

OPINION CAM era and the 'naked' highway

There are many potholes on the road to connected and automated mobility, but expect a safety communications network within the next decade, says **Daniel Ruiz**

Last month, Londoners were treated to an exciting glimpse into the future of self-driving transport. A fleet of highly-automated vehicles, proudly demonstrated at Stratford's Queen Elizabeth Olympic Park, showcased their ability to easily manoeuvre around complex urban landscapes.

However, as impressive a spectacle as this was to witness, the road to fully-fledged self-driving services is a long one. There is still plenty to do if we are to achieve widespread connected and automated mobility in Britain.

Through the development of Zencic's UK Connected and Automated Mobility Roadmap 2030, it has become clear that services will not be successful in the long-run through vehicle-based systems alone. We will need to see extensive roadside infrastructure developed, along with a robust wireless communications network, to support the safe roll-out of self-driving fleets.

SAFETY FIRST

The driving force behind self-driving vehicle development is, above all other considerations, safety. Therefore, safety use cases are the priority for the next generation of infrastructure to support self-driving vehicles. This infrastructure is not just roadside and not just static; it is the aggregate of all infrastructure types and states. It includes the interconnectivity of vehicles to help each self-driving vehicle understand its environment when travelling, i.e. sharing data with nearby vehicles to let them know about hazards on the road – unlocking the potential of the hive mind.

A key component of safety-related infrastructure is a well-integrated communications network. It will form an important framework which will underpin the data-sharing needed for self-driving

safety cases. The clock is ticking because, as is detailed within the roadmap, these networks will need to be defined by 2020 in order to achieve the first service using safety messages across the vehicle community by 2026.

By 2029, our analysis has predicted that 80% of the strategic road network (SRN) will be covered by a safety communications network. The SRN is an important advantage for the UK. It accounts for 2% of the road network by length, yet it handles 30% of all traffic and 66% of haulage. This means the UK can cover a large portion of its busiest roadways with a comparatively small amount of infrastructure.

Compared with larger countries this will lead to the UK being able to benefit from connected and automated mobility (CAM) services earlier. Due to this, the SRN will also be where consumers and businesses will likely encounter CAM first.

Once in place, this intricate communications network will enable cross-organisational data-sharing – a crucial first step on the road to CAM. Data-sharing is another factor which requires immediate attention as our roadmap shows this will need to be established in the next two years. The value of the CAM services that we'll eventually see in the UK will become increasingly defined by the quality of data and the insights generated from this data-sharing network. Strict management of

66%

of haulage traffic travels along the strategic road network

this data is critical to ensuring security and safety are maintained, while data-generating organisations must feel they can genuinely benefit from the evolution and enrichment of their data through sharing. This is where the UK's global leadership in digital resilience is another asset.

WHAT THE CONSUMER WILL SEE

When it comes to physical infrastructure, consumers and businesses will most likely notice the connected side of the CAM equation first, perhaps through the gradual digitisation of roadside signage.

From 2022, alongside the roll-out of new digital infrastructure, consumers will begin to notice fewer physical road signs and signals. This will be due to vehicles becoming more connected, and digital signage recognised by the vehicle itself will become preferable, both economically and functionally.

Digital signage is cheaper and can be updated dynamically; meaning, for example, that vehicles will instantly recognise variable speed limits and lane closures.

From 2027 onwards, these changes will be hard to miss. The road to digitisation will lead to the so-called "naked highway", whereby gantries and signage will become entirely digitised and no physical roadside signage

should be necessary. In the period leading up to 2027, there will need to be a resolution to the conundrum that 'old' vehicles (which will still be road-legal) will need to be retrofitted with the capability to read virtual signage, and the road operators will need to maintain physical signage for a while longer until it is deemed safe to remove it and assume the virtual versions are visible to those who need them.

DATA AS THE REAL VALUE OF CAM

A convergence of technological and commercial developments will eventually mean the communications networks and cross-organisational data sharing protocols are mature enough and there is also a critical mass of connected vehicles.

Data processing technology ("edge", "fog", and other computing techniques for dealing with big data) will allow real-time management of traffic, and congestion will be reduced alongside increases in journey time reliability and a massive reduction in incidents.

The deployment of discrete intelligent transport systems (ITS) use cases, such as the first national connected vehicle service going live in 2026, will contribute towards this vast network intelligence and unlock the social and economic benefits from CAM.

THE IMPORTANCE OF TESTING

Underpinning all of these developments is the need for years of rigorous testing. This is another area where the UK has an advantage. Testbed UK comprises several world-class testing facilities which, crucially, are working together to share knowledge and accelerate the development of CAM infrastructure, as well as vehicles and services.

Within Testbed UK, Midlands Future Mobility is developing 100km of diverse routes in the public domain equipped with an operator-neutral 5G network which will help accelerate progress in the development of CAM technology. Millbrook-Culham has run 5G tests at over 160mph at their high-speed bowl, and CAVWAY is being developed to simulate any motorway-related scenarios necessary for self-driving vehicles.

Due to the promising work being undertaken throughout Testbed UK sites, it's necessary that they receive continued investment if we are to begin mature trials of self-driving vehicles by our set target of 2025. Only then might we get to see initial deployments of CAM systems and services at any degree of scale on our highways by 2030. The UK's CAM community believes it can be done.

30%

of all traffic uses the SRN



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ABOUT THE AUTHOR

Dr Daniel Ruiz joined Zencic (formerly Meridian Mobility UK) as CEO in January 2018, having led a 500-strong team at Dyniq UK. He now leads the UK's connected and autonomous vehicle (CAV) programme.

