Lords Science and Technology Select Committee inquiry on Autonomous Vehicles

ABI and Thatcham Research Joint Response

INTRODUCTION

About the ABI

The Association of British Insurers is the leading trade association for insurers and providers of long term savings. Our 250 members include most household names and specialist providers who contribute £12bn in taxes and manage investments of £1.8trillion.

About Thatcham Research

Thatcham Research is the motor insurers' automotive research centre. Established by the motor insurance industry in 1969, the centre's mission is to contain or reduce the cost of motor insurance claims whilst increasing safety standards. Today, Thatcham Research still occupies its unique position as the UK's only 'not for profit' insurer funded research centre. Whilst the original aims remain intact, the centre now enjoys a much wider remit at the forefront of the latest vehicle technology research, spanning safety, security and repair.

EXECUTIVE SUMMARY

Insurers wholeheartedly support the development of automated vehicles, which have the potential to revolutionise road safety. In its response to the recent C-CAV consultation, 'Pathway to Driverless Cars', the industry made proposals for insuring the first wave of automated cars. We would welcome the adoption of these proposals in the Modern Transport Bill. The industry's proposals can be summarised as follows:

- Drivers should continue to buy a single motor insurance policy to cover both manual and automated driving.
- Insurers should have a new legal right to recovery, allowing them to get costs back from motor manufacturers, software companies or other parties in cases where the vehicle or technology was found to have been at fault.
- Strict rules on what people can and cannot do behind the wheel need to be maintained and drivers will need absolute certainty about when they can safely allow the car to drive autonomously.

The insurance industry recognises that this will be an interim solution, designed to give confidence to manufacturers, investors and consumers for when this technology is first available on the market, and to ensure the UK meets its ambition of becoming a world leader in this technology. As the technology develops, we recognise further consideration will need to be given to the question of liability.

The insurance industry intends to be closely engaged in those further debates and for further reforms to underpin this system, it will be important that the UK Government is closely engaged in the international process of setting regulatory standards for safe use of automated driving technology. A critical issue will be *appropriate access to data, to ensure that where there are accidents, claims can be settled quickly and there are not protracted disputes* between manufacturers and insurers over who was, or should have been, in control of the vehicle. We believe it is in the interests of all stakeholders to resolve these questions, but it is likely the Government will need to provide clarity over how the relationships between different stakeholders will operate when automated driving becomes a reality.

IMPACTS AND BENEFITS

1. What are the potential applications for autonomous vehicles?

1.1. The insurance industry is an enabler that can manage the risks associated with automated driving and give consumers the confidence they will need to make full use of this technology.

1.2. Automated driving clearly has wide potential to transform the road network. Other stakeholders will want to comment on the various benefits in more detail. However, specific to insurers, two applications in particular will be significant –

- Safety mechanisms to address the 94%[1] of accidents currently estimated to have occurred as a result of human error.
- Connected car infrastructure and associated data that has the potential to be used to assess risk and manage claims more efficiently.

1.3. To understand how this technology is likely to be applied, especially in the short-to-medium term, it is worth noting that several different levels of automation could be introduced. A commonly used definition of the potential stages of vehicle automation has been created by SAE International. This definition sets out increasing levels of automation, ranging from Level 0 ('No Automation') up to Level 5 ('Full Automation')[2].

1.4. However, while these SAE International definitions have helped to facilitate discussion between different sectors and stakeholders, the insurance industry does not believe that these definitions will prove sufficient to manage the roll-out of this technology onto the roads. There are two reasons why these definitions will have limited use –

- Firstly, the rollout of this technology is unlikely to simply involve a progressive step from one level of automation to the next (as these definitions imply). Instead, it is likely that some manufacturers will produce vehicles that allow 'automated' driving on certain road conditions (where the driver can disengage entirely) but on other roads, the driver will be expected to be fully in control (albeit supported by assistance systems affecting braking, lane detection and potentially even overtaking and speed). The SAE definitions do not appear to adequately explain such a scenario, which is dependent less on the technical capability of the vehicle and more on the surrounding road infrastructure. The crucial issue will not be the level of automation the car is capable of, but how the transition between different levels of automation at different stages of the journey is managed.
- Secondly, while technical experts will understand these definitions, these definitions do not provide enough clarity for consumers. It will be vital that road users fully understand the distinction between 'driver assistance' and 'fully automated driving', especially if automated driving will only be safe in certain road conditions. While the technology may develop in gradual stages towards 'full automation', for the driver

[1] This estimate of the number of accidents estimated to involve human error is used in the Department for Transport's 2015 Road Safety Statement (https://www.gov.uk/government/publications/road-safety-statement-working-together-to-build-a-safer-road-system, p.27) – we are aware of a number of other estimates, but all range between 90-95%.
[2] More information on SAE International's Five Levels of Automation is available here: http://www.sae.org/misc/pdfs/automated_driving.pdf

the step between when they need to maintain overall control and when they can safely disengage is clearly the most significant and must be managed accordingly.

1.5. Therefore, a priority for the insurance industry is ensuring that policymakers and consumers understand the clear distinction between advanced driver assistance systems (ADAS) and fully automated driving technology (ADT). Consumers must not be misled about the capability of ADAS (which is already appearing in commercially available cars and is likely to become more advanced) and ADT (which we do not expect to be commercially available until approximately 2021, at the earliest).

1.6. One further significant point to note is that, even if the technology that supports fully automated driving can only be fully deployed in certain road conditions (such as motorways), the underlying sensors/radars will also be available to assist 'manual' driving. This means that automated driving technology offers considerable potential benefits to driver safety (and convenience) in all driving conditions, not just while fully automated driving is enabled.

2. What are the potential user benefits and disadvantages from the deployment of autonomous vehicles?

2.1. One of the main potential benefits expected from this technology is improved road safety outcomes. Already, this potential is being realised with the fitment of autonomous emergency braking (AEB). For example, in 2015, research published by Thatcham Research found that a VW Golf VII fitted with AEB technology was involved in 45% fewer insurance claims for third-party injury than equivalent vehicle models that did not have this technology.[3] The insurance industry is currently actively investing in further research and analysis to understand the benefits of this technology for safety. Furthermore, the insurance industry has actively encouraged the take up of the technology by putting vehicles that come with AEB as standard into a cheaper insurance category.

2.2. However, alongside these potential safety benefits, there is an associated risk that will need to be managed. As outlined above (paragraph 1.5), it is vital that consumers are not misled about the potential of the technology. To address this, there must be absolute clarity around vehicle owners/operators' roles in the driving task, including their responsibility to monitor the road and driving conditions and their responsibility to ensure systems are only deployed when it is safe to do so.

2.3. There is a risk that the significant media interest in 'driverless cars' encourages manufacturers to use misleading language in their marketing and advertising. Some adverts already appear to give the impression that a car with sophisticated ADAS is a 'driverless car', when it is not. In fact, the technology relies on the driver to remain in overall control of the vehicle. Any technology offering 'driver assistance', however advanced, by definition is reliant on a driver. Eventually, fully automated driving is expected to be possible, supported by redundancy systems that will not require a 'driver' to intervene in an emergency. Until then, the practical reality is that if drivers feel encouraged to remove their hands from the wheel, it is likely they will also remove their eyes from the road ahead and turn their concentration away too. These risks will need, therefore, to be carefully managed and it will be essential that these are

[3] Thatcham Research, 'Golf drives down personal injury', May 2015 - http://www.thatcham.org/news-and-events/news-and-press-releases-reader/items/golf-drives-down-personal-injury

adequately addressed by the vehicle 'Type Approval' process and also within the relevant UK regulations (such as the Highway Code).

2.4. More broadly, there are three issues of particular significance that will also need to be addressed before fully automated vehicles are approved for use on the road –

- **Accident Data** – It will be essential for the insurance industry to have access to relevant vehicle data, in a usable format, for use in the instance of a claim, where it will be essential to know whether the automated technology was being operated at the time of an incident and, if so, if it was being operated in line with manufacturer instructions and regulations. Failure to ensure this data is available in an accessible format could lead to unnecessarily protracted disputes.
- **Accurate Information on Vehicle Specifications** – The Government has proposed that the Modern Transport Bill will create a requirement for cars enabled for automated driving to be covered by an appropriate level of insurance. It will therefore be essential for insurers to be able to verify what technology is available for use in the car, in order to meet this requirement. More broadly, insurers will need to understand what technology is used in cars to ensure they are able to accurately assess the risk and set a competitive premium.
- **Vehicle Parts and Repair Costs** – Increased sophistication of vehicle technology has inevitable consequences for the cost of repair, both in relation to the cost of parts and the skills required to perform repairs (both for ongoing maintenance and in the event of an incident). It will be vital to maintain the capability for competition within the repair network and vehicle aftermarket, both in order to ensure consumers are not disadvantaged and to allow insurers to manage the costs of any claims.
- **Arrangements for driver assistance technologies** – Consideration should also be given by Government to these issues when they apply to the increasingly sophisticated assistance technology likely to be fitted to cars before full automation is possible. In circumstances where faulty assistance technology may have contributed to the accident, a proportionate degree of data sharing would make disputes between drivers (and their insurers) and manufacturers easier to resolve. It would also be in the wider interests of ensuring a clear pathway to full automation for all parties to begin developing closer relations in advance.

2.5. We see no reason why these issues should prevent the successful uptake of automated driving technology, as we believe it will be in the interests of all stakeholders to address them. However, it will be important that policymakers address these issues as they develop the regulatory framework that will underpin the use of this technology.

3. How much is known about the potential impact of deploying autonomous vehicles in different sectors?

3.1. The ABI is only in a position to comment on what the likely impact of this technology on the insurance industry would be. It is too early to answer this question with absolute certainty. Ultimately, this will depend on the real-life claims experience. However, the initial assumption of the insurance industry is that, provided the safety performance of automated driving technology is as predicted, this will reduce the overall frequency of road accidents, and as such will reduce costs overall, including for those vehicles not equipped with the technology.

3.2. Furthermore, the likely increase over time in market penetration of vehicles with Advanced Driver Assistance Technology (ADAS) suggests that, by the time vehicles equipped with fully automated driving technology are on our roads in significant numbers, the "conventional vehicles" of today will be fewer in number and fully automated vehicles may be interacting largely with sophisticated ADAS equipped vehicles (the next generation of conventional vehicles) more than with "fully manual" ones.

3.3. That said, a number of factors could ultimately determine whether there are any additional costs related to insurance for automated driving, including:

- Frequency of incidents where the driver of a 'manual' car is the at-fault party in an incident involving an automated car.
- The mix of drivers – were those drivers who continue to use 'manual' driving technology to be those with less safe driving behaviour and/or worse claims histories, there could be an associated impact on premiums.
- The speed of penetration of ADT technology and the ease with which other drivers adapt to how this technology works.
- Any change in the cost/availbility of parts for 'manual' vehicles.
- As ADT penetration within the market increases, there may be a reduction in the number of engineers who specialise in the skills needed to repair and maintain manual cars.

4. How much is known about public attitudes to autonomous vehicles?

4.1. The ABI is aware of a number of surveys that have been conducted to assess consumer attitudes to this technology. However, the view of the insurance industry is that – while the technology is still in development and trial phase – such consumer surveys may have limited value. Several ABI members are active partners in the ongoing UK Government funded trials of automated driving technology.[4] We believe the results of these and other trials should be used to guide how consumer and public attitudes are addressed as the technology develops.

4.2. Insurance is an enabling sector. Clarity on how these vehicles will be insured and certainty that consumers will not be disadvantaged as a result of accidents for which they were not responsible can be expected to have a significant positive impact on public attitudes to this technology.

4.3. One potential area of concern is a common perception that the public do not prioritise safety systems when purchasing new cars (put crudely, anecdotal experience suggests that if consumers have a limited budget for optional features to be added to their car, they would select a top of the range in-car entertainment system over an optional fitment AEB system). Consideration should therefore be given by all stakeholders to how take-up of technology with a clear safety benefit can be incentivised. It is also worth noting that, while an individual driver may not see a viable cost/benefit incentive to purchasing an expensive optional added safety feature, the aggregated effect of reduced accidents on the efficiency of the road network is potentially very significant, and would more than justify the investment in this technology.

[4] Full details of the ongoing Innovate UK funded trials are available here: https://www.gov.uk/government/collections/driverless-vehicles-connected-and-autonomous-technologies

4.4. As previously mentioned (paragraph 2.1), the insurance industry has already demonstrated its willingness to play its part in incentivising the take-up of safer driving technology with its approach to Autonomous Emergency Braking. Any vehicle where AEB is fitted as standard will receive a lower insurance 'Group Rating'[5], which can lead to significant reductions in the premium charged to customers. The insurance industry opted to introduce this incentive before it had collected claims data reflecting the safety benefits, a demonstration both of the insurance industry's confidence in this technology and its willingness to embrace developments that will improve road safety outcomes.

5. What is the scale of the market opportunity for autonomous vehicles?

5.1. Insurers are strongly supportive of the development of this technology, which has the potential to have an even greater impact on road safety as the invention of the seatbelt. There are also significant benefits to society and the economy from extending mobility to those currently unable to drive and to making the road network more efficient.

5.2. The significant interest from the insurance industry in this technology is demonstrated by the creation of the ABI and Thatcham's joint 'Automated Driving Insurance Group'.[6] This group includes representatives from leading motor insurers and leading industry stakeholders. It has met regularly during 2015/16 to facilitate the development of the insurance industry's position on these issues and to enable engagement with key stakeholders, including from Government, regulators, vehicle manufacturers and other stakeholders. The creation of this group demonstrates the insurance industry's commitment to adopting a pro-active and collaborative approach to automated driving technology as it develops.

CREATING AN ENABLING ENVIRONMENT

Research and development

6. Is the scale of current and planned demonstration facilities for autonomous vehicles sufficiently broad and ambitious?

6.1. The facilities available for demonstrating low speed autonomous pod-type vehicles are now well developed with a range of trials underway (and potentially more to come with further rounds of Innovate UK funding). While this form of automated driving may well become prevalent in dense urban areas, other forms of automated driving are also likely to be developed that will allow the technology to be used for semi-rural and inter-urban travel. This is likely to involve vehicles that look much like ordinary cars that are capable of driving in both manual and automated mode. Although, in some respects, these semi-rural and inter-urban driving environments are less complex, they are also typically much higher speed. Few, if any, demonstration facilities exist that allow safe, controlled experimentation at high speed on a road with geometric, visual, radar/lidar and communication properties of Motorways, dual carriageways and other high speed elements of the primary route network.

[5] Group Rating is an advisory system, administered by Thatcham Research on behalf of the ABI, which provides an assessment of the relative risk of new vehicle models, with factors considered including safety, security and ease of repair. More information on group rating is available here: http://www.thatcham.org/what-we-do/group-rating

[6] Members of the group are: Admiral, Ageas, Allianz, Aviva, AXA, Co-operative Insurance, Covea, Direct Line Group, esure, LV, Markerstudy, RSA, Zurich, the Lloyd's Market Association (LMA) and the Motor Insurers' Bureau (MIB).

6.2. The ability to test and evaluate this form of automated vehicle would be greatly enhanced by a dedicated section of off-road track capable of accurately simulating high speed roads up to and including motorways.

7. Is the Government doing enough to fund research and development on autonomous vehicles, and to stimulate others to do so? Should it be doing more to coordinate UK actions?

7.1. There appears to be a strong and healthy group of innovative businesses operating in this field (including several spin-outs from academia). The work of C-CAV and Innovate UK should also increase public awareness and acceptance of vehicle automation. One clear benefit of the Innovate UK-funded trials is that, through the involvement of several ABI members in consortia, attention is being given to how these vehicles are insured.

7.2. However, it appears that the focus of the Government's attention appears to be the driverless 'pod' style vehicles, which will seemingly be most suitable for inner-city and urban driving. However, of equal importance will be the automated driving technology that could be used for inter-urban and semi-rural driving (i.e. on motorways). This is likely to be rolled out, initially, by established vehicle manufacturers. The insurance industry would recommend that more attention should be given to research and development focused on the technical standards that will underpin the 'Type Approval' process for new vehicle models.

7.3. We understand that there are already ongoing discussions, primarily within the global UNECE framework for vehicle Type Approval[7], about what changes will be needed to how specific vehicle models with automated functionality are authorised for use. We are concerned that some of the proposed regulatory requirements appear to be being developed without a substantial quantity of scientific evidence and research – perhaps because of the desire to ensure the regulatory framework is in place before manufacturers begin seeking to bring automated vehicle technology to market.

7.4. In order to address this concern, the Government could potentially fund applied research to help define the appropriate technical standards that would underpin the global regulatory framework for Type Approval of new vehicle models. If such research could be completed to high standards, but with a fast turnaround, this would allow the global regulatory framework to be updated in good time. Were the Government to provide funding for such a project, it would therefore quickly and safely remove the barriers to taking the innovative technology research already being funded by Innovate UK and making it a commercial proposition available to motorists.

8. How effective are Innovate UK and the CCAV in this area?

8.1. As outlined above (paragraph 7.1-7.4), Innovate UK and CCAV are working very effectively at generating a strong ecosystem of small innovative companies producing hardware and software elements required for automated vehicles. However, this work needs to be more pro-actively coordinated with work on technical standards and Type Approval of vehicles (where key decisions will be taken at a global level through the UNECE process.)

[7] It is our understanding that such systems are under active consideration as part of an ongoing review at UNECE level of steering system regulations (Regulation 79), and that this means it is likely they will be able to receive type approval within the 2-4 year timeframe.

9. Is the environment for small and medium-sized enterprises (SMEs) working in this sector sufficiently enabling?

N/A

Real world operation

10. Will successful deployment of autonomous vehicles require changes to digital or physical infrastructure?

10.1. For the insurance industry (as already indicated in the answer to Question 2 above) access to data and information on vehicle specification/capability will be crucial. Consideration will therefore need to be given to how data related to the use of automated driving technology is stored and accessed. These issues are already actively being explored by the insurance industry as part of the Automated Driving Insurance Group (ADIG)'s ongoing agenda. The operation of an 'event data recorder' is also being explored in the context of the MOVE-UK consortium[8] (one of the projects being funded by Innovate UK).

10.2. More generally, given the expectation that the Modern Transport Bill will include a clause requiring consumers to ensure they have adequate insurance in place to cover the use of automated driving technology, consideration will need to be given to how insurers verify what technology has been enabled on a vehicle. This will also need to be considered in the context of maintaining a competitive and efficient network for vehicle repair and maintenance. It will be important to have ready access to information about what parts need to be replaced and/or re-calibrated to ensure the vehicle can be driven safely following a repair.

10.3. Many of the automated driving systems will require ongoing upgrades and maintenance (including, potentially, via over the air software updates). The insurance industry would expect there to be regulatory oversight ensuring that safety-critical upgrades are performed and clarifying where the responsibilities of manufacturers and registered keepers lie in relation to ongoing maintenance of the vehicle. It is likely that this will need to be supported by digital infrastructure that will be capable of verifying that necessary upgrades have been performed. In addition, the insurance industry would welcome clarity from Government on the extent to which it envisages highway infrastructure and vehicle-to-infrastructure (V2I) technology underpinning the use of this technology.

11. How might a move from current levels of highly automated vehicles to their extensive deployment best be managed? What do you see as the key milestones?

11.1. The insurance industry supports the proposal contained within the recent C-CAV 'Pathway to Driverless Cars' consultation that a "rolling programme" of regulatory reviews should be implemented. Automated driving technology has worldwide applications and the underlying technology will continue to evolve. Changes will require continuous review and the regulatory framework needs to deliver certainty of principle while maintaining sufficient flexibility to be adaptable to changes. A rolling programme

[8] Partners to the MOVE-UK consortium include: Bosch, Jaguar Land Rover Limited, TRL Limited, The Floow Limited, Direct Line Insurance and the Royal Borough of Greenwich. Funding for this project was confirmed in February 2016, with more details available here: https://www.gov.uk/government/news/driverless-cars-technology-receives-20-million-boost

will allow regulatory change based on experience and due reflection, particularly bearing in mind the considerable amount of interdependent national and international regulation that has built up.

11.2. In that respect, it is vital that, in addition to the issues being considered in the context of the Modern Transport Bill, the UK Government actively works with its worldwide counterparts to establish:

- Universally agreed, easily understood, consumer-friendly definitions of advanced driver assistance systems and automated driving systems; and
- Universally agreed minimum and maximum technical requirements for different levels of ADAS and for ADT, binding upon all involved parties.

11.3. In addition, as the technology becomes commercially available, it will be important (as emphasized in paragraph 2.3) that the marketing and sales process for these vehicles pays due regard to informing drivers about the safe use and capability of these vehicles, and does not market something as 'driverless' irresponsibly. We would also envisage the driving test being amended in due course and also note the proposals in C-CAV's 'Pathway to Driverless Cars' consultation to amend the Highway Code.

12. Does the Government have an effective approach on data and cybersecurity in this sector?

12.1. The insurance industry recognises that, with the technology itself still at a comparatively early stage of development, further consideration will need to be given to these two issues and it would not be realistic to expect such issues to be settled at this stage. We have already set out our views on the importance of data in Question 2.

12.2. With regards to cybersecurity, a crucial distinction will be between potential cyber breaches affecting individual vehicles and 'systemic' attacks across an entire vehicle fleet or cohort. In the event of a systemic attack, it is clearly inappropriate that this be seen as a responsibility for motor insurers[9], and if adequate alternative measures are not established, this could make providing insurance for automated vehicles unattractive or even entirely unviable.

13. Are further revisions needed to insurance, regulation and legislation in the UK to create an enabling environment for autonomous vehicles?

13.1. Yes. The ABI and Thatcham have already provided a detailed response to the recent C-CAV consultation as part of its 'Pathway to Driverless Cars' work.[10] If required, we are happy to answer further questions from the committee on the detailed policy proposals contained in this response, which were developed following extensive consultation with ABI members and legal experts.

[9] A more detailed explanation of this issue and the need for separate arrangements for a systemic cyber-attack on automated vehicle systems is contained in the ABI/Thatcham response to C-CAV's recent 'Pathway to Driverless Cars' consultation, available here: https://www.abi.org.uk/~/media/Files/Documents/Consultation%20papers/2016/09/090916_ABI_Thatcham_response_CCAV_Automated_Driving_Consultation.pdf (p.18)

[10] Our response to the consultation has been published in full here: https://www.abi.org.uk/~/media/Files/Documents/Consultation%20papers/2016/09/090916_ABI_Thatcham_response_CCAV_Automated_Driving_Consultation.pdf

13.2. In this response, the insurance industry proposed that, for the first wave of vehicles that are capable of fully automated driving (likely to initially be used on motorways and for parking manoeuvres) the Government should require an extension of the existing motor insurance policy, and associated terms and conditions – maintaining a 'single policy' approach – and the Government should also create an associated right of recovery (allowing insurers to claim costs from manufacturers, developers or other stakeholders where they are ultimately responsible for a road accident). Our response to the C-CAV consultation makes detailed proposals for how such a right of recovery could work. This would ensure that automated driving is covered and provide cover for the 'not at fault' driver as well as passengers and (external) third parties.

13.3. However, the insurance industry does not believe that the appropriate mechanism to achieve this is through extending the application of 'product liability' insurance (as was proposed in the original C-CAV consultation document). While existing product liability terms and conditions are appropriate in their current settings, we believe existing practices would need to be significantly altered if this system were to be extended to deal routinely with road traffic accidents. We believe this would be disproportionate and unnecessary. Instead, the insurance industry's proposal that existing motor insurance is expanded to cover automated driving would meet the Government's intended policy outcomes without disrupting established insurance covers for other technologies.

13.4. It is clear that there will need to be a consistent approach to this from manufacturers. In their public statements, some manufacturers (notably Volvo) have stated that they would accept that they are liable for incidents where the automated driving technology failed and caused an accident. Other manufacturers have appeared to suggest that they would see the driver as ultimately responsible for any accidents, and as a result would not necessarily accept liability. It is unclear how much engagement there has been between vehicle manufacturers to establish an 'industry wide' position on these issues or to agree common definitions. It is our impression that the different views in individual manufacturer's public statements do not necessarily reflect different approaches to the fundamental legal/regulatory questions under discussion. Instead, they appear to reflect different approaches to the technology itself, with some manufacturers committed to 'fully automated' driving, with the 'driver' fully disengaged (in which circumstances, it would be entirely unreasonable to hold someone liable for an accident they could do nothing to prevent) and other manufacturers developing technology that will depend on interaction with an active and alert driver (in which case, it may seem more reasonable to continue to hold that driver ultimately responsible for preventing an accident). We expect that the UK Government's work on the Modern Transport Bill will prompt vehicle manufacturers to engage constructively on these questions on an industry wide basis. It is clear that regulation cannot be 'brand specific', and that all vehicles on the road will ultimately need to be bound to the same safety standards and regulatory framework.

13.5. We await the Government's official response to this consultation and the proposals that will be published in the Modern Transport Bill. In future years, as technology develops further, we recognise that achieving the right insurance objectives will require further attention from regulators and Government. However, we believe decisions on this should be taken in light of the experience with the first wave of this technology.

14. What, if any, ethical issues need to be addressed in the substitution of human judgement in the control of vehicles by algorithms and Artificial Intelligence?

14.1. The insurance industry recognises that this is a matter worthy of attention as safety standards for automated driving are set. We do not have any detailed evidence on this issue, beyond cautioning against a disproportionate response to these issues. Although the UK has seen significant improvements in road safety outcomes in recent years, there are still far too many people killed and seriously injured on UK roads.[11] As such, automated driving technology should be measured in relation to its potential to reduce the number of deaths and serious injuries that would otherwise have occurred, and regulatory decisions taken accordingly, rather than holding this technology to a potentially unrealistic standard.

Wider governance

15. What does the proposed Modern Transport Bill need to deliver?

15.1. The insurance industry regards the proposed legislative change to deal with insurance arrangements for the first wave of automated vehicles as essential to give industry and consumers clarity. We see the Government's commitment to setting a clear direction in advance of the technology being commercially available as very welcome.

15.2. Beyond this, the insurance industry hopes that the Modern Transport Bill will be an opportunity to set out how the process of ensuring all stakeholders are able to work together to manage the needs and expectations of drivers and consumers as this technology develops. We recognise that it will not be able to resolve every question, given that the Bill will become law several years before the technology itself is commercially available, but the Bill should set out a framework through which all stakeholders can collaborate to resolve these questions.

16. How effective is the UK's education system in delivering people with the right skills to support the autonomous vehicles sector?

16.1. Autonomous vehicles will require highly complex and sophisticated sensors and technology. Most forecasters anticipate that autonomous vehicles will be more heavily utilized than traditional vehicles (i.e. each individual vehicle will be on the road for a greater proportion of the day) and that, despite the safety benefits, they will still suffer occasional accidental damage, not just from road traffic accidents but also from falling objects, road debris, windscreen damage and vandalism.

16.2. The UK currently enjoys a vibrant independent repair sector that helps to maintain competition and control the costs of both service and repair. It is vital that the technical education sector is supported in developing a wide range of technicians capable of repairing autonomous vehicles. As such, the insurance industry is concerned that the current funding model from the skills funding agency (SFA) discourages skilled candidates from training for a career in the independent repair sector. If this skills gap is not filled, then it will leave vehicle manufacturers as the only organisations capable of providing the training and skills. The independent repair sector is a vital part of

[11] IN 2015, there were 1730 reported road deaths, 22,144 reported serious accidents and 186,189 reported casualties of all severities on UK roads. Source: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/556385/rrcgb2015-00.pdf

maintaining a competitive environment for vehicle repairs, and ensures insurers are able to manage and control the cost of repair work.

17. Is the Government's strategy and work in this area sufficiently wide-reaching? Does it take into account the opportunities that autonomous vehicles offer in a wide range of areas, not just on the road?

N/A

18. What are the implications of exit from the European Union for research and development and the autonomous vehicle industry in the UK? Are specific actions from the Government needed to support or protect the autonomous vehicles sector in the short term or after the terms of Brexit have been negotiated?

18.1. The UK has significant potential to become a world leader in this technology, and the forward-looking approach adopted by the Government to automated driving is therefore welcomed by the insurance industry. We are not aware of any reason why the terms of Brexit should directly affect the ongoing research and development into how automated vehicles will be used.

18.2. It will be vital, however, that the UK recognises that there is a significant international dimension to this debate, and that the broader interests of the UK insurance industry[12] are acknowledged and protected, in order that the potential for insurance to act as an enabler for this technology is realised.

18.3. As discussed above, the technical regulations used as part of the Type Approval system that currently governs vehicle design across Europe are formulated by the United Nations Economic Commission for Europe (UNECE). This acts as a forum for the global harmonization for automotive regulations. The UK has been a member of the UNECE agreements since considerably before its membership of the EU began. The insurance industry is not aware of any plans for the UK to withdraw from the UNECE.

18.4. The environment for research, development and the wider supply chain for the design and construction of automated vehicles will inevitably depend on general health of the automotive industry in the UK. The facilities required for research and development around automated vehicles are expensive, and are often financially supported by the demand for ongoing and routine test work after the initial research is done. Thatcham Research has relied on this business model to fund its development of cutting edge testing that has demonstrated the safety benefits of a range of ADAS technologies and the insurance industry plans to continue with this approach to research and test the capability of new innovations in vehicle automation.

18.5. However, if fewer vehicles were to be developed in this country, there would be a reduced volume of routine test work for Thatcham and other research institutions, test houses and proving grounds. This would undermine the UK's ability to fund the investment in cutting edge technology to test the most innovative developments in automated driving. Therefore, in order to meet the ambition of making the UK a world

[12] The ABI has recently set out the strategic objectives of the UK insurance industry within the context of the UK's EU Exit here: https://www.abi.org.uk/News/News-releases/2016/09/ABI-sets-out-five-priorities-to-make-the-best-of-Brexit

leader in automated driving, the Government must ensure it retains a competitive vehicle manufacturing industry and associated repair and testing network.

Association of British Insures
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