Connected and autonomous vehicles at the crossroad: Opportunities and challenges

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Unprecedented opportunities, but we’re not there yet

- Low-speed AEB – ↓38% real world rear-end crashes
- 2,500 lives saved, 25,000 serious accidents prevented (2014-2030)

- Urban roads, peak traffic, low numbers of AVs: -12% delays, +21% journey time reliability
- ITS using V2V and V2I: ↓CO₂ emission ≤20%

- 6/10 with limited mobility – ↑ quality of life
- 47% older people – more easily fulfil day-to-day tasks

- £51bn value added p.a. by 2030
- 320,000 additional jobs by 2030 (25,000 in automotive manufacturing)

1.8m (or 2/3) British new car buyers benefit from driver assistance systems

<table>
<thead>
<tr>
<th>Feature</th>
<th>Fitted as Standard</th>
<th>Optional fitment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collision Warning System</td>
<td>1,071,728 (39.8%)</td>
<td>727,052 (27.9%)</td>
<td>1,798,780 (66.8%)</td>
</tr>
<tr>
<td>Parking Assistance</td>
<td>589,720 (21.9%)</td>
<td>993,638 (36.9%)</td>
<td>1,583,358 (58.8%)</td>
</tr>
<tr>
<td>Automatic Emergency Braking</td>
<td>764,751 (28.4%)</td>
<td>665,118 (24.7%)</td>
<td>1,429,869 (53.1%)</td>
</tr>
<tr>
<td>Overtaking Sensor</td>
<td>140,024 (5.2%)</td>
<td>993,638 (36.9%)</td>
<td>1,113,662 (42.1%)</td>
</tr>
<tr>
<td>Adaptive Cruise Control</td>
<td>185,802 (6.9%)</td>
<td>788,986 (29.3%)</td>
<td>974,788 (36.2%)</td>
</tr>
<tr>
<td>Blind Junction View</td>
<td>8,078 (0.3%)</td>
<td>253,121 (9.4%)</td>
<td>261,199 (9.7%)</td>
</tr>
</tbody>
</table>

Source: JATO Dynamics analysis based on SMMT new car registration data 2016
Four overarching challenges

Technology and infrastructure
- Sensor fusion, AI, machine learning, deep learning for L4/5
- Fully fail-operational system
- HMI and control handback
- High precision mapping
- Virtual testing and validation
- Digital (e.g. LTE-V, 5G, ITS G5, satellite): coverage, reliability, bandwidth, capacity
- Physical infrastructure

Business models
- New opportunities from ‘servitisation’ and ‘horizontalisation’ of the product
- New insurance business models (e.g. PAYD)
- Who pays for connectivity?
- Towards integrated mobility solutions

Policy, regulation and standards
- Insurance/liability framework
- Highway Code and Construction & Use Regulations
- Harmonised international regulations (UNECE Reg. 79)
- Type approval, certification and future MOT
- Data protection and data sharing
- Driver licensing and future ‘driving test’
- 5G and IoT standards

Behavioural issues and public acceptance
- Public perception and misconceptions
- Co-existence with legacy motor parc and other traffic
- Social behaviours (e.g. playing chicken)
- Reshaping future cities and urban centres
5G is welcome, but will not be a panacea

Mobile coverage on the UK road network

<table>
<thead>
<tr>
<th></th>
<th>Full network coverage</th>
<th>Partial network coverage</th>
<th>No network coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2G</td>
<td>211,753 (86%)</td>
<td>28,975 (12%)</td>
<td>4,561 (2%)</td>
</tr>
<tr>
<td>3G</td>
<td>119,057 (48%)</td>
<td>111,679 (45%)</td>
<td>14,554 (6%)</td>
</tr>
<tr>
<td>4G</td>
<td>43,070 (18%)</td>
<td>65,950 (27%)</td>
<td>136,271 (56%)</td>
</tr>
</tbody>
</table>

Note: percentages might not add up to 100% because of rounding. Partial network coverage means that at least one of the four network providers – Vodafone, O2, EE, Three - will offer a signal.

From CAVs to connected mobility and lifestyle solutions

Mobility

Options

Integrated

Vehicle-as-a-Platform
UK testing ecosystem
Thank you

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