investigation.

- The majority of respondents felt that drivers need to understand ALKS system capabilities and limitations in order to use it safely. There were many suggested approaches to providing education and information, but only a minority proposed mandatory driver training. Respondents also believed manufacturers have a responsibility in ensuring drivers understand how to use their vehicles, and that common approaches/messaging will be needed.

- There was widespread support for a public awareness campaign to educate all drivers accurately about ALKS vehicle systems, and to inform other road users.

  Next steps:

- We will check with the police that they have sufficient powers to access the Data Storage System for Automated Driving (DSSAD) data, including in the specific circumstances raised by stakeholders.

- We will work with insurers and manufacturers to facilitate an agreement on data because access to data is essential to enabling the safe deployment of AVs on our roads.

- We will work with both Government's agencies and industry to consider potential driver education and public awareness initiatives, and we will set out next steps once these have been explored in further detail.

- We will also work with manufacturers to ensure that they provide sufficient, accurate information and learning for drivers, from marketing to point of sale and in use.

Ensuring Safe Use

Main findings

- There was broad support for the criteria in the Monitoring & Control Tests, with several suggestions for how the criteria could be refined or made more objective.

- The majority of respondents expressed concerns about a scenario where any vehicle approved to the ALKS regulation would be automatically considered to be an automated vehicle under the Automated Electric Vehicle Act (AEVA) 2018 because they felt ALKS does not guarantee sufficient capability to be considered automation.

- Many of the respondents felt that an ALKS vehicle will not be able to detect an enforcement vehicle, although a number of technologies were suggested that could achieve this. Many also felt that ten seconds may not be long enough for a driver to gain situational awareness and respond appropriately to an enforcement vehicle, and that in some cases a faster response may be needed.

- Many respondents suggested different types of technologies that could detect minor or low energy collisions. However, due to scepticism about the ability of ALKS to do so, many suggested drivers retain responsibility for responding. The majority also considered that there were risks of injury, or late notification of emergency services, from not stopping for low-energy impacts, as well as the legal risk to the driver who would normally be required to stop in the event of a collision.

- A significant number of responses commented that ALKS-equipped vehicles must be able to recognise all GB road signage including closed lanes, with some suggesting that the vehicles should ask drivers to take over if they cannot recognise signage. Some noted that recognising signage may be more difficult in adverse weather conditions and pointed to a number of technologies available for accessing real-time data on signage. However, there was scepticism regarding whether Great Britain has the technology for this to work effectively and therefore respondents requested that assessments be made of the systems' capabilities.

- Many of the respondents had concerns about vehicles that are registered as AVs on the DVLA database, but the keeper has chosen to have the functionality disabled so the vehicle is not capable of operating as an AV. The

reasons for the concerns were difficulties in ensuring the vehicles had the right insurance, enforcement of rules on vehicle use by the authorities and owners or second owners overestimating vehicle capability. There were also concerns that reliance on the AV status on the DVLA database could lead to vehicles having invalid insurance, and that drivers might seek to amend the status after an accident in an attempt to avoid liability.

Next steps:

- Our approach to listing is set out further down in this document. The consultation published alongside this summary of responses seeks views on amendments to the Highway Code for the safe use of ALKS.

Fair Delegation & Residual Responsibility

Main Findings

- There was broad support for creating an exemption for the driver from prosecution in the Motorway Traffic Regulations if ALKS came to an 'unjustified' stop. However, stopping in lane was widely perceived as a safety concern and several responses said that to avoid it, the driver should always be responsible and required to intervene.

- There was also support for our proposals to not make other changes to Motorway Traffic Rules, although some noted that this may not be sufficient to ensure that drivers are clear they will be held responsible if the vehicle stops due to their failure to respond to a transition demand. The majority of respondents agreed that the Highway Code should be changed to state that drivers of ALKS must be alert and respond to a transition demand. However, there were some concerns that parts of the Highway Code are advisory only and so further legislative changes might be required. Respondents also highlighted the need to ensure the Highway Code is future-proofed as far as is possible.

- The majority of respondents did not think that amending Rule 150 in the Highway Code is sufficient to clarify that the driver may rely on ALKS because many existing drivers do not regularly read the Code to check if it has been updated. Many responses proposed an awareness campaign and driver training to communicate rules on use and driver responsibilities, noting the safety risks arising from drivers over-relying on vehicle capabilities.

Next steps:

- The consultation published alongside this document is seeking views on proposed amendments to the Highway Code, which will be incorporated into future driver training.

- To address concerns about drivers not keeping up to date with the Highway Code and to ensure there is clear communication of the rules on use of ALKS, we intend to work with Government agencies and with industry to establish a

common approach to communicating the rules on responsible use to drivers.
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- Following the Call for Evidence, and after reviewing the Motorway Traffic Regulations, it has become clear that it is not currently possible to exempt the driver from criminal liability for breach of the prohibition on 'unjustified stops' without also exempting a vehicle driving itself from the same rules. It is important that the prohibition on stopping in lane remains as a road rule with which automated vehicles must comply.
- Where a driver is not paying attention to the road because the vehicle is driving itself, it would seem unfair to prosecute that driver for an unjustified stop made by the system over which the driver had no control. We recognise that this is a difficult issue and we will work closely with enforcement authorities to find a way forward.
- The review conducted by the Law Commissions has sought views on how to relocate responsibility away from the occupant of an automated vehicle. Any change to the law will require primary legislation. We will work with the Commissions to ensure their proposals address the current issues with the law.

Performing other activities

Main Findings

- The majority of respondents were not in favour of allowing drivers to perform other activities when using ALKS even if their only responsibility is to respond to a transition demand. This is because respondents had concerns about the capability of vehicles with ALKS technology and the lack of evidence about the impact on driver ability to respond in a timely manner to takeover requests. Many respondents also suggested that the driver should still be ultimately responsible and so remain attentive, and that the effectiveness of driver attention monitoring systems remained untested.

- A considerably larger majority of respondents were also against the idea of allowing other activities if ALKS was not listed as automated because of the impact on the ability of the driver to monitor the driving task at all times, resulting in safety concerns.

- The majority of respondents were not in favour of allowing the use of an infotainment system. While performing tasks which shut off when there is a transition demand was considered safer, there were concerns about the ability of ALKS technology to safely drive the vehicle and the impact on driver response times.

- There were suggestions that the list of other activities drivers are allowed to perform should be kept under review as more evidence becomes available on their impact on driver attention, response time and therefore road safety.

  <u>Next steps</u>:

- The responses under this theme were influenced by concerns about ALKS capability and safety. We do not intend to allow drivers to perform other activities unless they are using vehicles which can safely and lawfully drive themselves. This is consistent with the feedback received and the independent research we have commissioned (see Annex A).

- If a vehicle is capable of safely and lawfully driving itself, it is reasonable to enable the driver to perform other activities if these do not affect the driver's ability to respond to requests from the system. We intend to consult later in the year on amending Regulation 109 on use of screens to update its language and consider changes to the use of screens by drivers of automated vehicles.

- To address concerns about drivers not keeping up to date with the Highway Code and to ensure there is clear communication of the rules on use of ALKS, we intend to communicate widely on the rules on use.

Use of ALKS up to 70mph

Main findings

- A small majority of respondents opposed the idea of allowing ALKS vehicles to drive up to 70mph, many because they consider ALKS to be unsafe and that current technology does not support safe operation at higher speed. Several expressed concerns that in the absence of clear specifications, manufacturers would have to certify safe operation at higher speed. Others pointed out that the 10 second transition period might be too long for operation at a higher speed.

- Those supporting operations at a higher speed pointed out that ALKS will have very limited use because it is limited to 60 km/h and cannot change lanes. Manufacturers expressed a preference to develop a specification for operating at a higher speed through the UNECE rather than by setting domestic requirements.

Next steps:

- We remain committed to supporting the development and deployment of automation in road vehicles. We will commission research to scope the technical requirements needed for enabling motorway-based automated driving systems to operate at higher speed and change lanes. This research will inform GB type approval requirements of such systems and the ongoing negotiations at the UNECE.

Other issues

Main Findings

- A concern was raised that disabled drivers should not be more disadvantaged in using an automated vehicle in comparison to using a conventional vehicle today.

Next steps:

- As suggested by the Disabled Person's Transport Advisory Committee (DPTAC), we have examined what consideration has been made for people with limited impairments able to drive today, and those who drive adapted vehicles, when designing transition demands and driver monitoring. The UK negotiated for the Regulation to require both auditory and haptic feedback after 4 seconds in the event of a transition demand. The system therefore should not discriminate against hearing-impaired drivers.
- We will conduct a Public Service Equality Duty (PSED) assessment for the listing of automated vehicles.

4. The Listing Methodology for Automated Vehicles

Introduction

- In the August 2020 Call for Evidence, the Department for Transport proposed two tests – the 'Monitoring & Control Tests' – as a way of assessing whether a vehicle could meet the definition of automation under the Automated & Electric Vehicles Act (AEVA) 2018. This requires that the vehicle no longer needs monitoring or control by the driver. These were posed as legal tests rather than physical tests.
- We also sought views on whether to list vehicles fitted with Automated Lane Keeping System (ALKS) as automated vehicles. In particular, we asked whether approval to the ALKS regulation was sufficient in and of itself for listing.
- This chapter provides an update to the Monitoring & Control Tests informed by comments received from the Call for Evidence. It sets out the Government position on the listing of ALKS, and gives a more in-depth overview of the proposed listing process for future automated vehicles.

The Monitoring & Control Tests

- In the Call for Evidence, we sought views on the Monitoring & Control Tests as tools to clarify how a decision could be made on whether a vehicle required monitoring or control by the driver. The tests comprise a set of criteria.
- Respondents were generally supportive of the criteria but were sceptical that ALKS was capable of meeting them all, particularly the criteria on compliance with road traffic rules and avoidance of being the cause of a collision.
- Please see Annex B for the revised Monitoring & Control Tests.

Amendments to the Monitoring & Control Tests

- Based on comments received from the Call for Evidence, Government has made amendments to the Monitoring & Control Tests and made its reasoning clearer on how ALKS is compliant with the Tests. You can find further details in Annex B.
- The criteria have not been amended, but the definitions of the two Tests have been clarified so that they apply only where the vehicle is 'operating within its Operational Design Domain (ODD), and can identify the boundaries of that domain.'

Compliance with road traffic rules

- In the Call for Evidence, we highlighted our concerns about ALKS vehicles being able to comply with some of the Highway Code rules, notably:
    - Responding to an enforcement vehicle (e.g. by issuing a transition demand),
    - Stopping after a low-energy collision,
    - Identifying GB-specific road signage.
- The aim of highlighting these concerns was to prompt a discussion about the capabilities of ALKS. After analysing the responses and holding conversations with stakeholders we have reached the position that all three must and can be met by vehicles fitted with ALKS.
- Furthermore, every vehicle fitted with ALKS intended for deployment on GB roads will require an approval to the ALKS regulation with evidence that the vehicle can comply with GB road rules specifically. The Vehicle Certification Agency (VCA) will have sight of this approval, and check its validity, whenever a vehicle is submitted for GB or UK-NI Whole Vehicle Type Approval.

Avoiding putting itself in a position where it would be the cause of an accident

- Many respondents highlighted the fact that ALKS will stop the vehicle in lane if the driver does not respond to a Transition Demand and a Minimum Risk Manoeuvre is triggered. They felt that this means ALKS cannot comply with the criterion of avoiding putting itself in a position where it may be the cause of an accident.
- In their third consultation paper, the Law Commissions of England & Wales and the Scottish Law Commission, do not see the requirement of a transition demand necessarily undermining the definition of self-driving. A vehicle can be considered to drive itself even if the human driver is required to resume control in a timely manner. This stands in contrast to vehicles that immediately hand back control to the driver without any warning.
- A vehicle stopping in lane could be a risk to vehicles approaching from behind, but the Minimum Risk Manoeuvre (MRM) performed by ALKS is a last resort should the driver not resume control.
- We highlighted in the Call for Evidence that where a driver does not respond to a transition demand and allows the vehicle to come to a stop and remain at rest, they would be in breach of Regulation 7 of the Motorway Traffic (England & Wales) Regulations, and Regulation 6 of the Scottish Motorway Traffic Regulations.
- It is important to note that we consider the vehicle to no longer be driving itself if the driver resumes manual control at any time or a transition demand times-out (because a driver has not responded to the prompt). Therefore, the driver resumes their driving task responsibilities once either of these events occur, not once the system disengages itself after bringing the vehicle to a stop. If the driver has not resumed control and the vehicle has not made a transition demand, then the vehicle is still considered to be driving itself.
- We expect handovers to which the driver does not respond to be rare and should only occur in the event the driver is incapacitated. Where a vehicle makes an unlikely emergency stop in lane without a transition demand, this is

likely to be in response to an obstacle in the road, thereby protecting the driver, and is already an exemption under Regulation 7 and Regulation 6.

Future work on regulation

- As the regulations for AVs develop, further work needs to be done on the changing role of the human inside the vehicle and the appropriate entity to bear responsibility for the vehicle's compliance with road traffic rules.
- This is being considered by the Law Commissions. Their proposals tackle the difficult question of where to relocate responsibility having removed it from the human driver when a vehicle is driving itself. They identify the need for a robust safety assurance process, supported by the introduction of the Automated Driving System Entity (ADSE), who vouches for the safety of the system and against whom appropriate sanctions are applied when vehicles perform unsafely. The Commissions' final set of recommendations will be forthcoming at the end of 2021.
- In the interim, vehicles will be approved to the ALKS Regulation, which requires that vehicles be designed to comply with the relevant rules of the road. Vehicles fitted with ALKS will be monitored under the existing mechanism of market surveillance (see below).

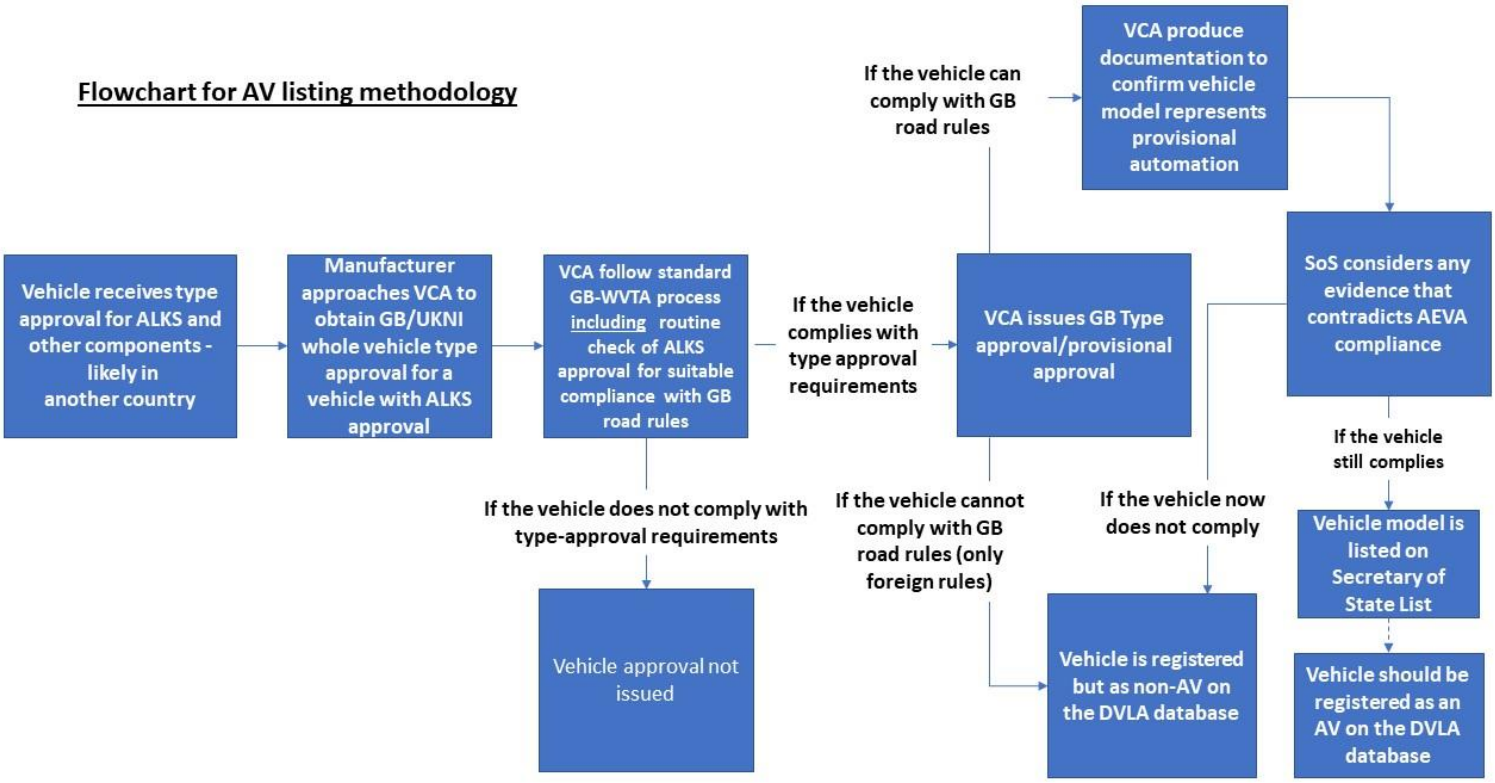
The decision to list vehicles fitted with Automated Lane Keeping Systems

- Following the Call for Evidence and based on the evidence received from stakeholders, the Government expects that vehicles fitted with ALKS for use on GB roads will be automated vehicles under the Automated & Electric Vehicles Act 2018.
- Vehicles that receive an ALKS systems approval for GB roads are therefore expected to be listed on the basis of evidence currently available. However, rather than list all vehicles fitted with ALKS by default, individual models will be listed after they have received whole vehicle type approval (WVTA). This will enable the Secretary of State to review evidence that may have come to light before the formal decision as to whether to list the vehicle model is made. The Secretary of State is required to keep the contents of the list under review. This includes considering new evidence that may have since become available.

The Process for Listing and Registration of Automated Vehicles

- The process for listing of ALKS requires careful consideration because it could set a precedent for the future listing of automated vehicles.
- Government proposes that, when a manufacturer submits for GB (including provisional GB) or UK-NI WVTA a vehicle that already possesses ALKS approval, the VCA will check the validity of the ALKS approval to ensure that it has been approved for use on GB roads.
- If confirmed, the VCA will then generate a document that is passed to the Department for Transport to inform the Secretary of State that the vehicle has the appropriate ALKS approval.

- If neither VCA nor DfT officials are made aware of evidence that may bring into question the vehicle's ability to drive itself safety and lawfully within its ODD, then that model will be listed on the Secretary of State's List. This list, and the WVTA documentation, will then be used by manufacturers to know whether to first register the vehicle as an AV on the DVLA database.
- Vehicles that are placed on the market in Northern Ireland and possess ALKS approval for GB roads will also be listed providing the same model in GB is listed. Regardless of where the vehicle is placed on the market, if it has ALKS approval for GB roads and is a listed model, it should be registered as an AV on the DVLA database. We do not expect unique vehicles in Northern Ireland and the insurance provisions of AEVA do not extend to Northern Ireland.
- The diagram below shows how the process will work:



The flowchart for AV listing methodology shows the process for how a decision is made to list a vehicle equipped with ALKS. It explains that a vehicle must submit their vehicle to VCA to be considered for listing, and, if successful, is listed by Secretary of State on the recommendation of the VCA.

- In the August Call for Evidence, respondents expressed concerns about a situation where a vehicle is registered as an Automated Vehicle but the registered keeper has decided not to use the self-driving function or has had it disabled.
- If a vehicle is listed as an 'Automated Vehicle' then it must be insured as an Automated Vehicle, even if the registered keeper has no intention to use it as one.

- If the registered keeper of the vehicle wishes the AV status field to be changed then they must contact DVLA. It will only be possible to change the field if the manufacturer is able to supply information to the DVLA to confirm the change is legitimate. Where a vehicle has been incorrectly first registered, e.g. the vehicle should have been registered as an AV but the field was accidentally marked ‘no’, DVLA will take steps to amend the record.
- The registered keeper is responsible for ensuring they have a valid insurance policy whether the vehicle is automated or not.
- Since no automated vehicle will yet have been listed upon commencement of AEVA, we will not be publishing the list. A sample version of the list can be found in Annex C.

Market Surveillance of ALKS

- Market surveillance is a standard practice for vehicles that operate on UK roads to ensure that manufacturers are complying with the relevant type-approval requirements. This will be no different for vehicles fitted with ALKS.
- If concerns are raised about the ability of vehicles fitted with ALKS to comply with the ALKS regulation, the Government, through the DVSA, will take steps to ensure these are properly investigated and action is taken where necessary.
- Separately from market surveillance, the VCA plan to test various systems to investigate how they perform on GB roads and if they comply with the approval requirements as vehicles with ALKS start to become available in the UK.

5. Annexes

- Annex A – Research on the Safe Performance of Other Activities in Conditionally Automated Vehicles,
- Annex B – Revised Monitoring & Control Tests, and assessment of ALKS against those tests
- Annex C – Sample version of the Secretary of State's List of Automated Vehicles

6. Acronym 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 sever 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.