Department for Transport

C-ITS and Automated Vehicles: Challenges and opportunities



Professor Phil Blythe Chief Scientific Advisor



IET International Conference on Intelligent and Connected Vehicles (ICV 2016)





Department for Transport The CSA: My Objectives

- Provide leadership on developing technology and innovation
- Improve the strategy for science and innovation research to maximise value across policy areas
- Maximise value from stakeholder research, in particular in EU and Universities
- 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 into analysis work programmes
- Identify and deliver on a number of high priority scientific issues including:
 - air quality and vehicle emissions;
 - intelligent infrastructure;
 - older people mobility;
 - big data/smart Cities;
 - railway signalling;
 - engineering skills; and
 - cooperative and autonomous vehicle





Autonomous Vehicles



- Centre for Connected and Autonomous Vehicles (C-CAV) works to promote them by:
 - leading innovating policy development in this sector
 - delivering a programme of research, development, demonstration, and deployment activity, worth up to £200 million
 - providing co-ordination across government departments
 - being the single contact point for stakeholder engagement

Centre for Connected & Autonomous Vehicles Connected and Autonomous Vehicles





A mobility revolution

The advent of Connected and Autonomous Vehicle technologies heralds a revolution in the way we experience and think about mobility.







QUEEN'S SPEECH GOVERNMENT TO "CREATE RIGHT FOR EVERY UK GOVT "WILL USE OPPO HOUSEHOLD TO ACCESS HIGH-SPEED BROADBAN DELIVER SECURITY FO skynews.com) SO FAR AND 16 BODIES HAVE BEEN RECOVERED BREAKING NEWS QUEEN'S SPEECH: THE GOVERNMENT IS TO

LIVE HOUSE OF LORDS

sky NEWS



Government recognises the potential





Driver control



There are social benefits...

Driving will be safer and easier; emissions and congestion reduced



safety

- 1700+ people are killed on the UK's roads every year (and 1.25 million globally) – and our roads are some of the safest in the world.
 - By 2030, these technologies could prevent as many as 2,500 deaths.





These technologies will offer mobility for vulnerable sectors of society, unable or unwilling to take the wheel, and enhance quality of life.



Pathway to Driverless Cars: Proposals to support advanced driver assistance systems and automated vehicle technologies



Source: "The Pathway to Driverless Cars", Department for Transport, 2015

mobility



Department for Transport

The Pathway to Driver

A detailed review of

automated vehicle

A welcoming regulatory environment

The Pathway to Driverless

Moving Britain Ahead

Cars:

Code of Practice for testing

戀 Centre for Connected & Autonomous Vehicles

> Pathway to Driverless Cars: Proposals to support advanced driver assistance systems and automated vehicle technologies

> > **July 2016**

July 2015











We need real world demonstration

We want the UK to be at forefront of research, development and demonstration of connected and autonomous vehicles (CAVs).

Truck Platooning

 Following from 2014 feasibility study, trial will focus on operational impacts and benefits.



- What are potential benefits to fleet operators?
- How do platoons respond to UK network designs?

Four cities driverless car trials

• Government is investing, with industry match funding, in 3 major real-world trials of autonomous vehicles around the country.



GATEway – Three types of CAVs in Greenwich including passenger shuttles, and freight delivery.



Venturer – CAV equipped BAE Wildcats and lightweight self driving pods in Bristol.



UK Autodrive – A fleet of 40 autonomous pods, along with road cars, will be trialled in Milton Keynes and Coventry.

Public 2XSecurity Wifi needs expectations Analytics technologies Safety Validation interaction Acceptance new Things Sensors LTE Testing CAV DSRC Internet business models Radar methodologies ADS V2V User Situational perception customer Simulation autonomy V2I Jata systems Modelling Acquisition awareness Mapping Connectivity



Centre for Connected

& Autonomous Vehicles ringing world class research to market



£100 million Intelligent Mobility Fund

Match-funded by Industry up to £200 million (2015-2020) this competition fund will support collaborative R&D in these technologies.

The first, £20 million round (CAV1) launched in February 2016 and includes eight CR&D projects and 13 feasibility studies.

The second round (CAV2) opened on 22 August 2016 for up to £35 million in four streams to provide realworld user and commercial benefits, including as part of a wider transport system.

- 1. A large-scale challenge to develop and demonstrate a vehicle operating at SAE level 4 automation.
- 2. 4. Feasibility studies and industrial R&D projects.





Public Perception and understanding social and behavioural issues vital to AV adoption

What journeys will people want to use an AV for?





What are people's fears about AVs? How can we best overcome these?

- Identify and prioritise key questions
- provide recommendations for what research will be needed over the next two years

How will the market for AVs develop?



What types of people will be most attracted to AVs?

By October 2016: a road map of the key social and behavioural questions















Road Hazard Warning (RHW)

Red Light Violation Warning (RLVW)

Energy Efficient Intersection Service (IEIS

Compass 4D: Newcastle Pilot Benton Road Centre for Connected & Autonomous Vehicles 2 Coast Road & 3 Sandyford Road 4 5 14 : 21 (15) (15) 7 16 8 17:5 10 20 12 🖁 18 19



8 😪

CCTV

9

Link travel times

Centre for Connected & Autonomous Vehicles

Link travel time by time of day



Electric vehicle power consumption

Average power consumption per run



'A2 / M2 London to Dover Connected Corridor'



© Crown Copyright and database rights 2015. Ordnance Survey Licence Number 100039241 Department for Transport gisu1415j140



Quick sector overview (UKTI AIO)

International Festival of Business 2016 - Automotive

2

The UK for automotive investment

Since 2008, the UK has emerged as a leading location for automotive investment, based on three key factors;

- Growing supply chain opportunity
 - Strong domestic and export market
 - Huge supply chain opportunity
 - Increased local sourcing from OEMs
- Transformational research & development
 - Global centre of R&D capability & motorsport
 - Leading automotive R&D facilities
 - World leader in low carbon technologies
- Supportive business environment
 - Funding & support at national, regional and local level
 - Strong relationship between government and industry
 - Competitive incentives for businesses





Quick sector overview (UKTI AIO)

International Festival of Business 2016 - Automotive 3

Three UK core capabilities

Low carbon propulsion

- £1bn investment in Advanced Propulsion Centre (APC)
- UK is now European leader in EVs for both:
 - Production (25% of EU total)
 - Sales (20% of EU total)

Light weighting

- JLR most intensive aluminium car manufacturer in world
- National Composites Centre focus of UK R&D
- £40m invested in 2015, and more to follow
- UK supply chain for composites is developing rapidly

Connected and autonomous vehicles

- Centre for Connected and Autonomous vehicles (CCAV)
- £200m in matched funding for CAV R&D
- UK has most progressive regulatory environment











