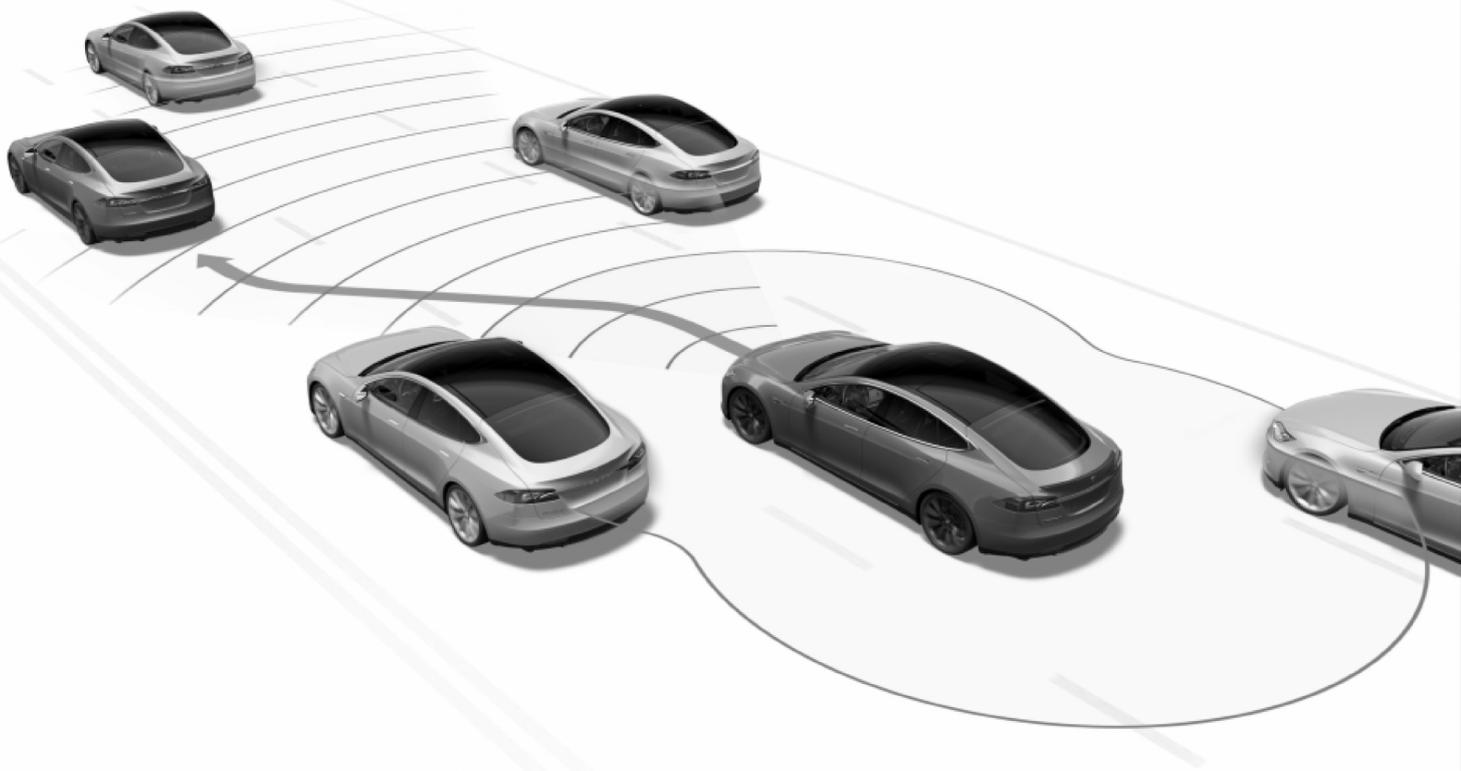


# the driverless revolution

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Achieve more. Together.

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## foreword

At Mills & Reeve, we pride ourselves on identifying future developments that are likely to be relevant to our clients. A few years ago, we realised that the arrival of driverless cars and automated vehicle technology was likely to have profound implications for organisations involved in infrastructure planning and for those involved in the technology, automotive and insurance sectors.

We held our Driverless Revolution event in Manchester on 28 September 2016 because we were conscious that, to date, the discussion in the UK, and the testing of self-driving vehicles, had mainly taken place further south in the country. We wanted to bring the discussion north.

This document summarises that discussion.

## Tesla

Tesla demonstrated their Model S and Model X vehicles at our Driverless Revolution event. Both models include advanced autopilot functionality. The Model S is the fastest production car in the world.



“What we’ve got will blow people’s minds. It blows my mind ... it’ll come sooner than people think”

Elon Musk, Tesla CEO, on fully autonomous driving

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## presentations

### Michael Talbot

Head of Strategy at the Centre for Connected and Autonomous Vehicles (CCAV)



CCAV is a joint policy unit between the Department for Transport and Department for Business, Energy & Industrial Strategy. CCAV provides a single point of contact for industry, academia, and international partners and co-ordinates and enhances government activity in the sector.

The Government is seeking to ensure the United Kingdom is at the forefront of technology for new forms of transport, including autonomous and electric vehicles.

Some of the key benefits that driverless vehicles can offer are:

- Fewer crashes
- More efficient transport networks
- More travel options for those who have few
- High quality jobs for those in the future intelligent mobility sector

“What differentiates the UK programme is that we operate in a more collaborative and transparent fashion than almost any other country”

### A welcoming regulatory environment

CCAV has published its Pathway to Driverless Cars, including proposals to support advanced driver assistance systems and automated vehicle technologies and a **Code of Practice** for testing. This open regulatory approach is one reason why Volvo chose the UK for its DRIVE ME programme.

“There is widespread support for additional investment in the UK testing environment if we are to be world class”

### Research projects

There is currently around **£250 million** of investment going in to Research & Development for demonstration projects taking place here in the UK on CAV technologies over the next few years. Around half of this is coming from Government.

### Projects

INSIGHT	UK CITE	VENTURER	TASSC
A2-M2 CONNECTED CORRIDOR	TOOLS FOR AUTONOMOUS LOGISTICS OPERATIONS	PATHWAY TO AUTONOMOUS COMMERCIAL VEHICLES	UK AUTODRIVE
i-MOTORS	MOVE_UK	FLOURISH	INTACT

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## Matthias Seidl

Senior Researcher at TRL

TRL (the UK's Transport Research Laboratory) is the global centre for innovation in transport and mobility. It provides world-leading research, technology and software solutions for surface transport modes and related markets of automotive, motorsport, insurance and energy.



### Safety

What does safety mean when we talk about autonomous vehicles? The current situation is that there are **1,700** fatalities on our roads every year and **22,000** seriously injured casualties – these can be life changing events.

Autonomous vehicles will not be distracted or fatigued. They will not speed. They will not drink or drive. They will be able to judge risk in a more objective way than humans. They will be able to react much quicker to their surroundings. There will be no blind spots around the vehicle when they have 360° sensing.

However, a simple error in the software could lead to a large number of collisions a very short space of time. We need to make sure these vehicles are safe before we deploy them on the road.

### Projects

**MOVE\_UK** is one project trying to develop a really clever method of validating the safety of these systems in a real world environment on the road but without putting anybody at risk. Five Land Rover Discovery vehicles will be driven on the roads of Greenwich by Borough Council employees. Sophisticated cameras and sensors will be installed in the vehicles and autonomous safety systems will run in the background in silent mode whilst they are being driven. Data will be transmitted continuously to TRL servers to allow TRL to compare what the human driver did in a certain situation with what the virtual autonomous safety system would have done. Through data analysis, the manufacturers will be able to fine tune their system parameters to enable them to react the way they want them to.



**GATEway** is a project focusing on societal impact. Members of the public will use shuttles as part of normal daily life and TRL will observe them and study reaction to the system. The observational studies will be supplemented by interviews with people using the shuttle and general public questionnaires to assess:



- Do people accept them?
- How do passers-by react?

During the second phase of the project, TRL will look into how systems can increase accessibility to transport for impaired users. In a third trial, automated deliveries will be tested where the GATEway vehicles will deliver goods from a local depot to a residential neighbourhood.

**How does it work?** A 3D scan has been made of the environment in which the GATEway shuttle pod will move. The shuttle has stereo visual cameras and LIDAR scanners on board that can permanently compare the pre-scanned environment with what it sees at the moment and that allows the shuttle to safely discern between the station environment and any other traffic participants that can move and need to be avoided as it is driving along.

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## Stephen Hamilton

Partner at Mills & Reeve

We can assume the technology will get there and we can assume it will be good enough with all the money being ploughed in by Google, Apple and others. The legal roadblock comes back to the driver.



### International law

1949 Geneva Convention on Road Traffic and 1968 Vienna Convention on Road Traffic broadly state: “Every vehicle...shall have a driver” and “Drivers shall **at all times** be able to control their vehicles”.

If you hand control to the vehicle, the driver ceases to be in control **at all times**. Consequently, there is a legal impediment to the introduction of highly autonomous vehicles and fully autonomous vehicles.

People are beginning to look at proposed amendments to the Vienna Convention. The most recent proposed amendments come from the Swedish and Belgian governments. Their suggestion is to redefine the driver to mean: (i) any person or a vehicle system (ii) which has the full control over the vehicle and (iii) is in conformity with international legal instruments. But we don't have those international standards yet.

### The meaning of control

Looking at control, on the one side you've got navigational control. On the other you've got critical event control that kicks in when something goes wrong – at that point getting from A to B becomes somewhat secondary, so critical event control overrides navigational control.

If we're going to get to a driverless future we've got to accept that it is the system in control and the system has the right to take action in those emergency scenarios.

“The roadblock is much more about public perception and public tolerance, but how would our lives change if we had on demand access to transport that could take us any time, any place, anywhere, for less than the current cost of running a car?”

### The General Principle Proposed

The system should only steer around an obstruction if:

- (a) the vehicle can rejoin its primary path or continue its journey in accordance with road traffic laws and regulations without impacting another obstruction; or
- (b) the vehicle can come to a stop off the carriageway without impacting another obstruction.

If the vehicle cannot achieve (a) or (b), the vehicle should activate emergency braking to minimise the impact on the obstruction.

So how good does the system have to be? Better than we expect of drivers? That's not actually a high barrier... Over 90 per cent of all road traffic accidents are down to human error. That's a lot of mistakes. But if we require perfection, then we're actually going to lose some of the benefits.

### Changes to the way we live

Instead of driving, people can do something else in the vehicle: Sleep. Work. Play. Shop. Entertainment.

Cars become transport: Designed for use. Demand driven. Access to all.

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## highlights from the Q&A session

**Right now, we have cars on our roads with ADAS technologies that can be misused for hands-free driving. This creates new risks, which could lead to catastrophic consequences. Does the Government have any specific plans for dealing with these new risks?**

**Michael Talbot:** These technologies are there to provide you with advice but you are still in charge of your vehicle and if you fail to take charge of your vehicle then there are already a fair amount of things that could happen to you in terms of liability and charges for not being properly in control. Where possible we should seek to use existing regulations to support the development and demonstration of the technologies.



PHOTO: left to right: Michael Talbot, Matthias Seidl and Stephen Hamilton

**What impact will autonomous vehicles have on professional drivers?**

**Michael Talbot:** CCAV is very mindful of this issue. As you go back through the history of technology innovation and adoption there is a period of time when the transition from one set of skills to another can cause some problems and this is something the Government will be looking at extremely carefully and sensitively. This is not a problem we see happening in the near future so we have some time to prepare.

We have been here before with different kinds of technologies...for example, automatic lifts. The technology was there for a long time before it was adopted. People were terrified to get into a lift that didn't have an operator. But then there was a strike in 1945 in New York...and that was that.

**Will driverless cars be required to be easily identifiable in some standardised way by other motorists and what precautions may other road users need to take when interacting with a driverless car?**



**Matthias Seidl:** TRL has been conducting research on HGV platooning and the impact on vehicles in the adjacent lane because platooning HGVs drive at a very close distance, as they are supposed to. And the research question was would they need some indicator to the adjacent traffic that they are in autonomous mode, because otherwise the adjacent traffic may also be inclined to reduce their distance and actually drive more unsafely. So TRL has done driving simulator studies on that which suggested, yes, it would be good to have that indication but it's not as crucial as originally anticipated at the outset.

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Where we think further ahead to autonomous vehicles where the driver might just be a passenger in the car and might not for example face the road scene, and might not be able to make eye contact with pedestrians or cyclists, we will need some form of the vehicle communicating with other road users to indicate to them it is safe to cross the road because the vehicle has recognised and detected them. Eye contact between traffic participators is more important than many people realise and we will have to find ways of replacing that in autonomous vehicles. One car manufacturer has produced a concept vehicle which had a set of LEDs at the front, meaning it could project a pedestrian crossing on the road with lasers. So car companies are thinking about this.

## How are we developing smart roads in tandem with smart cars and is our road infrastructure ready for self-driving vehicles?

**Matthias Seidl:** We need a way of permanently connecting vehicles to the Internet that can either be near field Wi-Fi type connections or by the next generation of the mobile network standard (5G hopefully), so this is an anticipated upgrade to our roads that might happen in the future.

Other aspects of infrastructure that are often talked about are: How are autonomous vehicles going to detect lane markings? Do the road signs need to be in a specific state? Do the road signs need to communicate to the car the speed limit and so on?

The CAR 2 CAR consortium of vehicle manufacturers and some regulatory bodies is aiming to standardise vehicle to vehicle communication and near field protocols.

**Michael Talbot:** Conventional vehicles will be around for a long time so whatever we come up with, we're going to need to have both running alongside each other for a long time.



“the speaker line-up was excellent and the topics really helped to demystify what can seem a very complex landscape”

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In the joint paper issued earlier this month by the Association of British Insurers (ABI) and Thatcham Research, it was recommended that drivers should continue to buy a single motor insurance policy to cover both manual and automated driving. It was also recommended that 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. What processes need to be put into place, and what international hurdles need to be overcome, in order to facilitate this new legal right of recovery? And what are the manufacturers' views on this?

**Michael Talbot:** This is what we're talking about right now with the legislative consultation that has just closed. The proposal is a two speed system with quick settlement of the claim up front with the individual and then the slower more telematics driven discussion between the insurer and the various players in the connected autonomous vehicle space, including the manufacturer, but there may be others involved. It's going to be a complex system and that's one of the things we're hoping to unpick by starting this now as early as we can.

**Stephen Hamilton:** The driver for change is to make sure it's as simple as possible for insurance purchasers and avoid any scenario where the injured third party is having to make choices about who they pursue.

The burning question is around adoption rates that will ultimately drive the pace of change – what's the panel's prediction on this and what percentage penetration do they expect to see?

**Michael Talbot:** In Government we don't know because the uncertainties are so great. It will take decades to turn the whole thing over. But there are ways we can do that – we can look at Government procurement. Motability is one of the largest fleets in Europe so there's an opportunity there to support people who require Motability more easily using these technologies and also there's the fleet and rental sector. A lot of people will probably experience these technologies through that route.



**Stephen Hamilton:** We sometimes show a picture of Piccadilly Circus in 1894 full of horse drawn carriages and then another in 1912 when there isn't a horse in sight. That transformation happened in the space of 18 years when there was no way that supply chains, or the world, were as connected as they are now. So if that happened in 18 years, then I'll leave you to draw your own conclusions about how quickly it might happen now.

**Matthias Seidl:** There are lots of uncertainties but it is going to be an attractive technology so I expect it to have a high uptake rate.

“The problem isn't technology, it's legislation, and the whole question of responsibility that goes with these cars moving around ... and especially who is responsible once there is no longer anyone inside”

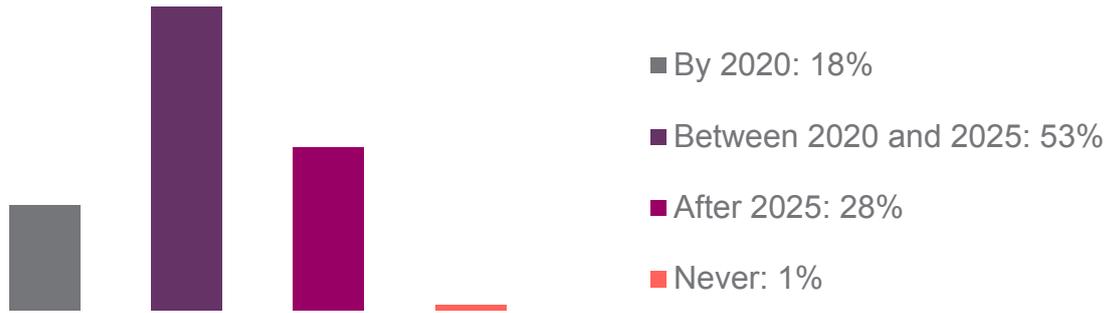
Carlos Ghosn, Renault-Nissan CEO

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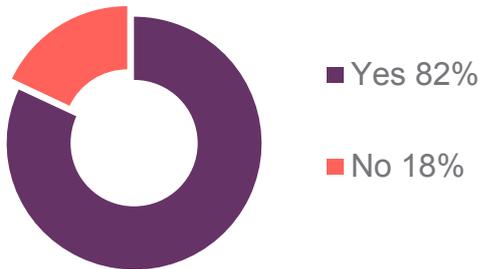
## survey results

After hearing these presentations we put the following questions to our audience and here's what they thought:

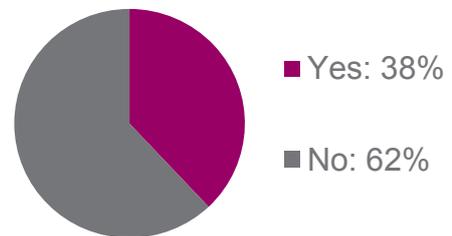
### When will we see the first vehicle operating in fully autonomous mode on a UK public road?



### Would you be happy being a passenger in a self driving car?



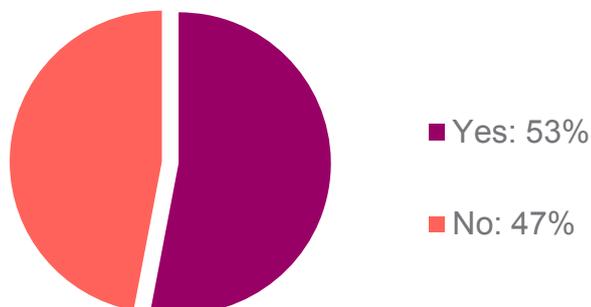
### Will it ever be illegal to drive yourself on a UK public road?



### Which of the following will emerge as the first autonomous vehicle market leader?



### In 20 years' time, will people generally still own their own car?



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## organisations represented

AHR Architects Ltd	Electricity North West Limited	Rapleys LLP
AIG Europe Limited	Ernst & Young LLP	Renault UK Ltd
Allianz Cornhill Insurance plc	Express Language Solutions	Rentalcars.com
Aon Limited	Finch	Rider Hunt Construction Consultants
Aon Private Clients	GBB (UK) Ltd	RML Group
Aon Risk Solutions	Halfords Autocentres	SBD Automotive
Arthur J Gallagher (UK) Limited	High Performance Consultancy	Squire Patton Boggs (UK) LLP
Assystem UK Ltd	Hiscox UK	St. James's Place Wealth Management Group
Atomicom	IDIADA	Telefónica O2 UK Limited
Auto Trader PLC	JMP Consultants Limited	Transport for Greater Manchester
BAMM Hub Limited	John Broadbent Consulting	Travelers Insurance Company Limited
BASF plc	Kirkland Developments Limited	University of Manchester
Bilfinger GVA	Manchester Airports Group Plc	Validus-IVC Limited
Buro Happold Engineering	Manchester Metropolitan University	Waterman Infrastructure & Environment
Buro Happold Limited	Marketing Birmingham	Witherslack Group Ltd
Carplus Bikeplus	Marks & Clerk	YP Potential
CH2M	Mouchel Limited	
Conigital	NBSO	
Cranfield University	North Edge Capital LLP	
Dept International Trade	OMC Motor Group Limited	
Eastwood & Partners Ltd	Pro-Manchester Limited	

*“the content was most thought provoking...it is rare to come home from a work seminar and have a chat about it with my wife”*

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## afterword

I was delighted to chair the discussion about the Driverless Revolution and help organisations share ideas about how to maximise the potential of this exciting new technology.

One of the key messages from the event was collaboration will fast-track development. There are already several significant projects underway, involving collaboration between transport authorities, universities, software developers, OEMs and others – we heard about some of these at our event.

But since our event, we have discussed new collaborations, including some that focus on CAV solutions for Greater Manchester. CCAV has also secured £100m (match funded up to £200m) to integrate and strengthen the national testing offer. It really does feel like the UK is embracing the opportunities presented by this new technology!

What was clear from the discussion was that CAV technology will be transformative. And the majority of attendees at our event thought we will see the first vehicles operating in fully autonomous mode on UK public roads within the next ten years.

There are a whole host of implications arising from this in areas such as real estate and planning, construction, employment, commercial arrangements and insurance. At Mills & Reeve, we have the experts in these areas looking to the future and ready to help our clients realise the early benefits of the Driverless Revolution.

We're excited about the future. Are you?

Paul Knight

Commercial, IP & IT lawyer



to discuss the Driverless Revolution further please contact:



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