Centre for Connected
& Autonomous Vehicles

# UK TESTING ECOSYSTEM FOR CONNECTED AND AUTONOMOUS VEHICLES

A call for evidence

MAY 2016

# Contents

# A call for evidence on the UK testing ecosystem for connected and autonomous vehicles

The UK has an opportunity to assert a global leadership position in the demonstration and deployment of connected and autonomous vehicle (CAV) technologies, capitalising on our competitive advantage of being able to test anywhere in the UK today (as set out in the Code of Practice), and building on the strength in depth of our world-leading centres of excellence and wider business environment.

Last year, the Council for Science and Technology wrote to the Prime Minister about the importance of CAV technologies; a "real-world lab" for testing was its top recommendation. The Centre for Connected and Autonomous Vehicles (CCAV) conducted and initial assessment (summarised in this document), in consultation with industry.

This call for evidence seeks to build the evidence base to determine how the UK might integrate and strengthen the national testing offer and whether there is a case for a new flagship test bed to provide a focus for this activity. It will also inform development of powerful and tangible investment signals to global corporates of the UK's leadership ambition and position.

**Issued**: 26 May 2016

**Respond by**: 31 July 2016

**Enquiries to**:

Centre for Connected and Autonomous Vehicles
1 Victoria Street
4th Floor, Victoria 3
London
SW1H 0ET

Email: callforevidence@ccav.gov.uk

# 1. Foreword

Not so very long ago, driverless vehicles were firmly in the realms of science fiction. Today, some of the world's biggest tech and automotive companies are already a long way down the road in turning science fiction into reality.

Connected and autonomous vehicle technologies have the potential to transform the way we travel. Bringing together advances in computing power, sensing technology and data analytics will make driving easier, safer, cleaner, quicker and more accessible.

The UK has long been home to technological innovators and pioneers. That's why, with industry, we created the Centre for Connected and Autonomous Vehicles to ensure that the UK can capitalise on its strengths to become a global leader in this field.

An important part of the Centre's work is examining the options for testing this exciting new technology, including the case for an ambitious UK test bed that will allow driverless vehicles to be tested in complex urban environments.

The Centre is now calling for evidence to inform the next steps on testing. Where should the Government focus its activities? How best can we work with industry and academia to make the most of the opportunities on offer? What should the role of local government and network operators be?

These are just some of the questions we need to answer if the UK is going to fulfil its potential as world leader in connected and autonomous vehicles, and we welcome the input that will help us achieve this.

Rt Hon Sajid Javid MP

Secretary of State for Business, Innovation and Skills

Rt Hon Patrick McLoughlin MP

Secretary of State for Transport

Rt Hon Oliver Letwin MP Chancellor of the Duchy of Lancaster

## 2. Executive summary

The UK has a world leading regional test environment. To strengthen the UK's position as a world leader in test environments, government is seeking opinions on the wider ecosystem as well as the viability of a flagship, live urban test bed. This call for evidence sets out in a refined list of ideal technical requirements for such a test bed.

This call for evidence on the UK testing ecosystem for connected and autonomous vehicles (CAVs) seeks to:

- Test, refine, and prioritise the ideal characteristics identified by the Centre's study,
- Identify gaps in the current UK testing ecosystem,
- Identify opportunities to secure future competitive advantage,
- Consider the case for a flagship, large-scale, live urban test facility,
- Ask industry and academia to articulate what they want and need from the testing and demonstration landscape to attract and de-risk investment and ensure viability,
- Foster opportunities for collaboration across sectors, academia, local government, network operators and to inform development of compelling, industry-led propositions,
- Gather views on what government's role could be in removing barriers, enabling, and accelerating the development of these technologies (this call for evidence does not create an expectation of government funding)

The audience for this call for evidence includes potential partners from industry (not just from automotive but from all sectors), academia, centres of excellence, local government and network operators, as well as innovative companies not currently investing in the UK. Companies could come from the gaming, telecoms, Formula 1, rail, marine, aerospace, and other sectors, as well as from the UK's world-leading insurance, financial, and legal centres.

The call for evidence closes on 31 July 2016.

# 3. Background

The government recognises the significant benefits that connected and autonomous vehicle (CAV) technologies will bring and has acted quickly to make the UK a world leader. In 2014 the government announced £19 million to fund the demonstration of driverless vehicles in four UK cities, and in 2015 the Chancellor announced a further £100 million for an Intelligent Mobility research and development fund to be matched by industry. This funding is unlocking and attracting significant industry investment to the UK. Alongside this, the UK has also secured a global reputation as one of the most welcoming environments for testing connected and autonomous vehicle technologies through the government's regulatory review, The Pathway to Driverless Cars, and the subsequent Code of Practice for testing.

The Centre for Connected and Autonomous Vehicles (CCAV) was announced by Business Secretary Sajid Javid and Transport Minister Andrew Jones in July 2015. It is a joint team, with members from both the Department for Business, Innovation and Skills and the Department for Transport.

CCAV is helping to ensure that the UK remains a world leader in the research, development, demonstration, and deployment of connected and autonomous vehicle technologies. It is working with industry and academia to realise the significant potential benefits of these technologies for UK society and the economy. It will:

- Lead innovative policy development in this new, fast-growing, and fast-changing sector,
- Deliver a high quality programme of research, development, demonstration, and deployment activity, worth up to £200 million, through Innovate UK,
- Coordinate and enhance the impact of activity across the Department for Business, Innovation and Skills, the Department for Transport, and the rest of government,
- Be a single contact point for engagement with industry, academia, and international agencies.

Alongside these objectives, CCAV is examining the testing ecosystem for connected and autonomous vehicle technologies. As part of this work it is considering the case for an ambitious UK flagship test bed to provide both a focus for testing connected and autonomous vehicles at large scale in complex urban environments, a key recommendation from the Prime Minister's Council of Science and Technology.

Successful development of connected and autonomous vehicles will require the expansion of the classic automotive testing environment to allow for the validation of new technologies coming together in new ways. Much of this will be enabled by advanced software. It is vital for the UK to be able to provide the capability for the testing of the full range of technologies necessary to succeed in this market.

# 4. The call for evidence

An initial review by CCAV suggests that the UK should build on its ability to test anywhere, as set out in the Department for Transport's Regulatory Review, Pathway to Driverless Cars, and by the Code of Practice for testing these technologies in the UK. It should also build on the UK's existing, regionally distributed centres of excellence, resurgent automotive sector, world-leading research base, and ongoing connected and autonomous vehicle demonstrations, among others.

This call for evidence on the UK testing ecosystem for connected and autonomous vehicles seeks to:

- Test, refine, and prioritise the ideal characteristics identified by the Centre's study,
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- Consider the case for a flagship, large-scale, live urban test facility,
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## 4.1 Proposed characteristics of an ambitious connected and autonomous vehicle technology testing landscape

Analysis by CCAV suggests that a varied and distributed offer will make the UK a more investable and competitive proposition and spread the risk across a number of projects that should be big enough to scale, but small enough to fail.

The key components of a flagship test bed to support development from initial concept to market deployment are likely to include, but are not limited to:

- **Strong local political support**.
- An activist **skills and training infrastructure** to help users get the most out of the ecosystem's components and their own projects as well as on-site support on cyber-security, user behaviour, insurance, law, finance, standards, IP, software and so on.
- **Virtual validation and verification capabilities** to address the unsustainable time and cost of physical testing requirements of increasingly complex, software driven systems.
- A comprehensive **physical infrastructure** (roads, signs, signals, intersections, weather conditions, etc), a library of general purpose vehicles and off-the-shelf kit, and a Fab Lab for the design, (additive) manufacture, repair, and modification of components.
- **Cyber and Security Standards expertise** for testing and certifying the resilience and interoperability of technologies against cyber-attack.
- A **data catalyser** to release the value of real-time data, while protecting the IP of the data owner, and the privacy of the data source.
- **A comprehensive and flexible mix of connectivity options** to reflect current and future connectivity scenarios to support (or interfere with) vehicles and/or infrastructure - a minimum level of ubiquitous connectivity is a priority.
- **High precision, real-time, dynamic mapping**.
- A horizon scanning function to keep the test bed at the cutting edge of the latest technological, regulatory, and consumer requirements in this fast-changing sector.
- A business model accelerator, bringing together different skills and ideas to create the conditions for new CAV products and services from which UK will obtain long-term, sustainable economic value, as well as operationalising new business cases.
- Innovative procurement tools, support and advice, such as the Small Business Research Initiative (SBRI), challenge prizes, and pre-competitive procurement to stimulate achievable, bespoke solutions to challenges as they arise.

## 4.2 Questions

1. **Are the proposed characteristics of an ambitious testing ecosystem correct (see section 4.1)? Where are the errors, gaps, and opportunities?**

2. **Do you support a flagship testing facility?**

   *If so…*

   a. What should it look like and what should it do?

   b. Where should it be?

   c(i). How fast could this facility be delivered?
   c(ii). How could it be delivered in stages to ensure impact in the short term?

   d. What would it cost (who should pay for it and how)?

   e. What additionality to the existing offer would it provide, and how would it fit into the existing CAV testing ecosystem?

   f. What role central government could play? (This call for evidence does not create an expectation of new funding)

   g. Do you wish to express an early interest in being a partner in its funding and delivery?

   *If not…*

   h. Why do you not support this concept?

   i. Do you have any alternative suggestions as to how to deliver the need that such a test bed might fulfil?

3. **How have other countries responded to similar challenges and priorities? Are there any lessons to be learned and applied in the UK?**

4. **We are currently exploring options for communications activities to increase awareness and understanding of the benefits of Connected and Autonomous Vehicle technologies. What support do you think government should offer in helping to raise awareness and communicate the benefits of these technologies?**

## 5. How to respond

Wherever possible, views should be supported by evidence of impact and economic benefits. This will help us to make a robust case for any future support package.

The Call for Evidence is split into 4 broad sections:

- Section 1 invites ideas on the wider testing ecosystem in the UK
- Section 2 invites views on the case for a UK flagship facility
- Section 3 invites views on international case studies
- Section 4 invites views on how best to communicate the benefits of these technologies

At the end of the response form we have asked a general question on what it would take to make the UK a leader in the field. An “any other comments” section is also included at the end of the form in case you feel that support should be targeted at a measure that is not covered in the above sections.

Please note that we do not expect you to submit evidence or views in every area listed if not applicable.

When responding please state whether you are responding as an individual or representing the views of an organisation. If you are responding on behalf of an organisation, please make it clear who the organisation represents by selecting the appropriate interest group on the call for evidence form and, where applicable, how the views of members were assembled.

Submissions should, where possible should be presented on the response form below with evidence provided as separate attachments. Submissions of evidence should be no longer than 10 pages.

The response form is available electronically on the consultation page: www.gov.uk/government/consultations/driverless-vehicle-testing-facilities-call-for-evidence (until the call for evidence closes). The form can be submitted by email to: callforevidence@ccav.gov.uk.

In exceptional circumstances we will accept submissions in hard copy. If you need to submit a hard copy, please send your response to CCAV at the following address:

Centre for Connected and Autonomous Vehicles
1 Victoria Street
4th Floor, Victoria 3
London
SW1H 0ET

Any questions about the call for evidence should be submitted to CCAV at callforevidence@ccav.gov.uk.

Please provide submissions and evidence by **31 July 2016**.

The evidence submitted will inform CCAV's understanding of the wider issues surrounding the connected and autonomous vehicle technology testing ecosystem which we have been asked to examine.

Evidence will be reviewed by CCAV. If further information or clarification is required, CCAV will contact you.

## 6. Confidentiality and data protection

Information provided in response to this consultation, including personal information, may be subject to publication or release to other parties or to disclosure in accordance with the access to information regimes (these are primarily the Freedom of Information Act 2000 (FOIA), the Data Protection Act 1998 (DPA) and the Environmental Information Regulations 2004). There is also a statutory Code of Practice issued under section 45 of the FOIA with which public authorities must comply and which deals, amongst other things, with obligations of confidence.

If you want information, including personal data, that you provide to be treated in confidence, please explain to us what information you would like to be treated as confidential and why you regard the information as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the department.

## 7. Help with queries

Questions about the policy issues raised in the document can be addressed to:

Michael Talbot
Centre for Connected and Autonomous Vehicles
1 Victoria Street
4th Floor, Victoria 3
London
SW1H 0ET

Email: callforevidence@ccav.gov.uk

If you wish to comment on the conduct of this call for evidence or make a complaint about the way this call for evidence has been conducted, please write to:

Angela Rabess
BIS Consultation Co-ordinator
1 Victoria Street
London
SW1H 0ET

Tel: 020 7215 1661
Email: angela.rabess@bis.gsi.gov.uk

# Annex A: Response form

The call for evidence is available at:
www.gov.uk/government/consultations/driverless-vehicle-testing-facilities-call-for-evidence

The closing date for responses is 31 July 2016.

Please return completed forms to:

Centre for Connected and Autonomous Vehicles
1 Victoria Street
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London
SW1H 0ET

Email: callforevidence@ccav.gov.uk

Information provided in response to this consultation, including personal information, may be subject to publication or release to other parties or to disclosure in accordance with the access to information regimes. Please see page 12 of the consultation for further information.

If you want information, including personal data, that you provide to be treated in confidence, please explain to us what information you would like to be treated as confidential and why you regard the information as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the department.

I want my response to be treated as confidential ☐

Comments: Click here to enter text.

## Questions

Name:
Organisation (if applicable):
Address:

| | **Respondent type** |
|---|---|
| ☐ | Business representative organisation/trade body |
| ☐ | Central government |
| ☐ | Charity or social enterprise |
| ☐ | Individual |
| ☐ | Large business (over 250 staff) |
| ☐ | Legal representative |
| ☐ | Local government |
| ☐ | Medium business (50 to 250 staff) |
| ☐ | Micro business (up to 9 staff) |
| ☐ | Small business (10 to 49 staff) |
| ☐ | Trade union or staff association |
| ☐ | Other (please describe) |

### Question 1

Are the proposed characteristics of an ambitious testing ecosystem correct? Where are the errors, gaps, and opportunities? (see section 4.2)

Comments: Click here to enter text.

**Questions 2**

Do you support a flagship testing facility?

**A** ☐ Yes ☐ No ☐ Not sure

Comments: Click here to enter text.

***Question 2a***

If yes, what should it look like and what should it do?

Comments: Click here to enter text.

***Question 2b***

Where should it be?

Comments: Click here to enter text.

***Question 2c(i)***

How fast could this facility be delivered?

Comments: Click here to enter text.

***Question 2c(ii)***

How could it be delivered in stages to ensure impact in the short term?

Comments: Click here to enter text.

***Question 2d***

What would it cost (who should pay for it and how)?

Comments: Click here to enter text.

***Question 2e***

What additionality to the existing offer would it provide, and how would it fit into the existing CAV testing ecosystem?

Comments: Click here to enter text.

***Question 2f***

What role could central government play? (This call for evidence does not create an expectation of new funding)

Comments: Click here to enter text.

***Question 2g***

Do you wish to express an early interest in being a partner in its funding and delivery?

☐Yes ☐No

Comments: Click here to enter text.

***Question 2h***

If you are not in support of a flagship test facility please explain why you not support this concept?

Comments: Click here to enter text.

***Question 2i***

Do you have any alternative suggestions as to how to deliver the need that such a test bed might fulfil?

Comments: Click here to enter text.

**Question 3**

How have other countries responded to similar challenges and priorities? Are there any lessons to be learned and applied in the UK?

Comments: Click here to enter text.

**Question 4**

We are currently exploring options for communications activities to increase awareness and understanding of the benefits of Connected and Autonomous Vehicle technologies. What support do you think government should offer in helping to raise awareness and communicate the benefits of these technologies?

Comments: Click here to enter text.

Thank you for taking the time to let us have your views. We do not intend to acknowledge receipt of individual responses unless you tick the box below.

Please acknowledge this reply ☐

This publication available from www.gov.uk/bis

Contacts us if you have any enquiries about this publication, including requests for alternative formats, at:

Department for Business, Innovation and Skills
1 Victoria Street
London SW1H 0ET
Tel: 020 7215 5000

Email: enquiries@bis.gsi.gov.uk

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