



The Insurance
Institute of Liverpool
Chartered Insurance Institute

GATEway insights, ADAS and the impact of automation on Underwriting and Pricing practices

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Today's Agenda

The rise of ADAS and Autonomous Vehicles

The GATEway project – our involvement and lessons

Technology – can it really deliver the promised savings?

Future outlook including Underwriting and Pricing Implications

Driverless Cars – Why? The Potential Benefit...

Human

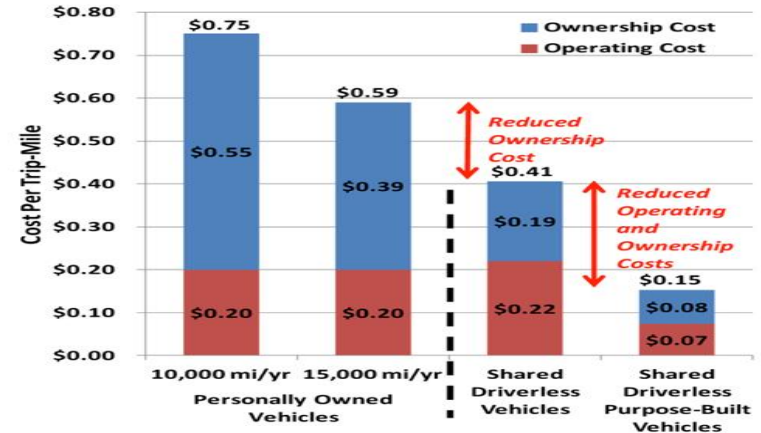
- c.93% of all motor accidents are caused by human error
- c.1.2 million road deaths globally
- Up to 50 million non-fatal road traffic accident-related injuries globally
- WHO project road deaths as the 5th biggest killer globally by 2030, if current trends extrapolated

Financial

- WHO report estimated global cost of RTAs to be \$518 billion
- Morgan Stanley report estimates that driverless cars can contribute c.\$5.6 trillion in annual global financial savings
- Significant productivity improvement

Shared Driverless Fleets

Personal travel costs can be dramatically reduced



Source: Program on Sustainable Mobility, The Earth Institute, Columbia University

The rise of ADAS and Autonomous Vehicles

The Rise of Driverless Cars



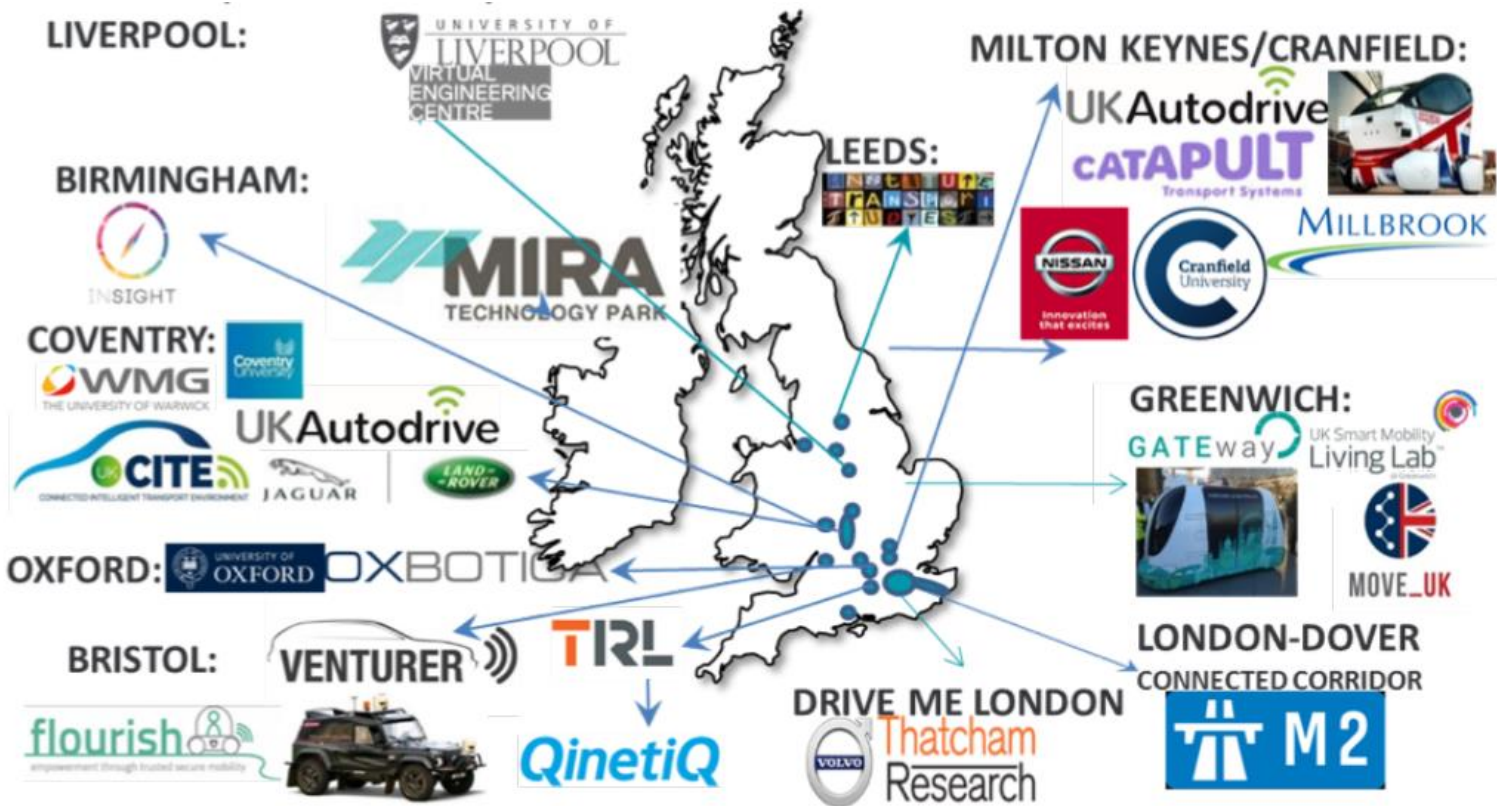
Industrial Strategy

- Identified the UK's Future of Mobility as one of the Industrial Strategy's **'Grand Challenges'**
- The Government wants to see fully self-driving cars on the UK roads by 2021
- Changes to the regulatory framework, including updating our Code of Practice
- 3 year Law Commission project



**Law
Commission**
Reforming the law

Current Research and Development



- 4 'Driverless cities' trials
- CAV1
- CAV2
- CAV3
- CAV4 – open now!

Insurers Response – ABI / ADIG

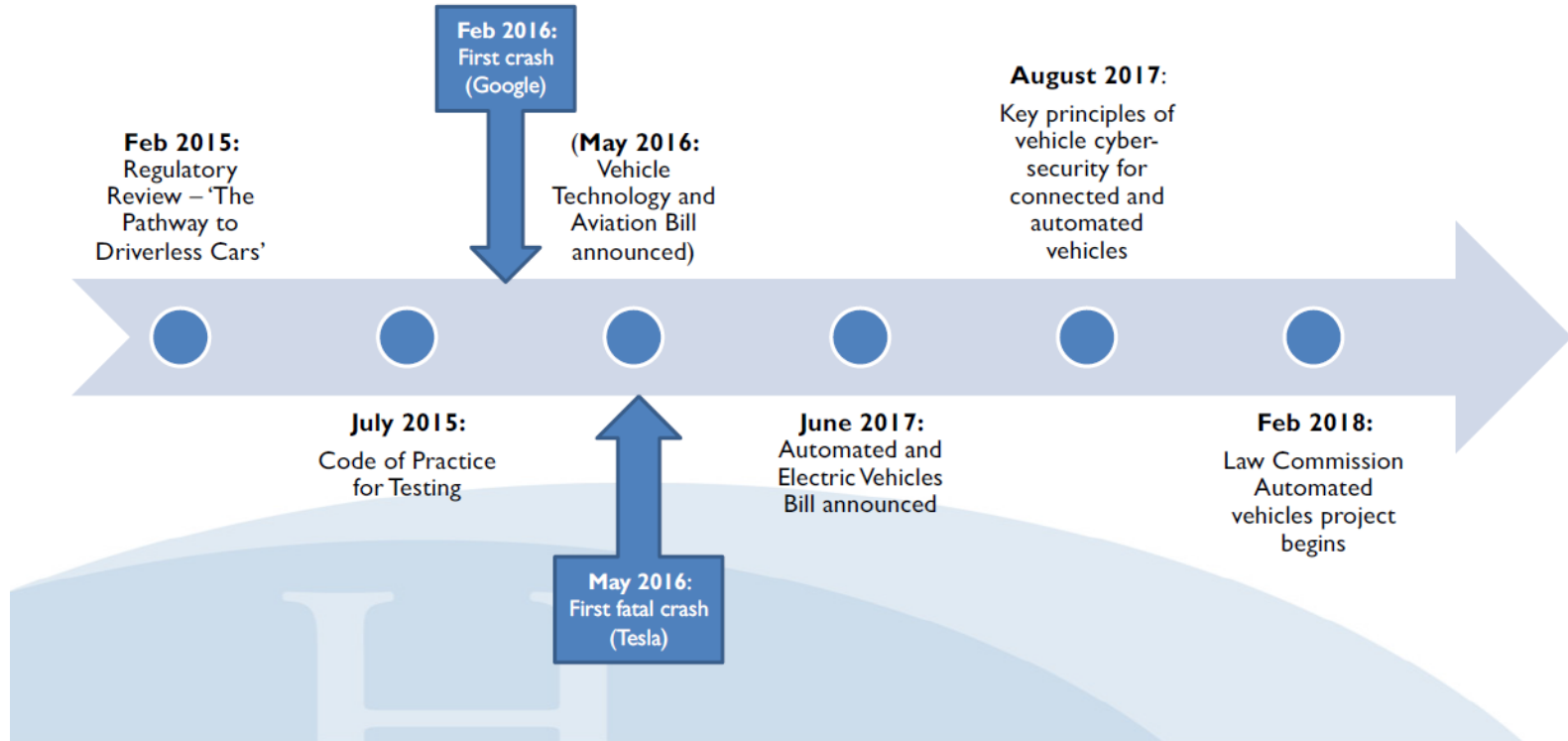


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Legal Developments



The Automated and Electric Vehicles Bill

Automated and Electric Vehicles Bill

New rules to ensure safe and effective insurance for self-driving cars



 Department for Transport

- Announced in Queen's Speech – June '17
- 2nd Reading in the Commons – 23rd Oct
- Commons Committee Stage – 2nd - 16th Nov
- Report Stage / 3rd Reading - 29th Jan '18
- 1st Reading in the Lords – 30th Jan
- Start 2nd Reading in the Lords – 20th Feb

Current Definition of Automated Driving

“An Automated Vehicle is a vehicle capable of operating in clearly defined automated mode(s) which can safely drive the vehicle in specified design domains without the need to be controlled or monitored by an individual”

Automated and Electric Vehicles Bill

Challenges for Insurers - Automation offers **two** significant issues to UK insurers:

- Additional liability for accidents involving a vehicle operating in an Automated mode
- May also include claims for injuries to the driver, potentially introducing an additional claimant in each case



The GATEway Project



'Harry'

GATEway - Background

The Challenge: *'To ensure UK is a world leader in developing and testing connected and autonomous vehicles' C-CAV*

Objective: investigate public acceptance of automated vehicles operating in an urban environment

- 2 year Project based on Greenwich Peninsula and including trials in Woolwich
- The broad consortium of members has generated significant interest from and links with industry, academia, public and media
- Trials:
 - AVP
 - Multiple PODs in AV mode in use on Peninsula
 - Cargo PODs
- Activity includes research into general attitudes to autonomy



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GATEway - Trials

Cargo Pod – trial run in conjunction with Ocado and carried out in Woolwich. Vehicle ‘drives’ from delivery point to delivery point, linking via app with customer on arrival for collection of shopping

Alongside trialling tech, user sentiment tracking (wider Greenwich residents plus trial attendees) undertaken plus pedestrian / pod interaction

Pods based on Heathrow Terminal to Terminal ‘pods’. Aim is to have multiple pods concurrently in use linked by a Fleet Management system

AVP trial undertaken at the ICH on the peninsula. Auto Valet park and retrieve trialled with volunteers. Vehicle drives autonomously to hotel. Auto parks (valet) and subsequently retrieved.





Risk, Liability and Insurance Issues – Safety Case & Mitigation



Safety Case

- Full safety case developed by TRL
- 16 key elements of safety case identified
- Key elements identified and mitigations put in place
- Safety case continues to be adapted and modified during trials

Key mitigations

- Route markings and pictograms
- Temporary warning signs
- Marshals / safety stewards
- ACS speed reduced in hazardous locations
- Passing places / safe stopping areas
- Geofencing the vehicles / routes
- Encryption / secure connections

Key Risks Identified from the Safety Case

- Collision with pedestrian; cyclist; vehicle; infrastructure
- Vehicle deviates from route

- Cyber attack
- Fire
- Passenger / Steward injured



- Theft
- Vandalism/malicious behaviour
- Physical/verbal abuse

- Injury claims
- Non-compliance with legislation
- Vehicle damages infrastructure



Risk, Liability and Insurance Issues – Observations

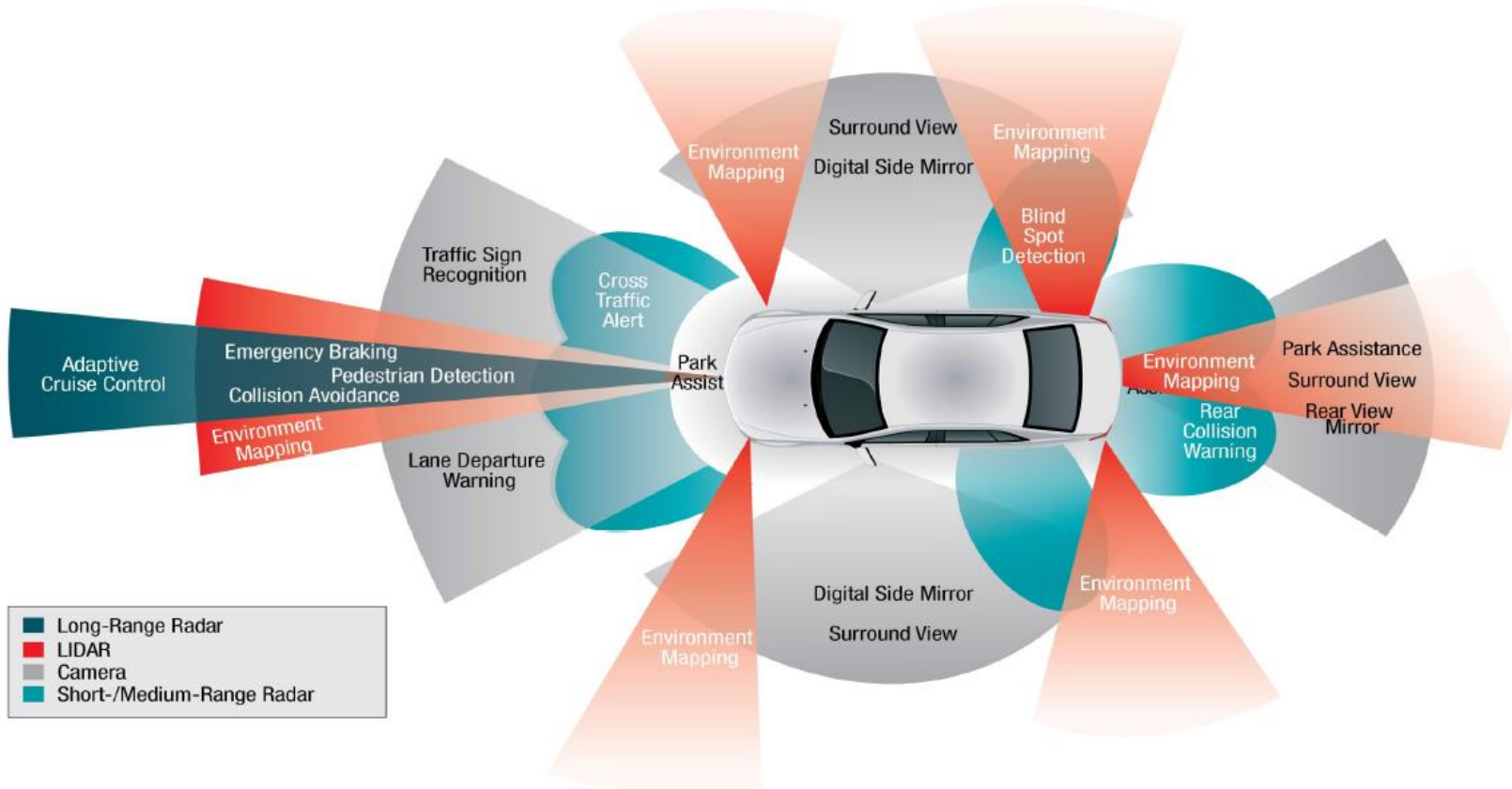
- Importance of the safety case / early engagement

There have been NO CLAIMS!

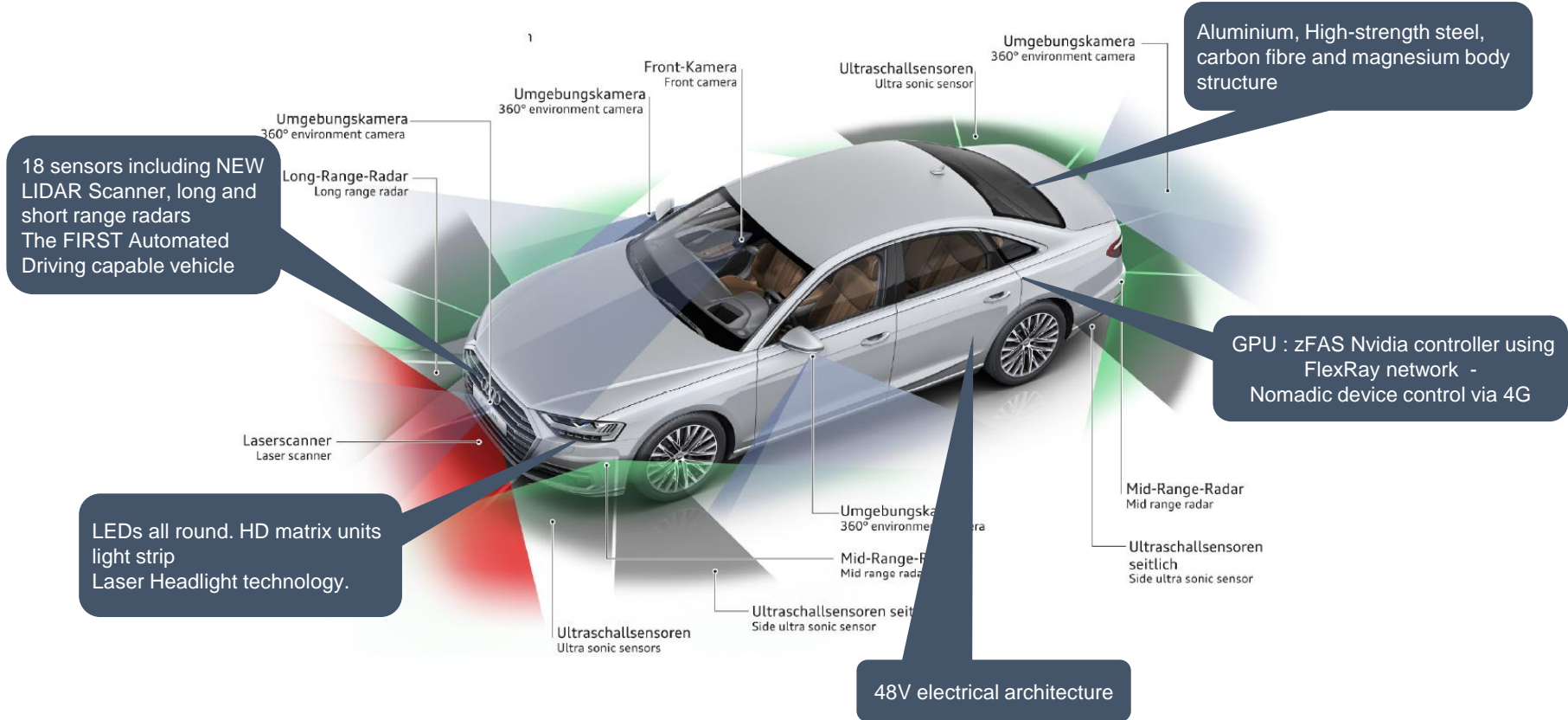
- The current testing environments are maybe a little 'sterile' but do help identify which aspects of the trial environments need to be replicated in real world environments
- Early discussion on the definition of an autonomous vehicle. How we deal with the 'driver' issue.
- There will be 'new' covers and change in focus for existing covers e.g. growing importance of Cyber
- Increased opportunity to use data, video footage and other positioning data to deal with and manage claims
- Currently operating under 'Code of Practice', but increasingly see need for revised legislation (forthcoming Automated & Electric Vehicle Bill)

Technology – can it really deliver the promised savings?

Example 1 – High functioning Autonomous Vehicle

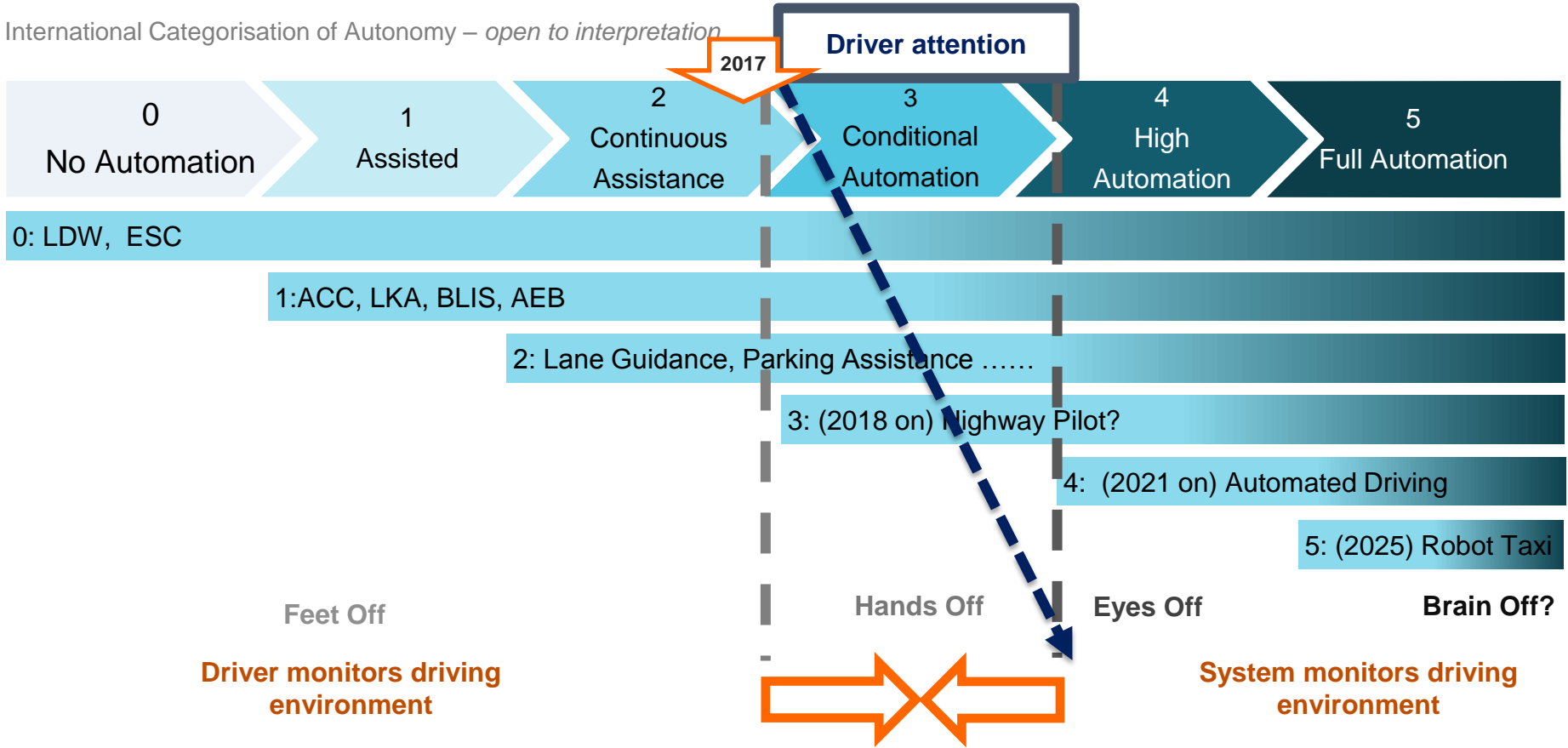


Example 2 (2018 Level 3 Autonomy)



Levels Of Automation And Timeline

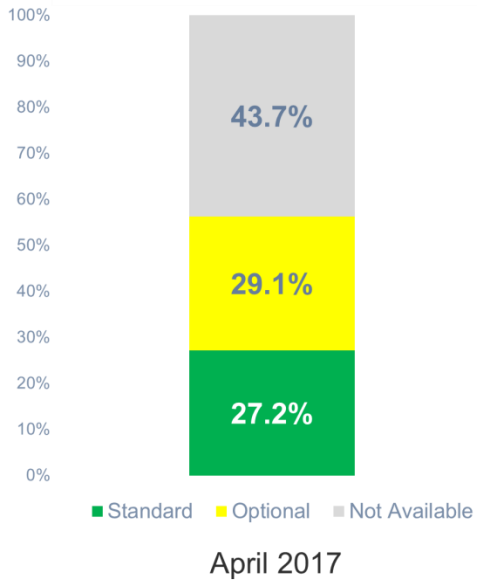
International Categorisation of Autonomy – *open to interpretation*



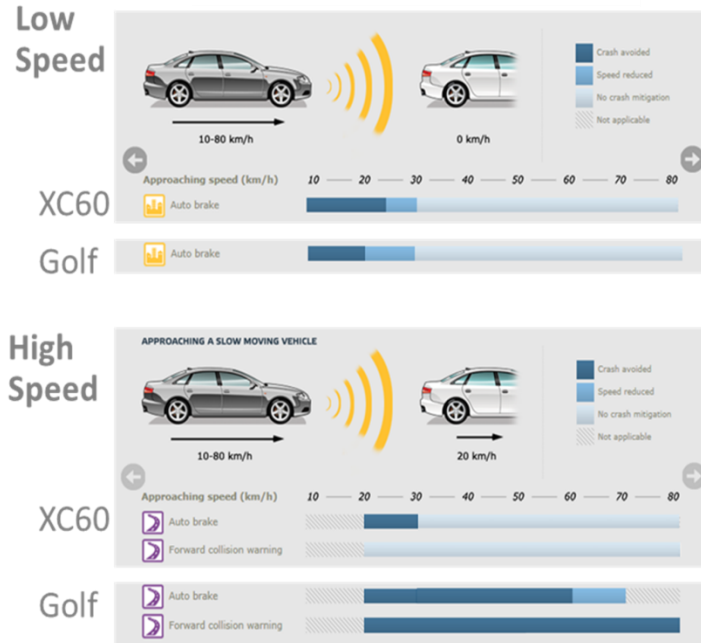
AEB – The proven benefits

Thatcham has been instrumental in developing AEB test procedures in Euro NCAP and RCAR and analysing the real-world effect of these systems

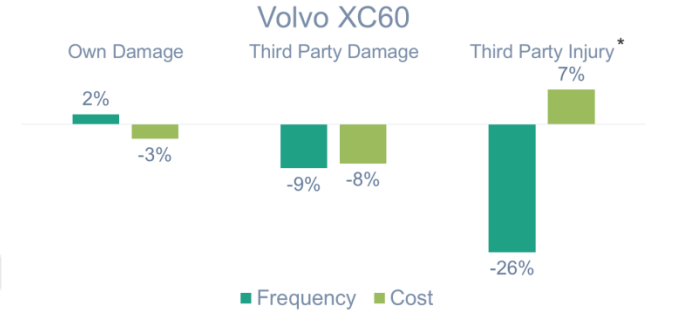
New car AEB fitment



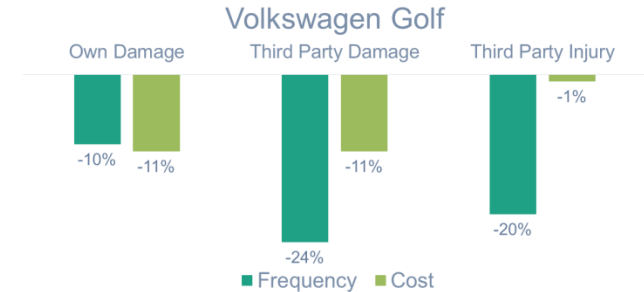
AEB testing



Real-world analysis



* Increasing costs due to raising of average cost through elimination of lower value whiplash cases



Increasing importance of software / algorithms

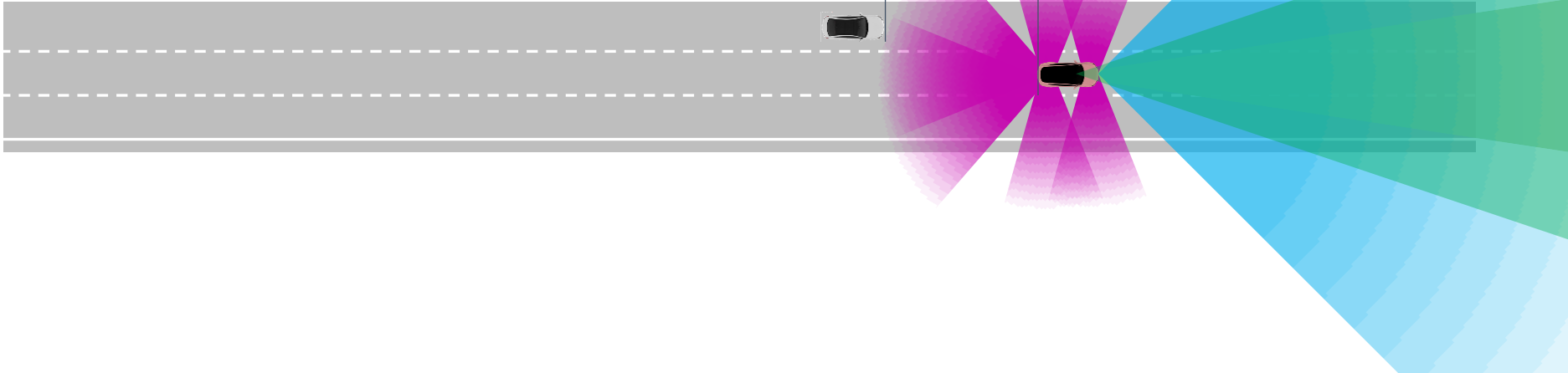
Thatcham tested four vehicles replicating AD (Assisted Driving) capabilities in a standard 'moving' and 'stationary' environment – conclusions:

- Assisted driving offers greater protection than manual driving AEB emergency intervention
- Full collision avoidance demonstrated by one system at AD regulation proposed maximum speed (81 mph)
- High speed protection demonstrated – philosophy of manufacturer rather than technological limitation

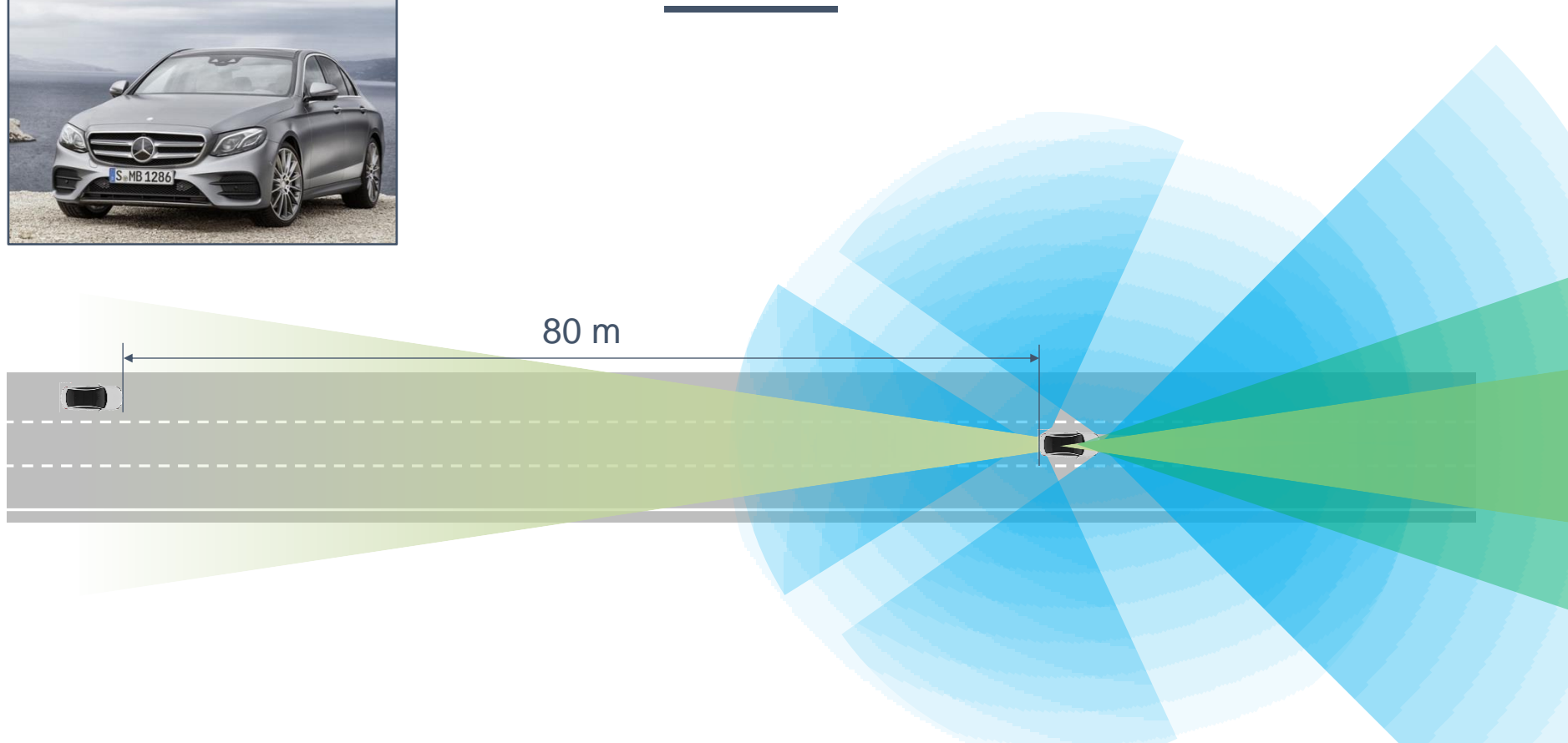


So why have there been several well publicised fatal Tesla accidents?

Tesla Model S – Sensor Visibility



Mercedes – Sensor Visibility



Vehicles with continuous assistance today

“Drive Pilot” -
Mercedes



“Pilot Assist” -
Volvo



“ProPilot 1” -
Nissan



“Auto Pilot” -
Tesla



- Up to 30s hands free with automated lane change – driver initiated
- Continuous steering assistance not currently permitted under UN Type Approval – ECE R79
- Vehicle manufacturers currently obtaining *local* type approval through Article 20 ahead of regulation – (EC Commission)

Future outlook including pricing and underwriting implications

Vehicle Manufacture Future Priorities

A

Automated

Assisted and Automated Driving

Assisted

Automated

Autonomous

C

Connected

Connected vehicles and Cyber Security

Connected

Cyber

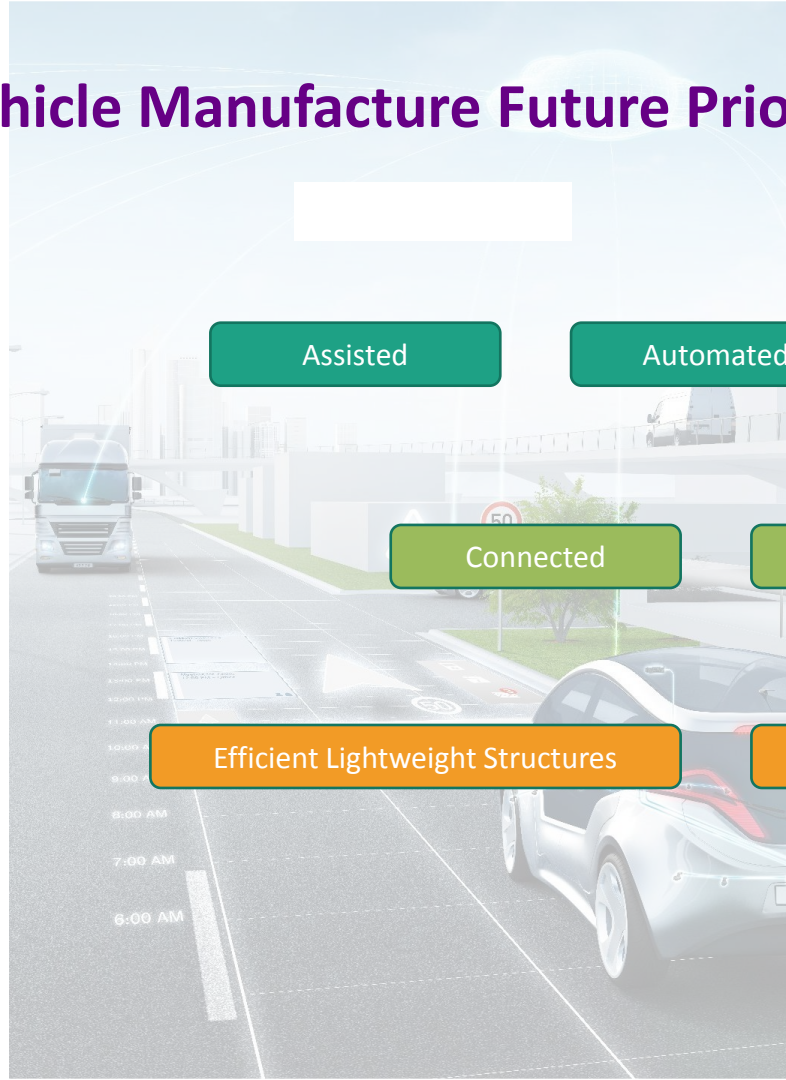
E

Electric

Electric powertrains and lightweight structures

Efficient Lightweight Structures

Electric Propulsion



Autonomous driving/ Car Insurances



Autonomous driving technologies will:

- Significantly reduce the number of crashes and number of claims.
- The number of minor crashes will almost be eliminated.
- Reduction of crashes may be balanced by a few serious crashes due to systems brakedown.
- Cost to consumers for insurance premiums will be significantly reduced.
- Manufacturers may decide to include insurance premiums in car price.

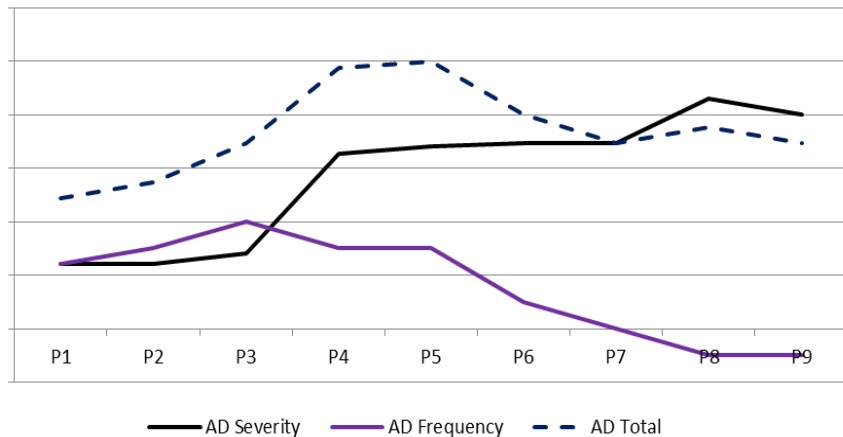
The Emergence of Electric and Death of Diesel?

January	Total	Diesel	Petrol	AFV	Private	Fleet	Business
2018	163,615	58,703	95,892	9,020	69,416	89,513	4,686
2017	174,564	78,905	88,380	7,279	76,714	91,182	6,668
% change	-6.3%	-25.6%	8.5%	23.9%	-9.5%	-1.8%	-29.7%
Mkt share 2018		35.9%	58.6%	5.5%	42.4%	54.7%	2.9%
Mkt share 2017		45.2%	50.6%	4.2%	43.9%	52.2%	3.8%

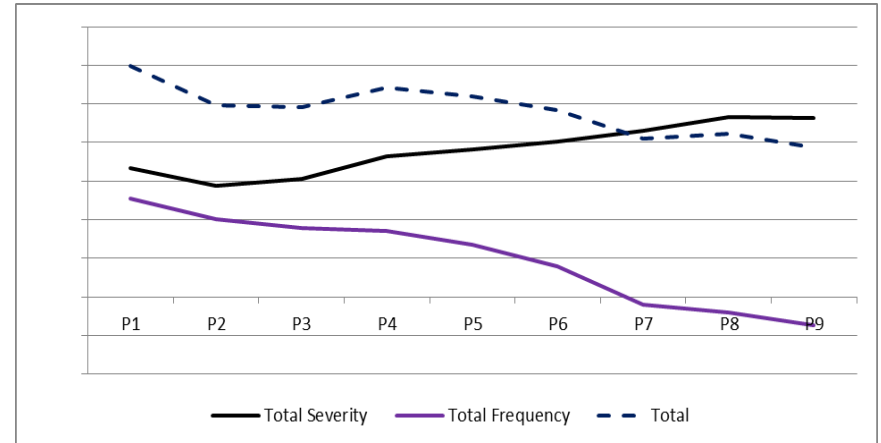
Reducing Frequency / Increasing Severity

Our own data shows increasing severity and reducing frequency. Frequency on some heads now 'negative'

AD Severity / Frequency



Total Severity / Frequency



Trends vary by head of damage, but frequency and severity delta is more pronounced on AD

What are the key impacts on Underwriting and Claims

Hand in hand with autonomy is the movement towards Electric vehicles away from petrol and diesel – Underwriting and Claim practices need to reflect this

Increased use of subrogation within claims – manufacturers need to be open to sharing data with Insurers

Safety systems that advise drivers are being replaced by safety systems that simply do the action – subsequent acceleration of frequency reductions

Car technology will drive the process in terms of service and also post claim repairs – the right shop with the right job with the right kit!

Extensive use of cameras, video recording and data will assist claims liability discussions

- New technology, once fully embedded, will massively reduce the frequency (up to 90%+) and potentially severity of losses
- Roads will become a much safer place. Severe BI losses and deaths will reduce
- Shift from Personal to Commercial Models – ‘fleets’ of semi / autonomous vehicles (alongside shift from ownership to usage)

What are the key impacts on Pricing

New heads of cover – we need to consider how we price for Cyber and other 'new' covers

Increased prevalence of machine learning techniques

Potential for Dynamic Pricing

Usage model from ownership model – monthly subscriptions with a miles / minutes / power charge for each journey

Collection and analysis of data including in the event of claims and even 'non reported' incidents

- Premiums likely to shrink – changing Insurer dynamics / operating models?
- Much of the current data / rating structures we currently use (e.g. driver focussed) will become redundant
- We'll both need to use the 'new world' data in different ways and be forward looking in our underwriting approach.

How can AV's be integrated into the UK transport Infrastructure

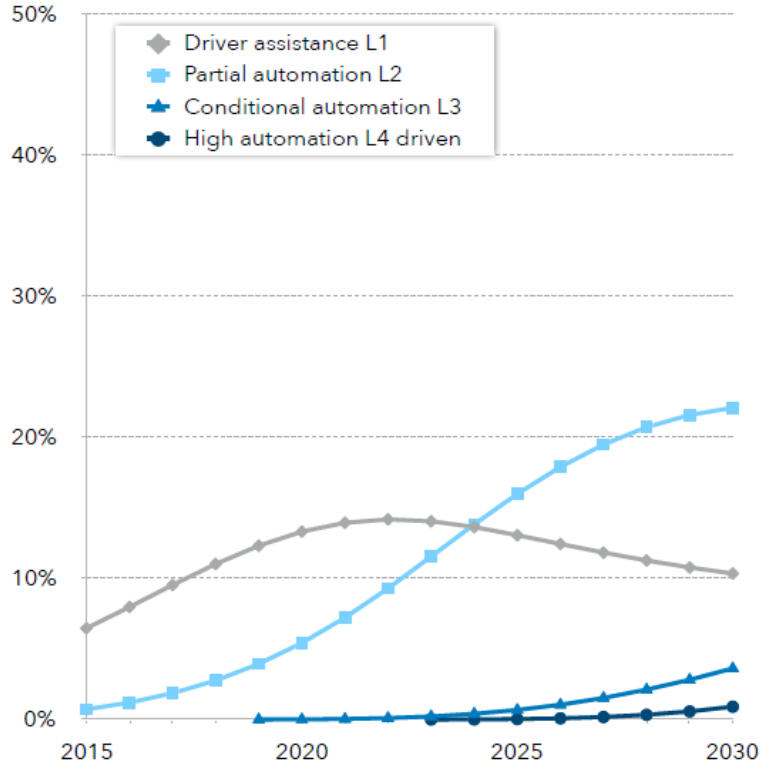
- 'Horses for courses' – across the Greenwich and other Innovate programmes there are a variety of different styles of AV and type of technology being trialled – one size wont fit all.
- Need to think how AVs can deliver benefits across the vehicle landscape – replacement / supplementing of personal cars, HGV platooning, local delivery vehicles etc.
- More thought needs to be given to integrating future AV developments into city and road design – likely emergence of 'hub' cities and environments.
- Alongside technology and legislation, infrastructure (communications and physical) needs to be fit for purpose and suitable for AV operation

Over 80% of respondents following the Cargo Pod trials were satisfied or very satisfied with the delivery and customer experience



How Quickly Will We See The Changes?

Penetration in passenger cars on the road
(%, Europe)



By 2024, ADAS will become mainstream

Level 3 automated will remain marginal until 2025 but every OEM will have one on the market

Member state regulation will dictate adoption not solely technology

Level 4 and fully driverless cars will start appearing on dedicated routes but overall volumes will not grow until 2028

Thank You!

Questions.....