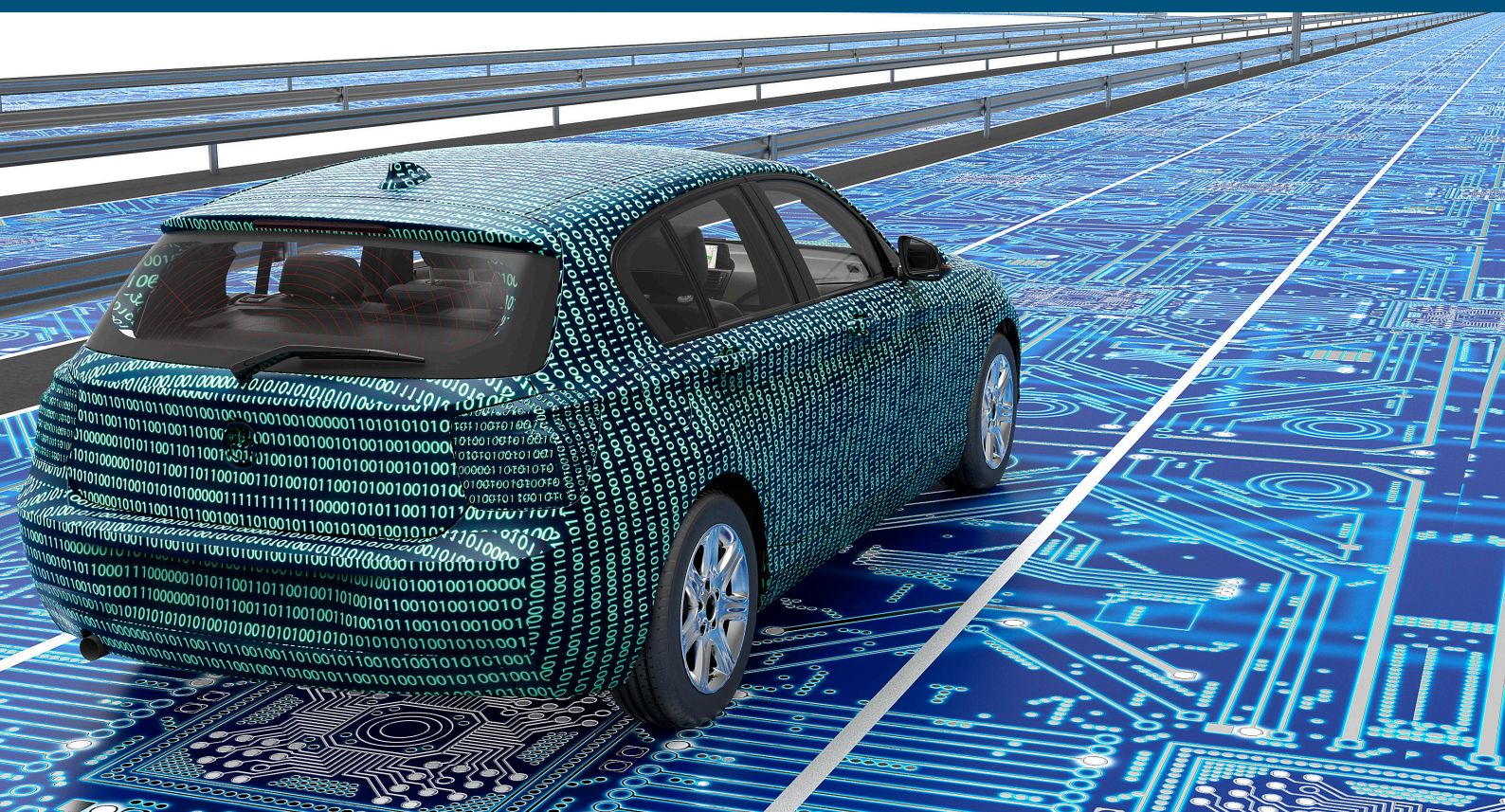




HERBERT
SMITH
FREEHILLS

CONNECTED AND AUTONOMOUS VEHICLES

NAVIGATING THE FUTURE
CONFERENCE REPORT
NOVEMBER 2017



Introduction

Connected and autonomous vehicles are fast becoming a reality. It no longer seems to be a question of 'if' but 'when'.

The potential impact of this technology is vast and it is being hailed by many as the fourth industrial revolution. While the automotive sector stands to be radically altered, it is not alone. The possible applications of this technology straddle a variety of different sectors including aerial, marine, public roads, private and public transport, space, military, agricultural, mining and many more.

There is little doubt that this technology will have far reaching social and economic effects. Connected and autonomous vehicles will change not only the way people travel, but also the way that we think about mobility.

Disruption on such a broad scale undoubtedly presents a wide range of business opportunities. However, the rate at which this technology is developing, combined with the evolving global regulatory landscape, poses a number of novel and challenging issues. These include:

- How can regulators remove barriers to the development and testing of this technology whilst simultaneously establishing clear minimum standards?
- Is local/regional regulation feasible?
- How should liability be apportioned in the event of an accident?

- Who will own the data provided by connected and autonomous vehicles and how can that data be monetised?
- What role will data protection legislation play?
- How will the General Data Protection Regulation (GDPR) impact the evolution of this technology when it takes effect from May 2018?
- How can manufacturers guard against cyber risk?
- What changes are required to physical infrastructure to realise the full potential of connected and autonomous vehicles?

On 18 July 2017, Herbert Smith Freehills hosted a series of panel discussions with guest speakers with a range of expertise. This report relays some of the key questions, challenges and potential solutions that were discussed and that are expected to arise as the motor and technology industries converge in the quest to introduce connected and autonomous vehicles.



Watch the Connected and Autonomous Vehicles conference highlights video:

<https://www.herbertsmithfreehills.com/latest-thinking/connected-and-autonomous-vehicles-conference>

Contents

02 Panel 1: Overview

06 Panel 2: The global regulatory landscape

10 Panel 3: Product liability and insurance

14 Panel 4: Big data, cyber security and IP

18 Panel 5: Infrastructure and smart cities

21 Conclusion

23 How we can help

24 Contacts

Panel 1: Overview

There has already been substantial development and increased use of connectivity and automation in the cars we drive today. Most car manufacturers already offer emergency braking or parking assistance to those willing to pay a relatively small premium for safer and more convenient driving.

Change has been incremental over the past decade but when will we see the big sea change and who will lead the way? Will it be the traditional car manufacturers? The tech companies? The network operators? Or will the real change come about through a collaboration of all of these industries coupled with incentives and investment offered by government?



Chair: Philip Pfeffer

Partner, Herbert Smith Freehills

Peter Campbell

Motor Industry Correspondent,
Financial Times

David Coulling

Partner, Herbert Smith Freehills

David Davies

Executive Director, Parliamentary
Advisory Council for Transport Safety

Stephen Gibson

Director, SLG Economics

Q: What is the current public perception of autonomous vehicles and what role will that play in the development of the market?

Peter Campbell: At the moment, I think when people get into the cars they quite like them. I tested a Tesla Model S last year and when I switched on the autopilot features I was amazed by how quickly I trusted it even though I knew the limitations of the system... But if there is a big crash involving what the public consider to be a "driverless" car the mood will turn very quickly against this technology. Robots will be held to a much, much higher standard than humans.

Q: Is there a concern that safety will be compromised in the pursuit of commercial opportunities?

David Davies: I wouldn't make that accusation at this stage. I think you have to take some risks in order to learn. If every trial is ultra-safe then we will never learn but a careful balancing act must be achieved.

In the short term I feel that we need to stop focusing solely on the technicalities of these trials in isolation and think about what we actually want from the vehicles. There is more scope for consultation and public discussion. The industry is already talking about safety but there are other benefits: the reduced need for parking; a different approach to the use of urban space; and the ability to target specific social and environmental problems.

Q: How do we quantify the value of the benefits associated with the autonomous vehicle market and which industries do you think will reap them?

Stephen Gibson: I spent half an hour looking and I got a dozen different estimates of the value [of the autonomous vehicle market]...but the one thing that everyone agrees on is it is going to be large and it is going to be transformational. Who is going to gain the benefit of that? Is it going to be the Uber fleet managers, the car manufacturers or the software manufacturers? That is very much still up for grabs.

Peter Campbell: A lot of people expect the value not to be in the car and the hardware, which is almost certainly going to be commoditised, but in the network operation and the data management.

Q: What will the connected and autonomous vehicles market look like in the future - is this the end of the traditional car manufacturer?

Stephen Gibson: It is difficult to say what exactly the connected and autonomous vehicles market will look like in the future. If we think about the music industry, for example, it used to be run by traditional music distribution companies; now it is run by technology companies. There was a clear shift as the technologies surrounding the industry developed. The question for the connected and autonomous vehicles market is whether it will be led by the traditional car manufacturers or by the technological leaders. I think this will be decided by the direction in which the technology develops.

David Coulling: It looks like it is going to be an evolution for car manufacturers rather than an outright disruption which sees the incumbent manufacturers displaced by new market entrants. The big technology companies that were looking to create the platforms and the hardware seem to have thought better of building cars, perhaps because of the heavy regulation in that market. Instead, they are focussing on the technology platform and associated in-car software, so we are seeing the car manufacturers partnering up with someone for the in-car software layer. My feeling is that the nature of the auto industry and the technical and regulatory challenges of building cars, coupled with the money at stake and the strength of automobile manufacturers' balance sheets and cash flow, will mean that the incumbent car manufacturers will retain their central role, certainly in the next decade and the four decade horizon.

"Uber carried out a survey quite recently of a few thousand Londoners and 43% of Londoners now think that using an app based booking service is a genuine alternative to owning a car. If they are already thinking that now then, undoubtedly, by the time we get to the next generation, who aren't going to be learning to drive in urban areas, in my view this is going to become part and parcel of everyday life"

HELEN HAYES, UBER

Panel 1: Overview

Q: How will road space be shared between different levels of autonomous vehicles and how will we accommodate those that like to physically drive?

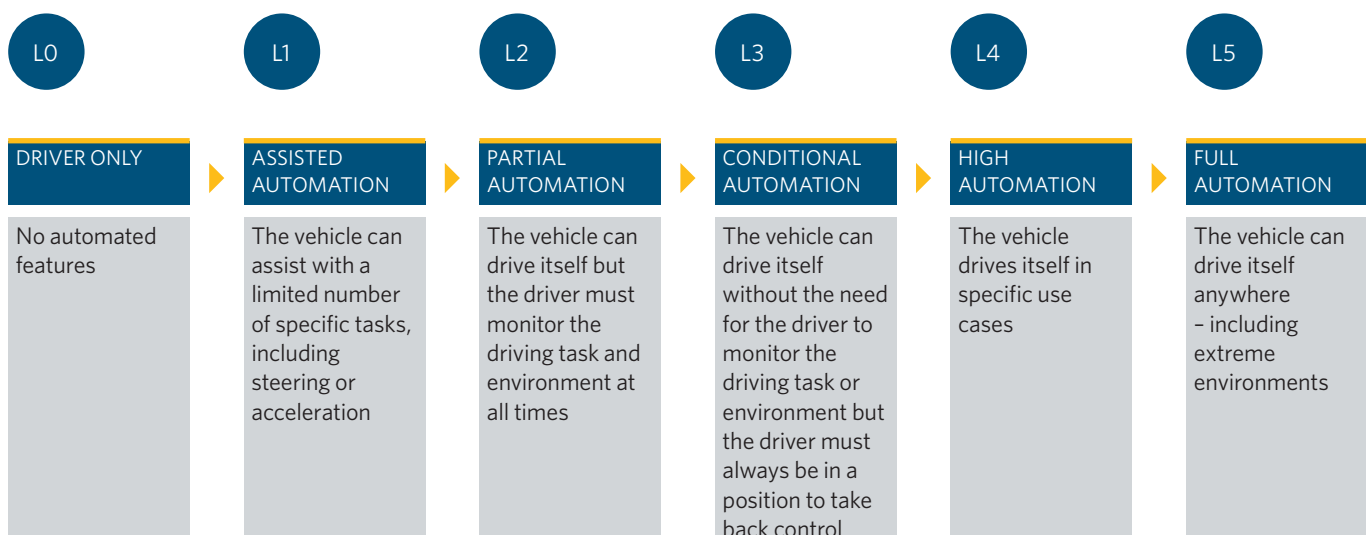
Peter Campbell: I think people are gradually being weaned off the thrill of driving. If you look at falling car ownership among young people who live in cities, there isn't the societal, emotional attachment to cars that there was maybe 20 years ago. Given that we are talking about a timeframe for fully autonomous cars that is in the decades, it is possible that by the time today's kids are grown up they won't feel the need to buy a car or to physically control it. The market has a great way of finding gaps and plugging them so you could see a huge rise in track days and other driving experiences.

Philip Pfeffer: My hypothesis is a little bit blunter. I think it is going to come down to economics. If it is proven that the technology is safer it is going to be prohibitively expensive for the average person to get the added insurance that will be required to be able to drive... At some point they are going to have to regulate traditional cars off the road because the technology will no longer be sufficient to deal with communication between the infrastructure and between the cars. I assume there will be a licensing regime whereby if you do not meet that standard you are simply not going to be able to be on the road.

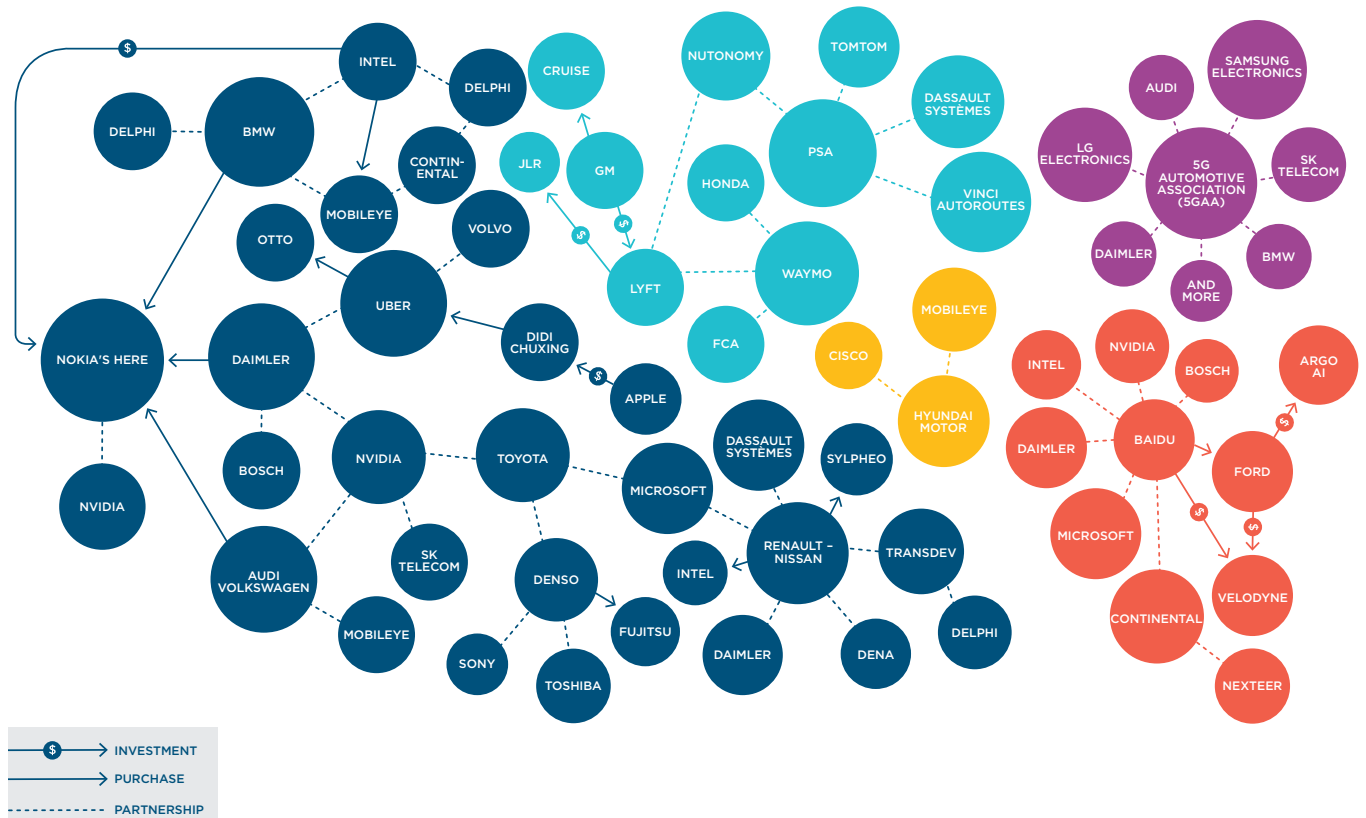
Q: How will the growth of the autonomous vehicle market change car ownership?

Peter Campbell: The advent of driverless cars is going to be absolutely colossal for the car industry. A lot of people think fully driverless cars would fundamentally change car ownership. Right now your car sits in the drive for 90% of the time, so why would you buy a driverless car? Why wouldn't it automatically feed into an Uber system where you beckon a car when you need one?

Levels of automation



Cross-industry collaboration



The image above sets out some of the cross-industry collaboration that has already taken place in the development of connected and autonomous vehicle technology. The growing - and varied - list of partnerships, investments, and acquisitions underscores the assumption that no one company has the knowledge, the technology or ability to overcome the many challenges that stand in the way of the successful development of this technology.

Panel 2: The global regulatory landscape

The development of connected and autonomous vehicle technology is progressing at a speed which law makers are struggling to match. Regulators are under pressure to create a framework that removes barriers to the development, testing and adoption of connected and autonomous vehicles but which sets out clear standards to which manufacturers should adhere. Whilst safety is a priority, regulators need to find a way to enforce safety standards without stifling innovation. It is envisaged that the first mover advantage gained by those countries quick to put in place clear and robust regulations with regard to the testing of autonomous vehicles will reap huge benefits in terms of investment.



Chair: Philip Pfeffer
Partner, Herbert Smith Freehills

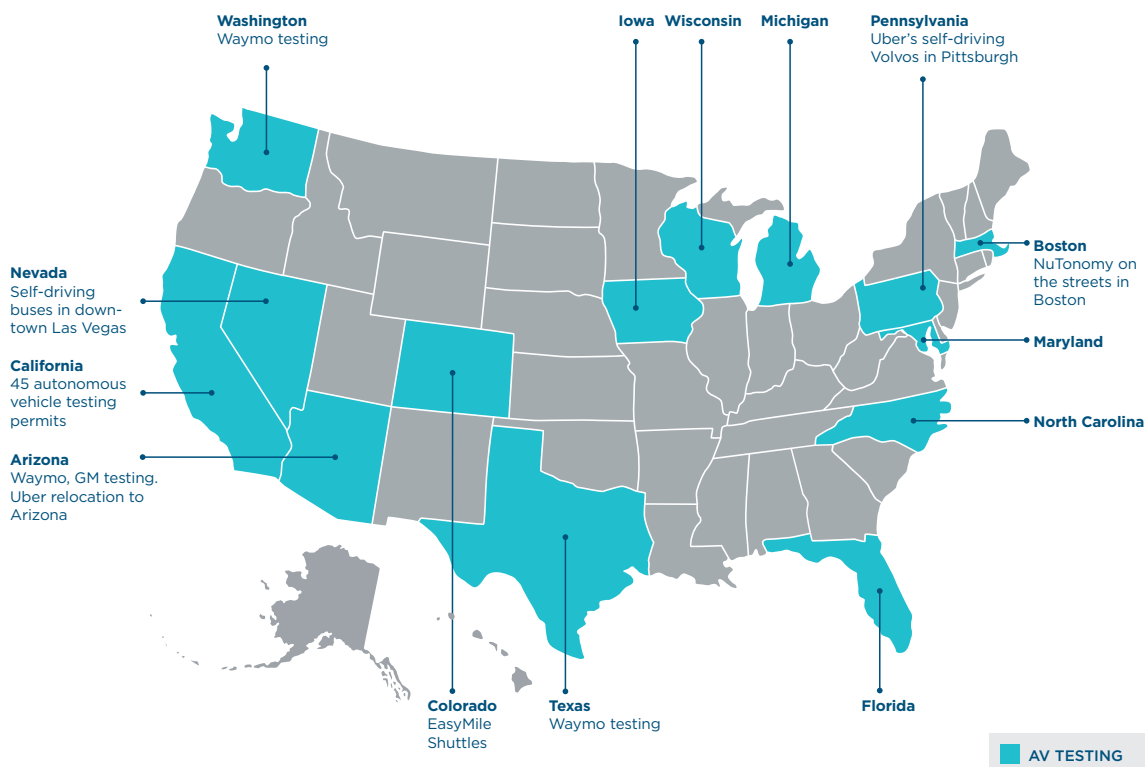
Joseph Falcone
Partner, Herbert Smith Freehills

Helen Hayes
Legal Director UK & Ireland, Uber

Lode Van Den Hende
Partner, Herbert Smith Freehills

Panel 2: The global regulatory landscape

Selected US AV testing



UPDATE

On 6 September 2017, the US House of Representatives passed legislation that would pave the way for nationwide testing and deployment of highly autonomous vehicles ("HAV"). The "Safely Ensuring Lives Future Deployment and Research in Vehicle Evolution Act" or the "SELF Drive Act" would establish the federal government's primary role in regulating HAV design, construction and performance, and replace the current patchwork regulating at state level with a uniform system of HAV rules.

On 4 October 2017, the Senate Committee on Commerce, Science and Transportation voted to advance the American Vision for Safer Transportation Through Advancement of Revolutionary Technologies ("AV START") Act. The bill covers areas including cyber security, traffic safety and consumer education. It is expected that this bill will be merged with the SELF Drive Act. The Senate and the House of Representatives will now work together to finalise the bill.

Focus on Europe

Lode Van Den Hende: In the EU, several Member States already allow for or have announced the adoption of regulations to legalise the testing of automated vehicles. As with their US counterparts, Member States want to be seen to be open for business by companies investing in this area. Testing regulation is currently localised but a degree of neighbourly co-operation is vital to allow cross border testing if Member States are going to attract major companies to commit to testing vehicles on their territory.

Regulation of the end product, however, is likely to require action at EU level. In addition to legal implications, there are a number of practical reasons for this being the case. It is unlikely that manufacturers would be willing to adapt the specifications of their automated cars for individual Member States. It will simply be too expensive. It is also likely that some smaller Member States have neither the capability nor the desire to create their own regulation. Finally, and perhaps most importantly, there is an obvious need for motorised vehicles in continental Europe to cross national borders. If this is to happen without difficulty, regulatory harmonisation is needed.

Europe has already taken steps to create a combined and overarching approach to the regulation of autonomous vehicles. The Amsterdam Declaration, signed in April 2016 by all Member States, including the UK, encourages the European Commission to take the lead on automated driving and to develop a uniform policy. The EU already operates within a broader context of international harmonisation covering both the way in which vehicles can be used (such as the 1968 Vienna Convention on Road Traffic and the 1958 UN Agreement on Uniform Technical Prescriptions for Wheeled Vehicles). The Conventions were designed to facilitate the use of cars on an international basis and to increase road safety by establishing standard traffic rules and have recently been amended to accommodate a level of autonomous driving. The EU stated that their preferred route to regulation for autonomous vehicles is to use these conventions to deploy new regulations and rules that will govern different technologies in the EU but also in other jurisdictions.

Q: How can governments attract businesses to invest in testing programmes in their country?

Helen Hayes: An interesting concept is that of monetising testing. The testing process is hugely expensive so the ability of businesses to be able to create some revenue from testing and to try to build some consumer confidence in the product at this stage is attractive.

Q: In your view, is local regulation an option or must regulation be on a grander scale?

Helen Hayes: The idea of local regulation applicable to the manufacturer, the operator, the driver and the vehicle is untenable. The regulation of autonomous vehicles needs to be federal to reduce the burden, not only on businesses, but on local licensing authorities who are unlikely to have the requisite capabilities to be looking at vehicle testing and deciding whether a particular prototype is fit for the road or not.

"There is a huge question about how regulation is going to be fit for purpose going forward and the speed at which regulation is going to be able to adapt and evolve"

HELEN HAYES, UBER

Panel 3: Product liability and insurance

Although there are high hopes that autonomous vehicles will significantly improve road safety and, ultimately, save lives, there have already been examples of fatalities and it seems inevitable that there will be further accidents as the technology develops. On what basis will product liability claims be brought in this context? Who will be liable? And what role will the insurance market play? It is estimated that the personal insurance market could shrink to 40% of its current size within 25 years.¹ How will the insurance sector adapt to this challenge?



Chair: James Allsop
Senior Associate, Herbert Smith Freehills

Professor Gary Burnett
Professor of Transport Human Factors,
Faculty of Engineering at the University
of Nottingham

Anthony Dempster
Partner, Herbert Smith Freehills

Iwan Parry
Head of Insurance, Transport
Research Laboratory

Philip Pfeffer
Partner, Herbert Smith Freehills

Q: Connected and autonomous vehicle technology is obviously novel, but does this mean that companies involved in the development of this technology will face novel claims when things go wrong?

Philip Pfeffer: Yes and no. Yes in the sense that we have not seen product liability claims in relation to autonomous vehicles because they haven't happened yet. No in the sense that these claims will likely fall within the three well-trodden product liability categories: manufacturing defect, design defect and failure to warn. A manufacturing defect occurs when something goes wrong in the manufacturing process but the design was fine. A design defect is where there is an alternative feasible design that is commercially acceptable and that, had it been deployed, would have avoided the injury. A failure to warn claim is effectively that you didn't give the consumer adequate information to apprise them of the risk or alternatively you gave them adequate information but then said something else which neutralised the warning. For example, the German Department for Transport has raised concerns around the use of the term "Autopilot" on the basis that it is misleading to consumers.

Q: Industry is already split over the viability of Level 3 automation. In light of this and the speed at which this technology is developing, how can manufacturers be certain that they are using reasonable care to make their products as safe as reasonably practical for their intended purpose?

Philip Pfeffer: There are two points here. The first is duty of care. I think there is no easy answer. The technology is moving at an exceedingly fast pace so what is today's state of the art will no longer be tomorrow's. A practical tip for anyone involved in the development of these cars is to ensure that everything is well documented from a research and development perspective. The second point is that the classic defence to a product liability design defect claim is that the manufacturer was using the state of the art technology that was available at the time of manufacturing. What happens to this defence if you are in a scenario where the industry is literally split in two with one half of the industry saying we can make Level 3 autonomous vehicles work and the other half of the industry saying

we are not going there? It concerns me and it should concern others who are going to have to defend those claims.

Q: Do you think the risks around Level 3 automation are too great?

Iwan Parry: The question about Level 3 is really about handover... A lot of research has been done that demonstrates to us very clearly how bad people are at being disconnected and reconnecting into something like a driving task... I think that many companies will take the decision to go straight to Level 4 and I think there are very good reasons for that... One concern is that some OEMs might move straight to Level 4 when others see Level 3 as a commercial opportunity to get into the market early rather than through sustainable long-term investment.

Q: How are manufacturers seeking to address the difficulties with handover between car and driver?

Philip Pfeffer: Every car manufacturer that I talk to in their development of Level 3 vehicles is building in some form of driver status monitoring. They are essentially taking a view that it is not necessarily a good idea to have the driver as the last line of defence and that there needs to be a mechanism for the system to deal with the human not paying attention or not being able to take control for whatever reason.

Professor Gary Burnett: Decades of human factors research has shown that people will very quickly become complacent with technology. The relationship between objective reliability and subjective trust is an "s-curve": what tends to happen is that where there are low levels of reliability, there is a low level of trust, but when you reach a certain point, around 60% or 70% reliability, trust suddenly jumps up. When you get to say 70-80% reliability, in consumers' minds the technology is 100% trustworthy. We saw this with the introduction of satnav from 2005 onwards, when many crashes were occurring due to people blindly following their satnavs. Driver status monitoring is key to dealing with this complacency.

1 KPMG actuarial analysis in 2014 - <https://assets.kpmg.com/content/dam/kpmg/pdf/2016/06/id-market-place-of-change-automobile-insurance-in-the-era-of-autonomous-vehicles.pdf>

Panel 3: Product liability and insurance

Q: Testing is obviously critical to demonstrating the viability of autonomous vehicles. How much testing will take place in a real world environment?

Iwan Parry: The Department for Transport held consultations last year around the potential for testing environments to be established in the UK to assist the industry and support innovation within connected and autonomous vehicles. In the autumn statement, £100 million was made available for test environments and we are currently responding to an initial call which is releasing £55 million to support the development of test beds in the UK...One of the criteria for the requirement from the government was that real world test environments are created as well as off road track type environments. The reason why the real world test environment is so important is that our automated vehicles of the future are going to need to respond to a very wide range of different types of scenarios and conditions in the most complex environments. We have to start creating ways in which we can start testing the technology, verifying the technology, potentially certifying the technology or at least giving the regulators the evidence to create the right kind of regulatory environment.

Q: If this technology is expected to reduce road collisions, what impact can we expect on the insurance sector?

Anthony Dempster: I think there is a recognition that with the advance of technology we are likely to see a reduction in accidents and a resulting fall in insurance premiums, which is a good thing. I think we are going to see the insurance industry moving from underwriting based upon the age and driving history of the driver, towards insurance of the product liability risk. The underwriting is likely to focus upon the technology risk of the different vehicles. The insurance industry sees opportunities here. It is very keen, certainly in the UK, to be at the forefront of the development of new products to cater for automated vehicles.

The Automated and Electric Vehicles Bill (formerly the Vehicle Technology and Aviation Bill) proposes to introduce a new insurance framework for high level automated vehicles – Level 4 and Level 5 – which provides that, subject to certain exceptions, the insured party will have a direct claim against the insurer when an accident is caused by an automated vehicle when driving itself. The insurer will be given a statutory right to bring a claim against the person responsible for the accident whether that is the motor manufacturer or the software producer.

Typical categories of product liability claims

MANUFACTURING DEFECT

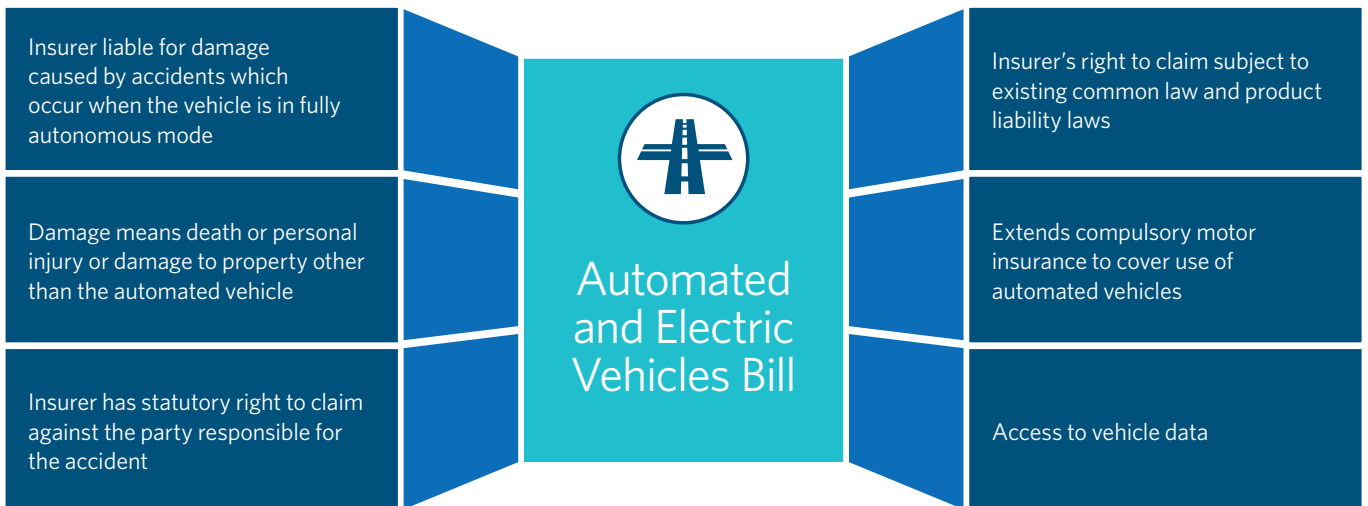
- Arises where product diverges from manufacturer's intended design
- EXAMPLE: Braking system fails in a particular vehicle due to production or installation error

DESIGN DEFECT

- Arises where the entire product line has a design flaw that causes injury
- EXAMPLE: Airbags do not deploy correctly, despite having been produced to specification

INADEQUATE WARNINGS OR INSTRUCTIONS

- Failure to warn of product's risks / failure to provide adequate instructions for product use
- EXAMPLE: Failure to note rollover risk in ATV or failure to provide adequate warnings/instructions for vehicle maintenance



At the moment there is a lacuna surrounding Level 3 automated vehicles. For example, if a vehicle is operating with active cruise control and something goes wrong with the system, the driver might not have the opportunity to react before there is an accident. The injured third party in that accident would ordinarily have an action in negligence against the driver. However the driver might well say I wasn't negligent because the cruise control failed and I didn't have the opportunity to react. The law of negligence therefore may not help the injured third party who may be left having to pursue an action against the manufacturer.

Q: Does it surprise you that the insurance industry in the UK is generally supportive of having primary liability?

Anthony Dempster: The insurance industry was generally very positive about accepting primary liability for accidents caused by automated vehicles but as part of the legislation the insurer will be given a statutory right to bring a claim against the person responsible for the accident. The difficulty with that is that the insurer still has to prove its case against the vehicle manufacturer and it will have to prove its case based upon existing common law and product liability laws. There was some push, particularly from some of the insurers, for a reverse burden of proof or presumption of liability on the part of the manufacturer but that is not something which has been included in the draft Bill.

Philip Pfeffer: The other challenge from a commercial perspective is that manufacturers' insurance premiums will presumably go up with the rise of autonomous vehicles. If insurers agree to pay out automatically in response to every claim arising from an autonomous vehicle going wrong, then they will have to turn to the manufacturers for this money. This is a classic commercial conflict - how likely is it that insurers will want to sue their new biggest clients in the auto insurance sector?

"We need to create a sandpit environment in which these technologies can be deployed, evaluated, verified, validated and ultimately brought through to full deployment"

IWAN PARRY, TRANSPORT RESEARCH LABORATORY

Panel 4: Big data, cyber security and IP

Many foresee the value of the connected and autonomous vehicle market lying in the enormous amount of data that will be collected, generated and processed by the vehicles and the platforms supporting them (both from driving activities and in-car passenger activities). It is estimated that a single driverless car will produce 750MB of data per second. Compare this with the current US adult consuming about 650MB per day. If the market is to realise the full extent of this value, it will need to overcome significant challenges in data storage, processing and connectivity.



David Coulling
Partner, Herbert Smith Freehills

Andrew Moir
Partner, Herbert Smith Freehills

Q: Could you elaborate on the data-related challenges and opportunities likely to arise?

The driverless ecosystem will rely on the vehicle maintaining a two-way conversation with its occupants, other cars on the road, a network provider, the surrounding infrastructure and potentially the road itself. Information ranging from traffic management data, weather and road conditions will be cross-referenced in a fraction of a second and relied upon to enable the vehicle to make decisions to protect the occupants and other road users from harm. The latency and the accuracy of the transmission of the data are of paramount importance and will be a key focus for the players looking to do well in this market.

Regulatory guidance will need to be put in place for owning, recording, monitoring and accessing data provided by connected and autonomous vehicles. It is currently unclear how the challenges will be tackled but recent legislation passed in Germany suggests there should be a black box in every car that collects information that can be analysed in the event of an accident or an issue with the technology. It may be necessary to create a central repository where this data could be stored and revisited if need be after the event.

It is envisaged that the vehicles will also generate valuable data that the car manufacturer will be able to use to improve the technical aspects of the vehicles, to provide better customer service and to sell on to other companies for advertising and marketing purposes.

Q: What role will data protection legislation play and how can the pitfalls be avoided?

Just as important is ensuring that you have the necessary consents or other legal basis to collect and process the data from the vehicles and owners. Data protection legislation will be very relevant in the connected and autonomous vehicle market. It is

inevitable that the vehicles will collect and transmit personal data such as the location of the vehicle, at which point the company is engaging with data protection legislation.

A key principle here is data minimisation. What do you actually need to collect? If you do need to collect the data, can you dispose of it as quickly as possible or just deal with pseudonymised data because then the regulatory burden is lessened? Much of the data that is required, such as car proximity and traffic flow, can be collected without the need to take the number plate or the driver's identification. As a rule of thumb, you should only collect what you need, process as much locally in the vehicle as you can and then only store data externally for as long a period of time as is absolutely necessary.

It is also important to store and process data in a compliant way. One way is through consumer consent, which can be obtained at the time of purchase or use. Consent may also need to be renewed as the relationship with the driver changes, for example by touching "I agree" when prompted to do so by the vehicle as part of a software update. This gives the car manufacturers a good opportunity to have more of a dialogue with the occupants around what the data will be used for. We see increasingly that big consumer facing companies are differentiating themselves either positively or negatively by the stance that they take with regard to the use of the data they collect. Other market participants, for example local authorities, transport management organisations and road safety bodies, may be able to rely on a 'legitimate interests' or 'public function' basis for legitimising their data processing without the need for consumer consent (although in practice it will be preferable to be up front with consumers about all data uses).

"As a rule of thumb, you should only collect what you need, process as much locally in the vehicle as you can and then only store data externally for as long a period of time as is absolutely necessary"

DAVID COULLING, HERBERT SMITH FREEHILLS

Panel 4: Big data, cyber security and IP

Q: How might a company maximise the value of the data collected by an autonomous vehicle?

The ownership of the intellectual property in the data that is generated by the car is going to be absolutely crucial. The best position will be that you, the company, own the rights to the data, but the real utility of the data often comes when it is aggregated with other data from elsewhere. It may be that part of the data is, in fact, being licensed to the company.

The following tips could help to maximise the value of the data:

1. Ensure that you have the rights to the data you collect and any data that is coming in from third parties and that, once you have aggregated it, you have the ability to license the data to another company on the terms you need.
2. Seek to negotiate these rights at the outset of a project because it will become increasingly difficult and expensive to negotiate this once the product begins to become a success.
3. Future-proof your rights by including the ability to expand them, where possible, to enable you to do things with the data that you might not have thought about at the outset.
4. If you are dependent upon third party data, ensure that you are able to pass any liability for inaccuracies back to the third party.
5. Consider your collateral usage rights: it is quite common in general data analytics projects to outsource the processing to a third party who may intend to use the data to provide a similar service to competing car manufacturers. Whether this is allowed or not should be clear in the contract with the third party processor.

Q: What impact will the General Data Protection Regulation (GDPR) have?

The GDPR recognises that with the increasing adoption of machine learning, AI and automated processes there is a risk to data subjects that profiling or automated decision making will be used. For example, the vehicle may collect data on where the driver likes to shop and will serve them adverts based on this information. Or insurers could profile how well people drive, and offer them insurance premiums automatically.

It is anticipated that such opportunities could generate millions of pounds for those in control of the data. The rules give the data subject the right to object to profiling of this nature unless the data controller can demonstrate that their rights in processing the data outweigh the data subject. This is likely to work for maintenance and accident analysis but is unlikely to stand fast with advertising. There are also requirements for applying a human appeals process to any decisions that are taken automatically. The fine for breaching GDPR obligations can amount to up to 4% of the company's annual turnover which makes it even more important that the market gets this right.

A key change between the old and new data protection legislation is in "controlling the processor". Under the new GDPR, if you outsource the processing to a processor, that processor has a direct responsibility in relation to the obligations under the regulation; that includes the cyber security issues as well in looking after the data. This will impact the connected and autonomous vehicle market given that it is anticipated that the data will pass through a number of hands such as car manufacturers, network operators and insurers.

Q: What are the cyber risks and how can the car manufacturers ensure adequate protection?

The combination of the two technologies – the autonomy and the connectivity – gives rise to potentially significant cyber security issues, as Chrysler found out back in 2015 when a vulnerability was discovered that enabled a hacker to remotely control the acceleration and braking of their vehicles. As a result, Chrysler had to recall 1.4 million vehicles in order to patch the vulnerability.

Whilst there is huge pressure to get the product to market, it is crucial to ensure that robust security features are built in, and regulatory compliance and product liability issues are dealt with at the outset. The GDPR sets out two ways in which data should be protected. The first is security by design, which involves considering what you are going to do with the data, how it will be stored and processed and building in appropriate security measures at the outset. The second is security by default, which involves only collecting personal data which is needed. The challenge here is that, as time goes on and technology progresses, you may think of a new way you could have used the data if you had collected it.

From an operational safety perspective, there is already an abundance of technical guidance as to cyber security best practice for connected and automated vehicles. The risk of not following it is that it later founds the basis of a product liability claim.

Q: What if the owner modifies the software to improve the vehicle's performance?

The Automated and Electric Vehicles Bill contemplates that people may seek to alter the software that is running within these vehicles in order to improve their speed or performance. Whilst the Bill excludes liability to the insured in the event that there is tampering with the vehicle, it does not remove liability to third parties if that vehicle causes damage or injures someone. In this context, it is going to be incumbent upon the manufacturers and the designers of the technology to ensure that these vehicles are tamper proof.

"The adoption of autonomous vehicle technology entrusts safety-critical operations to software, the authors of the software, and the reliability of the data it processes. As a result, cyber security by default and by design will be vital for driver safety and for consumer adoption of this new technology"

ANDREW MOIR, HERBERT SMITH FREEHILLS

Panel 5: Infrastructure and smart cities

Connected and autonomous vehicles will play a significant role in the cities of the future. It is hoped that they will lead to improved road safety, reduced congestion, and less pollution. It has even been suggested that the reduced need for car parking spaces could free up valuable land which could provide a solution to the UK's housing crisis. Unless we find a way to maximise the advantages while addressing the disadvantages, however, these benefits could easily be offset by an increased number of cars on our roads, loss of jobs and a dramatic reassessment of property values. Our final panel discussed the infrastructure challenges that stand in the way of the autonomous vehicle market.



Chair: Matthew White
Partner, Herbert Smith Freehills

Matthew Hudson
Head of Strategy, Technology and Data,
Transport for London

Roger Madelin
Head of Canada Water Development,
British Land and Commissioner of the
Independent Transport Commission

Abbie Pokorny
Senior Associate, Herbert Smith Freehills

Lee Street
Director and Head of Technology
Services, AECOM

Q: What infrastructure must we invest in to realise the full potential of autonomous vehicles in our cities?

1. The communications network

Lee Street: To enable successful and co-ordinated autonomous functions you have to have a connected network. For me, that means that we cannot have 3G or a poor 4G network, we have to have 5G. We should also be complementing this in certain parts of major transportation routes with high capacity ITSG5, especially at key nodal points and corridors. It is going to require a lot of investment and I'm interested to see who will pay for this and how trials can support sustainable commercial models.

As a result of reports prepared by the C-ITS Platform in Europe the EU has stated that by 2019 Member States will have, at the very least, trials of connected services. They have claimed to have had major telcos commit to providing 5G on major transport hubs and major cities by 2025. They state that there is funding in place to assist but there could well be a gap between what the EU is striving towards, what Member States can afford and what investors are willing to contribute.

2. The operating network: who is going to deliver these services and how?

Lee Street: Is it going to be the likes of Major Roads and Local Roads Authorities or is it going to be completely commercialised and outsourced? If it is the latter, then control and governance in operations and safety needs to be carefully considered against commercial interest. That is not being considered as yet in any detail, although operators are starting to consider this.

Matthew Hudson: When I hear from a technology perspective that we must have this fantastic network in order for it all to work, in order to make those sharp decisions of life or death driving down the roads, I just think how on earth is that going to work? There is a huge cost attached to trying to run this system and service. If you don't have clarity on how the service model is going to work, how do you know what the costs are going to be? How do you know what contracts will need to be in place and what liabilities sit between us, when we haven't got that service model? So I think there is an urgent need to work out how the service will actually operate in order then to decide who is going to be doing what, who wants to take a piece of that action or even more, who wants to take on some of that liability.

3. The electricity network

Abbie Pokorny: It remains to be seen whether the existing electricity grid will be sufficient to support a large influx of autonomous and electric vehicles. There are two big issues here:

- The need to improve charging speeds: It simply takes too long to charge an electric vehicle with a longer range battery at present. This is less of an issue for individual consumers if we stay with the traditional model of car ownership where overnight charging is feasible but if we start to see a transport as a service type model where for every minute that the vehicle is idle a company is losing money, there will be pressure to move towards a system that allows vehicles to charge much more quickly. One of the suggestions National Grid has been considering is whether to move away from individual kerbside chargers, which tend to be slow, towards a petrol station model that provides for faster charging.
- Coping with peak demands: The network will need to find a way of encouraging vehicle operators to charge their cars at off-peak times or storage capability will need improvement. Electric vehicles can be programmed to charge overnight to take advantage of cheap pricing but unless consumers take advantage of this it won't have much impact. Instead you replace existing charge points with smart charging points that automatically charge off-peak. The alternative is significant grid reinforcement works.

"Our cities are planned around and defined by roads and vehicles. Autonomous technology will not only change the way we travel, it will change the face of real estate as we know it"

MATTHEW WHITE, HERBERT SMITH FREEHILLS

Panel 5: Infrastructure and smart cities

Q: How will the progression of connected and autonomous vehicles affect the public transport network?

Roger Madelin: The big win for urban areas is in the increased effectiveness of the public transport network.

Matthew Hudson: I can see connected and autonomous vehicles being used for the last mile of a journey but the most efficient way to move thousands of people is on the railways.

Q: Will public transport benefit from the growth of connected and autonomous vehicles technology?

Abbie Pokorny: I think that the growth of connected and autonomous vehicle technology will benefit public transport. In fact, we are already seeing technology bringing benefits to the public transport system - on an individual level, we can already check our smart phones to find out what time the next bus is coming and decide how quickly we need to leave the house in the morning, and on a wider level TFL has been upgrading tube signalling to improve train frequency. I think that the benefits of technology in this space will continue to grow and that this will drive a better and more efficient public transport service, requiring fewer people to rely on private cars.

Q: The big question: when will we see a paradigm shift towards a fully autonomous and connected vehicle industry?

Lee Street: I think it's a lottery in terms of dates for C-ITS and higher levels of autonomous functions but in my opinion we are not going to get the full benefits of co-ordinated, safe and harmonised traffic management (autonomous or not) until we have invested in appropriate infrastructure and considered service delivery.

Abbie Pokorny: It comes down to funding and I think this is a real issue.

Roger Madelin: The agriculture industry is already there and there will be certain zones, areas and usage where autonomous vehicles will be very prevalent and probably take over from manual vehicles but in urban areas I think the answer is at least... 36 years!

"I think [National Grid] have some reasonably sensible concerns about whether or not the existing network will be sufficient to support a large influx of autonomous and electric vehicles"

ABBIE POKORNY, HERBERT SMITH FREEHILLS

Conclusion

The connected and autonomous vehicles market faces many challenges: technological, regulatory and consumer acceptance. Each of these must be overcome in order for this technology to succeed. While these challenges are significant, the potential economic, social and political benefits that this technology promises are such that governments and industry alike want to see it succeed. Who will lead the way, how it will operate in practice and when connected and autonomous vehicles will become ubiquitous on our roads remains to be seen. Each question spawns a thousand more and most remain unanswered but one thing is certain: this technology has the potential to change the concept of mobility as we know it.





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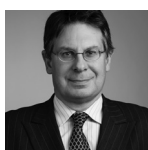
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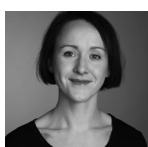
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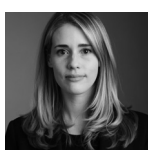
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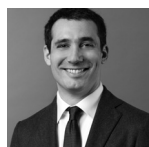
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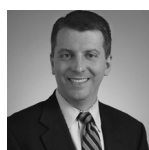
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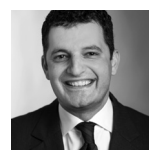


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