Robin Hickman examines the call for evidence on the future of mobility recently issued by the Centre for Connected and Autonomous Vehicles and the Department for Transport

the future of mobility – a lesson in hubris?

Welcome to a new regular column – Off the Rails. In this, I will cover transport planning issues, and from the premise of transport planning supporting the development of sustainable cities. To the readership of this journal, this may not seem to be a radical agenda: surely we have been advocating this for 50 years or more? But look around at all of our cities, towns and rural centres, and we can see the problems being faced.

It is impossible for all in society to use high-quality public transport, or to walk or cycle, to access their everyday activities. Vehicular traffic, and the infrastructure that facilitates it, does not support environmental, social and, in the long run, economic objectives. For sure, our current transport systems are not supportive of a high-quality public realm and attractive cities. This is the case in the UK and in many countries overseas. There are many dimensions to these problems, in research and practice. I will explore how we seem to have fallen off the rails in transport planning, and what the evidence and options might be for a changed approach.

Our first story examines the dangers of flying too close to the sun. Scholars of Greek mythology, and probably most of us, know the story of Icarus and his use of new technology. Icarus was the son of Daedalus, a craftsman. Icarus and his father tried to escape from Crete by constructing wings, made from feathers and wax. Daedalus warned his son of complacency in the journey, asking that he fly neither too low nor too high. This would avoid drowning in the sea or travelling too close to the sun, which would melt his wings. However, Icarus suffered from hubris and ignored his father's warnings, became giddy with the sensation of flight, and flew too near to the sun. The sun melted his wings and he fell into the sea and drowned.

Move forward two thousand years and more, and we perhaps can see another example of over-fascination and confidence in emerging technology. The Centre for Connected and Autonomous Vehicles and the Department for Transport have issued a call for evidence on the future of mobility.[1] The call starts with a foreword from Transport Secretary Chris Grayling MP and some fairly emotive and loaded text on the nature of the problem, as perceived, and some potential solutions:

'We are on the cusp of a profound change in how people, goods and services move around the country, driven by extraordinary innovation in engineering, technology and business models. Large investments are being made in the electrification and automation of road vehicles, in the modernisation of rail services and in the development of autonomous aerial and marine transport. New market entrants and new business models, such as ride hailing, ride sharing and Mobility as a Service (MaaS), are challenging our assumptions about how we travel.'

From the call for evidence the solution and objective seem already evident:

'Automated vehicles could make our roads safer, and mobility could be available when we want it, where we want it and how we want it.

'The future of mobility also presents enormous economic opportunities for the UK. We have strengths in many of the most relevant areas of research and development, including artificial intelligence and complex vehicle engineering. We have dynamic businesses developing new mobility solutions, and innovative, strong and diverse automotive, rail, maritime and aviation sectors. We have a long history of bringing transport innovation to the world.'

Further:

'Continuing to be one of the most open environments in the world for transport innovation is important to this goal, so we are undertaking a review of all relevant legislation to ensure our regulatory framework evolves with the times and technologies.'

This seems to be very clear – the solutions for our evolving travel behaviours and our industrial strategy

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'Ethically, matters are even more difficult. Even if AVs become technically feasible, I would argue – and so do many others – that they are not ethically feasible'

are automated vehicles (AVs), perhaps within some form of nebulous MaaS, which will help to integrate all of the modes. It is hoped that we can consume mobility on demand, as long as the regulatory barriers are low and the mobility providers are able to provide the services they would like. The cover of the call depicts a likely streetscape – an AV has stopped for a pedestrian wishing to cross the road (male, white, young, and smiling, of course), and he waves and thanks the vehicle while crossing. There is a space for pedestrians, and a clear, designated route for the AVs. There are cycle hire docks, but no cyclists. There is one elderly person (being manually pushed in a wheelchair) and a young child looking puzzled at the AV. There are still double yellow lines on the road – perhaps the vehicle has not been programmed to not park anywhere?

Enough of this frivolity. The call asks 15 questions in two sections – Part 1 on the background, emerging trends that are shaping mobility, and the approach that the Government should take; and Part 2 on how government can support innovation, with a focus on 'mission-orientated' policy-making, ensuring a regulatory framework that 'evolves with the times', and resolving barriers to data sharing and use.

Part 1 is straightforward. Travel behaviours are changing – people are travelling and driving less, although mode share has remained similar over the last 20 years, with the exception of an increase in travel by train and on the London Underground. Commuting has decreased, van traffic has increased rapidly, now (in 2016) making up 15% of road traffic relative to 9% in 1986. There are age differences – older people are driving more and younger people less. More people are living in urban areas.

Innovation, it is perceived, has the potential to transform how people and goods move around our urban areas. Cleaner transport is viewed simply in terms of achieving zero-emission (electric) vehicles by 2040. The ambition is for fully self-driving cars (AVs) on UK roads by 2021. By 2035, it is estimated that the UK market for connected and automated vehicles could be worth up to £52 billion. Chris Grayling and the motor manufacturers are salivating.

Alongside, there are expected significant potential social benefits, including 'more efficient use of urban space'. There are expected new modes. Drones will be able to 'address local needs', such as supporting emergency services. Vertical take-off could be deployed in urban airspace, potentially integrated with surface transport. These new transport solutions and 'others not currently imagined' have the potential 'to increase consumer choice and drive productivity and efficiency'.

I will not list them all, but some of the questions asked are:

- 'We have identified … the main technologies and trends that we believe will affect urban mobility in the coming decades. Are there any missing?'
- 'We want our urban infrastructure to support these trends and deliver benefits to society. What changes are required to urban infrastructure?'
- 'What possible market failures might emerging technologies and trends give rise to that could require intervention by government?'
- 'What role should government play in helping ensure that future transport technologies and services are developed in an inclusive manner?'
- 'How can government ensure that future urban transport systems support people's well-being and flourishing, healthy communities?'

Part 2 suggests that 'mission-orientated' policy-making will be followed, setting clear and specific goals, backed by a range of policy measures. This is compared to the Apollo mission to land a man on the moon – another seemingly interesting spend of funding with little rationale.

Back to reality and the future of mobility. Four areas are seen as benefiting from this catalytic innovation, with the UK at the forefront of the international effort to design low-emission vehicles. Streets will be safer – self-driving vehicles offer an opportunity to vastly reduce the number of road casualties and deaths. There will be improved access to transport, with demand-responsive services in rural areas and multi-modal integration in urban areas. There will be cleaner freight with innovations in vehicle powertrains, fleet management and drones.

Most fantastically, liveable cities will also be realised – there will be more walking and cycling, and autonomous vehicles will remove the majority of parking spaces.

The following questions are asked:

- 'Which 'missions'… [pushing the space mission metaphor rather too hard] could be most effective in driving innovation and investment?'
- 'How should government funding be targeted to help UK innovators build and scale transport solutions?'
- 'How could the experience of working with local and/or national regulators be improved for transport innovators?'

It is difficult to respond to such a consultation. For one, government expects people to have time to respond to these things. Not many people do – perhaps a few interested academics, perhaps some retired people with time on their hands? But mostly the vested interests, in this case those pushing AVs, i.e. the motor manufacturing industry and lobby. This is not effective consultation; it is barely tokenism, but that is another topic.

Where should we start on a response? I will try with just three points. If we take a step back, there are some questions that are critically not being asked:

- Technically, it is still far from clear that AVs are possible, particularly in urban areas. Consider AVs on Oxford Street or any busy pedestrian street in London, or indeed elsewhere. If I, as a pedestrian, know that the AV will stop if I step out onto the road, then this will become a great game – the pedestrian will know the AV is programmed to avoid a collision and will take priority, crossing the road whenever they see fit. What if there is a mix of fully automated vehicles and conventional vehicles – how will I know?
- Ethically, matters are even more difficult. Even if AVs become technically feasible, I would argue – and so do many others – that they are not ethically feasible.[2] There is the classic 'trolley' problem that is difficult to resolve. Consider your trolley (AV) is driving down the road, and you and your child are in the vehicle. Another vehicle pulls out of the side road with five people in it. You are heading for a dangerous collision with deaths likely. The only way to not collide with the vehicle and to avoid killing five people is to swerve and take out three pedestrians on the footpath. How will the AV be programmed? To protect the occupants of the AV? To optimise movements and act to cause the least possible casualties? What if some of the pedestrians are elderly people – are their lives counted less than those of young people? There are endless variations. All of them can potentially be solved technically, but they are very difficult to solve ethically. This would require a debate on the ethical dimensions of AVs and the choice of a common set of values. I am not sure this is possible.
- Finally, let's consider urban planning objectives and our aspiration to build great cities. Do we wish to support AVs as a central element of future mobility and urban liveability? We need to think what our streets might look like, discuss and debate the possibilities, and conclude whether AVs are compatible with attractive and sustainable cities. As urban planners we would mostly say no. There are already too many vehicles on our streets and we are pushing for much greater levels of usage of public transport, walking and cycling. Any technology that makes use of vehicles easier is likely to lead to more vehicles.

Amazon, Google, Tesla, Mercedes and others may develop the AV technology that allows products to be delivered, and people to be driven to any destination they wish – but that does not mean that we need it. Even with Uber we have seen the problems of vehicles circulating and waiting for their passengers in town centres, and AVs are likely to lead to much more of this and much greater vehicle-kilometres travelled (VKT). 'More efficient use of space' means more priority and capacity for AVs and more VKT – and this is not compatible with an attractive city.

Hubris is defined as 'exaggerated pride or self-confidence' (*Merriam-Webster Dictionary*, online, 2018), representing a loss of contact with reality and an overestimation of personal competence and capabilities. Importantly, it is associated with failure and the downfall of the perpetrator. The Icarus complex remains today: there are massive unforeseen effects of AVs, a lack of critical consideration of the issues, and blind faith in technology and the market's ability to deliver something useful.

This call for evidence will inform the government's Future of Urban Mobility Strategy, to be published, remarkably quickly, by the end of 2018. Such an important matter as the future of mobility, I would suggest, requires much further consideration – with much greater effort to ask more fundamental questions, to reach more people on their views, and to rigorously debate the issues. I have submitted my response to the call – you have read it here – but I am not expecting a reply!

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Notes

1 The *Future Mobility Call for Evidence* can be found at www.gov.uk/government/consultations/future-of-mobility-call-for-evidence/future-of-mobility-call-for-evidence The authors are the Centre for Connected and Autonomous Vehicles and the Department for Transport, and they tellingly appear in this order on the call for evidence website. You may say this is alphabetical, but I read more into it than this! The deadline for submissions was 10 Sept. 2018

2 For a more detailed discussion on ethics, see P Lin: 'Why ethics matters for autonomous cars'. In M Maurer, J Gerdes, B Lenz and H Winner (Eds): *Autonomes Fahren: Technische, Rechtliche und Gesellschaftliche Aspekte*. Springer, 2015