

# Can Britain's roads cope with driverless vehicles?

Much has been made of the benefits that connected and autonomous vehicles may bring, but equal focus is needed on the ability of highway infrastructure and communication systems to support new methods of mobility say Teresa Jolley and Sir Nic Cary.

## Introduction

There was a flurry of press interest on 6 February following the Government's announcement that it had removed the need for a driver to be in a driverless vehicle from its code of practice: 'Automated vehicle trialling'.

Many expected that this meant driverless vehicles would arrive on Britain's roads this year. Daniel Ruiz, the chief executive of Meridian Mobility – the Government's connected and autonomous vehicle hub – gave an interview to the BBC's World at One on the same day.

In the interview, he said that "safety is paramount" and added that vehicles "will have 'safety technicians'... either in the vehicle or sitting observing on a one-to-one basis".

One point raised by presenter Sarah Montague at the start of her interview with Daniel Ruiz was left hanging in the air: "Many people will say... our roads can't cope with it".

While there has been an understandable level of interest in the vehicles themselves, as part of Britain's future mobility strategy we also need to be as alert to the readiness of our infrastructure, as well as legal and insurance measures and ensure that these vehicles deliver societal benefits.

## Connected infrastructure

The quality and pervasiveness of our mobile data infrastructure will be key to supporting connected and



↑ A lack of Internet connectivity could hinder the use of autonomous vehicles ROMAN CHEKHOVSKOY – SHUTTERSTOCK



**Teresa Jolley,** creative director, DEFT153  
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autonomous vehicles (CAVs). Yet one only has to take a short journey in Britain using a smartphone to recognise how patchy data coverage is.

Many are advocating the new 5G version of mobile telephony as the best means of supporting CAVs. However, the roll out of 5G is in its infancy.

Rolling out 5G to support vehicle connections will need very significant investment and there are serious questions surrounding the business case for the number of antennae that will be required.

Tackling this will require strategic planning and co-ordination by local authorities to manage, prioritise and improve a diverse mix of connectivity solutions along our roads to ensure that the provision is adequate in both urban and rural areas.

As part of the Government's announcement on 6 February, the Future of Mobility Minister Jesse Norman said: "Thanks to the UK's world class research base, this

country is in the vanguard of the development of new transport technologies, including automation."

The Government is much less vocal about how it is going to work with and help fund local authorities to bring this about. As owners and maintainers of 97% of Britain's roads, local authorities are the essential infrastructure partner in the CAV revolution.

## Struggling with the basics

Currently many local authorities are struggling to even maintain road surfaces adequately, as the most recent Asphalt Industry Alliance 'ALARM' survey shows. Without Government support through partnership with local authorities, the ambition to be a global leader in CAV technology might fail.

There are numerous competitions and grants for local authorities to apply for, including the 'Transforming Cities Fund'.

However, almost universally, these only offer capital funding and many



← Many authorities struggle to maintain existing infrastructure

MARC BRUXELLE – SHUTTERSTOCK

indicate that bids will be judged on the level of innovation they contain.

There does not seem to be an acknowledgement by the Government that much of the essential infrastructure to support CAVs may not be particularly innovative, just plain necessary. Nor is there any obvious support or guidance on how local authorities are expected to fund the operating and maintenance costs of such infrastructure.

Many local authority business cases for CAV support could fail if the Government is not able to partner with local authorities to help them find a way to afford the operating and maintenance costs of the new infrastructure.

**Striving for good outcomes**

Of course, as some vehicle manufacturers claim, CAVs might be able to survive without any vehicle support infrastructure. But they will not behave well if they drive unsupported by such infrastructure – including telecoms and the ability to send and receive messages.

Without being able to communicate, not just with each other but with their surrounding infrastructure, CAVs will not be able to park or recharge reliably and they may end up driving in a manner that makes our road spaces and kerb sides even more congested than they presently are.

The table below provides a list of some of the infrastructure, both physical and virtual, that should be in



↑ Driverless cars promise much but will need to operate safely CHESKY – SHUTTERSTOCK



**Sir Nic Cary**  
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place for CAVs to behave well on our roads.

All of these provisions will have to be integrated into our existing road infrastructure, which was not designed or built to accommodate CAVs.

The control they offer is limited to such things as static signs and road markings, zebra crossings, traffic signals, variable message signs and – in the case of the strategic road network – variable speed signs.

The cost to Britain of investments in CAV infrastructure is as yet unquantified. Such vehicles promise many potential benefits. However for the advent of CAVs to deliver these requires considerable investment, a change in the behaviour and thinking of drivers and wider acceptance by society about vehicle ownership and shared use of vehicles.

**Conclusions**

We are interested in hearing your views. There are lots of projects, programmes and activities happening to explore and address these challenges. In Birmingham we have created the West Midlands Data Discovery Centre to address some of the key challenges CAVs present to our transport infrastructure in a practical, sustainable way.

Here, CAV infrastructure challenges can be explored via collaborations between major civil engineering organisations, local and regional authorities, central government specialists, small to medium sized enterprises and academics.

The centre will have a feature stand at Traffex on 2 to 4 April.

**Acknowledgement**

*This article has been peer reviewed by the CIHT Technology & Innovation Panel.*

Infrastructure	Description	Purpose
<b>Connectivity and data</b>	<p><b>Telecoms</b>                      High density, high bandwidth, high capacity Vehicle to Infrastructure (V2I) communications transmitters to support the main vehicle C-V2X (4G/5G cellular) and DSRC (Dedicated Short Range Communications), as well as local cellular and WiFi communications to support vehicle occupant mobile communications technologies.</p> <p><b>Data</b>                      There is no current agreement as to exactly which data and in what format it will be essential to share with and between vehicles for their behaviour to be acceptable and safe, but the Purpose column provides a list of much of what is likely to be essential.</p> <p>To note: vehicles also communicate with each other, mainly using Vehicle to Vehicle (V2V) DSCR communications, but this does not require external infrastructure.</p>	<p><b>Enabling:</b></p> <ul style="list-style-type: none"> <li>• Vehicles to take informed decisions about speed and route, avoid incidents, obey Traffic Regulation Orders</li> <li>• Vehicles to communicate with third party service providers, data collectors and traffic management systems.</li> <li>• Traffic signals to transmit stop / go information.</li> <li>• Traffic management centres to transmit warnings, advisories and digitised traffic regulation orders to vehicles.</li> <li>• Software providers to issue safety, performance and map updates to vehicles.</li> <li>• Vehicles to transmit breakdowns and incidents to emergency responders and traffic management centres.</li> <li>• Journey planners and third-party data services to update routing and timing.</li> <li>• Parking providers to give updates on parking capacity.</li> </ul>
<b>Security</b>	Cyber security of vehicle and occupant messaging and physical security of roadside support infrastructure.	Protects the confidentiality, integrity and availability of messages to and from vehicles and occupants from being tampered with, intercepted or blocked.