



Automation, electrification and micro mobility

The Insurance Implications

Thatcham
Research
1707ENF



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SAFER CARS. FEWER CRASHES

17/06/21

VM Priorities

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

A

Automated

Assisted and Automated

Assisted

Automated

Autonomous

C

Connected

Connected vehicles and Cyber Security

Connected

Cyber

E

Electric

Electric powertrains and lightweight structures

Efficient Lightweight Structures

Electric Propulsion



UK Government

International Regulation and Legislation

- GSR – Safer European vehicles
- AEVA – Enabling EV and Automation in the UK
- Road Traffic Act

UK Policy

- 10 point plan for a Green Industrial Revolution
- Taxation, incentives, investment
- Future Transport Plan
- Vision Zero – reduce road deaths
- Zenic Road Map – Whole ecosystem
- Brexit – Challenges and Opportunities

The Ten Point Plan for a Green Industrial Revolution

Building back better, supporting green jobs, and accelerating
our path to net zero

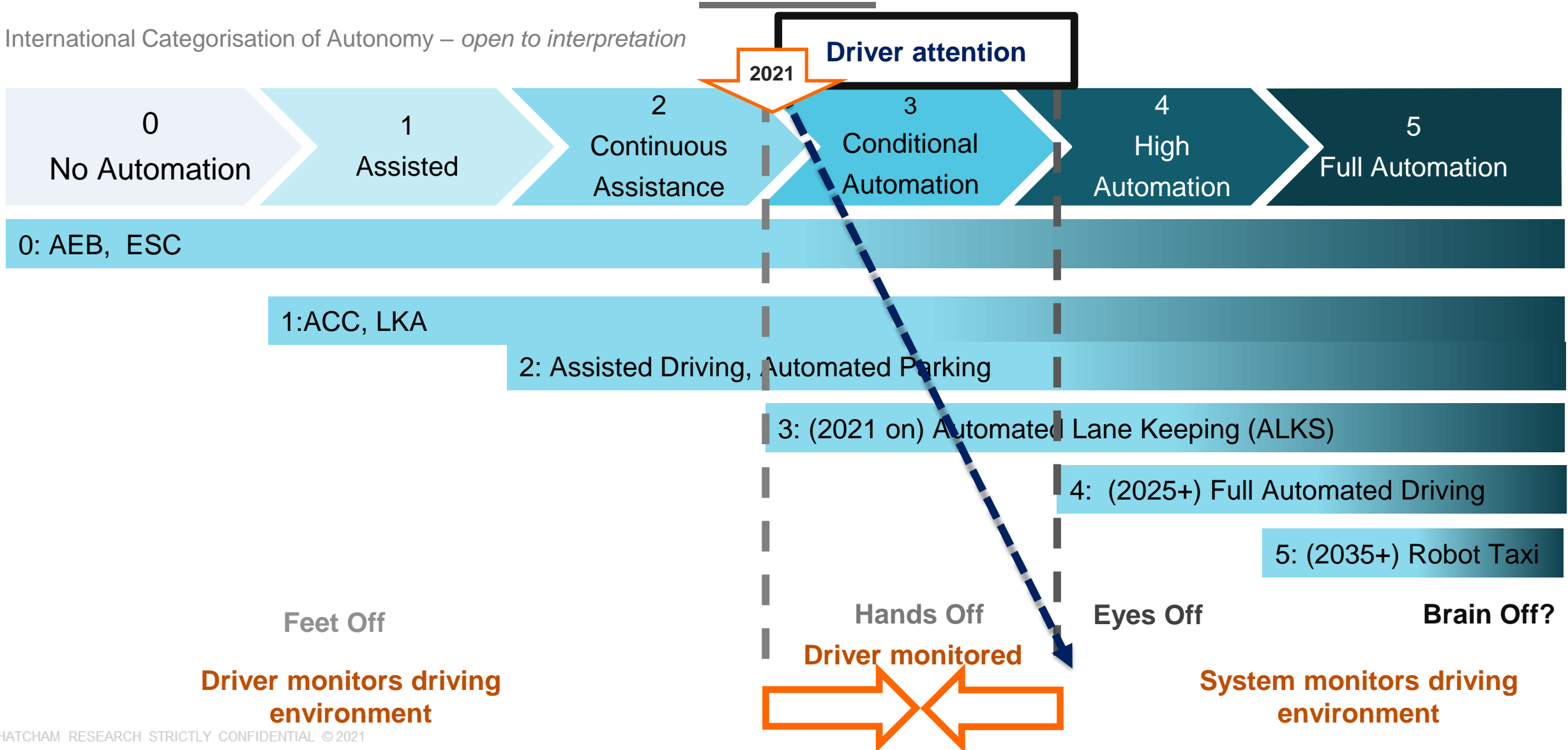


November 2020

Assisted Automated Autonomous

SAE Definitions and Timeline

International Categorisation of Autonomy – open to interpretation



Automation

➤ Consumer appetite and expectation?

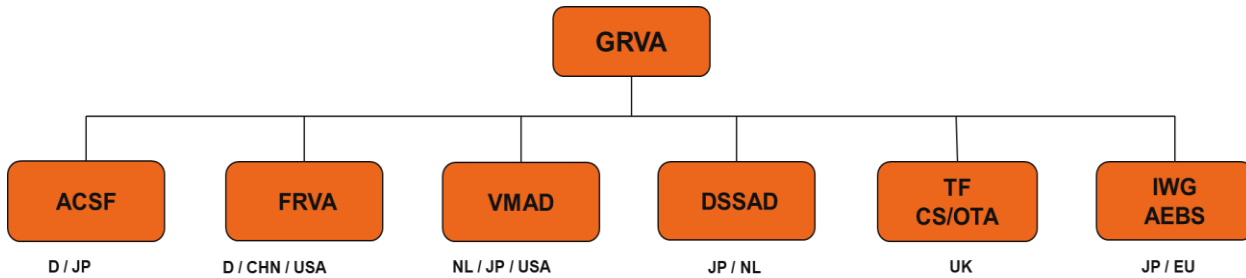


Regulation vs Consumer Testing

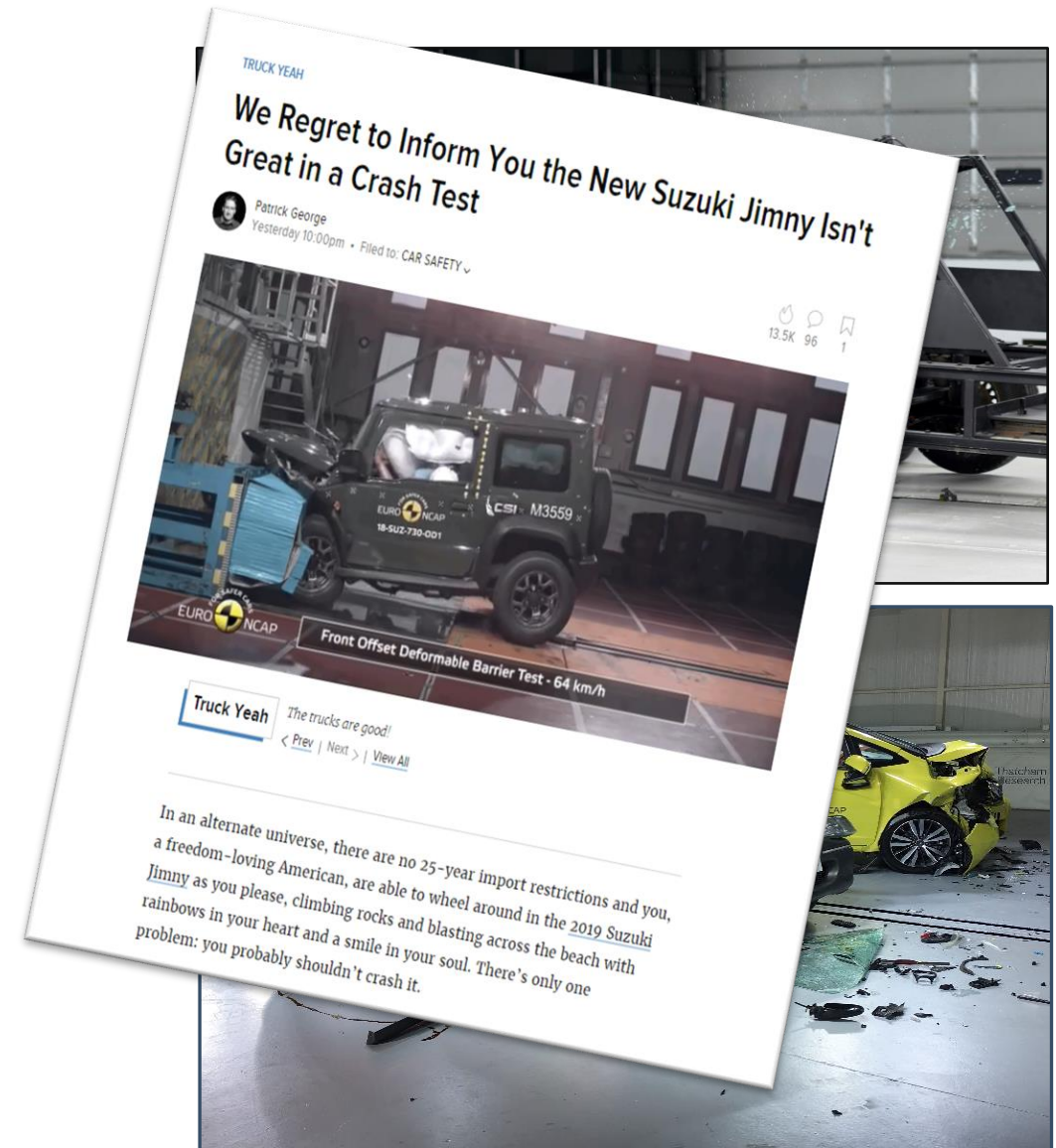


Structure WP29 at UN ECE

World Forum for Harmonization of Vehicle Regulations



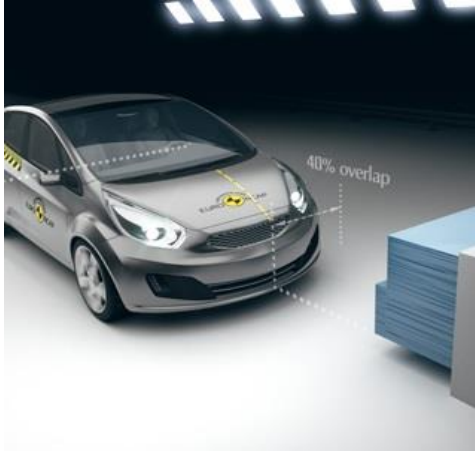
European Commission



Consumer Testing – A Market for Safety



Full-scale Crash Tests



Frontal Offset
Deformable
Mobile Barrier
(Since 1997)



Frontal Full-width
Rigid Barrier
(Since 2015)

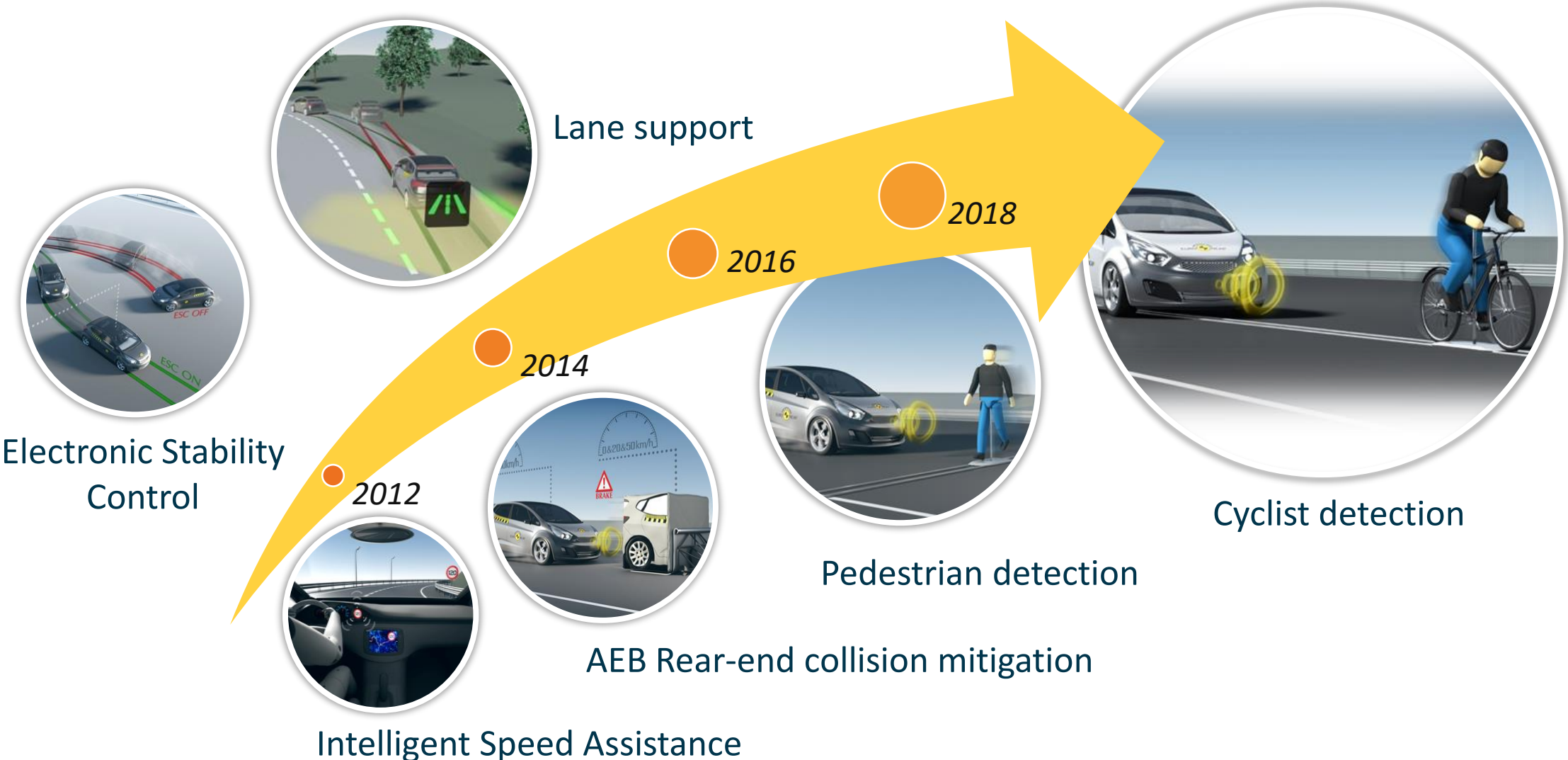
Side Mobile
Deformable Barrier
(Since 1997, updated 2015)



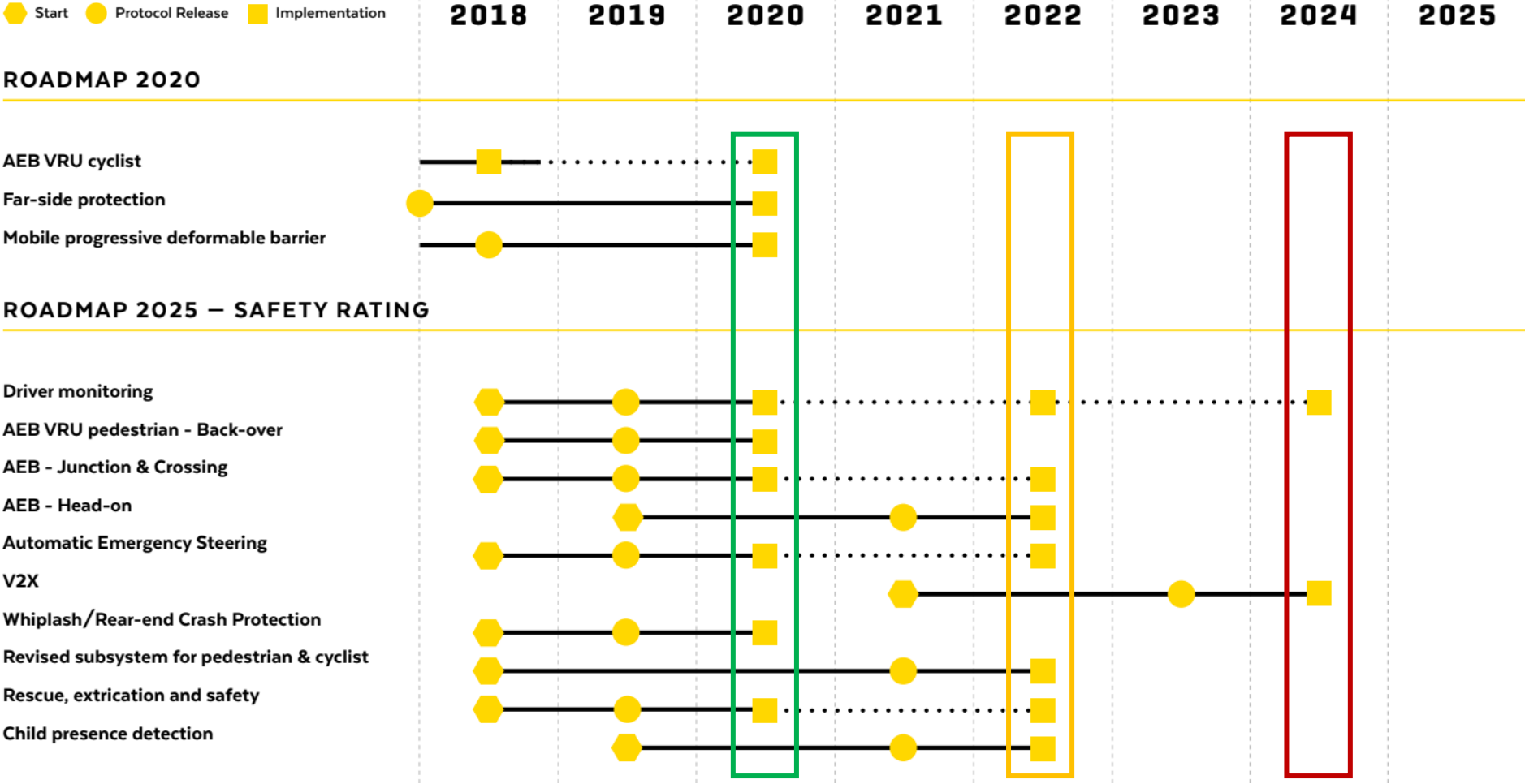
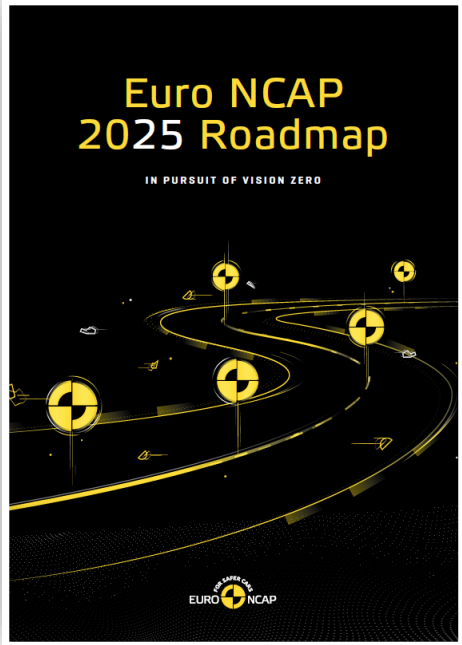
Side Pole
(Since 2001, updated 2015)



Driver Assistance Systems

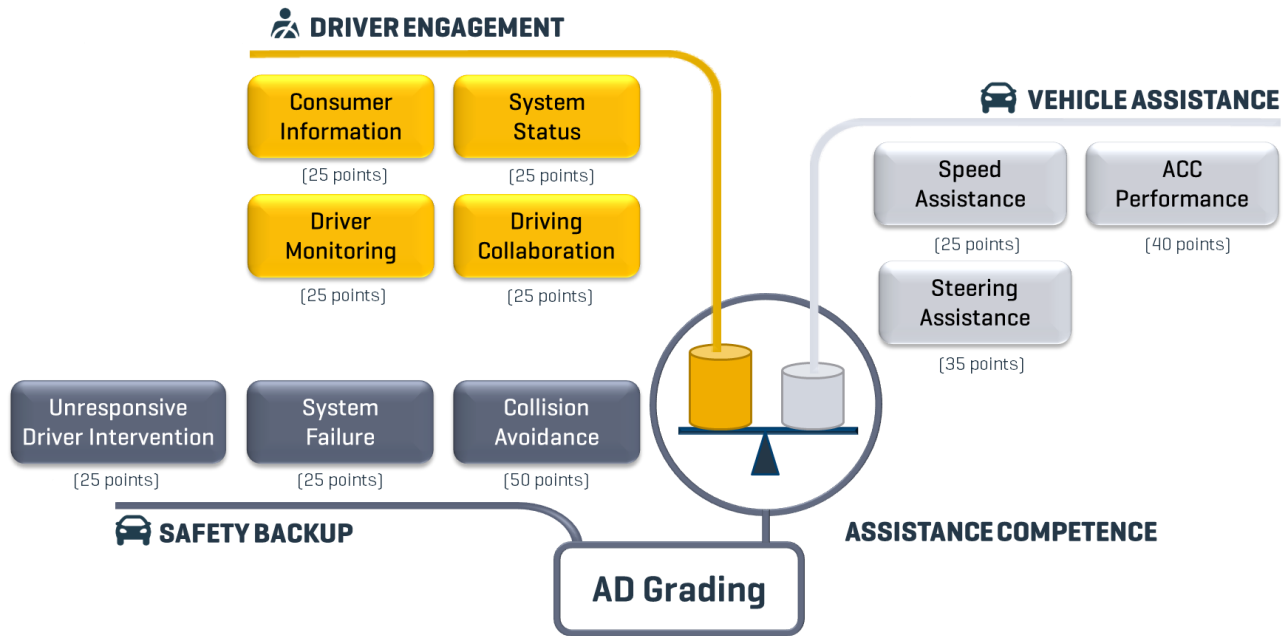







Euro NCAP Roadmap to Change



Testing Automation

> Development of Assisted Driving grading tests



 <p>2020 ■■■■ VERY GOOD</p> <p>Audi Q8 Adaptive Cruise Assist</p> 	 <p>2020 ■■■■ VERY GOOD</p> <p>BMW 3 Series Driving Assistant Professional</p> 	 <p>2020 ■■■■ GOOD</p> <p>Ford Kuga Co-Pilot 360</p> 
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Automated Driving Technology

Mercedes S Class (W221) Level 3 Automated Driving in 2021

Driving Assistance Package with DRIVE PILOT

Parking Package with 360°-Camera

Antenna Module

Rear Multi-Purpose Camera
Opening angle 50°

Stereo Multi-Purpose Camera
Opening angle 70°

Front Long-Range Radar
Opening angle 90° / 9°

Ultrasonic Sensors
Opening angle 120°

LiDAR
Opening angle 120°

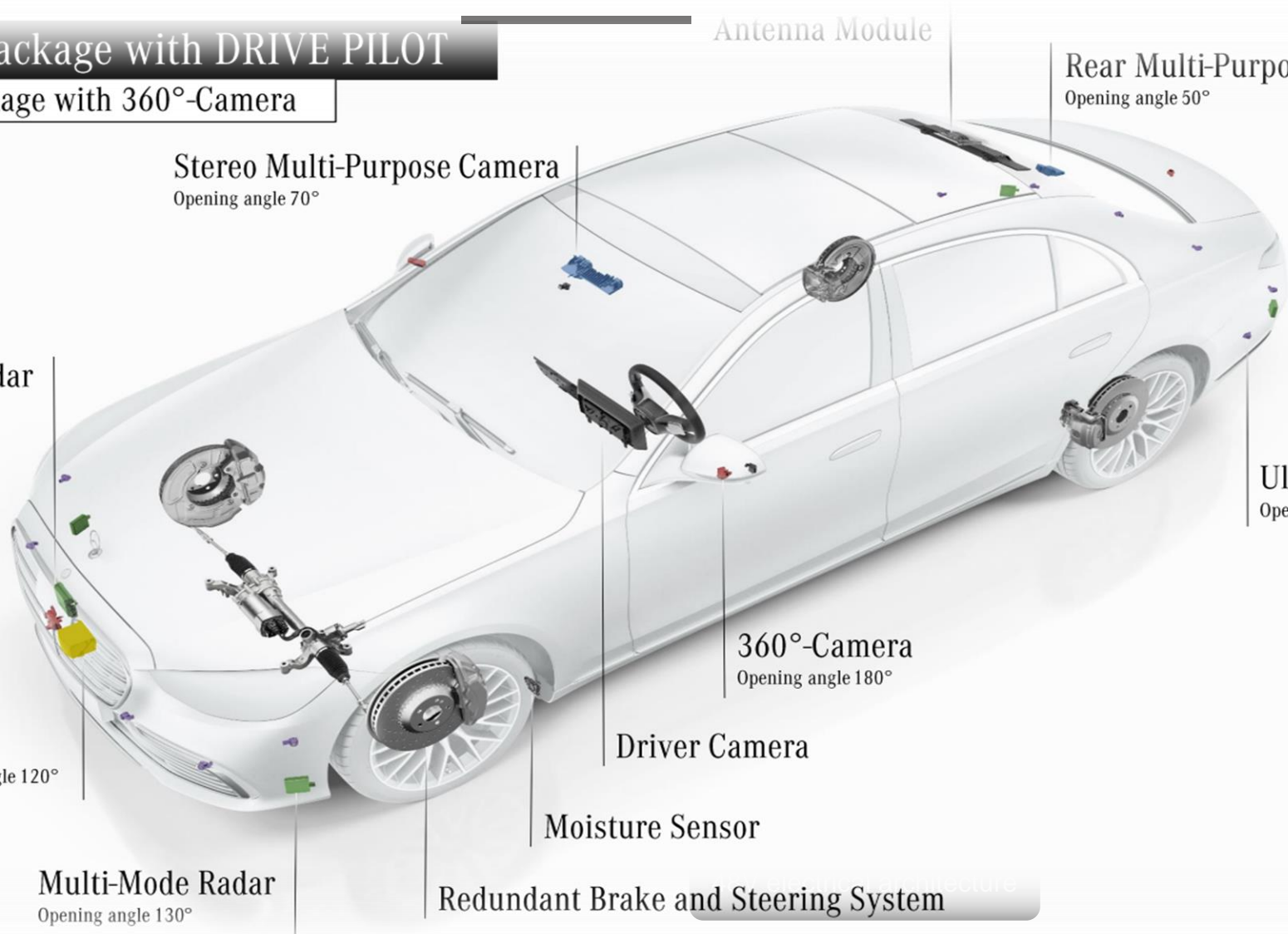
360°-Camera
Opening angle 180°

Driver Camera

Moisture Sensor

Multi-Mode Radar
Opening angle 130°

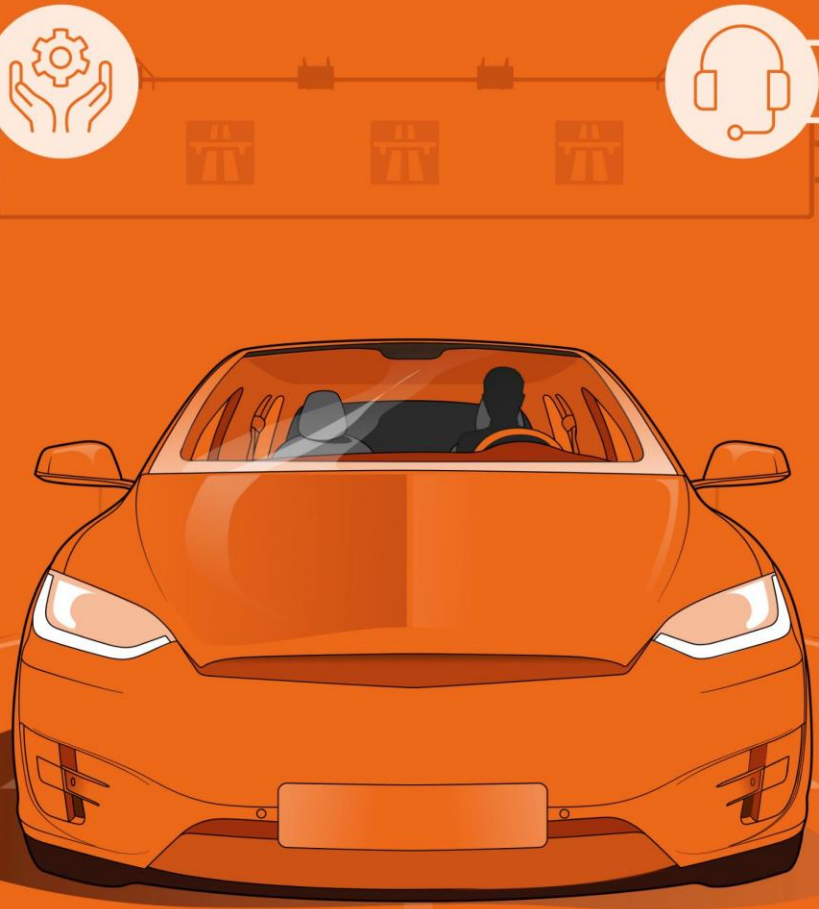
Redundant Brake and Steering System



Automated Lane Keeping Systems

- ALKS first L3 system 2021
- Automated Driving is seen as a key part of UK Transport Strategy and will be instrumental in reducing emissions, congestion and road casualties.
- UK Insurers support the adoption of **Safe Automation** and have been keen advocates of the **AEVA**
- The adoption of Automated Driving will follow type approval work at the **UN ECE**
- DFT issued a request-for-comment to understand safety implications although they are on record as saying “**The UK will be first to allow automated driving.....**”
- Legal to use in the UK by end 2021?





Sustainability



User Support



Collision Data



Location Specific

Cyber Resilience



Safe Driving

Collision Protection



User Monitoring

Ending Automation



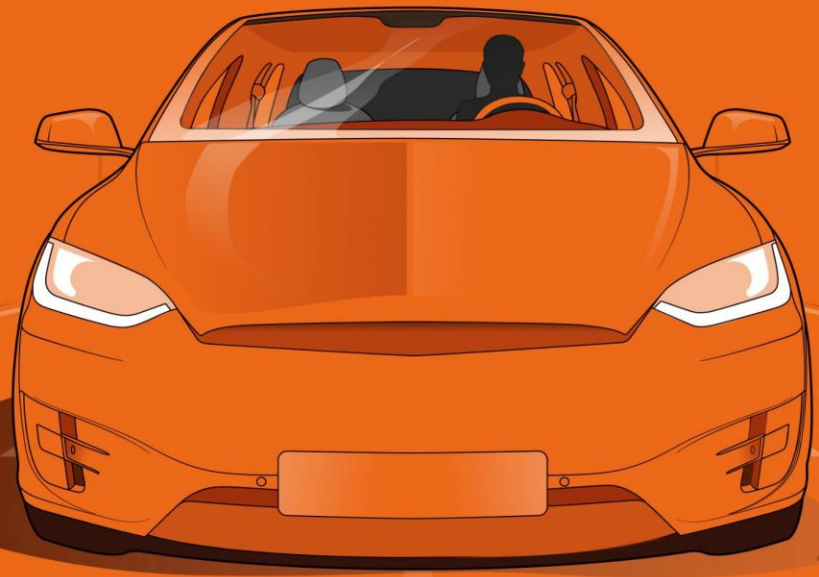
Secondary Tasks

12 Insurer Requirements

Using Automation




Starting Automation



Sustainability   User Support

Collision Data   Location Specific

Cyber Resilience   Safe Driving

Collision Protection   User Monitoring

Ending Automation   Secondary Tasks

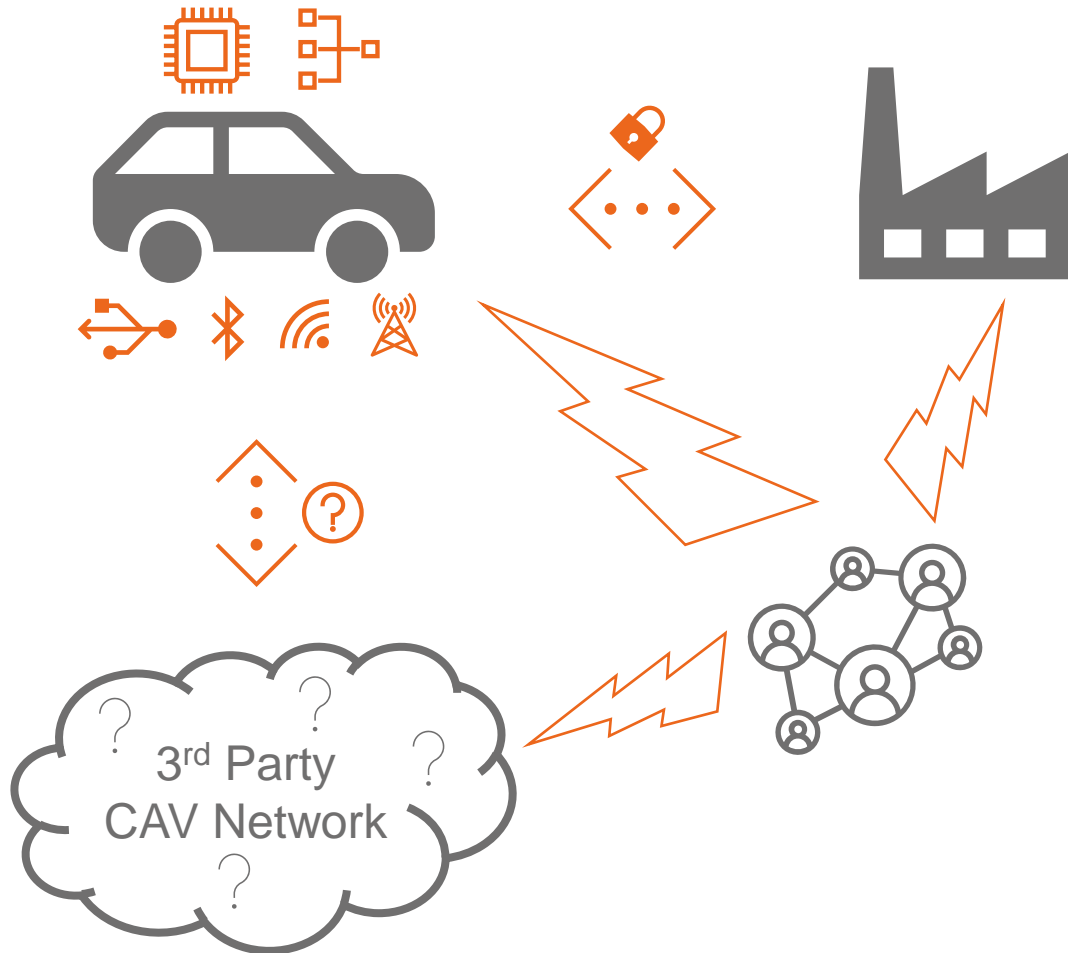
Using Automation   Starting Automation

12 Insurer Requirements

A white SUV is parked on a grassy shoulder next to a paved road. The background is filled with dense green trees. The text is overlaid in large white font.

There are more than 28 million connected vehicles on global roads and a major cyber-attack could happen tomorrow

Risk Landscape



Vehicle

- › Complexity: chips – network – architecture
- › Inputs: plug-in – wireless – remote

Vehicle Manufacturer

- › Backend: OTA updates – data exchange – control
- › Corporate: IT system – response – supply chain

Increased scope & complexity of risk, but feasible

3rd Party CAV Network

- › Service – insurer – entertainment – V2V – V2X
- › Infrastructure: mobile network – servers - hardware

Dynamic Risk

- › Threat actors: terrorism – hackers – errors
- › Software updates – emerging vulnerabilities

Risk visibility, assessment & control beyond existing motor insurance framework

Collision avoidance testing



e-scooter target



Nearside testing – Tesla



Ford Focus – typically representative



Tesla Model 3 – high performer

eScooter collision frequency estimate

- > Comparison of UK and French national stats – micro-mobility categorised in France in 2019
- > Of the 632 cases, about 1/4 are single vehicle micro-mobility collisions

Vehicle type B			Vehicle type A					
	UK		France					
	Pedal cycle		Pedal cycle		EDPM		EDP	
	Qty	%	Qty	%	Qty	%	Qty	%
Car + Taxi/Private hire car	11205	84.8%	2526	74.5%	319	70.9%	90	75.6%
Van / Goods Vehicle	1050	8.0%	286	8.4%	42	9.3%	10	8.4%
Bus/coach	228	1.7%	55	1.6%	12	2.7%	5	4.2%
Pedal Cycle	81	0.6%	77	2.3%	22	4.9%	1	0.8%
EDPM	N.A.	N.A.	22	0.6%	3	0.7%	0	0.0%
EDP	N.A.	N.A.	1	0.0%	0	0.0%	0	0.0%
All other	642	4.9%	432	12.7%	53	11.8%	14	11.8%
Sum	13206	100%	3399	100%	451	100%	120	100%

- > EDPM – motorised micro-mobility personal vehicle (including e-scooters)
- > EDP – non-motorised micro-mobility personal vehicle
- > Pedal cycle – proxy e-scooter vehicle

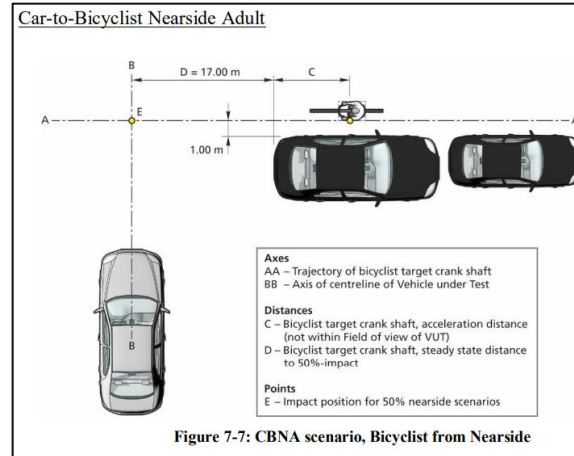
- > About 80% of micro-mobility personal vehicle collisions occurred versus **car vehicle type**
- > Assuming **similar operating conditions** of micro-mobility personal vehicle exist between UK and France
- > Based on the French car to pedal cycle/EDPM collision ratio, extrapolate **1,418 e-scooter-like** vehicle collisions versus **13,206 pedal cycle** collisions in the UK in 2019

Testing results

No Braking	Red
Some Braking	Yellow
Avoid	Green

CENA

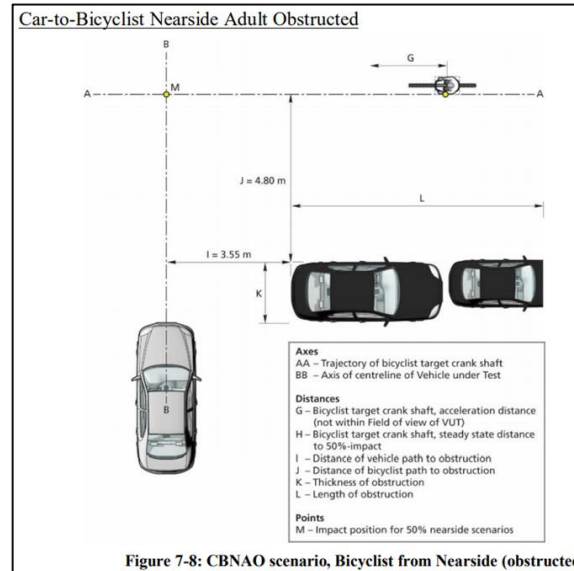
- Tesla – good 15km/h e-scooter performance, except low speed
- Tesla – limited performance against 20 km/h e-scooter
- Ford – no performance against 15km/h e-scooter
- Ford – moderate performance against 10 km/h e-scooter only



		Car-to-e-scooter Nearside Adult (CENA)											
		Vehicle Speed (km/h)											
Model	Target Speed	10	15	20	25	30	35	40	45	50	55	60	
Tesla	15km/h	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	
	15km/h	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	
Ford	20km/h	Red	Red	Green	Green	Yellow	Yellow	Red	Red	Red	Red	Red	
	15km/h	Red	Red	Red	Red	Red	Red	Yellow	Red	Red	Red	Red	
	15km/h	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
	20km/h	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
	10km/h	Green	Green	Green	Green	Green	Green	Green	Yellow	Yellow	Red	Red	

CENAO

- Tesla – moderate performance against 10km/h e-scooter only
- Ford – no performance against either speed e-scooter



		Car-to-e-scooter Nearside Adult Obstructed (CENAO)											
		Vehicle Speed (km/h)											
Model	Target Speed	10	15	20	25	30	35	40	45	50	55	60	
Tesla	10km/h	Green	Green	Green	Green	Yellow	Green	Green	Green	Yellow	Red	Red	
	20km/h	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
Ford	10km/h	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
	20km/h	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	

New EV's

Nissan Leaf



Renault Zoe



Jaguar I-Pace



Tesla Model 3



Rivian



Ford Mach e



Porsche Taycan



Polestar 2



NIO ES8



Always U5



BYD Han

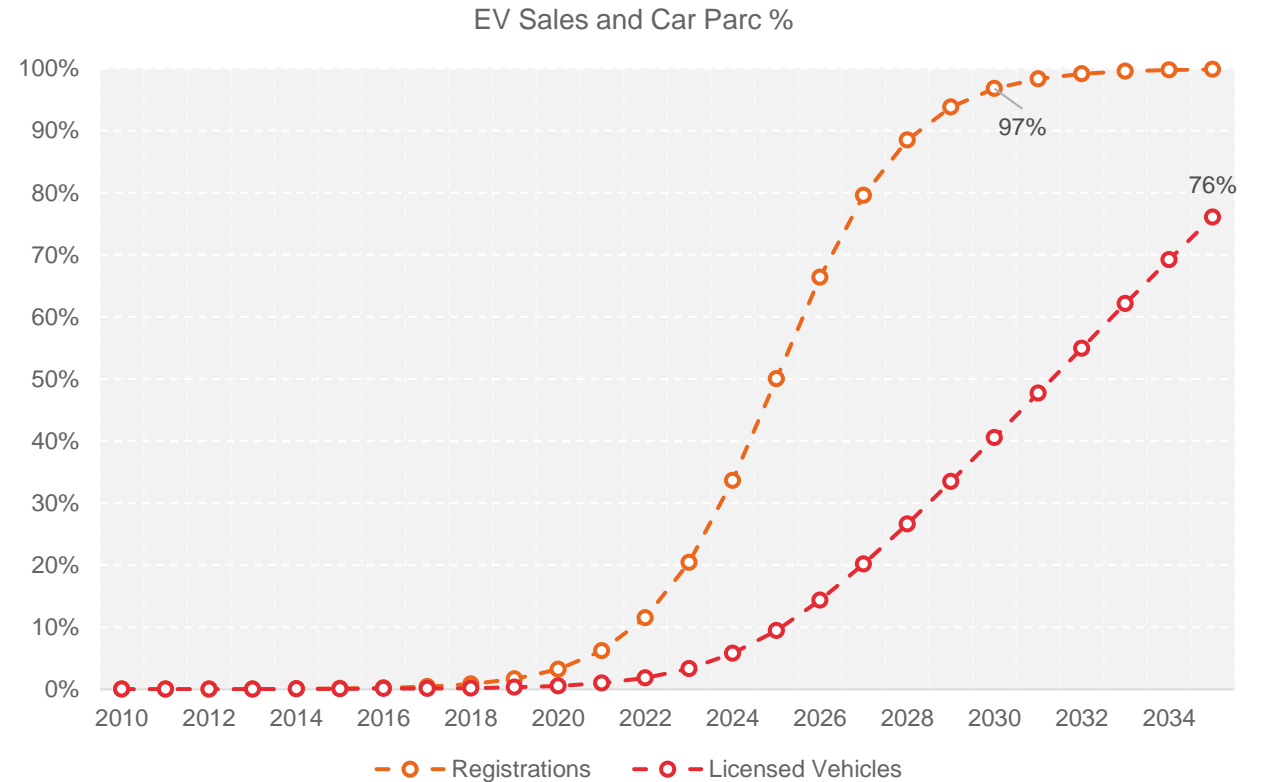


Xpeng P7



Electrification

- UK Government Electrification target brought forward
- 2030 new vehicles 100% BEV and HEV
- 2035 new vehicles 100% BEV only
- Electric new Car registrations under 5% in 2020
- Take-up influenced by financial incentives
- Repair costs will be on average higher
- Repair process unclear
- Will stabilise as EV's become common place



Thatcham Research Projections 2021 based on Government strategy and New vehicle registrations

Electric Platform Technology

VW MEB



Conclusions

- ACE – Automated Connected and Electric – the future
- Government environmental pledges – Kyoto, Paris and economic benefits – the Green economy set the pace of change
- Assisted technology with us today
- Automated with us later in 2021
- Technology requires human oversight to be safe
- eScooters adoption encouraged
- Most ADAS systems cannot recognise
- EV's to become common place but more expensive to repair
- New cyber threats mean policy wording should be checked
- The future is ACE





Thank you