ITS International Magazine – Written evidence (AUV0009)

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Key issues

K1/ ITS International is a UK-based globally-distributed magazine covering issues concerning all facets of intelligent transport, including connected and autonomous vehicles and ADAS. Two of the most vital points we wish to make fall under the ‘Crucial issues not captured under the questions’. We are deeply concerned about the excessive security risk autonomous vehicles pose and negative impact their introduction would have on society.

K2/ Readily available autonomous vehicles, especially cars, would greatly increase the risk of a terrorist attack far beyond that of a suicide bomber. Instead of sacrificing themselves in a one-off suicide mission, an extremist would be able to use unoccupied autonomous vehicles to deliver bombs to several targets simultaneously. The terrorist would be many miles from the target(s), giving them time to make good their escape before any device explodes.

K3/ As the use of autonomous vehicle removes the need for the terrorists to sacrifice their own life, many more extremists would become active in dispatching devices to intended targets. Furthermore, through the use of autonomous vehicles a group of individuals could easily coordinate simultaneous attacks on one or more targets and such plots would be very difficult for authorities to intercept or stop.

K4/ We have highlighted this potential to senior figures on both sides of the Atlantic (including UK Catapult) but so far nobody has provided a satisfactory method of neutralising this threat.

K5/ We have also seen significant global marketing impetus behind the introduction of autonomous vehicles which has drowned-out any debate about the wider social implications and desirability of this technology. As detailed below, the widespread introduction of autonomous vehicles will increase congestion and CO₂ emissions while benefitting only those inside the vehicle, which would be socially divisive and unacceptable.

Answers to questions posed:

Response to question 1 – Applications

1.1/ A report by Allianz indicates there are 600,000 unmanned aircraft, or drones, in commercial operation and highlights safety and security issues these raise (see http://www.agcs.allianz.com/assets/PDFs/Reports/AGCS_Rise_of_the_drones_report.pdf)

1.2/ From this point onwards, we will limit this submission to on-road applications which include buses and shuttles, trucks and vans, cars and taxis.

Response to question 2 – Benefits & disadvantages

Benefits:
2.1/ The autonomous operation of some buses and shuttles running on pre-set routes, could lower fares and running costs and thereby allow an increase in service frequency and overall capacity. Platooning, (rather than autonomous) trucks could reduce transport costs in certain circumstances but could hamper other vehicles joining and leaving the motorways and consequently would be difficult to achieve in many parts of the UK.

2.2/ Safety gains must be excluded from this section as they are not unique to autonomous vehicles and are already being realised through the use of ADAS. Furthermore, the risk taking and inattentive drivers are the ones least likely to utilise the autonomous function if there is a manual alternative.

2.3/ While autonomous vehicles will provide a reduction in emissions compared with most human drivers that reduction is dwarfed by the gains available from advances in driveline technology such as electric vehicles. This has a greater effect on reducing emissions regardless of whether the vehicle is autonomous or not.

2.4/ Also excluded is any increase in car sharing and ride-sharing as these services are already providing very high levels of convenience with traditional vehicles through innovations such as free-floating car sharing. See: http://www.itsinternational.com/sections/general/news/zipcar-launches-free-floating-car-sharing-service-in-belgium/. So in practice it is unlikely that the introduction of autonomous cars will lead to a major increase in car sharing beyond that already being realised.

2.5/ Despite the availability of ride-sharing, 80% of journeys are still undertaken with a single occupant. Ride-sharing usually occurs between people who know or have found each other through a ride-sharing website and it is unlikely that users of autonomous cars, especially those from vulnerable groups, would allow total strangers to be picked up enroute. The Spitscoren project in Holland has shown how journey-matching websites and mobile phone apps can encourage ride-sharing by introducing individuals to each other before a journey (see www.spitsscoren.nl/default.aspx).

2.6/ The suggestion that autonomous vehicles’ faultless lane keeping would increase capacity by enabling a traditional three lane motorway to be reconfigured with four narrow lanes is equally misleading, because at least two lanes will have to remain wide enough to accommodate trucks overtaking each other.

2.7/ As ADAS can provide the safety gains, emissions reductions are dictated by driveline technology, car- and ride-sharing are better fostered by other means, and the predicted increased in road capacity is unlikely to be realised, it is clear that the unique advantages of autonomous vehicles relate only to those people or goods on board.

Disadvantages:
2.8/ Contrary to idealised projections, in reality autonomous cars will increase congestion because they would be the equivalent of having a chauffeur, allowing commuting ‘drivers’ to work, sleep or socialise during the journey. This means commuting time could be used productively and consequently the occupant is less concerned about congestion extending
travel times or the practicalities and cost of parking. These factors will encourage more people to commute by car leading to increased urban congestion, which will inconvenience other road users. With like-for-like drivelines, CO₂ emissions would increase and air quality would deteriorate.

2.9/ Autonomous cars would make more journeys than traditional vehicles because some commuters would send their vehicle back home for other family members to use during the day, before summonsing it back into the city in the afternoon for their homeward trip. The additional congestion, longer travel times and emissions created by unmanned journeys would not inconvenience vehicles’ owners who are still at work or at home, and when they occupy their autonomous cars their travel time is productive. The consequences of these actions would again disadvantage other road users and the local population.

2.10/ Owners of autonomous cars could also set them to circulate around local roads while they have a meeting or a meal in order that they are instantly available once the meal or meal is finished.

2.11/ Owners of autonomous vehicles would use them to deliver ‘forgotten items’ and on a business level they would replace fleets of motorcycle and bicycle couriers who deliver packages around large cities and take-away meals. This would adversely impact employment as well as increasing congestion and emissions.

2.12/ A recent white paper published in America by consultancy SBD and location-cloud company Here concludes that the US could suffer severe increases in congestion for up to 40 years if driverless vehicles are released for general sale. See: www.sbdautomotive.com/c/here/traffic_congestion_autonomous_vehicles/media/index.html

2.13/ Uber is testing driverless taxis (http://www.itsinternational.com/categories/location-based-systems/news/uber-tests-self-driving-cars-on-pittsburgh-streets/), however the widespread use of such vehicles would devastate the employment prospects of the UK’s 397,600 licenced taxi and minicab drivers while offering no advantages to travellers other than potentially lower fares. Beyond the loss of employment and income tax revenue, there is a distinct probability that large companies operating driverless taxis would be tax domiciled abroad.

2.14/ Having reduced or removed the risk of being run over, criminals gangs could stop autonomous vehicles by walking out in front of one, braking sharply ahead of them or placing cones across the road in order to hijack it, steal any cargo, rob the passengers or even take the occupant(s) hostage. This is a particular threat where the driver cannot retake control. The recent behaviour of people-smuggling gangs around Calais should be noted in this respect.

Response to question 3 – Impact of deployment

3.1/ Currently pilot schemes of on-road autonomous vehicle are under way in various countries but none has yet concluded and when they do it is likely these will concentrate on the technical aspects of deployment rather than the impact on society.
Response to question 4 – Public attitudes
4.1/ When asked, the public have generally been sceptical about using autonomous vehicles and their enthusiasm is waning (see http://www.itsinternational.com/categories/location-based-systems/news/consumers-showing-less-interest-in-autonomous-driving-systems/)

4.2/ It is clear that much effort is being expended to convince the public of their desirability (see http://www.itsinternational.com/categories/utc/news/alliance-aims-to-influence-transportation-policy/)

Response to question 5 – Market potential
5.1/ Analysis by John Greenough of Business Insider Intelligence is predicting 10 million self-driving cars to be on the road by 2020 (see http://uk.businessinsider.com/report-10-million-self-driving-cars-will-be-on-the-road-by-2020-2015-5-6?r=US&IR=T. This obviously presupposes regulations are changed to allow the sale of autonomous vehicles to the public at large.

Response to question 6 – Facilities
6.1/ The demonstration facilities may be adequate but the government must insist that the research is not simply confined to the technical aspect of autonomous vehicles and that there is adequate evaluation of the wider implications of allowing autonomous vehicles on our roads.

Response to question 7 – Government funded R&D
7.1/ The funding could be distorting the true image and impact of autonomous vehicles because the availability of funding will spur the creation of projects without necessarily addressing the social desirability of autonomous vehicles. If this were done, funding could be targeted at those autonomous vehicles which provide the greatest public benefit.

Response to question 8 – Innovate UK and CCAV
8.1/ Innovate UK and CCAV are engaged in fostering the development of autonomous vehicles and may well be doing so competently but in doing so they have a vested interest in maintaining the deployment of autonomous vehicles. Therefore they are unable to provide the balanced view needed by regulatory authorities.

Response to question 9 – Environment for SMEs
We have no information or view about this issue.

Response to question 10 – Infrastructure changes
10.1/ Ensuring in-service reliability of autonomous vehicles would require a higher consistency of markings and signage than is currently available on most of the UK’s 250,000 miles of roads, in addition to very high definition digital maps that are constantly updated. The upgrading and ongoing infrastructure and mapping costs may well be beyond the reach of the public funding and would take many years to accomplish.

10.2/ Any obscured sign or ‘inadequate’ demarcation could raise public liability issues in the event of a collision.
10.3/ For reasons set out in Paragraph 2.5, it is unlikely that the autonomous vehicle advocates’ idea of converting a traditional three-lane highway or motorway to four narrow lanes to increase capacity could be achieved without major infrastructure investment.

Response to question 11 – Deployment
11.1/ For the reasons set out Paragraphs 1 to 18, it is imperative that deployment of autonomous vehicles is restricted – possibly to public service operations. The needs of elderly, blind or otherwise disabled people would be better handled through the expansion of technology such as ‘Mobility as a Service’ where a driver would be on hand to assist special needs passengers.

Response to question 12 – Cybersecurity
12.1/ Systems in an autonomous vehicle are safety critical so a breach of cyber security is unthinkable and an ongoing ‘battle’ against the hackers will be necessary but extremely expensive. While progress has been made in preventing ‘mass’ hacks (see http://www.itsinternational.com/categories/detection-monitoring-machine-vision/news/karambas-carwall-thwarts-mass-hacks/), currently there is no counter to individual hacks.

12.2/ It should be noted that the consequences of a hack on an autonomous vehicle are likely to be far worse than with ADAS. With ADAS the systems are active only for part of the time on a limited number of functions and the driver retains full control.

12.3/ Vehicle manufacturers must not be allowed to use cybersecurity as a pretence for restricting access to diagnostic and repair of ADAS or other systems and provision will be necessary for trained independent repairers and third party checks such as the MOT test.

Response to question 13 – Insurance & Regulations
13.1/ Any revision to the legislation should await information about the full effect of autonomous vehicles in the wider society.

Response to question 14 – Ethical Issues
14.1/ To restrict ethical questions to the mechanical functioning of autonomous vehicles would be an error as it would exclude consideration of the ethics of the wide impact. This includes exposing the public to an increased threat of terrorist action, the loss of driver employment (and possibly tax revenues), the divide (probably regressive) between autonomous vehicles users and the general public, whether society should tolerate empty journeys and the effect on the climate of increased CO₂ emissions.

Response to question 15 – Modern Transport Bill
15.1/ Authorities worldwide acknowledge that congestion cannot be solved with single occupancy vehicle solutions. Therefore the Modern Transport Bill must force the authorities controlling road, rail, air and water-borne transport out of their individual ‘silos’ to fully own, embrace and facilitate multi-modal transport including cycling, walking, car- bike- and ride-sharing and ‘Mobility as a Service’.