Future Vehicle Safety Technologies
Influencers and Trends

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

- **Automated**
  - Assisted and Automated

- **Connected**
  - Connected vehicles and Cyber Security

- **Electric**
  - Electric powertrains and lightweight structures

- **Efficient Lightweight Structures**

- **Electric Propulsion**

- **Cyber**

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Electric Platform Technology

VW MEB
Passive Safety Testing

- **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)
Active Safety Testing

- Intelligent Speed Assistance
- Lane support
- Electronic Stability Control
- Pedestrian detection
- AEB Rear-end collision mitigation
- Cyclist detection
Roadmap to Drive Change

ROADMAP 2020

- AEB VRU cyclist
- Far-side protection
- Mobile progressive deformable barrier

ROADMAP 2025 – SAFETY RATING

- Driver monitoring
- AEB VRU pedestrian - Back-over
- AEB - Junction & Crossing
- AEB - Head-on
- Automatic Emergency Steering
- V2X
- Whiplash/Rear-end Crash Protection
- Revised subsystem for pedestrian & cyclist
- Rescue, extrication and safety
- Child presence detection

Protocol delivery timeline:
- Green squares: Protocols delivered
- Yellow squares: Protocols under development
- Red squares: To be initiated

Years:
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- 2025
## A Definition of Automation

<table>
<thead>
<tr>
<th>ASSISTED</th>
<th>AUTOMATED</th>
<th>AUTONOMOUS</th>
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</thead>
<tbody>
<tr>
<td>1. Driver retains for responsibility and shares control with the vehicle</td>
<td>1. Vehicle has full responsibility for control in an Operation Design Domain (ODD) defined by the VM.</td>
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</tr>
<tr>
<td>2. Vehicle and Driver share Object and Event detection and response (OEDR)</td>
<td>2. Vehicle performs (OEDR)</td>
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</tr>
<tr>
<td>3. Driver may not perform secondary tasks over and above those permitted in normal driving</td>
<td>3. Driver may perform certain other non driving secondary tasks</td>
<td>3. Driver is effectively a passenger</td>
</tr>
<tr>
<td></td>
<td>4. Driver needs to be available for transition of control – but not to maintain safety</td>
<td>4. Driver has no ability to control apart from a mode change</td>
</tr>
</tbody>
</table>
The best systems offer a balance between the amount of assistance they provide and the level of driver engagement and should be supported by an effective safety backup.

“An assistance system is only as good in addressing critical situations as the driver who operates it – hence Driver Engagement limits the overall verdict”
Testing Automation

Development of Assisted Driving grading tests
2020 Euro NCAP Assisted Ratings

- Audi A8
- BMW 3-series
- Ford Kuga
- Mercedes-Benz GLE
- Nissan Juke

- Peugeot 2008
- Renault Clio
- Tesla Model 3
- VW Passat
- Volvo V60
Assisted Driving Ratings

Overall normalised score and final rating

- Mercedes-Benz CLE: 87%
- BMW 3-series: 86%
- Audi Q8: 81%
- Ford Kuga: 76%
- Volkswagen Passat: 69%
- Tesla Model 3: 66%
- Nissan Juke: 62%
- Volvo V60: 60%
- Renault Clio: 53%
- Peugeot 208: 51%

Rating: VERY GOOD

Available on the Euro NCAP website.
Assisted Automated Autonomous

SAE Definitions and Timeline

0: AEB, ESC
1: ACC, LKA
2: Assisted Driving, Automated Parking
3: (2021 on) Automated Lane Keeping (ALKS)
4: (2025+) Full Automated Driving
5: (2035+) Robot Taxi

Driver monitored
System monitors driving environment

Driver monitors driving environment

Feet Off
Hands Off
Eyes Off
Brain Off?

Driver attention
Global Automation

› US and Europe at different speeds on the same journey

DRIVER FALLS ASLEEP IN A MOVING TESLA
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 various countries by mid 2021
12 Insurer Requirements
Driver Monitoring Systems (DMS)

Indirect – inferred drowsiness
- Time
- Steering and lane position

Direct – real-time drowsiness and attentiveness
- Camera/radar

Direct advanced – driver cognisance
Driver Monitoring Tech and Testing

Inattention

Drowsiness
eScooter testing

e-scooter target

Nearside testing – Tesla

Tesla Model 3 – high performer

Ford Focus – typically representative
Future Vehicle

- Government environmental pledges - The Green economy set the pace of change
- EV’s the major VM goal – giga-factory's
- New vehicle designs allow new architecture and new features – Connectivity and Automation
- Assisted, Automated and Autonomous
- Assisted Ratings push driver/vehicle balance
- Automation (limited) here with us this year – but is it automated?
- DMS a key part of this evolution
- New mobility solutions – new challenges
- Consumer ratings continue to set the pace of change
Thank you