Future of Mobility: A view of the DfT’s direction of travel

Prof. Phil Blythe, Chief Scientific Adviser, Department for Transport
The CSA: My Objectives

- Provide leadership on developing technology and innovation
- Improve the strategy for science and innovation research and future proof decision making in the DfT
- Position DfT as a leader in science across Whitehall and maximise value of the SAC
- Develop stronger links between science and internal stakeholders and provide strategic science input and evidence into analysis work programmes
- Identify and deliver on a number of high priority scientific issues including:
  - air quality and vehicle emissions;
  - intelligent infrastructure and smart condition monitoring;
  - older people mobility and accessibility;
  - big data/smart Cities and MaaS;
  - railway signalling/digital railways;
  - drones and future flight;
  - spaceflight;
  - engineering skills; and
  - cooperative and autonomous vehicle
- Support Industrial Strategy and Sector Deals
- Future-proof DfT investment decisions through science
What is driving the agenda?

- Innovation based companies will be attracted to UK cities that will use their technology and skills.
- BIS calculates that the Smart Transport market will be worth $100 million by 2018.

- Resilience can be improved through technology to anticipate and quickly react to extreme weather events that can cripple transport.

- Technology is influencing all aspects of city life and offers new ways to plan and manage transport according to peoples needs.

- Transport has a significant impact on poor air quality, technology can reduce this.
- Alleviate pressure on existing infrastructure and services and reduce congestion.

- Behaviour shifts have led to new travel options, such as working from home or the using the sharing economy. Mobility for older and impaired traveller.

- Increasing urbanisation puts more pressure on transport and new solutions are needed.
- Benefits to travellers can be achieved without large scale infrastructure building.
Role of Government – why do we get involved?

- Safety
- Mobility
- Efficiency
- Productivity
Department for Transport Key Intelligent Mobility Innovations
Moving Britain Ahead

Ideally electric or other future energy source

Increased interest in shared fleets and use of “mobility as a service”

The key to place-making benefits

Moving as part of system…in time, multi-modal

DATA: The key to new network management – people and freight

FULLY automated – can move when empty

HIGHLY automated – needs a “driver”

Pricing

Five Pillars of future ITS/Intelligent Mobility

Source: WSP, ITS Montreal
Trends in automation

- Not limited to cars: new technologies such as last mile delivery pods, drones, moving in to areas of traditional transport such as trains, ships and agriculture.

- Changing consumer perceptions. Consumers are increasingly expecting information to be available readily and easily. The smart phone is the only thing some people need to consume transport.

- A move toward a sharing economy. Asset ownership (cars) could be diminishing. Ride sharing and car sharing could lead to a shift away from private car ownership.

- UK ambition to be a world leader with over £300m invested or committed.
The goal – a self sustaining CAV ecosystem

- Stimulates economic activity
- Develops world class talent
- Supports and attracts adjacent business

- Stimulates cross-sector collaboration
- Connects regions
- Produces world class business & technical innovation

- Improves mobility for local population
- Attracts regional collaboration
- Attracts world class talent

- Produces world class customer experiences
- Attracts entrepreneurs
- Attracts global industry players

The Future of Mobility
Possible applications of autonomous vehicles (AVs) as part of a diversified public transport system

- High capacity core network with fixed line service
- Swarm of AVs as Robo-Taxis and on-demand shuttles
- AVs used as feeders to public transport stations
- Area-based on-demand autonomous mini-buses
- Autonomous Car-sharing vehicles

Source: UITP / üstra
So, what are we doing... CCAV Test Beds
Ultra Low Emission Vehicles: Government’s ambition

We will end the sale of new conventional petrol and diesel cars by 2040 and almost every car and van to be zero emission by 2050

Air Quality Plan, July 2017
Key barriers we are tackling

**Upfront cost**
Ultra Low Emission Vehicles (ULEVs) tend to cost more upfront than petrol or diesel equivalents due to the cost of battery or fuel cell technologies. However, prices are coming down as sales increase, and running cost savings from ULEVs can be substantial.

**Technology development**
Electric vehicle technology needs continued investment to accelerate performance improvements and prepare ULEVs for the mass market. Government research support encourages this technology development, and investment in the industry.

**Range and recharging**
Electric vehicles need new infrastructure and are a different proposition for drivers used to refuelling with petrol or diesel. Ongoing improvements in new ULEVs’ ranges, resulting from advances in battery technology, and improving refuelling and recharging infrastructure will help ease this transition.

**Energy system**
The extra electricity demand from uptake of electric vehicles could require some increased generating capacity and upgrades to local electricity connections.

**Public misconceptions**
Consumer concerns do not always reflect the reality of owning and driving ULEV. The Go Ultra Low campaign aims to address misconceptions.

**Other vehicles**
Taxis and buses significantly impact on urban air quality, but have particular challenges for electrification. Freight must also be tackled.

**Supply of vehicles from manufacturers**
A regulatory framework helps encourage manufacturers to clean up their vehicles and bring ULEVs to market.
Total Government investment in ULEV is now nearly £1.5 billion until 2020/21

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<th>Infrastructure Investment Fund (£££m)</th>
<th>~£1.5 billion</th>
<th>Research &amp; Development (£££m)</th>
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<td>Plug-in Car Grants (££m)</td>
<td>2015/16-2020/21 PROGRAMME</td>
<td>Go Ultra Low campaign (£m)</td>
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<td>Plug-in Van and Truck Grants (££m)</td>
<td>Domestic Chargepoint Grants (£m)</td>
<td>Go Ultra Low Cities (££m)</td>
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<td>Plug-in Motorcycle Grants (£m)</td>
<td>Other Infrastructure Grants (£££m)</td>
<td>Zero and Low Emission Buses (£££m)</td>
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<td>Plug-in Taxi Grants (££m)</td>
<td>Highways England Rapids (£m)</td>
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<td>Hydrogen Fuel Cell EV Grants (£m)</td>
<td>Taxi Infrastructure Grants (££m)</td>
<td>Public Sector Fleet support (£m)</td>
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<td>Hydrogen Refuelling Stations (£m)</td>
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<th>2020</th>
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<td>3-7% new cars ULEVs</td>
<td>100% new cars and vans ZEVs</td>
<td>Almost all cars and vans ZEVs</td>
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<td>+ £100m Fiscal Incentives (HMT)</td>
<td>+ £500m Advanced Propulsion Centre (BEIS)</td>
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Connected Intelligent infrastructure (CITS)
Mobility as a Service (MaaS) is happening
The Automated and Electric Vehicles Bill is progressing through the House of Commons

The Bill completed Commons Committee Stage on 16 November

Next is Report Stage (29 January) when the Amendment will be introduced
Followed by Third Reading.

Then the Bill will move to the House of Lords.

During the debates at the Committee stage of the Bill’s passage, the Minister committed to introducing an amendment which would take powers to ‘allow the transmission of data relating to charge points’
The way forward is challenging

- Do we understand what users really want?
- Do we understand what impact automation will have (more/less congestion, health etc.)
- Will we end up with the ‘point to point’ commercial MaaS where other social responsible transport services, such as buses and conventional taxi services are unable to compete?
- Will electromobility get adopted with the number of vehicles required to ensure a transition to low carbon, will infrastructure to recharge be available in a way that it does not hinder uptake and will the business models exist to support this?
- Will ULEV’s be ULEV’s or will there be gamification by the OEM’s?
- How can we avoid being beguiled by the new technologies?
- Do we need to consider transport as a whole system rather than a collection of loosely connected modes?
- Are local authorities & other stakeholders engaged?
- Is the DfT doing enough to let the UK know what is our ambition?
What are we doing at DfT?

- The Future of Mobility became one of four Grand Challenges set out by the Industrial Strategy, sitting alongside Clean Growth, the Ageing population and Artificial Intelligence.

- A commitment to publish a Future of Urban Mobility strategy within 12 months.

- A regulatory review to ensure we have the right regulations in place to encourage innovation, but also regulations that allow us to make decisions around the introduction of new technologies and control them where it benefits the transport ecosystem and society.