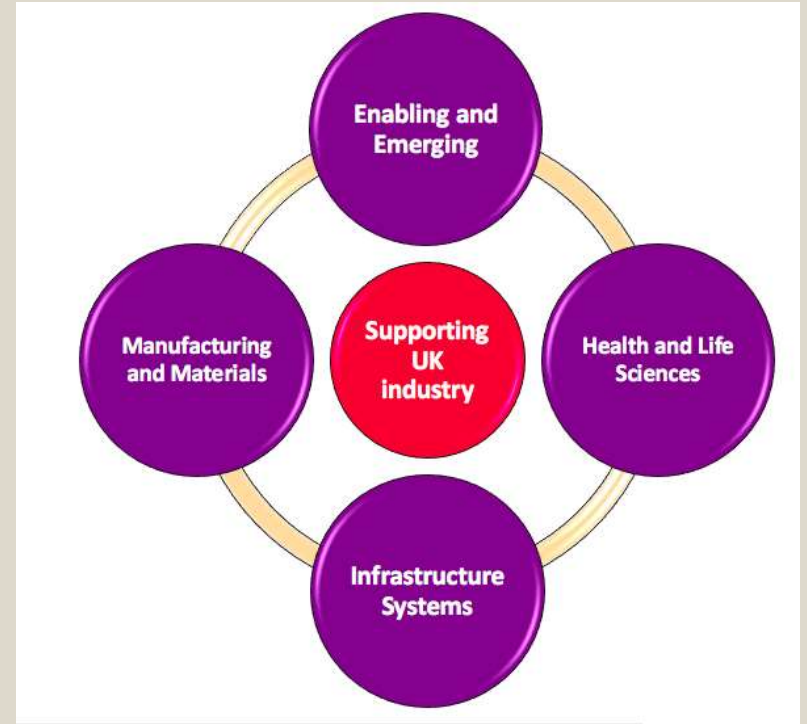


Connected & Autonomous Vehicles in the UK

Innovate UK

Innovate UK

- UK's innovation agency
- Business focused and led, and work across business, universities and government
- Investing c£500m per year in Industrial R&D and set to grow significantly



Innovate UK



return to the economy

7,600



organisations
supported



of GVA for every
£1 invested



> **7 jobs** created for every business invested in



UK Government has risen to the challenge

- ▶ In 2015, the UK Government created the Centre for Connected and Autonomous Vehicles (CCAV)



CCAV has four strategic objectives to ensure that:

1. The UK has a vibrant, world-leading connected and autonomous vehicle industry,
2. The UK remains one of the best places in the world to develop and deploy connected and autonomous vehicles,
3. UK research on connected and autonomous vehicles is effective, targeted, and coordinated,
4. Connected and autonomous vehicles in the UK are safe and secure by design and handle data appropriately.

A welcoming regulatory environment

- ▶ The Code of Practice for testing anywhere in the UK now



Internationally praised, our regulatory framework makes it easy to **test in the real world without special permits or surety bonds**. Our Code of Practice, set out in 2015, clearly and simply sets out that testers must obey all relevant road traffic laws and that:

- Test vehicles must be roadworthy;
- A suitably trained driver or operator (not necessarily in the vehicle) must be ready, able, and willing to take control; and
- Appropriate insurance must be in place.

(Although permission from the road owner/ operator is *not* required, testers should discuss plans with them and use a data recorder.)

<https://www.gov.uk/government/publications/automated-vehicle-technologies-testing-code-of-practice>

<https://www.gov.uk/government/publications/driverless-cars-in-the-uk-a-regulatory-review>

Bringing world class research to market

Four Cities driverless car trials (2014)

Three “driverless car” trials in Greenwich, Bristol, Coventry and Milton Keynes worth a total of £33 million. The projects have now all commenced with on-the-road demonstrations in 2016.

£100 million Intelligent Mobility Fund

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

The first, £20 million round launched in February 2016 and includes autonomous shuttles for visually-impaired people (INSIGHT, Birmingham) and simulations focusing on the needs of older users (FLOURISH, Bristol).

<https://www.gov.uk/government/news/driverless-cars-technology-receives-20-million-boost>

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.



GATEway Pod,
GATEway
Project,
Greenwich
(London)

Pathfinder Pod,
UK Autodrive
Project, Milton
Keynes &
Coventry



BAE
Wildcat
vehicle
Venturer
Project,
Bristol

Support for Collaborative R&D and Feasibility Studies

2015/16 competition

(2016-19 projects live)

- **£20m** Connected and Autonomous Vehicles
- Collaborative R&D projects and feasibility studies to stimulate **developments in autonomous vehicles** – total of 21 projects
- Also **£10m** competition for collaborative R&D projects to enhance **End to End journey experience** for people and freight.



Transport Systems Catapult

OUR CAPABILITIES



AUTOMATED
TRANSPORT
SYSTEMS

MODELLING
&
VISUALISATION

CUSTOMER
EXPERIENCE

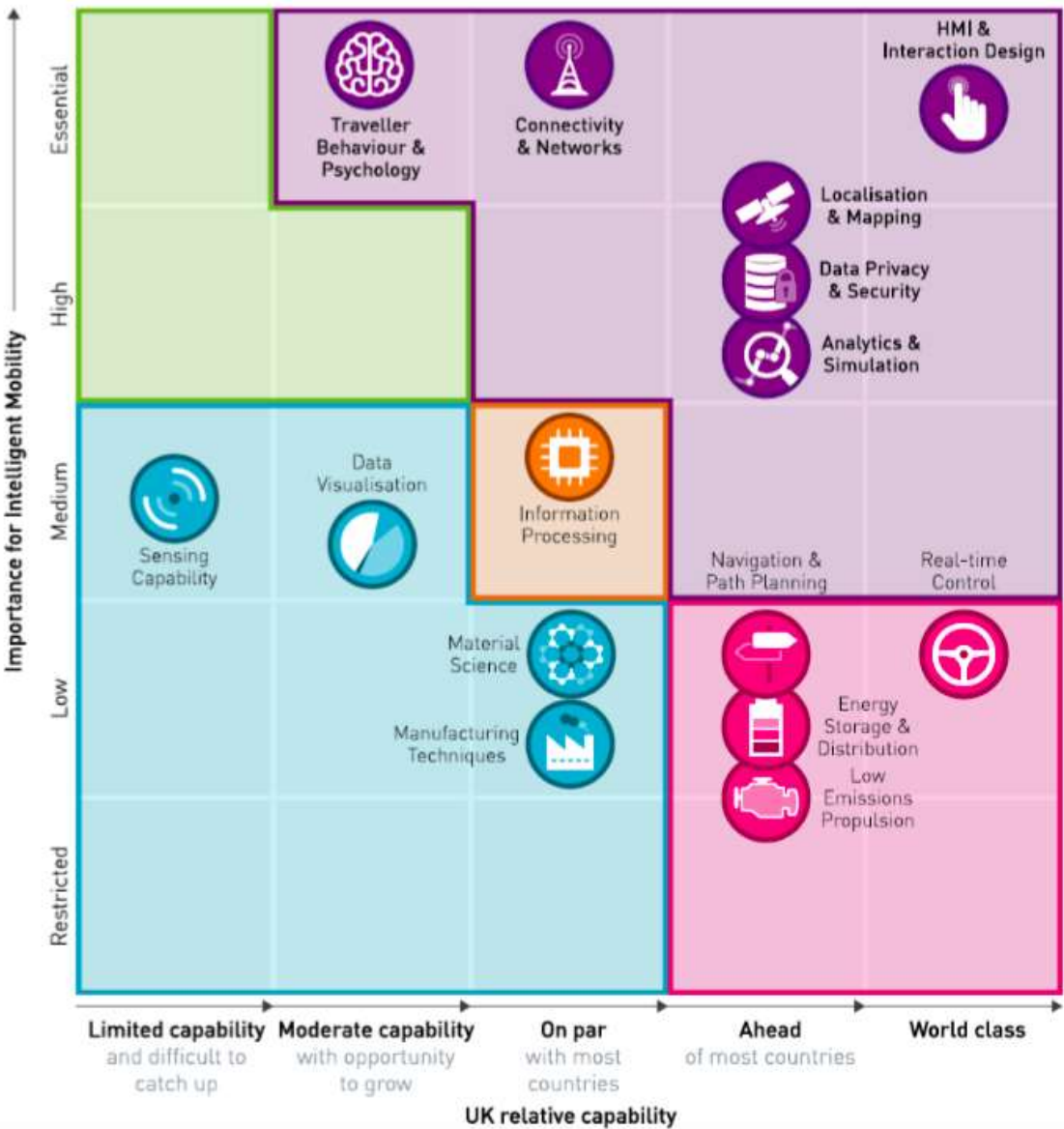


INFORMATION
EXPLOITATION

SMART ASSET
MANAGEMENT



UK Capability in CAV



6 key capabilities were identified

- Legend**
- Core capabilities
 - Priority developments
 - Potential developments
 - Collaborate with other countries
 - Not focused on Intelligent Mobility
 - Lower priority developments

Test Bed UK – additional £100m for infrastructure (5G etc.)



Thank you



2015/16 Connected & Autonomous Projects

Projects were announced in February 2015 at an event at Horiba-MIRA

8 CR&D projects & 13 FS projects, examples include:

- **UK Connected Intelligent Transport Environment (UKCITE):**

A project to create the most advanced environment for testing connected and autonomous vehicles.

It involves equipping over 40 miles of urban roads, dual-carriageways and motorways with combinations of 3 “talking car technologies” and testing for a fourth, known as LTE-V. The project will establish how this technology can improve journeys; reduce traffic congestion; and provide entertainment and safety services through better connectivity.

(Total project: £5.6 million; BIS funding: £3.4 million; duration: 30 months; consortium members: Visteon Engineering Services Limited, Jaguar Land Rover Ltd, Coventry City Council, Siemens PLC, Vodafone Group Services Ltd, Huawei Technologies (UK) Co Ltd, HORIBA MIRA Ltd, Coventry University, University of Warwick (WMG), Highways England Company Ltd.)

- **FLOURISH:**

This project will help develop innovative new tools to improve the understanding of user needs and expectations of connected and autonomous vehicles.

It will be based in the Bristol City Region and will test capabilities in both urban and suburban networked environments.

(£5.5 million; £3.7 million; 36 months; Atkins Limited, Age UK, Airbus Group Limited, React AI Ltd (Aiseedo), AXA UK plc, Bristol City Council, Imtech Traffic & Infra UK Limited, Office for Public Management Ltd, South Gloucestershire Council, Designability, Transport Systems Catapult, TSS - Transport Simulation Systems Ltd, University of Bristol, University of the West of England, Bristol



<https://www.gov.uk/government/news/driverless-cars-technology-receives-20-million-boost>

• **Insight:** a project to develop driverless shuttles with advanced sensors and control systems and trial them in city pedestrian areas, with a particular focus on improving urban accessibility for disabled and visually-impaired people. (£2.2 million; £1.5 million; 36 months; Westfield Sportscars Limited, Heathrow Enterprises Ltd, Fusion Processing Ltd, Creative Example Ltd, Conigital Ltd, Birmingham City University.)

• **Tools for autonomous logistics operations and management:** this project is a collaboration bringing together transport modellers and the computer games industry to develop new modelling and help improve the return on investment into Connected and Autonomous Vehicle fleets significantly. (£3.2 million; £2 million; 36 months; Immense Simulations Ltd, Improbable Ltd.)

• **MOVE-UK:** this project will be focused on accelerating the development, market readiness and deployment of automated driving systems. (£5.5 million; £3.4 million; 36 months; Bosch, Jaguar Land Rover Limited, TRL Limited, The Flow Limited, Direct Line Insurance, Royal Borough of Greenwich.)

• **INnovative Testing of Autonomous Control Techniques (INTACT):** this project will reduce the cost of testing and evaluating autonomous control systems in a safe, repeatable, controlled and scientifically rigorous environment. (£1 million; £850k; 24 months; Richmond Design and Marketing Ltd, University of Warwick.)

• **Pathway to Autonomous Commercial Vehicles:** this project will develop an innovative solution to monitor key information from the vehicle and predict safety risks based on analytics. It will build on a prototype which monitors tyre pressures and temperatures in commercial vehicles, combined with always-on network connection. (£1.2 million; £900k; 24 months; Tructyre Fleet Management Ltd, University of Portsmouth, Satellite Applications Catapult, RL Automotive.)

• **i-MOTORS - Intelligent Mobility for Future Cities Transport Systems:** i-MOTORS will deliver a connected Vehicle to Anything (V2X) system via a mobile platform as a proof of concept. In addition, the project will develop hardware which will receive and analyse sensory data in real-time from multiple locations via online cloud technology to raise the standard of data-processing in the connected and autonomous driving industry.