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British Motor Museum

Automated Driving and Car of the Future

IAEA – 11th May 2019

Agenda

1. Thatcham Research Introduction
2. Passive and Active Safety – Euro NCAP
3. Assisted Driving – New Tests for 2019
4. Towards Automation
5. The Challenge of Repair
6. Data – The New Currency

Euro NCAP has helped reduce UK in-vehicle KSI by 65% over 20yrs

New collision avoidance technology will reduce KSI further towards Vision Zero……

Today Thatcham's role is as important and unique as ever…

- The Insurance industries Research faculty
- Understanding tomorrows cars on tomorrows roads
- A key member of Euro NCAP defining new safety tests
- Leading International research into assisted and autonomous vehicles
- Lobbying International regulators for safety related technology
- Creating methods to efficiently and safely repair cars
- Vehicle security testing including Cyber research
- Training the bodyshop technicians of the future

3% ≤★★★

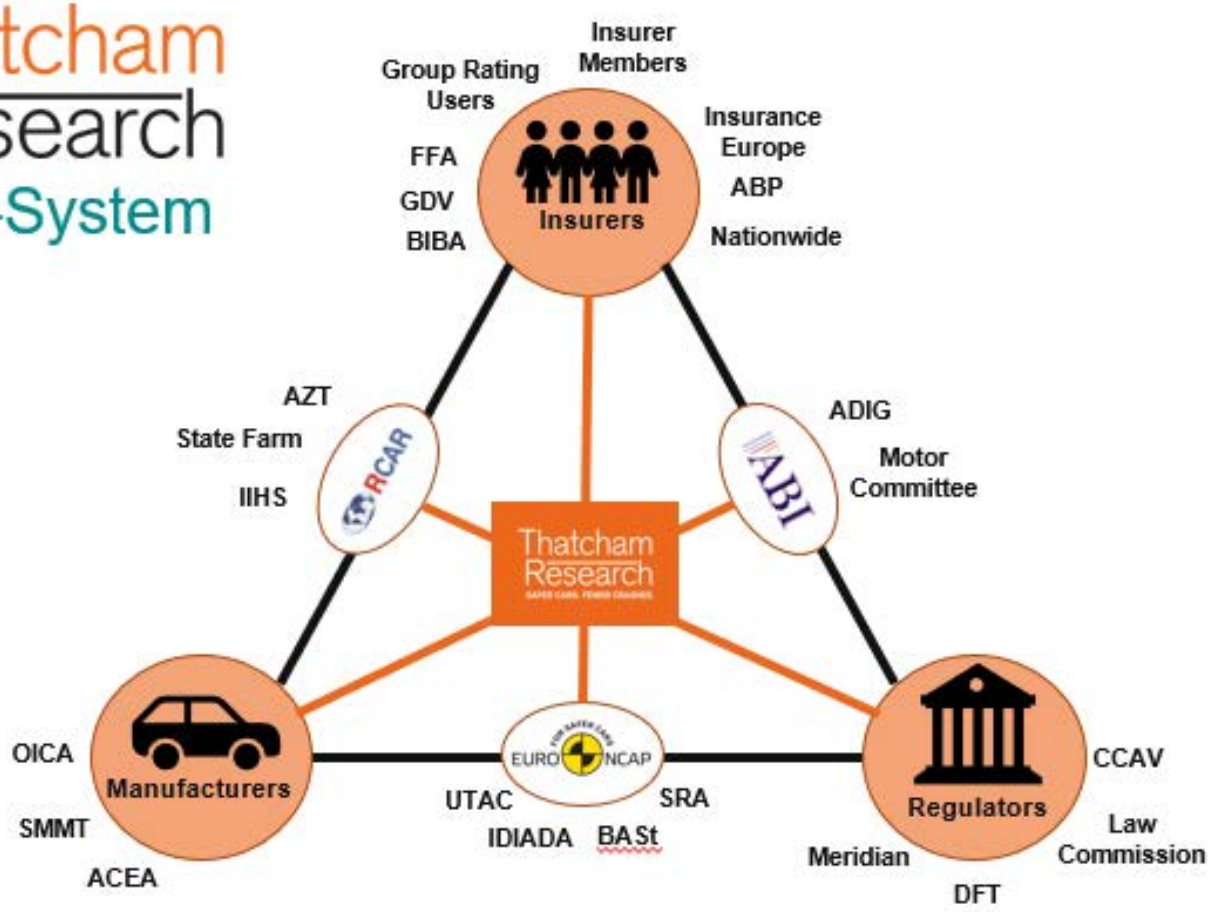
16% ★★★★

75% ★★★★★

Today 94% of all cars have a valid Euro NCAP Rating

Safer Roads, fewer Crashes delivered through Testing, Data and Intelligence

Thatcham Research Eco-System



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VM Future Priorities

Vehicle Manufacturers looking at 3 main strategic priorities – Challenges for Insurers

A

Automated

Assisted and Automated Driving

Assisted | Automated | Autonomous

C

Connected

Connected vehicles and Cyber Security

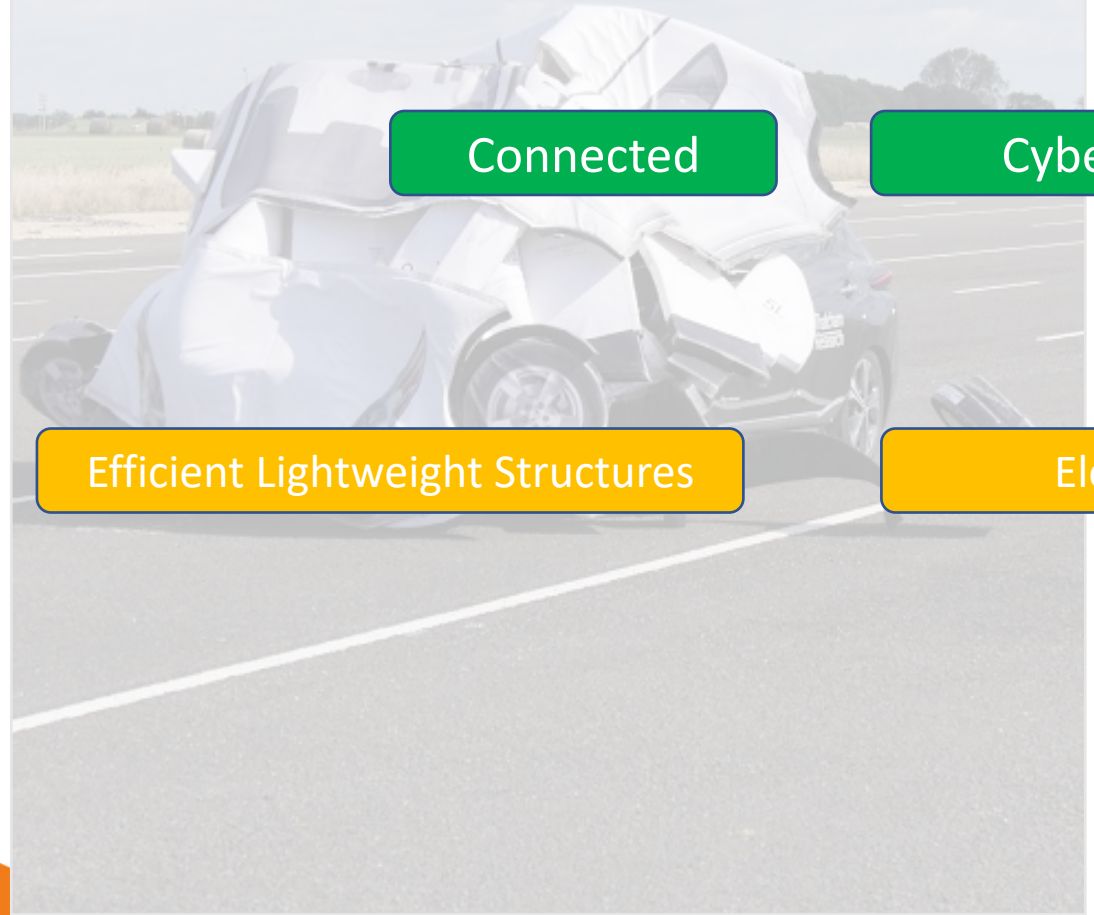
Connected | Cyber

E

Electric

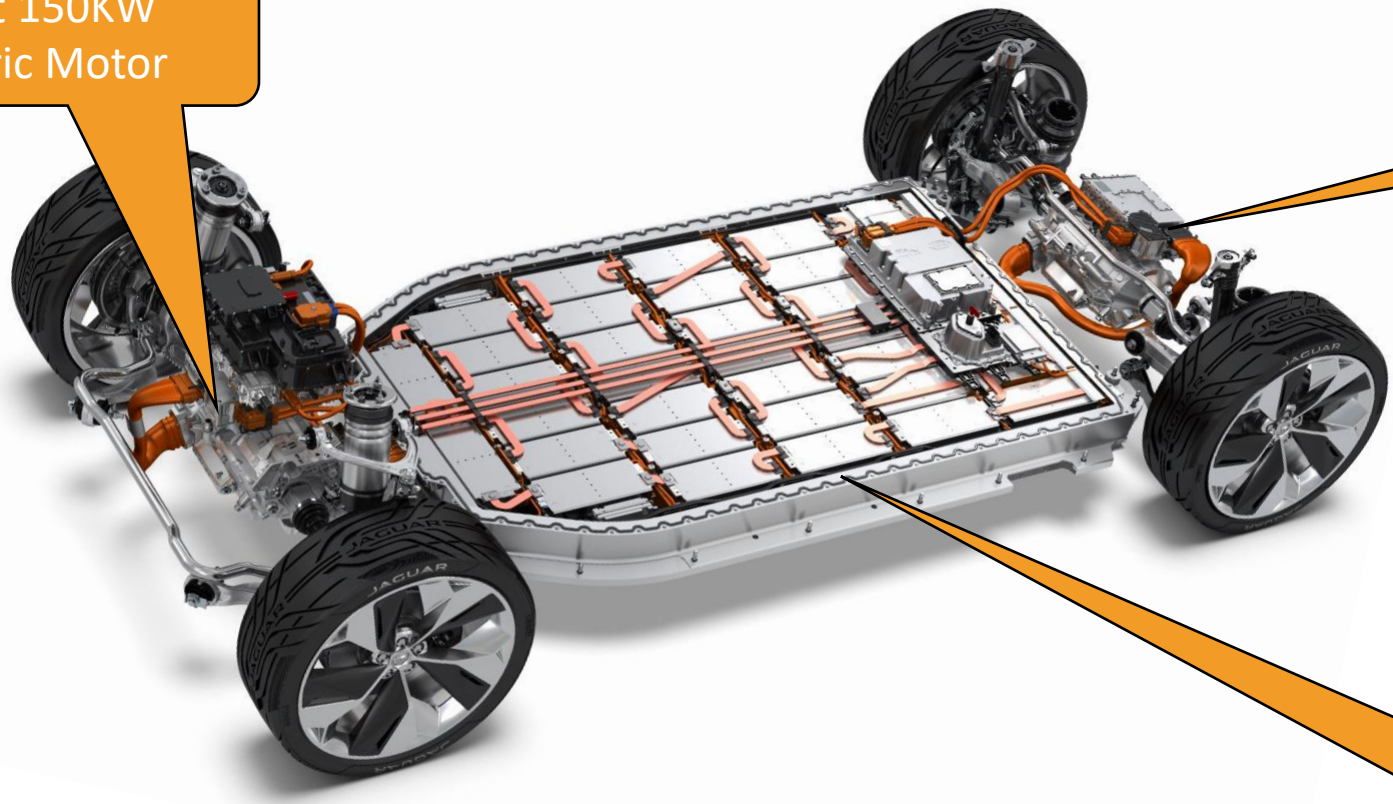
Electric powertrains and lightweight structures

Efficient Lightweight Structures | Electric Propulsion



The Future Vehicle

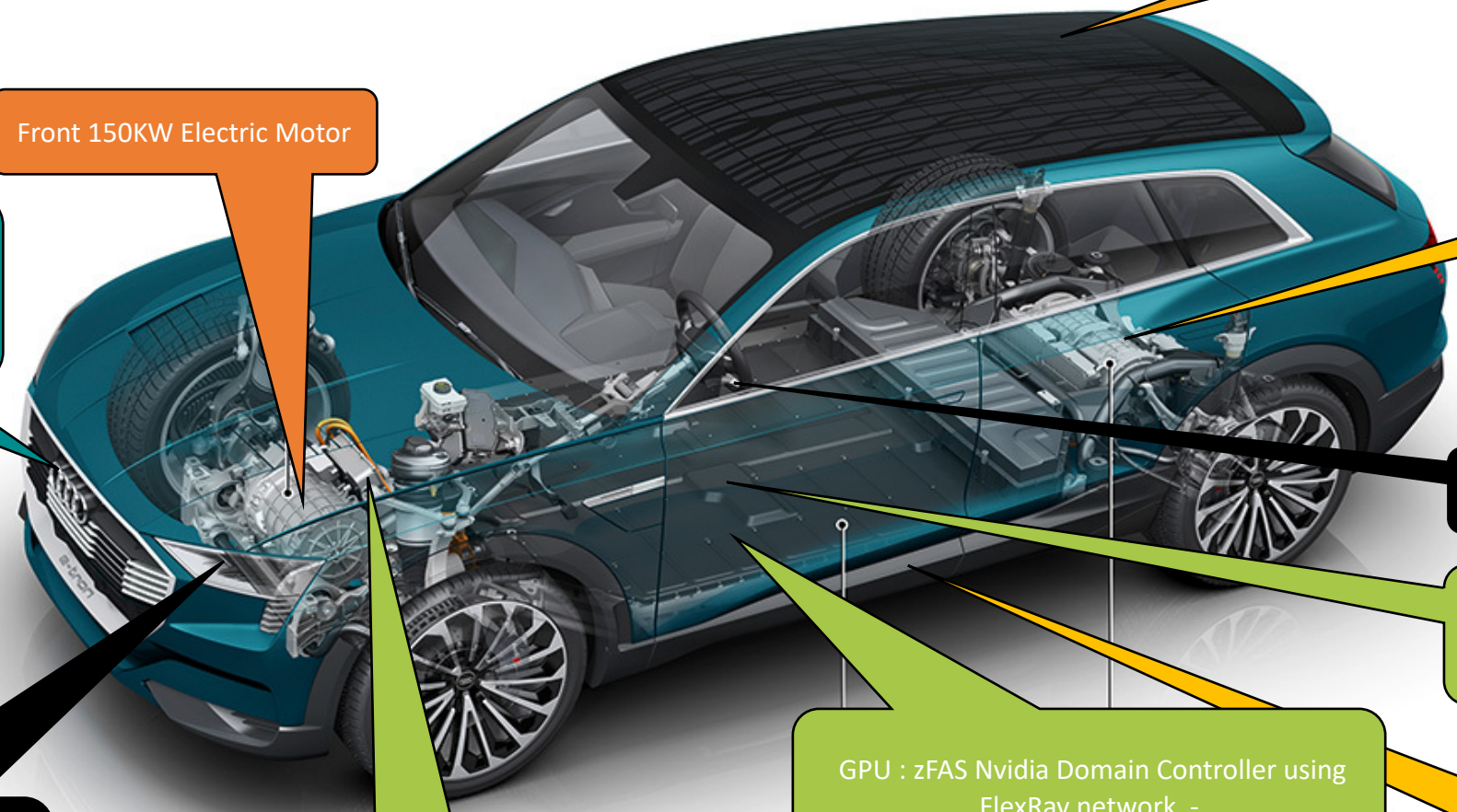
Future “Skateboard” Vehicle Architecture – Jaguar I-Pace



Today's Vehicle

Audi e-Tron BEV

A
C
E



Aluminium, High-strength steel, carbon fibre and magnesium body structure

Front 150KW Electric Motor

Rear 150KW Electric Motor

18 sensors including NEW LIDAR Scanner, long and short range radars for LEVEL 3 AUTOMATION (2020)?

eMirrors

Over-the-Air Updates for performance and functionality

GPU : zFAS Nvidia Domain Controller using FlexRay network -

LEDs all round. HD matrix units light strip
Laser Headlight technology.

48V electrical architecture

Aluminium "Skateboard" construction with integrated 95 kWh LC battery pack

Euro NCAP

- 20 Years of Driving Safety
- 20 Years of Progress

ADAS Today

Passive to Active Safety

- Crash testing has traditional focused on Passive safety, helping you survive a crash, Active helps prevent the crash in the first place

A key first active safety technology was Electronic Stability Control (ESC). ESC equipped vehicle are 25% less likely to be involved in a serious or fatal crash

Other Active Safety technologies like Blind Spot Information, Speed Assist,

Lane Keep Assist and Active Lighting are all on the market showing potential

The Volvo XC90 AEB system is able to prevent a collision against a stationary target up to the same speed as the Euro NCAP frontal test

AEB VRU

New Euro NCAP Test Procedures to Protect Vulnerable Road Users

Car to Pedestrian - 2016

Car to Cyclist - 2018

AEB – Next Gen

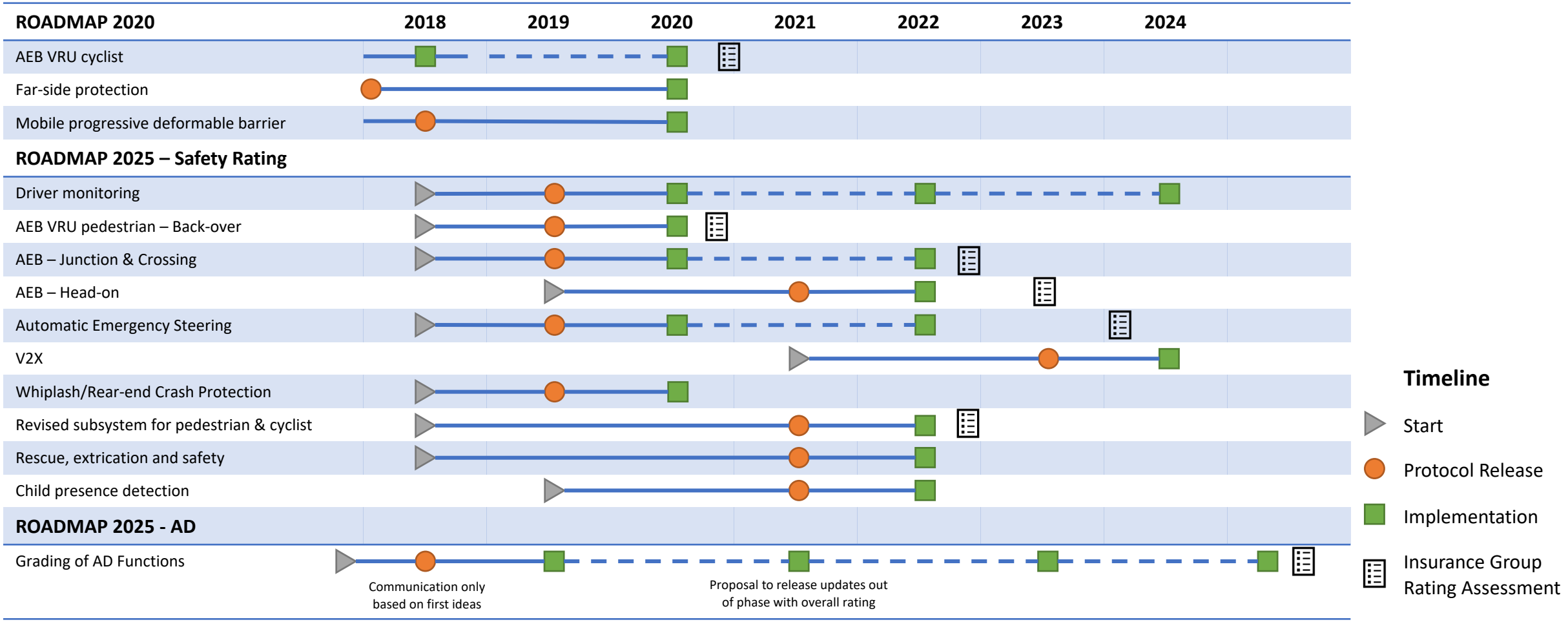
Future Euro NCAP Active Test Procedures

Turn Across Path – 2020

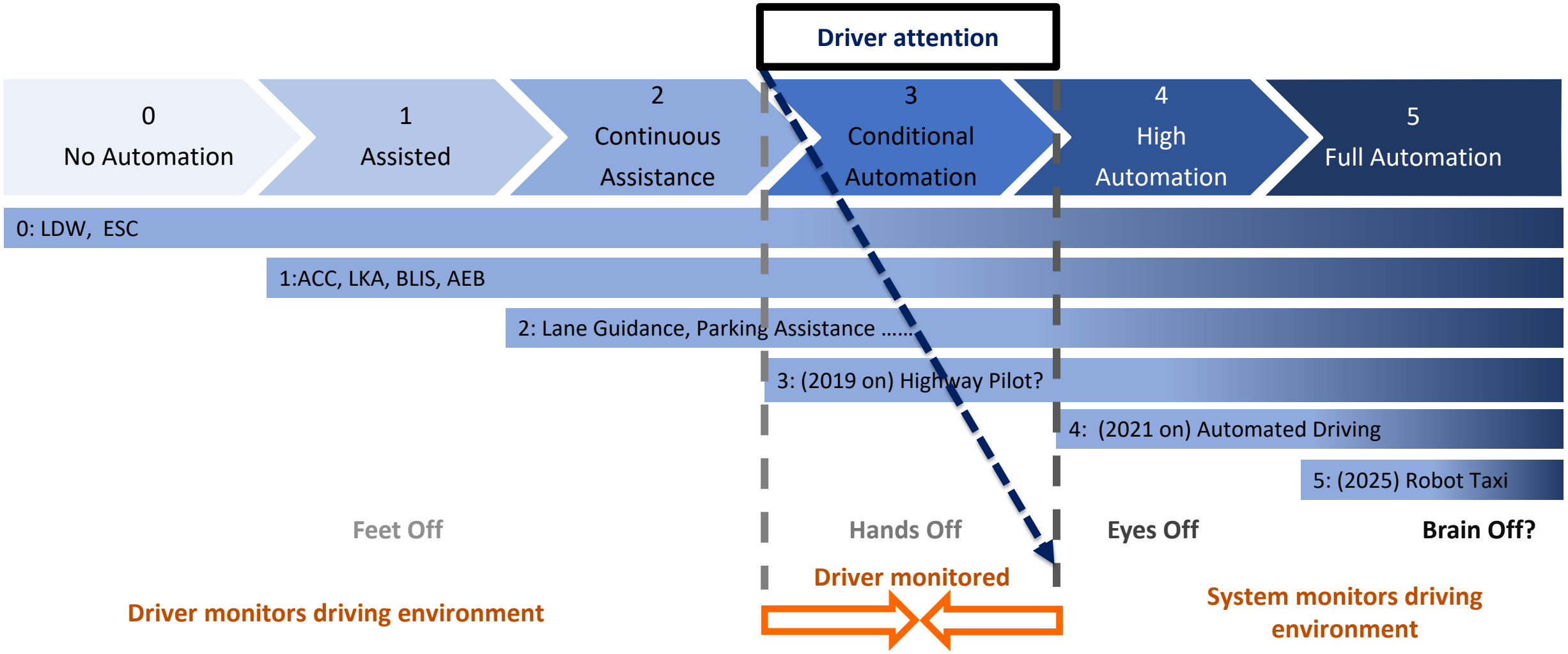
Junction Assistant – 2020

Euro NCAP 2025 Roadmap

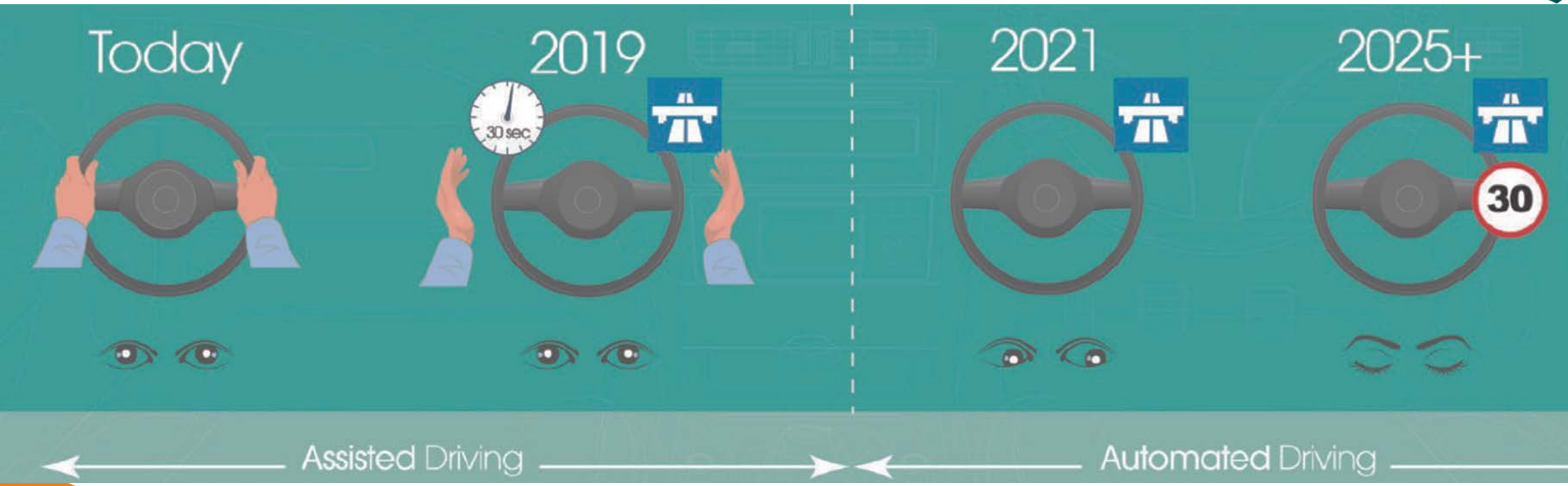
Thatcham – Principal Author in Support of Members



The Autonomous Car



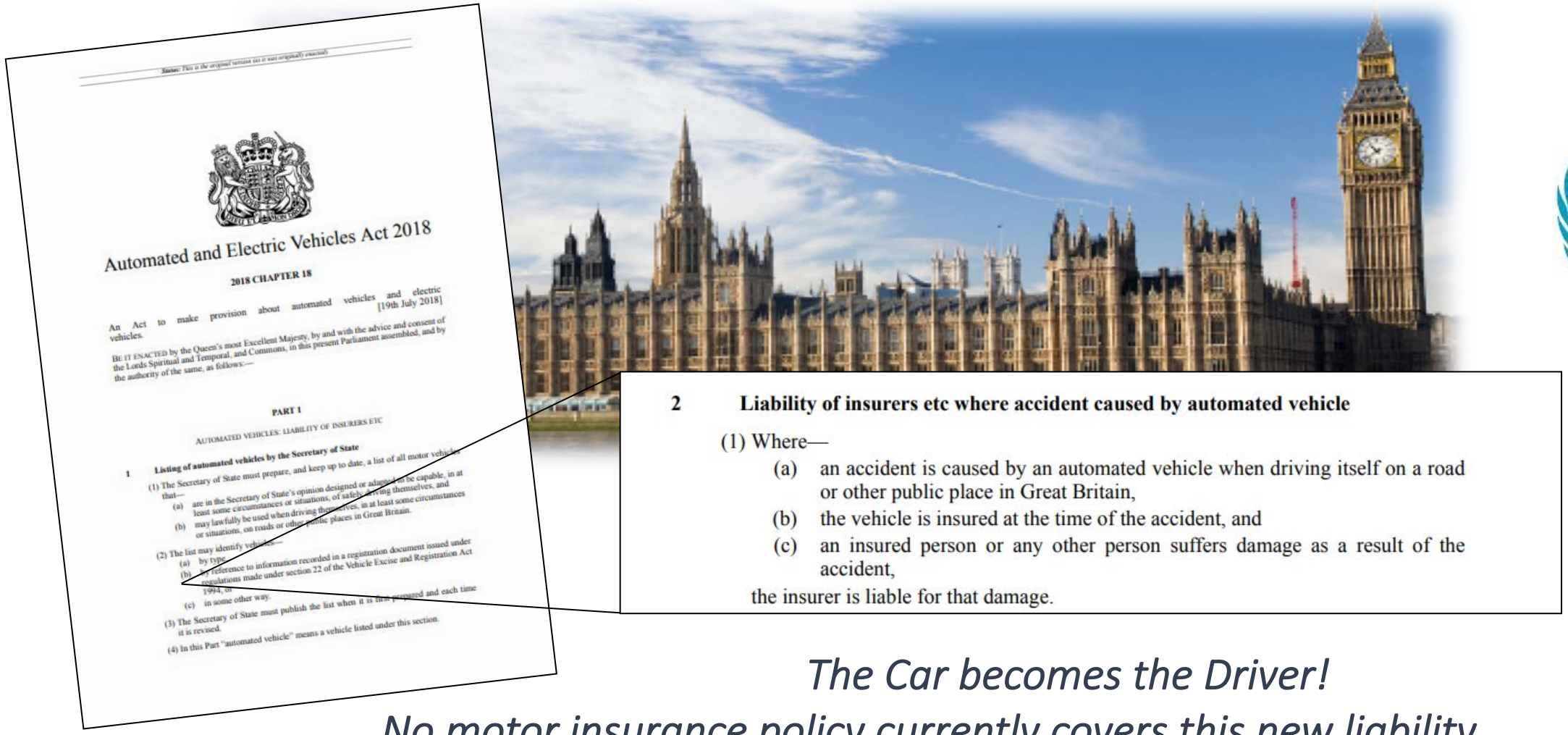
A Journey to Automation



- The Insurer View – Assisted or Automated

AEVA

Influencing the regulators and law makers in the UK and internationally



Automated and Electric Vehicles Act 2018

2018 CHAPTER 18

An Act to make provision about automated vehicles and electric vehicles. [19th July 2018]

BE IT ENACTED by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

PART 1

AUTOMATED VEHICLES: LIABILITY OF INSURERS ETC

1 **Listing of automated vehicles by the Secretary of State**

(1) The Secretary of State must prepare, and keep up to date, a list of all motor vehicles that—

(a) are in the Secretary of State's opinion designed or adapted to be capable, in at least some circumstances or situations, of safely driving themselves, and

(b) may lawfully be used when driving themselves, in at least some circumstances or situations, on roads or other public places in Great Britain.

(2) The list may identify vehicles—

(a) by type,

(b) by reference to information recorded in a registration document issued under regulations made under section 22 of the Vehicle Excise and Registration Act 1994, or

(c) in some other way.

(3) The Secretary of State must publish the list when it is first prepared and each time it is revised.

(4) In this Part "automated vehicle" means a vehicle listed under this section.

2 Liability of insurers etc where accident caused by automated vehicle

(1) Where—

(a) an accident is caused by an automated vehicle when driving itself on a road or other public place in Great Britain,

(b) the vehicle is insured at the time of the accident, and

(c) an insured person or any other person suffers damage as a result of the accident,

the insurer is liable for that damage.

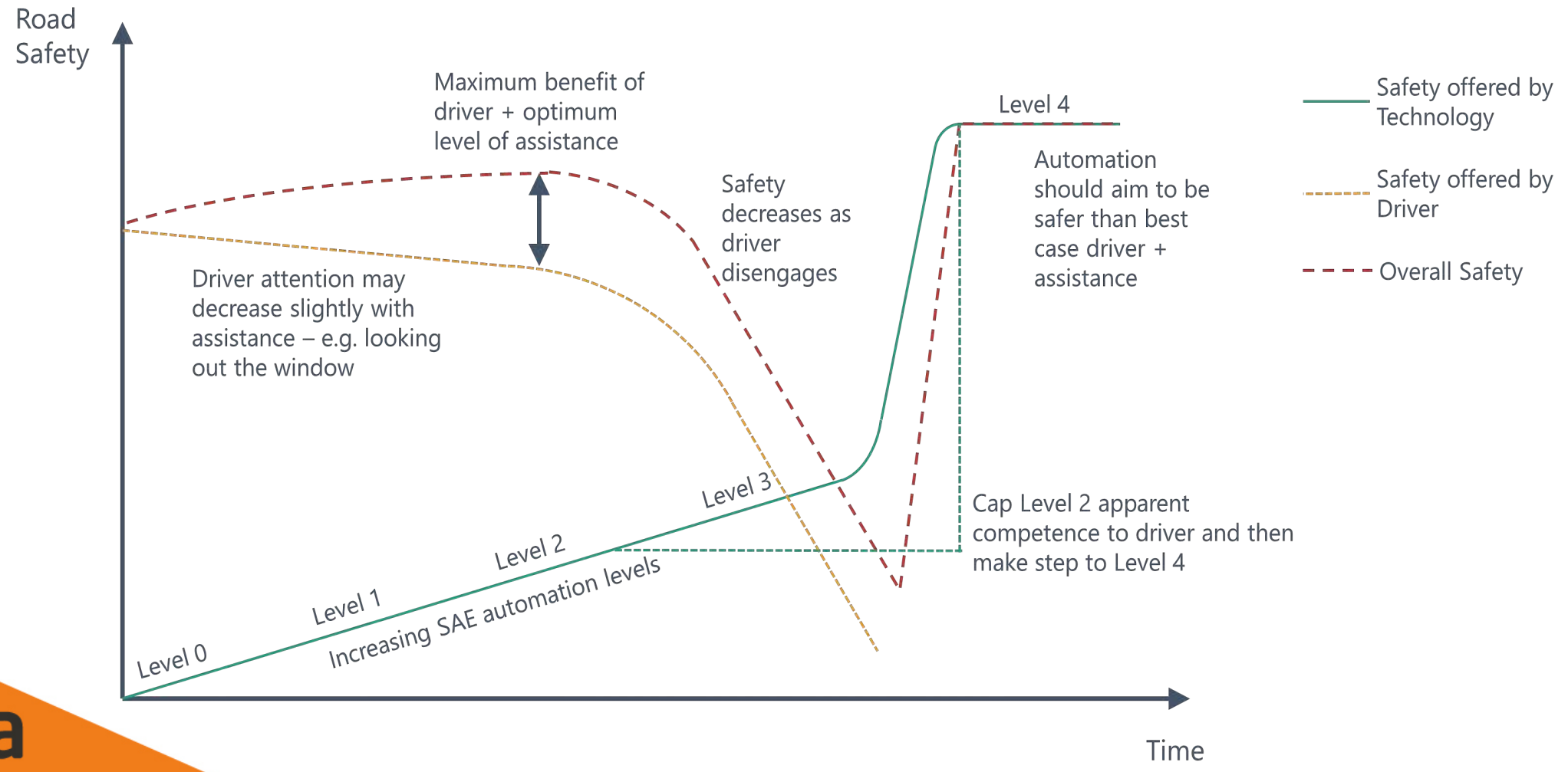
The Car becomes the Driver!

No motor insurance policy currently covers this new liability

Assisted Driving -
the big challenge

- The Perils of not monitoring Level 2

AD Technology vs. Road Safety



AD Assessment Fleet

The first Rating of Assisted Driving Technology

Audi A6

BMW 5

DS 7

Ford Focus

Hyundai Nexo

Mercedes C

Nissan Leaf

Tesla S

Toyota Corolla

Volvo V60

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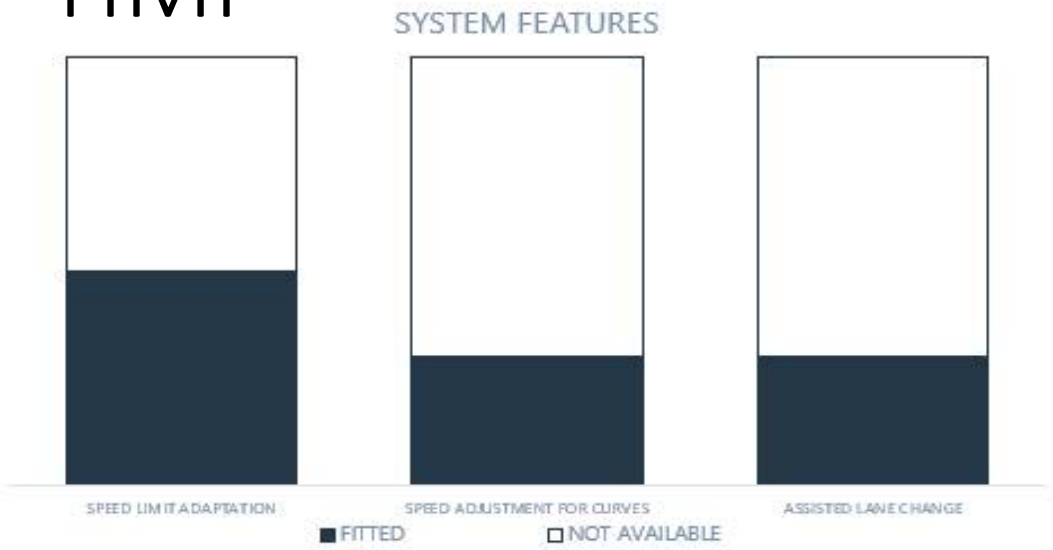
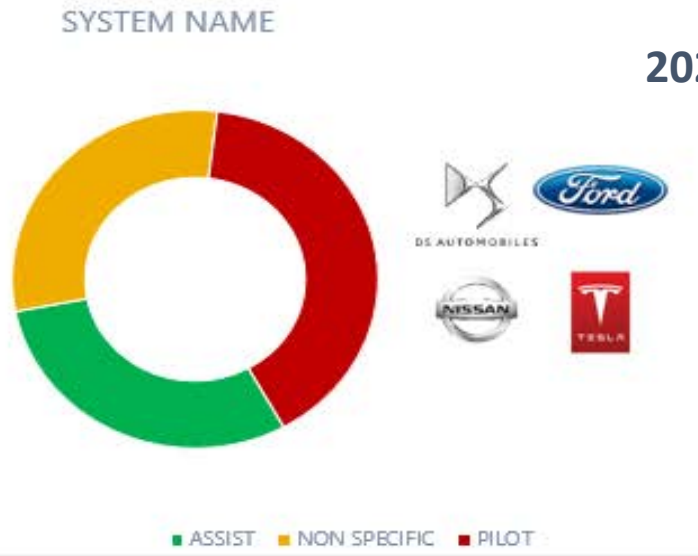
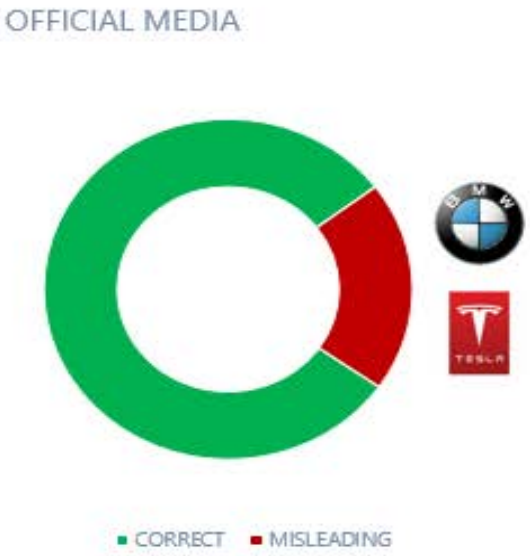
HMI

2020-25


SYSTEM FEATURES
SPEED LIMIT ADAPTATION
SPEED ADJUSTMENT FOR CURVES
ASSISTED LANE CHANGE
FITTED
NOT AVAILABLE


SYSTEM NAME
DS AUTOMOBILES
NISSAN
ASSIST
NON SPECIFIC
PILOT

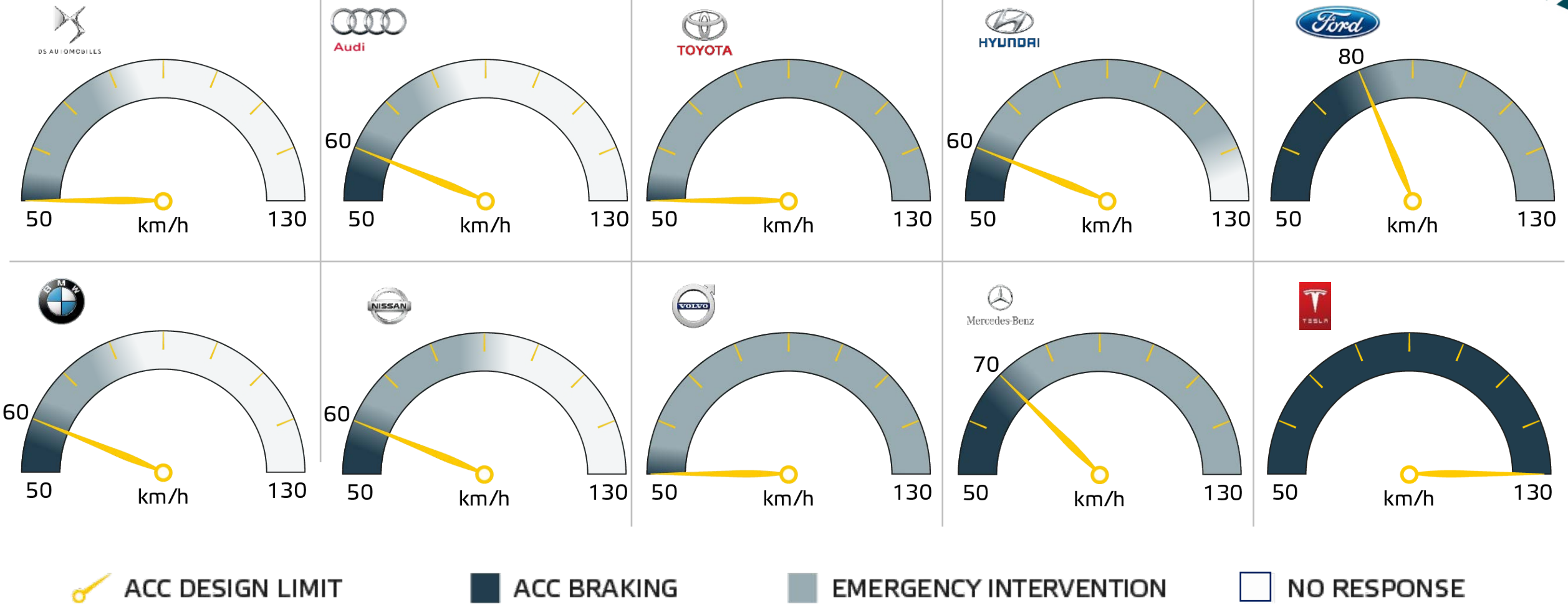

OFFICIAL MEDIA
CORRECT
MISLEADING


Hands Off Warning timeline
Visual Warning
Audible Warning
Controlled Stop
0
20
40
60
80
100
time [s]
SHUTDOWN
CONTROLLED STOP

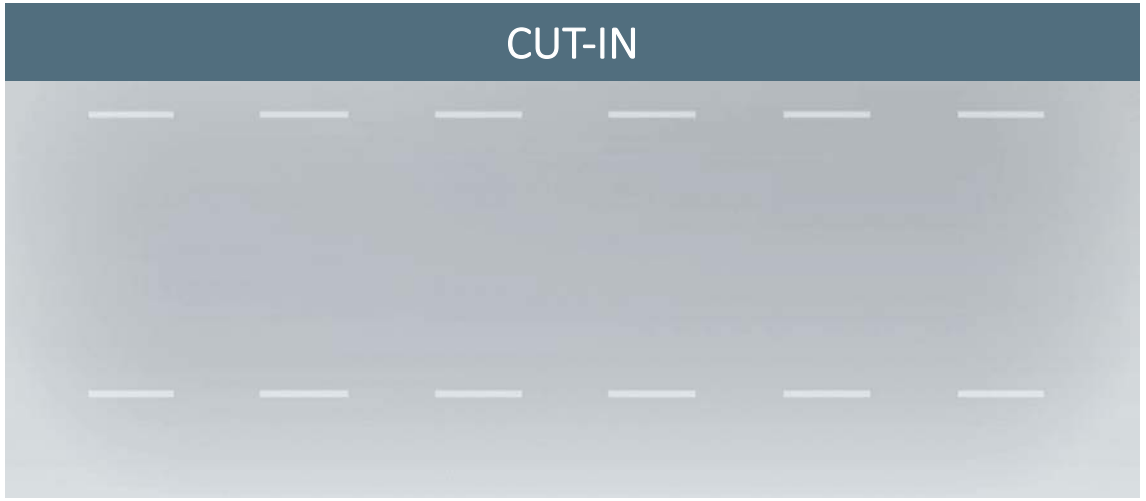
Adaptive Cruise Control

Stationary Car

EURO NCAP FOR SAFER CARS
www.euroncap.com
2020-25



Adaptive cruise control



10 Car L2 Tests

- Summary

DS AUTOMOBILES

Audi

Ford

HYUNDAI

TESLA

Mercedes-Benz

NISSAN

TOYOTA

VOLVO

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Assisted Vs Automated

- ‘Assisted and Automated Driving Definition and Assessment’ Technical and Summary papers launched.
- Definition of an Assisted vehicle produced, offering further clarity.
- ‘Can today’s cars drive themselves?’ video, shot at the Upper Heyford test track, brought the issue to life and has been viewed over 400,000 times.
- Reach over 400m and more than 520 pieces of indiv coverage

Car insurers warn on 'autonomous' vehicles

FT FINANCIAL TIMES

Selling an unintelligible dream at Tesla (an update)

Thatcham Research and the ABI (Association of British Insurers) are today issuing an urgent call to carmakers and legislators for greater clarity around the capability of vehicles sold with technology that does more and more driving on behalf of motorists. The call comes in the wake of growing reports of people crashing whilst over-relying on technology which is not yet designed to drive the car independently.

Fully Automated vehicles that can own the driving task from A to B, with no need for driver involvement whatsoever, won't be available for many years to come. Until then, drivers remain criminally liable for the safe use of their cars and as such, the capability of current road vehicle technologies must not be oversold

The Telegraph

'Automated' cars put drivers in danger by encouraging them to take their eyes off the road, insurers warn

WIRED

JACK STEWART TRANSPORTATION 06.11.18 07:17 PM

FINALLY, A REAL WORLD GRADING SYSTEM FOR AUTOPILOT TECH

Thatcham Research tests how well systems like Mercedes' Drive Pilot function (by testing them on faux vehicles), but also how they are marketed and sold to the public. THATCHAM

The Guardian

Motorists 'are being misled by autonomous driving aids' - report

Tesla and Nissan among carmakers criticised for setting ‘unrealistic expectations’

A Tesla Model S, which was involved in a traffic collision with a fire truck in Utah. Photograph: AP

The marketing of driving assistance features such as Autopilot, ProPilot and others as “autonomous” is setting unrealistic expectations and causing dangerous driving, according to insurers and vehicle safety researchers.

In a report, Thatcham Research and the Association of British Insurers (ABI) say that drivers are being lulled into a false sense of security by the marketing of new driver assistance features making their way into cars and costing upwards of £20,000.

BBC RADIO 2 BBC RADIO 3

BBC RADIO 4 BBC RADIO 5 live

Mail Online

Car makers told to stop claiming vehicles are ‘self-driving’: Drivers crashing because they are too reliant on technology which is only partly automated

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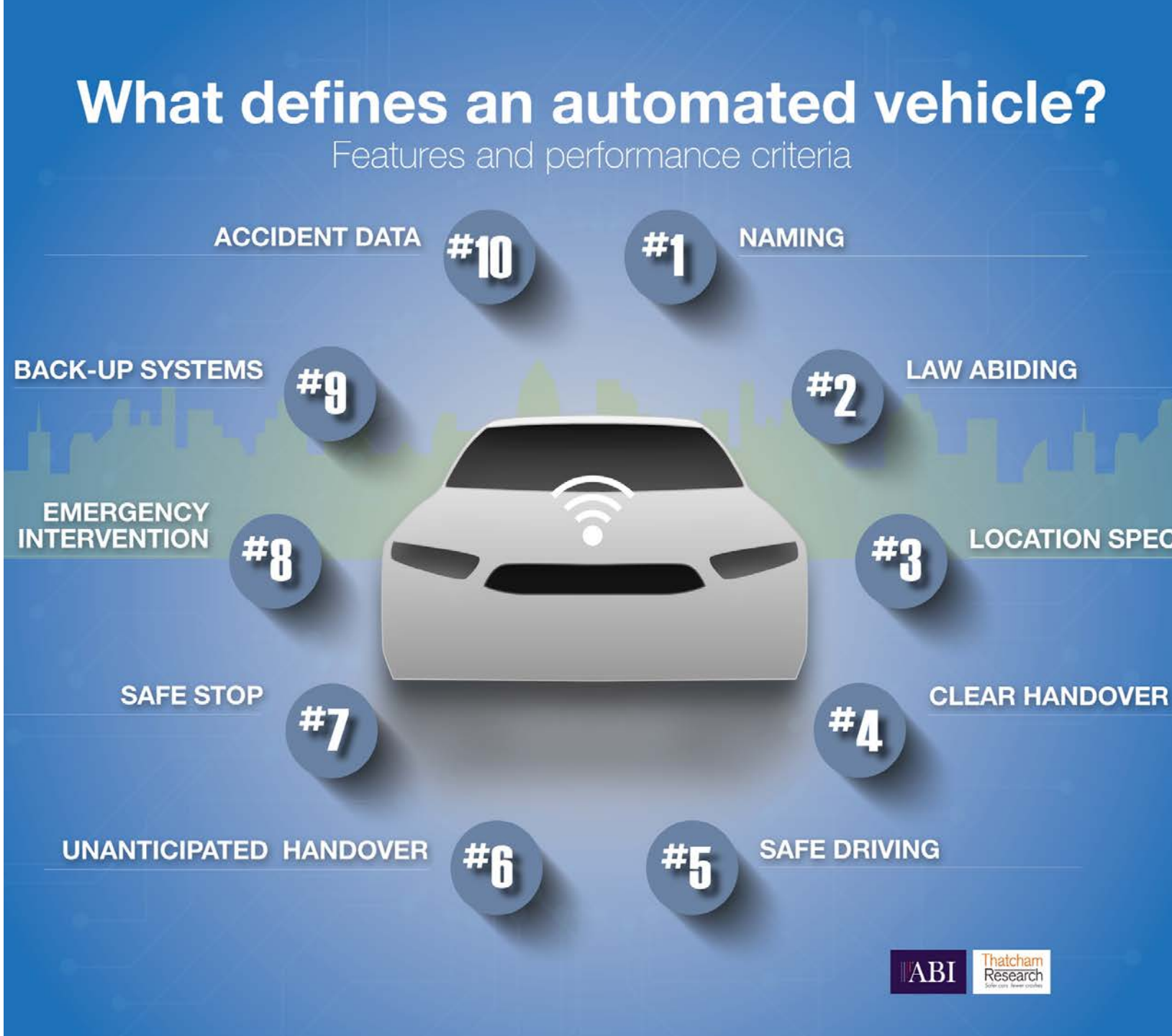
Automated Driving

Technical Definition for Insurers



Automated Driving?

Traffic jam Pilot – Low Speed Hands Free Motorway Driving

Audi A8 – the First L3 Automated Vehicle 2019 via Article 20 Exemption

The Road?

- Cars need Roads they can read
- Sensors read the road environment
- Investment on the road infrastructure critical to deliver AV's in the UK
- Connectivity just part of the story
- Road Markings and signage standardisation

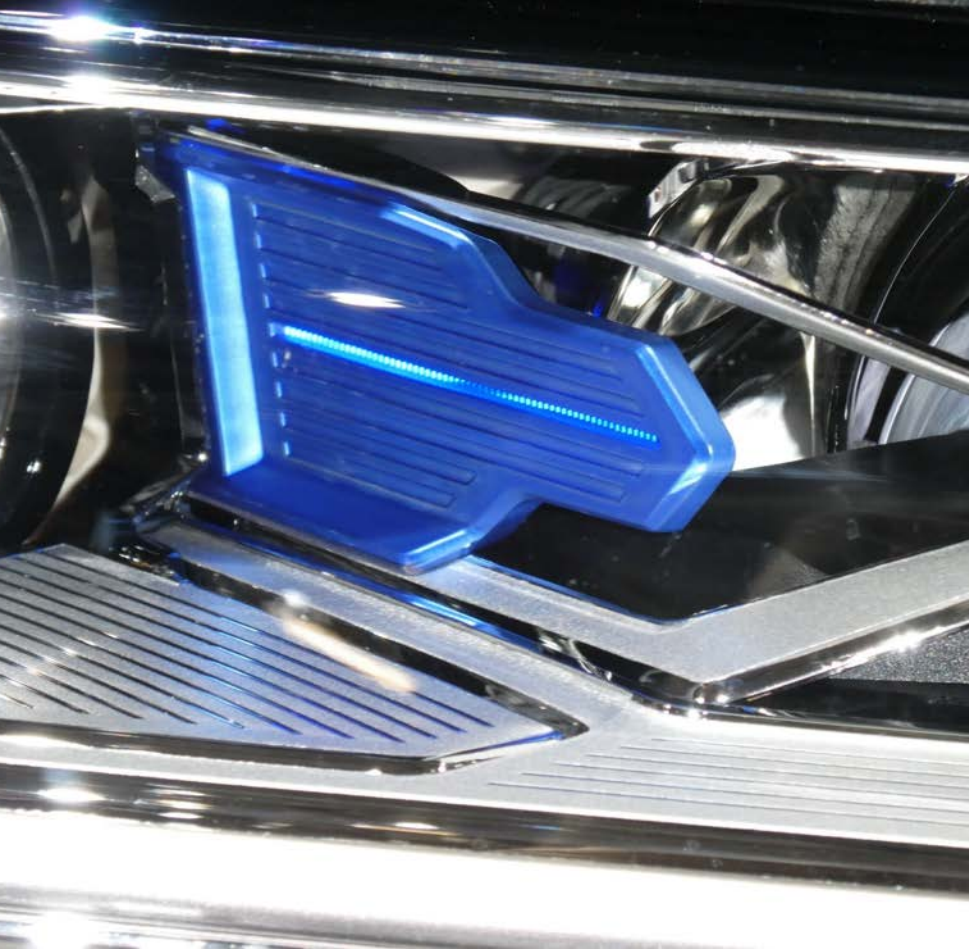
EV and hybrid repairability

- Information regarding disconnection and removal of EV or PHEV components for heat-related procedures is often missing or unclear
- Battery health information must be easily available
- Battery SRS fuses need to be replaceable, or at least re-set with suitable diagnosis
- Route coolant pipes and electrical cables away from accident damage areas

48 Volts

- 48v architecture is adding expensive additional components, with packaging exposing these to damage. Location away from external panels is beneficial

- Specific diagnostic equipment is required for some models, but some OEM are supporting safe and easy diagnosis by all repairers



More lighting – more OLED

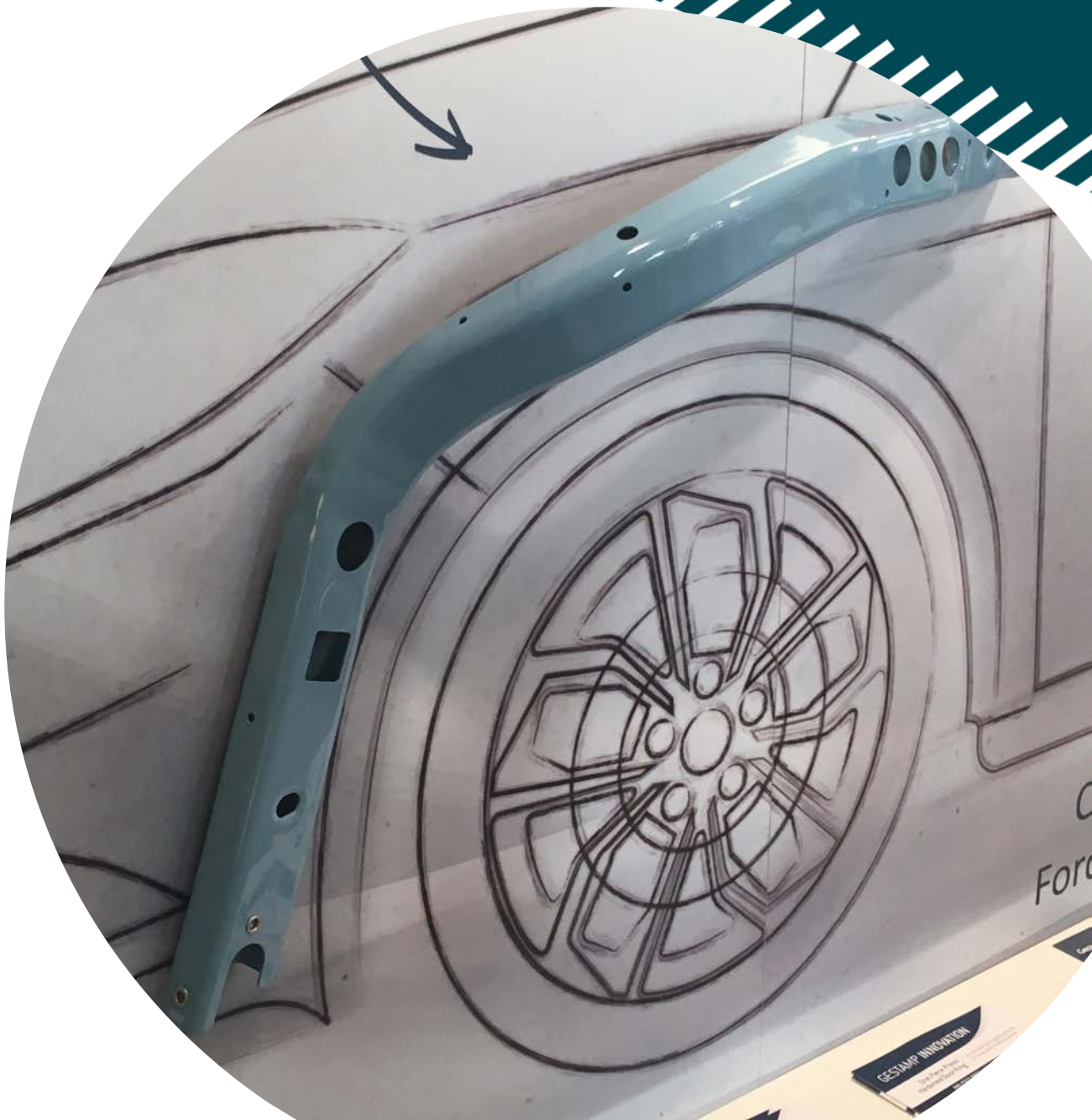
- Lighting technology sells cars
- Flat LED lighting sells MORE cars
- Digital lighting systems will continue to become more commonplace

‘live’ connected architecture – 5G ‘over the air’

- By 2021 there will be 94 million new cars and trucks connected and talking to each other – (Automotive IQ)

New generation steels

- High Formability Advanced High Strength Steels have arrived



ADAS Calibration

Fitment

Bumper repair

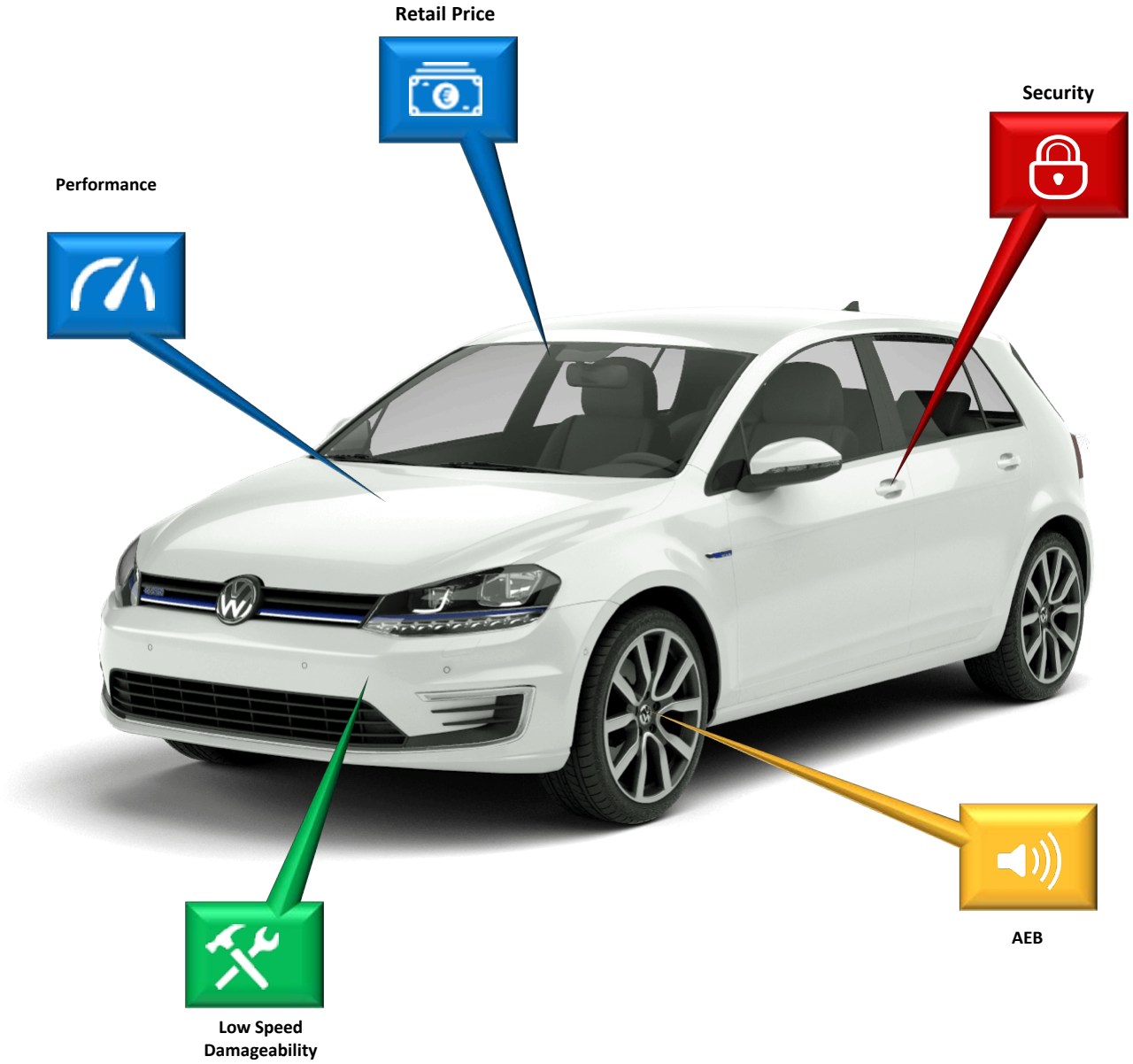
Calibration

2019 will witness the fastest rate of automotive technology development ever

Data – The New Currency

- Data Required to identify which vehicle has AV capabilities
- Data required to identify who was driving – car or the person behind the wheel
- Data must be standardised
- Data identifying user must be FOC
- Data must be “sent” from vehicle immediately post-crash
- Event recording must be triggered for minor events
- More comprehensive use data could be available for commercial use via the *Neutral Server* concept

Today ABI Group Rating – powered by Thatcham Research 1969 - 2018



Influencing Cost of Ownership

Group Rating comprises numerous vehicle attributes under various headings. :

Repair Times & Bumper Test
15 kph RCAR Low Speed Structural Test & 10 kph RCAR Bumper Test

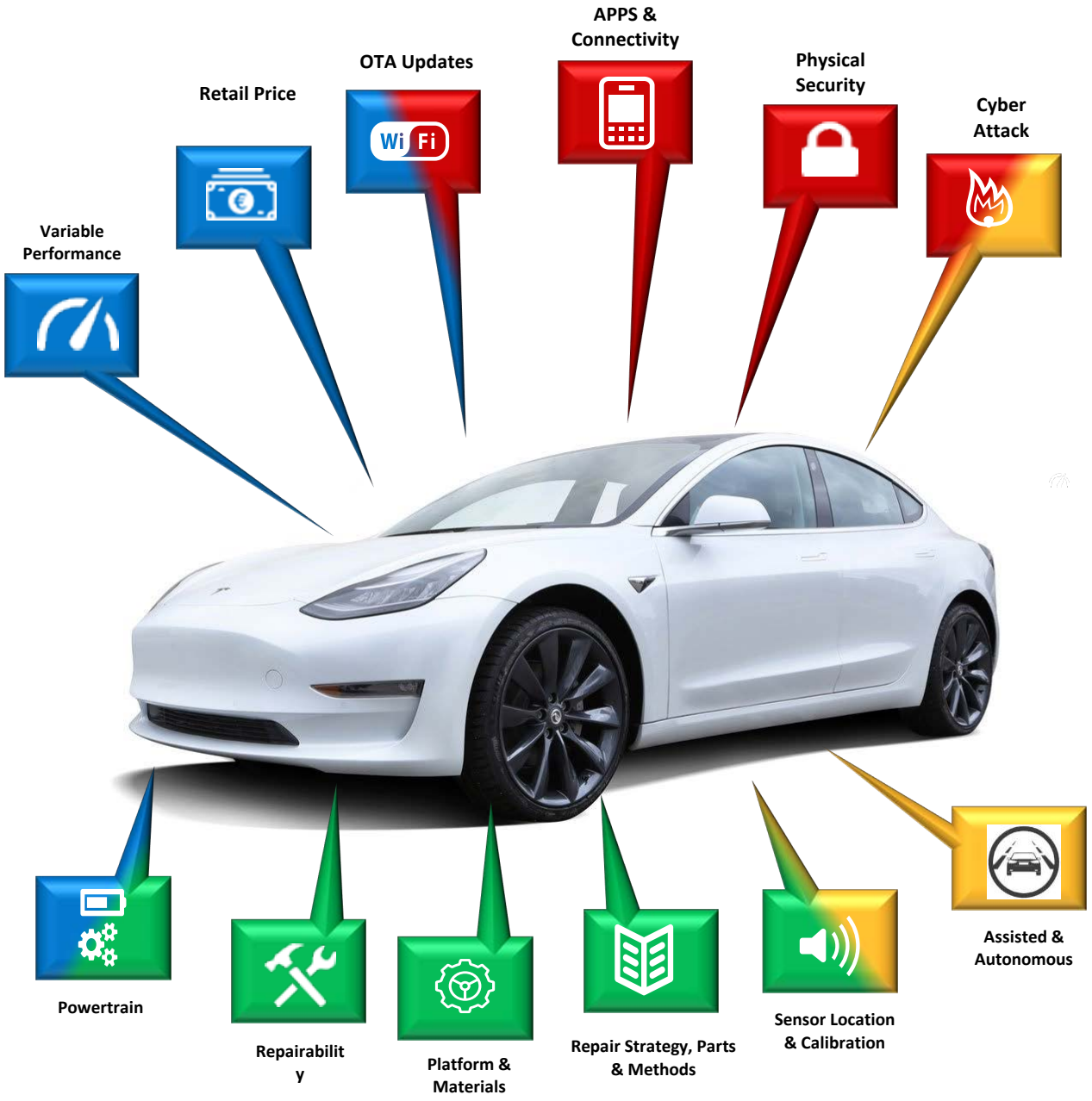
Vehicle Performance
Top Speed, 0-60 mph, Kerb Weight, Powertrain

Retail & Parts Costs
Retail Cost, Group Rating Parts Basket. & Crash Test Parts Baskets

Security
NVSA

ADAS
Low Speed City AEB

Tomorrow
The car and data as currency



Future Car Complexity

Group Rating comprises numerous vehicle attributes under various headings. :

Repair Times & Bumper Test
15 kph RCAR Low Speed Structural Test & 10 kph RCAR Bumper Test, Materials, Platform, Repair Methods, Calibration

Vehicle Performance
Top Speed, 0-60 mph, OTA Variable Performance, Kerb Weight, Transmission, Powertrain

Retail & Parts Costs
Retail Cost, Group Rating Parts Basket. & Crash Test Parts Baskets Linked to Live Price Files,

Security
NVSA, Connectivity, Cyber Security, Over The Air Updates. Signal Relay, APPs

ADAS
Low Speed City AEB, Interurban High Speed AEB, Low Speed Maneuvering Reverse AEB, Re-Calibration & Sensor Costs, Levels of Autonomy

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Thank you