Transport Select Committee

Self Driving Vehicles

Submission by the Chartered Institute of Transport and Logistics (CILT UK)

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Introduction

1. The Chartered Institute of Logistics and Transport (CILT UK) is a professional institution embracing all transport modes whose members are engaged in the provision of transport services for both passengers and freight, the management of logistics and the supply chain, transport planning, government and administration. Our principal concern is that transport policies and procedures should be effective and efficient, based on objective analysis of the issues and practical experience, and that good practice should be widely disseminated and adopted. The Institute has specialist forums, a nationwide structure of locally based groups and a Public Policies Committee which considers the broad canvass of transport policy.

2. The Transport Select Committee has called for evidence on several matters concerning Connected and Autonomous Vehicles (CAVs). With a complex mix of existing road users, the introduction of any CAVs could have serious consequences, many of which may be unforeseen. There is a huge variety of considerations and, unfortunately, we all have only partial visibility of what may develop in the next 5 or 10 years, let alone by 2050.

3. As a result, CILT warmly welcomes the opportunity to provide evidence to add to the discussion and would be very willing to provide further information if useful. It has proved challenging to neatly divide up our response, so we have provided some general comments on commercial goods and passenger CAVs and then used some of the suggested headings in the call for evidence.

4. However, the one issue which emerges time and again is **safety** – of everything from IT systems through to the vehicle users, and pedestrians and bystanders. This issue dominates nearly all our other comments, but we have still found it necessary to add specific safety comments.

General comments on CAVs

5. In discussing vehicle autonomy, 6 levels of driving automation are defined ranging from 0 (fully manual) to 5 (fully autonomous). There are various claims as to where we currently sit: the truth is it depends on the vehicle, location, and use.

6. Technology is developing very quickly, leading some manufacturers to claim their vehicles can operate at a high level of automation (level 4). Certainly many new cars could operate at level 3 (conditional automation), even if they currently operate with partial automation or driver assistance (levels 2 and 1 respectively). However, as new technology is fitted to vehicles, e.g. speed limiters or automatic lane control indication, these should be added to, and tested as part of, the annual MOT to make sure they work correctly and have not been tampered with.

7. For the purposes of the evidence below, we are looking towards full level 5 autonomy, defined as "where the vehicle can carry out any journey in any environment, without human intervention", irrespective of the vehicle power source. The 'any' in this definition means that true level 5

autonomy is still likely to be a long way off. However, if the range of journeys and/or environments can be restricted to some extent, full autonomy without a human driver is a great deal easier to achieve and, in many cases, achievable with current technology.

Logistics and commercial goods vehicles

8. The move towards autonomy has been a growing 'part of the furniture' in logistics for half a century. Warehouses have moved from guided fork-lift trucks through to fully automated black-boxes for full-pallet movements, and increasingly robotics and autonomous vehicles are transforming the picking and packing of individual items, from Amazon parcels through to supermarket yoghurts.

9. The obviously appeal is a reduction in labour costs but with a safety-first approach: the ability to mix autonomous vehicles with personnel due to their slow speed, forward looking controls and emergency stop ability. This has enabled autonomous goods vehicles to be used in a plethora of workplaces with personnel trained to work alongside them. In our Annual Awards: Warehouse Automation category, CILT has awarded several applicants for the productivity benefits of such systems.

10. Two particular use cases are already in operation and development: agriculture and closed-loop vehicles used in contained operational environments.

    Agriculture: Early developments in autonomous agricultural vehicles have been happening in the UK since 2017 . Given that such vehicles can operate at low speeds and on private land, full autonomy presents far fewer technical challenges.

    The use of autonomous vehicles guided by satellite or drone enables micro-application of fertiliser and agrichemicals only where needed. Without the need for a driver, such activities could be carried out by multiple small vehicles rather than large tractors, reducing soil compaction problems, and we could see autonomous groups of larger vehicles such as combine harvesters and their following vehicles.

    Closed-loop vehicles: These include, airport and maritime port vehicles including aircraft and dockside, RoRo tugs, container handling rubber-tyred cranes (RTCs), straddle carriers, and automated port area container carriers.

    In some locations, these have been in use for a decade or more and mature safety regimes exist to protect any personnel. As a result, much of this location, control, and safety technology is transferable to semi-public but controlled and supervised environments. The development of CAVs for locations such as warehouse sites and in rail yards is underway. We believe they could prove very useful and cost effective, for example in moving containers between rail terminals and warehouses within an SRFI.

    It is likely that industry will continue to develop the use of CAVs in any controlled or semi-controlled environment, given the commercial benefits that could result.

11. The core issue for commercial goods vehicle CAVs is **road safety**, as once in the public realm the uncontrolled and uncontrollable environment leads to a level of risk that most would consider unacceptable. The risk increases exponentially with the size and speed of a vehicle. A small CAV passenger car moving at 10mph in an urban environment is capable of being halted quickly, but a

44 tonnes CAV HGV moving at 56mph (or more) most certainly cannot. The risks could increase further with connected platooned vehicles, as the combined mass could be well over 200 tonnes.

12. Proponents may argue that detection and guidance technology will prevent any problems but, as anyone who struggles to get a Wi-Fi signal on their phone can confirm, technology is not infallible due to a whole variety of engineering and human factors. Present technologies can and do 'fail safe', but a mixture of CAV and non-CAV vehicles on a public road holds the risk of not failing safe, with potentially disastrous consequences.

13. Transferring autonomous goods vehicles into the public domain for parcels distribution is being trialled in limited locations. The Estonian firm Starship is a leader in this and has trialled their **droids** (or robots) in several countries. In the UK, Milton Keynes has been the centre of this activity with both Co-op and DPD involved.

14. These robots are designed to use pavements, given the size, slow speeds, and visibility in their design. As a result, trials in city centre locations have been less successful and their use and development seems to be focused on more suburban locations.

    Finally, DfT has been involved with trials of **platooning** and results were publish in July 2022 https://nationalhighways.co.uk/media/l43fgudu/helmuk-final-report.pdf.

Commercial passenger vehicles

15. Similar to developments in logistics, there is a growing use of technology for road-based passenger vehicles. Guided pods are autonomous vehicles, such as those used for passenger transfer between the long-term car parks and passenger terminals at LHR Terminal 5. These also operate within a controlled environment and are now well proven including for passengers who use a mobility aid or wheelchair or are travelling with a buggy.

16. Initial trails have also been conducted of road-based passenger vehicles, such as at Greenwich in 2018 and are proposed across the Forth Bridge. Such schemes are a natural progression of the technology development of autonomous vehicles, but also rely of the public acceptance (or ignorance) of the technology used in autonomous light rail and metro systems, such as the Docklands Light Rail and the London Underground Victoria and Jubilee Lines.

17. However, transferring the approach to the regular road network requires satisfactorily addressing road safety from various perspectives: the CAV (whether car or commercial vehicle), the bus or coach (whether CAV or not), and other road users (whether pedestrian, cyclist or micro-mobility, and both of the latter two could be electrically assisted or not).

18. Currently it's clear that where there is greater **interaction with the kerbside** there is a need for greater road sense. This is particularly true for bus and coach drivers, and for Hackney carriage taxis (rather than private hire vehicles), as the driver is constantly dealing with all the issues related to the passenger pickup and drop-off, especially for any visual or mobility impaired passengers, and the safety of other road users such as cyclists.

19. The CILT has seen very little evidence of how these interactions would work and would suggest substantial research and trials will be needed. Of specific intertest is understanding how

commercial passenger CAVs would deal with pulling away from the kerb given the mix of road users (whether CAV or not) and how other CAVs react to buses pulling away from frequent bus stops or buses changing lanes for cyclists and micro-mobility users.

20. There is also an added **personal safety responsibility** aspect in passenger transport. Bus and coach drivers are responsible for everything and everyone on the vehicle, as is the case for train drivers and guards. This is an area where there needs to be a clear policy direction across all modes, as while there is still ongoing debate about the need for a driver and a guard on a mainline train, or the need for a 'driver' on a Jubilee Line train, the development into how safety is managed on CAV road passenger vehicles is unlikely to be resolvable.

    For any commercial passenger activity, the industry would need to be convinced that safety standards are maintained or enhanced.

Commercial goods and passenger CAVs

21. There are major differences between vehicle and people movements in a busy urban street environment compared to a rural or motorway setting. This means that there may be a perceived **development pathway** from slower to higher speeds or from motorways to A and B roads, and a more incremental or nuanced development and acceptance of CAVs.

22. One consideration in any development pathway is how pedestrians move around in urban areas, where traffic speeds are slower. In the UK, unlike Germany or the Netherlands, pedestrians cross the road wherever they feel safe to do so, even if the vehicle driver may not agree with their assessment of road safety!

23. However, if CAVs use cameras and/or proximity sensors to stop and there is no greater control or enforcement on pedestrians, it is highly likely that pedestrians will increasingly step off the kerb assuming the vehicle will stop for them. Hopefully this would not result in more road incidents, but it will inevitably slow the traffic, reducing the **journey time reliability**. This would be a commercial nightmare for any public transport business case or for any goods vehicle operators.

Research and trials in the UK and abroad

24. There is a wealth of research, test reports and analysis available through the web from innovators and developers in the UK, Europe, and USA. Frequent events are held to promote this activity, e.g. The ADAS* and Autonomous Vehicle Expo in September in the USA (* advanced driver-assistance systems).

25. The UK government has announced several funding opportunities and a recent consultation but this is dwarfed by the research funded by global technology companies in the USA and China. There is a clear commercial imperative driving the research and development, which is based on existing technologies such as cameras and proximity sensors, with a 'big data' or Artificial Intelligence (AI) analysis to determine future 'behaviour' of CAVs.

26. The UK Road Safety Investigation Branch has only recently been established and there is little UK reliable data as to the causes of road incidents or the behaviours of other drivers in relation to the events that occur on UK roads. So, while road incidents are thankfully decreasing in frequency

in most countries, it must be noted that the road safety statistics in the USA make grim reading when compared to the UK.

27. However even with US data, this means that the analysis of incidents and the programming of CAV 'reactions' to these incidents are based on a limited number of real events. Some developers have added to these events with AI generated events, but this might impact the frequency of specific types of incidents compared with 'normal' driving conditions.

The CILT encourages an ongoing review of all trials and research to determine the applicability for future CAV operations in the UK.

Potential implications for infrastructure

28. Theoretically automation will enable a much better use of road capacity: vehicles can travel much closer or in road trains and will operate in new ways with the sharing of driverless vehicles becoming easier. CAVs designed with autonomous taxi-style transport service in mind could change the economics of ride hailing services and lorries operating in road trains could see improvements in fuel economy: although, these fuel improvements may only be 5 to 10 percent and the power required for an autopilot, let alone full autonomy, currently outweigh this benefit.

29. In urban areas CAVs will need to recognise parking and loading/unloading restrictions and pay the appropriate charge where necessary. There may be an issue as to whether the charge or any fine for non-payment should fall on the vehicle operator or the user and consideration will be needed around Control Parking Zones and visitor parking permits.

30. Where two-way roads are restricted to a single lane because of vehicles parked at the kerbside, CAVs will have to be programmed on which vehicle should give way and pull into a gap allowing the other vehicle to pass. This problem will also occur on single track roads in rural areas.

31. Recent technological developments have demonstrated that understanding the actual implications of technology in practice must be part of any roll-out. For example, the introduction of app-based ride hailing for private hire vehicles in London increased the number of such vehicles in the Congestion Charge Zone (CCZ) by over 70 percent between 2007 and 2017[1]. The impact was to increase congestion just as new cycling infrastructure was introduced, leading to a drastic drop in bus passenger numbers in the CCZ.

32. For this reason the widespread introduction of CAVs will intensify the case for road charging. CAVs will need to interact with charging regimes and be programmed to pay the appropriate charge and the cost of the charge should fall on users. Otherwise, in the absence of road user charges, CAV taxis, with no driver costs, could decimate any future public transport scheme business case, and are likely to significantly impact existing bus networks.

33. It would be very costly and/or impractical for all the passengers that use existing high-capacity public transport systems such as rail and tram to transfer to individual CAV vehicles. Staff who can also drive vehicles are likely to still be required for customer service and in case of emergencies, so the economic gains would be more limited.

[1] https://tfl.gov.uk/corporate/publications-and-reports/travel-in-london-reports Travel in London 12 (2019)

34. The big opportunity could be to use CAVs to connect people with these public transport services. CAVs could expand the coverage of public transport to rural areas and places with dispersed populations, which could be a particular advantage for older people and lower mobility groups.

35. The UK digital infrastructure and Wi-Fi network will be critical to any CAV rollout. Any system(s) will need robust cyber-security and will be required to operate 24/365. However, some degree of manual backup is likely to be required.

    The CILT encourages the prioritisation of delivering a robust UK digital infrastructure.

Government, regulations and approvals and authorisations

36. There is a huge amount of vehicle technology development occurring where appropriate regulations and vehicle roadworthiness need to be considered. However as mentioned above, the development of CAVs is being led by global tech companies seeking profit and this must not compromise road safety being paramount. The UK needs to get the balance right between influencing these developments and ensuring they are robustly tried and tested.

37. The rapid uptake of micro-mobility demonstrates clearly how vehicle use is likely to precede the regulations. We currently have DfT funded, speed-limited e-scooter trials ongoing, meanwhile there has been an explosion of personal escooters travelling faster than 15mph on both roads and pavements, suggesting any regulation may encounter public resistance.

38. The introduction of CAVs is vastly more complicated, with road vehicle users ranging from vintage motor cars through to non-assisted scooters and bicycles. Accommodating CAVs may require amending existing regulations on some or all of these vehicle types.

39. This will require understanding all of the relevant technology involved in CAVs, recognising the theoretical and actual impacts, and potentially regulating for everything from the use of private escooters through to AI systems (which few understand, even the developers if recent reports are to be believed).

40. This may also require a strategic re-evaluation of the values and principles of mobility and access which underpin the current standards and regulations. Who should get priority? How do we accommodate human error within increasingly automated systems? How should liability be managed?

41. Some of the discussion around these issues is already underway. For example, the Association of British Insurers has already considered Defining Safe Automated Driving, but agreeing applicable regulations that all stakeholders find acceptable may be problematic.

42. However regulation evolves, it is highly likely that over the next 20 to 30 years the need for driving skills will increasingly be replaced with a need for better customer service and social skills.

43. The issue of compatibility also needs to be addressed, given the likely range of CAVs from different manufacturers, using different IT systems. There may be a need for open access public data and/or IT systems and agreed international standards to avoid embedding conflicts into

future systems upgrades, and yet today it can be difficult enough transferring data between a Windows PC and MacBook. Additionally, a large amount of detailed public data is not available online, for example where planning or transport regulations control or limit kerbside parking or access for loading or unloading.

The CILT recommends that a thorough assessment is needed of publicly accessible data and the implications of any such system(s), as CAV roll-out will require significant regulatory control and robust vision system software.

Safety

44. As stated at the beginning of our response, the one issue which emerges time and again is safety. Underlying any rollout of CAVs is that a vehicle should be controlled at all times. Who is actually in control and who is legally in control are critical questions, although recommendations on legal control have been developed by the Law Commission.

45. The greatest potential benefit from the introduction of CAVs is the reduction of road deaths to zero, and this overarching aim should be paramount. Most road accidents are due to driver error and the basic assumption is that CAVs will reduce road incidents, which is likely to be true at level 5 – full autonomy.

46. However, the human brain has vastly quicker reaction times to visual data than text data, and in the stages before level 5, how quickly a responsible person in vehicle reacts compared to the processing time for any CAV will be critical. Similarly, the comparative reaction times of the drivers of non-autonomous vehicles verses the CAV will also be critical.

47. Public perception is likely to be a highly critical requirement for the widespread adoption of CAVs. Misrepresentation of developments or an early high-profile road incident could seriously impact public acceptability.

48. Any and all of the points mentioned in the other sections are applicable to the issue of safety. However, one area is critically lacking in any of the discussion of the technology underpinning CAVs. This is ensuring the future road transport system and vehicles are suitable for all of the population.

49. Research on the impacts of road traffic incidents and vehicle protections systems has traditionally been based on a standard sized male driver, with no accounting for female drivers, different body shapes and sizes, and disabled drivers. Similarly, many of the safety protocols being developed for autonomous vehicles are designed to work off standard features such as foot pedals and steering wheels. It is important that the needs of disabled drivers, who may be using hand controls, joystick steering etc. are included in the research and the protocols that are developed.

50. **To conclude**: the CILT strongly believes that CAVS are coming but we are still some way off widespread adoption. The mantra must be safety, safety, safety; safety for users, safety for non-users, and safety of the systems.

Wholesale introduction into the public domain requires significantly more work and a clear regulatory framework which is likely to require regular updating as technology develops and we get closer to level 5 full automation.

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