



Testing Driverless Cars

Report of pupils' views

to the Centre for Connected and Autonomous Vehicles, Department for Business, Innovation and Skills, Department for Transport, and Innovate UK

For their call for evidence on driverless vehicle testing facilities



Introduction

- 1. This response is made by Pupils 2 Parliament, a project to enable school pupils to consider and feed in their views to parliamentary, national government and national body public consultations and inquiries. The project has been approved by the Clerks of both Houses of Parliament to use the term ‘Parliament’ in its title.**
- 2. Pupils 2 Parliament aims to bring the particular viewpoint of children and young people to those conducting inquiries and consultations - plus the uniquely fresh and often challenging analysis that children and young people bring to decisions and policies.**
- 3. The project also aims to give school pupils the chance to learn about and consider key decisions being made by parliament, national government and public bodies, and genuinely to participate in democracy by feeding their views into real national decisionmaking.**
- 4. Pupils’ views are independently gathered through discussions with groups of pupils led by someone from Pupils 2 Parliament, using material from the relevant consultation or inquiry document to explain the issues. We specialise in putting the issues and questions even-handedly, without leading pupils in any way or suggesting any responses. All views come spontaneously from pupils, with no adult prompt.**
- 5. This report contains all pupil views given, without selection, comment or addition. The views in this report are entirely pupils’ own views, and nothing but pupils’ views.**
- 6. Views in this report came from 153 pupils aged 8 to 11 in six separate focus groups of one school class each, in four different schools. Three focus groups were held at Gig Mill Primary School, Stourbridge, and one each at Quarry Bank Primary School, Brierley Hill, Staunton on Wye Endowed Primary School, Hereford, and Priory Primary School, Dudley.**



What questions and issues about autonomous vehicles should be tested?

- 7. We asked each pupil group to tell us what aspects of autonomous, driverless, vehicles they thought should be tested. This also triggered some choices to be made and some wider questions to be asked. We gave no adult suggestions or leads, and we have listed here (in no particular order) all the questions and issues for testing that the pupils raised.**

8. General Safety (including some legal questions)

- Autonomous vehicles need to pass general safety tests (“how do they know that the car is safe?”).**
- Can the car stop safely before hitting anything, when reversing, or if someone walks in front of it?**



- Will passengers in autonomous vehicles need to (or have to) wear seat belts in case of accidents?
- Would the car tell passengers if they are not wearing their seat belts (using weight sensors in seats)? Can the car put passengers' seat belts on automatically? This might be especially important if there is no one driver in charge, or if the car is carrying children on their own. Would the car refuse to start until all passengers are wearing their seat belts?
- How does the car react if it is involved in a crash?
- Do normal airbags work ok in the car?
- How fast will driverless cars be allowed to travel, and will there be a maximum speed limit for them on motorways?
- Can the vehicles be given additional safety measures – like sticky paint on the bonnet that prevents somebody slipping down under the vehicle if it hits them?
- Will the vehicles always have reserve fuel or power supply to prevent them losing control if they run out of fuel or power?
- Could a driverless car get a speeding ticket?
- Is it safe for babies to travel in driverless cars?
- Is it safe for animals such as pets to travel in driverless cars?

9. Sensors

- As the car's "eyes", can they see the full 360 degrees around the car (without blind spots), are they high enough to have a clear vision all round without their vision being blocked, can they detect safely in all directions at once, and can they "see" in the dark and in fog or heavy rain?
- Does the car use laser beam sensors to "read the environment"?
- Can the car's sensors properly detect traffic on all the roads at a junction?
- Do the car's sensors always detect all traffic around the car?
- Can the car detect people crossing or standing ready to cross the road ahead of it?
- Can the car sense people and obstacles around corners?
- Can the sensors correctly read the speeds of other vehicles?
- Can the car correctly read and obey traffic lights?
- Can the car correctly read and obey road and traffic signs – including ones warning of temporary dangers ahead?
- Can the car's sensors detect and correctly identify people, children, large animals, very small animals like toads, rabbits and birds, and narrow things like a cyclist?
- Can the sensors detect sharp objects like nails in the road that are likely to risk a puncture?

10. Reading the road

- Will the car's GPS mapping be kept updated so that it doesn't attempt to drive on roads that have changed?
- Will the car detect that the road ahead is closed off, even if the road is clear on its mapping system, and take a different route?



- Will the car identify, and refuse to obey, a dangerous instruction (especially off road), such as to drive forward when there is a cliff edge ahead?
- Could a convertible body autonomic car detect risks of things falling into it (eg when driving beneath a stony cliff by the road), and raise its roof to protect its passengers?
- Will the car detect, or be informed, about sudden or unlikely dangers, such as a bridge collapsed ahead of it?
- Would the car take its own short cuts on a route, and would these always be suitable and safe?
- Will the car's GPS take it over private roads and paths, and will it be able to check whether these are or are not OK to use?
- Can driverless vehicles crosscheck their satnav locations and instructions by comparing satnav information with road signs they pass?
- Can the car always drive safely on roads without any road markings at the sides or in the middle?
- Could the car detect the depth of water in a pool or flood on the road, and be able to decide whether to go through it, go round it, or stop?
- If there is an extremely unlikely, but extremely dangerous, hazard ahead, such as a big fire, major floods, or even something like a nuclear explosion, will the car continue to drive its passengers into it, or turn and try to escape it?

11. Failures and breakdowns

- How often does the car go wrong?
- Autonomic vehicles get rid of the dangers of human error – but will they “mess up like humans do”?
- Will driverless cars go wrong as often as most computers and games consoles do? (“The car might go cuckoo”.)
- How often will a car go wrong and cause a crash?
- Can the car detect when it is developing a fault, and take safe action? Will it alert its driver, pull over and stop safely, and perhaps call the AA?
- Could a driverless car picking you up accidentally drive off again without you?
- How often would an autonomic car take you to the wrong place?
- How does the car react to a burst tyre? Is it able to take action to repair a puncture? Would it carry an ordinary spare wheel for a driver, passenger or assistance service to fit if needs be?
- Are the car's systems watertight against spilt drinks near or over its controls and electronics?
- Would the car automatically unlock and release its doors after an accident for its passengers to escape or be rescued?
- Will the car's windows be designed to stay unbroken, or to break easily, in an accident?
- Will the car detect and respond to smoke inside it, and how will it respond to an engine or electrical fire?
- Could the vehicle have protection if it drove off a high road – like bouncy tyre bags or even a parachute system to break a big fall?



12. Who can control autonomous vehicles (including legal questions)

- Is a child allowed to give instructions to a driverless car (eg to take them to school), or will it only accept instructions from an adult?
- Will there be a minimum age limit for being in charge of (or giving instructions to) a driverless car? Should this be the same as the age limit for driving now, or should a new lower age be set for a car that drives itself, because driving skills aren't needed?
- Will the car only accept instructions from someone registered to give that car instructions?
- Can the car detect and refuse to obey "silly instructions" – like those given by someone who is too drunk, or instructions like "drive me to Everest"?
- Might driverless cars require someone giving the vehicle instructions to pass a breath test in the car first?
- Will the car accept reasonable instructions from someone who is too drunk to drive (such as instructions to take them home) – and would someone riding in a driverless car while drunk still technically be in charge of a vehicle?
- Will there still be a driving test?
- Do you need a driving licence to be in control of a driverless car?
- Do you need a special driving licence to be able to take over manual control of a driverless car in emergency if its own systems fail?
- If the car is being driven manually, will it be fully manual (including the driver changing gears) or will it remain partially automatic (still using an automatic gearbox)?

13. Security

- Are standard keys and fobs safe enough for locking and unlocking a driverless car, or does it need a more secure way of identifying who can lock or unlock it?
- How well does the car recognise a person who is allowed to instruct it to start up and drive off? Does it use a system like password protection, fingerprint or thumbprint recognition, voice recognition or perhaps in future DNA recognition?
- Does the car need two security systems to be triggered before it will start up – for example, the right key being inside the vehicle and the right voice giving it instructions?
- How does the car detect and deal with someone trying to break into it or steal it? Can it lock the thief inside?
- How hacker-proof are the car's systems?
- Can the car avoid being unlocked, started up or given journey instructions by accident – for example, from another driver's key fob signals nearby, by picking up instruction signals from another vehicle, or by its voice recognition system picking up other people's speech through an open car window, or responding to words it hears in general conversation between its passengers that weren't meant to be instructions.
- Is the car secure from a person in the car accidentally leaning on or touching its control panel, and from animals bumping into control panels (or even from a fly landing on a touch screen)?
- What self-defence mechanisms will driverless cars be fitted with?
- Would autonomic cars need registration plates?



14. Giving instructions to the vehicle

- Can the car pull over and stop as soon as it is safe to do so if you tell it to do so at any time during a journey?
- Can the car stop at the next service station on a main road or motorway if you tell it to – for example if you want it to refuel, or for you to have a break or something to eat?
- How do you give instructions to the car? For example, using a touch screen, by voice activation, using a key fob, or through a tablet or mobile phone?
- Can the car still be given instructions if its touch screen is cracked or damaged?
- Does the person telling the car to set off on a journey have to travel in the car themselves, or can they give instructions and send the car off by itself (for example to pick somebody up from somewhere, to carry children to school, or to take itself back home after taking you somewhere)?
- Can you set and change the speed the car is to travel at?
- Can you instruct the car to drive more steadily if it is carrying an ill or disabled person?
- Is the car able to take instructions and read road signs in different languages, and either to recognise and change its language (for voice recognition and reading road signs), or to have its language changed by the person in charge?
- As well as taking instructions, does the car give its passengers the information they need and want about their journey, in a way and in a place they can easily see? (For example, constant feedback on the speed they are travelling at).
- Does the car have a reliable WiFi connection?

15. What can the car do?

- Can you call the car to come and pick you up, wherever you are?
- Can the car return empty from dropping someone off, wherever it has taken them?
- Can the car cope safely with bumpy or potholed road surfaces?
- Can the car drive off road? Can it sense when it is off road and adapt its sensors and systems to what it needs to control driving safely off road?
- Can the car cope on sand and desert surfaces?
- Could the car check or repair its vital parts (like damaged sensors) after an accident?
- Could the car detect dangerous road conditions for a journey and refuse to make that dangerous journey?
- What is the vehicle's fuel system – petrol, diesel or electricity?
- Can the car detect when it is nearly out of fuel or electrical charge, and take itself to refuel or recharge?
- Since driverless cars are likely to be used for long journeys, can they include facilities for providing food and drinks, and seats that easily turn into beds for passengers to sleep while the car drives a long way?
- During a journey, can you instruct the car to find and take you to a particular type of place nearby – like somewhere to eat of the sort you choose?



- Can the car “understand” and act in the right way at, things like pedestrian crossings? Will it decide safely when it should wait for a person to cross the road?
- Can the car assess whether it is stopping or parking in a safe and sensible place?
- Can the car assess when it should give way to other traffic?
- Can the car choose the right actions when it detects different things in its way – such as people, children, large animals or very small animals? Will it avoid or ignore small animals and birds according to what is safest at the time?
- What will the car do if it detects a person in its way but it might crash if it tries to avoid the person?
- Could the car pay for its own fuel when on a driverless journey?
- Does the car have enough traction and control to avoid getting into trouble on difficult roads or when off road?
- Does the car have fully automatic windscreen wipers to give passengers a good view to the front at all times, even if there is no driver?
- Can the car stop at the right place in a drive-through fast food outlet?
- Will the car have entertainment apps for passengers to use on long journeys? Does it include the communications systems and radio that other cars have? Can it automatically pick up calls from home? Does its communication system have the latest technology, such as a hologram of the person you are calling? Does it store phone numbers?

16. Coping with difficulties

- Could the car get itself out if it got stuck in mud?
- Would the car float if it drove into deep water?
- Could the car have suspension it can raise to get it through flood water?
- Does the car slow down and drive more carefully when it detects an icy road?
- What does the car do if it is not refuelled or recharged in time and it runs out of fuel or power? Will it pull in and stop safely before that without risking losing power and so going out of control?
- Can the car’s systems keep working properly in heavy rain, if the car drives through floodwater, in stormy weather, and if the car is struck by lightning?
- If a driverless car has manual controls, can it detect if a person driving it manually is falling asleep, and take over control from the driver?
- Can the car detect if a passenger is ill, or injured after an accident, and carry first aid equipment (such as equipment to revive someone having a heart attack), or itself divert to a hospital or trigger an emergency assist system?
- Does the car have a means of sending an alarm call to its owner if it is in difficulty?

17. Mixing with other vehicles

- Do driverless cars cause problems with other vehicles by driving differently (for example, by sticking rigidly to speed limits?)



- Will different ways of using the road between driverless and driven vehicles mean that in future we might have to have either all driverless cars, or none, but not a mixture of human and autonomic – “either driverless cars or driven”?
- Can the car detect emergency vehicles approaching, and pull over or stop in a way that lets them through?
- Can the car detect if it is being chased by another vehicle? Does it then speed up, take evasive action or pull over? If it is being chased by a police car, will it assist the police by pulling over and stopping?
- Does the car always indicate its intentions properly and in good time to other traffic, using indicators etc?
- Would the car give a warning (such as beeping or a voice announcing that it is a driverless vehicle) when moving or turning close to other drivers, cyclists, pedestrians and horse riders?

18. Future possibilities

- Can future driverless vehicles run on biofuel or even water? Can they be made more eco-friendly than other vehicles to cause less pollution?
- Could driverless cars be used as taxis, as long as they can tell where to pick people up and where to drop them off? Would this make driver controlled taxis less popular?
- Should cars automatically open their doors for you if they came to pick you up?
- Can autonomic cars be developed with special facilities and equipment for people with many different sorts of disability?
- Could there be bulletproof autonomic cars for use in dangerous places where vehicles get attacked – for instance for police or military use?
- Can an autonomic police car override speed limits?
- Could specialist autonomic vehicles have storage for specialist equipment?
- Could a driverless car talk with a passenger travelling alone and feeling lonely?
- Could an autonomic vehicle be programmed to plan a particular kind of tour (such as a holiday or sightseeing tour) and take you on it, in this country and abroad?
- Could autonomic vehicles be used for motor sports like stunt driving off ramps?
- Could a driverless combined car and hovercraft one day be developed, able to travel by road, off road, and across water or floods?



When an autonomic vehicle might injure or kill someone

19. A pupil in one group raised the question of whether a driverless car might put its own passengers at risk if it swerved to avoid pedestrians or animals. This is a major question that other people have raised too, and we asked the pupils in that group to comment on what should be done about this problem, and then to vote on what driverless cars should be programmed to do in this situation.

20. We set the scene as two children running out in front of a driverless car which didn't have time to stop, and which would probably hit pedestrians or a building or



lamp post beside the road if it swerved to avoid hitting the children, putting other people and its own passengers at risk.

21. Points on this made by pupils were that the car should take the action that put fewest people at risk of getting killed, that the children who ran into the road were at fault so shouldn't be saved at the expense of possibly killing others who hadn't done anything wrong, and that the risk of hitting the children by going straight ahead was 100%, while passengers or pedestrians only 'might' be injured after swerving. Other pupils thought driverless cars should travel far slower if they sensed children on nearby pavements.
22. Some saw a possibility that the children would immediately see their danger and jump back out of the way of the car – as well as causing the problem, they were also the ones most able to avoid the accident happening, so might themselves take action to avoid danger if the car carried straight on.
23. One pupil thought the expense of damaging or losing the high technology of the car should be taken into account, as well as the risk to people. Another thought the likelihood of wider property damage if the car chose to swerve should also be taken into account, as well as the likelihood of injuring or killing people. Others thought that killing children would take away whole lives, so property damage shouldn't be taken into account.
24. There was overall agreement that autonomic vehicles should be designed to sense and calculate risks, to be able to compute the action with the least risk of killing people – or the action likely to kill or injure the fewest people – and to take that action. They should also be designed to sense and slow down if children are nearby, and to detect as early as possible when they are likely to hit a person in order to brake hard and early to reduce the speed of the collision.
25. After the pupils had discussed this in the group, and without any leading either way by adults, they voted by 12 votes to 6 that the car should be programmed to swerve to avoid hitting the children ahead, rather than carrying straight on and injuring or killing the children in order to avoid the possibility of injuring or killing pedestrians or its own passengers.



Should cars be fully autonomic, or also have manual controls?

26. There was much debate about whether driverless cars should be fully autonomic, without steering wheels or manual controls for a driver to use, or whether they should have these – either for a driver to take over if the car developed a fault, or to choose to drive themselves for enjoyment. In three groups where this was raised, we asked pupils to vote on this issue by a show of hands.
27. Out of 72 pupils voting, 54 voted for driverless cars having steering wheels and manual controls for a driver to take control and drive the car themselves if they wanted to, or if the car went wrong, and 18 voted that they should be fully autonomic once safe



enough, without having controls for anyone to use to override the car's automatic systems.

28. The majority were therefore in favour of a hybrid autonomic or driven car, many believing that it should always be possible to switch an autonomic car to manual control if its automated systems developed a fault. As one pupil summed it up, "I'd quite like it to be both". Some suggested that an autonomic car could have a pop up or electronic steering control activated by a button to use when needed, rather than a large steering wheel there all the time. A few thought these manual systems in turn should have backup systems in case of their failure in turn.



Are children for or against the development and testing of driverless cars?

29. We had given each pupil group information from the Government consultation document about connected and autonomous vehicles (and what exactly an autonomous vehicle is). We had then asked the pupils to list the questions and issues they thought needed to be answered and tested for driverless cars. Once they had a good idea about driverless vehicles and the questions raised by them, we asked them to vote (using voting tokens) on whether they were now for or against the further development and testing of driverless cars.

30. The children voted overall **FOR** the further development and testing of driverless cars, by 93 votes to 58. The percentages were therefore 62% for and 38% against.

31. Pupils saw a number of positive advantages for having driverless cars. They could for example keep on with a journey while the driver fell asleep, or let the driver 'do other stuff while driving'. Being able to make journeys while the driver slept would avoid people driving dangerously while tired. Driverless cars would also be good for people who couldn't drive because of disabilities. They could also perhaps be used to pick people up on their own – it might be possible to call your car to pick you up from somewhere and to take you home, or to send it to collect someone, or to take children to school and back, without the need for a driver to do the journey as well.

32. Pupils in different groups however described driverless cars as likely to make people lazy. As one pupil put it, "wouldn't it be a bit lazy?". Driverless cars might make people "addicted to it" and use them for journeys they would otherwise have walked or not made by car. One pupil asked what was the real purpose of having driverless vehicles, as they cost a lot of money to develop and existing cars do the job of getting you from A to B. Some thought there would be a limited range of driverless cars at first and people may not like the models being sold enough to buy them, especially as they would be expensive. There was the question of whether driverless cars would eventually cost more or less than normal cars now. If they turned out always to be more expensive, many people would not be able to afford them.

33. Some pupils were concerned that they and others would still like to be able to drive vehicles themselves, rather than just have autonomic vehicles to take them from A to B. "I quite enjoy driving things." One pupil pointed out that there will always need to



be some types of specialist vehicles with human drivers – as they put it, “Formula One with autonomic cars would be really boring!”

34. A big question for all groups was whether driverless cars will eventually replace ordinary manually driven cars. Not all were in favour of this happening; “what if you want a regular car but could only get driverless ones?”. But many thought the mix of driven and driverless cars would eventually not work and we would have to have all one or all the other. Some thought there was a more limited role for autonomic vehicles – perhaps for public service and emergency vehicles but not as cars for general public use. Others thought there was more future for autonomic aircraft and boats than for vehicles on crowded roads.
35. There were ideas about other types of autonomous vehicles. If ambulances were made autonomous, the paramedics could all focus on their patients, without one having to drive the vehicle. Some thought riderless motorbikes could be used to get through traffic quickly to bring emergency kit to accidents and emergencies. Some were for, others against, developing riderless motorbikes for emergency use. Some were concerned that they might be liable to skid and cause accidents themselves.
36. Pupils in two groups spoke of the automated farm vehicles already in use, and saw much more scope for development of more uses for autonomous tractors and other farm vehicles.
37. Some pupils told us they had changed their views about autonomous vehicles during their discussions, after hearing other pupils’ views and concerns about them – some becoming much less keen on the idea.
38. There remained well over a third of pupils (38%) who did not want to see more development and testing of driverless vehicles. Most of these did not want there to be driverless cars at all. They were worried about them and about them going wrong, they found them ‘creepy’ and did not like the idea of an empty car possibly pulling out in front of them or approaching them, and they thought cars with drivers were both OK and preferable.
39. Some pupils did not like the idea of ever travelling themselves in a vehicle that had no driver at all, or travelling as children on their own in a car driving them by itself.
40. Others thought that using driverless cars would encourage people to make more car journeys (especially if cars could drop people off or collect them on their own, or drive children or other passengers who couldn’t drive themselves), increasing the number of cars on the road and increasing overall pollution. “Too much technology damaging the environments.”
41. Some spoke of the expense and cost to the Government of developing and testing autonomous vehicles, and would prefer the money to be spent on other things; “it’s not really that important – spend it on something more important”.



42. One pupil summed up worries about autonomic vehicle systems failing, not having a manual driving option, and feeling out of control of a vehicle you were in: “no – technical faults, no steering wheels, no control”.



Should there be a Flagship Test Bed?

43. One of the main questions in the Government consultation was whether or not people supported the idea of having a single national test centre for all autonomous vehicles. This would be one main place for all driverless vehicle testing, which the Government calls a “Flagship Test Bed”. We gave pupils the advantages listed in the Government consultation document for having a single national test centre. We did not go beyond the document to give them any arguments against. Then we invited pupils to give views for or against the proposal, without any adult suggestions or leading one way of the other, before putting it to a pupil vote (again using voting tokens).

44. **The children voted overall AGAINST the Government’s proposal to have a single national “Flagship Test Bed” for autonomous, driverless vehicles, by 89 votes to 57. The percentages were therefore 61% against and 39% for.**

45. Pupils gave their reasons for voting against the Government proposal for a single ‘test bed’. All these reasons came from pupils themselves, without any suggestions from adults. It would be better to have smaller test centres around the country where local researchers and firms could easily reach them; wherever a single ‘test bed’ is built, long travelling distances would be a problem; a single very big centre would be very expensive to build and run; there was a risk that a single test centre would encourage the boring development of one type (or very few types) of autonomous vehicle; even one large centre would probably not have all the test facilities you could possibly need; it would probably be easier to get things tested out if you are working in a small centre; and it would be good to have test places spread out so that everything is not lost if something goes badly wrong at a single big centre.

46. Some saw hacking into central computers as a real risk, and having data about autonomous systems held separately by local centres on their own computers would be safer than holding all the data in one central computer at a single national ‘test bed’.

47. Others thought that it was important to test autonomous vehicles out on lots of different roads and in lots of different conditions, and this would be more likely to happen on smaller and more varied test roads in centres around the country than in one big standard test area. A single test centre to test on all possible roads and conditions would have to be very big indeed.

48. It would be difficult to choose exactly where the best place is for a single national ‘test bed’. A single centre could suffer from traffic problems around it, and might need transport to be laid on to bring people in from distant companies and universities. Smaller more local centres would allow skilled people to stay where they are. There



might be problems bringing vehicles for testing a long way from the places where they were being built. A single 'test bed' making people and vehicles travel long distances would cause more pollution than local centres.

49. One group thought that it was important to make lots of jobs for people to work on developing and testing autonomous vehicles, and you could open such jobs up for more people more easily in local centres.
50. Pupils also thought that having a larger number of smaller test centres would encourage more, and more different, ideas being tried out. There was the danger in a single test centre that its bosses would choose which main ideas should be worked on and smaller ideas, which might get to be tested in smaller centres, would probably get missed out. "A boss may shut down ideas", such as things they thought wouldn't work – but which might well if they got to be tested. Junior people would be less likely to be able to get their ideas worked on and tested in a big centre than a small one. There was also more risk in a single big centre that others could steal your ideas and you wouldn't get recognised for your ideas or efforts.
51. One pupil noted that there are different principles in science, and it might be better to have different test centres each taking a slightly different scientific approach, than just one centre doing things in its one chosen way.
52. Pupils in different groups suggested having both a central main 'test bed', and smaller local ones spread more widely around the country. The smaller ones would be easier to reach, and could act as backups to the main centre if anything went wrong there. Work could be carried out in each smaller centre, with people coming together perhaps each year to share ideas and what people have done and learned. The smaller centres could bring the benefits the pupils had put forward, while the big one would be able to bring the benefits the Government had suggested. One group suggested having a 'test bed' in each of the four UK countries.
53. Many pupils saw test centres as taking on new jobs in the future, after the main testing was done. A 'test bed' might become somewhere not only for developing and testing new vehicles and their systems, but also as somewhere people could go to test driverless vehicles themselves before deciding whether to buy one. The centres would become places to go to choose your vehicle. Local centres spread around the country would be best for this sort of work.
54. One group also saw a test centre as becoming the place you would need to go to get problems with early autonomous vehicles sorted out, and this would be easier if test centres were more local.
55. Another group thought that if there were several test centres, each probably working on similar things, they could start competing with each other. In a single centre, designers would not find competitors beating them to it.
56. One of the Government's reasons for proposing one main "flagship test bed" is that it would encourage the sharing of ideas. Pupils were divided on whether it would be better to have people working in one place sharing all their ideas, or to have people



working in lots of different places, free to develop separate ideas and ways of doing things.

57. Pupils who voted in favour of the Government’s proposal for a single “flagship test bed” gave their reasons for voting that way. There would be more sharing of ideas; it would be possible to have maximum security in one place rather than in lots of smaller places; testing with costly simulators would be easier; it would be easy to change any template that fails; an idea or template could be shared without the risk of it being done wrongly after being shared between different centres; when it came to selling the vehicles it would be easier to have all choices for people to see in a single centre; fewer people and less equipment would be needed by one centre than having to spread things around many, staff and skills could be shared; one big centre would avoid taking up local land in many other places (though it was pointed out that one big centre would take up a lot of land); it would be easier to keep testing conditions the same all the time; one central computer could handle all the data more efficiently; and a single centre would prevent wasted effort through different centres duplicating the same work.
58. One pupil was worried that autonomous technology could prove vital in future wars, and felt that it could be kept safer in one well guarded centre.
59. Many simply said they thought testing would be easier in one place. It would be possible to develop a range of different areas and conditions in the same place, and to have big spaces like hangars to contain a wide range of test facilities together. A bigger centre would mean more tests.



How should the Government inform people about autonomous vehicles?

60. Finally, we asked pupils the consultation document’s question about how the Government could tell people about autonomous vehicles. Pupils saw this question as having two different sides to it; one was generally keeping people up to date with information about the development of autonomous vehicles, but the other was about making sure people could recognise an autonomous vehicle when they came across it on the road. There was general agreement that people should know if a car near them is driverless.
61. Suggested ways of keeping people generally informed about autonomous vehicle news and developments included TV advertisements, radio features, BBC news items, items on popular TV shows, newspapers, door to door leaflets, leaflets and posters in shops, flyers to hand out, cinema adverts, adverts on buses, billboards in streets, and putting information on YouTube and social media.
62. It would be helpful to grab attention for the most important messages by using less usual and hard to ignore methods such as streamers from planes, messages on advertising blimps, and using car demonstrations, autonomous vehicle trials, shows and parades.



63. It would also be helpful to give people the chance to visit and see and find out about autonomous vehicles for themselves.

64. To make sure people knew an autonomous vehicle when they saw one, the vehicles could be required to have a notice or sticker on them identifying them as self-driving or driverless, they could have a sign on the top like a driving instructor's car, or they could have a plate like an "L" plate attached when they were not being driven by a human driver. An alternative would be to have a special and easily recognised number plate for any driverless vehicle. Another possibility would be for driverless vehicles to have a distinctive colour band on them, just as police cars are easily recognised from their coloured bands.

65. When near people, driverless cars could be made to give a verbal warning that they are driverless, like many vans and lorries do when they are reversing. Some thought it might even help to have a dummy driver inside, not to "freak people out" dangerously when one pulled out in front of them! A phone app could be made freely available which would tell anyone who wanted to know that a car near them was driverless.



66. I am grateful to the Heads and staff of each of the schools for letting me carry out these focus discussion groups, especially grateful to the members of staff at each school who worked hard to take notes of the pupils' views, and above all I am grateful to the pupils themselves who gave their thinking, views and ideas for this report.

Dr Roger Morgan OBE

Pupils 2 Parliament

30th July 2016

