

# A driverless future for LCV's?

Electric vehicles and autonomous driving systems are two of the most talked-about developments in the transport industry, but they shouldn't be seen in isolation from each other. **Neil Fulton** explains how a driverless future should also be a greener one.

In a few months' time on a dedicated stretch of pavement in Milton Keynes, the Transport Systems Catapult (TSC) will be overseeing the trial of three self-driving pods in what is expected to be the UK's first "real world" test of an autonomous control system.

The driverless aspect of our LUTZ Pathfinder programme has gained plenty of recent attention, particularly in the media, but less attention has been paid to the fact that the two-seater vehicles will also be totally electric-powered. This was not just an after-thought, but was instead born out of the realisation that developments in autonomous driving should go hand in hand with the progress being made in reducing our dependency on carbon-based fuel.

Even the name of our programme emphasises its focus on a sustainable future for transport, with the "LUTZ" part referring to the wider Low-carbon Urban Transport Zone programme that will examine the potential interaction of autonomous vehicles, cloud-enabled mobility and transport-on-demand services – all with a view to providing the public with a wider range of transport options, while minimising the impact on the environment.

For our autonomous pods project, that begins with the decision to make them fully electric. But this is only a first step in terms of the environmental benefits that could be delivered by

autonomous vehicles if the technology is widely adopted in the future. Beyond the immediate scope of our trial, the longer term objective of LUTZ is to open up urban transport on demand, producing a range of carbon-reducing benefits. For example, those who may have chosen to drive a particular journey entirely by car because public transport could not take them all the way, will in future be able to use the pods to fill in the gaps.

Looking even further ahead, it is envisaged that autonomous vehicles will eventually be able to communicate with each other and even "link up", allowing driverless cars to potentially form train-like platoons which can conserve energy far more efficiently by braking and accelerating less often than today's conventional vehicles. Further improvements in air quality could also follow as emission control strategies become integrated with autonomous control systems.

In this driverless future, some of the current challenges facing electric vehicles would also be minimised, or even removed altogether. Battery recharging, for example, will be greatly simplified once vehicles are able to take themselves to charge points, and remove themselves afterwards to make room for other vehicles.

Beyond the environmental improvements, there will also



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be significant social benefits. Fully autonomous vehicles would free up the billions of hours currently spent driving, allowing people more time to work or play while getting from A to B. The impact for those who are unable to drive at all will be even more dramatic, with autonomous vehicles potentially giving full transport access to the visually or physically impaired.

It cannot be stressed enough, however, that we are still a long way from the reality of mass autonomy.

An early design concept of the LUTZ Pathfinder pods"



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 The Transport Systems Catapult was created to showcase and grow UK leadership in intelligent mobility solutions



The first, and most obvious, challenge is the technological one. Our own project, for example, is taking autonomy out of the university precinct setting and into a whole new area. The pavement-based nature of the LUTZ Pathfinder pods means that the vehicles will have to interact with pedestrians, cyclists and – where the pavement meets the road – cars. The difficulty here is that while computers are obviously much better and faster than humans at computing, they still have some way to go when it comes to their visual recognition skills.

A five-year-old child can instantly tell if a shape on the ground is an object or a shadow, and can quickly tell whether it's a plastic bag or small animal that has crossed their path, but the most powerful of today's computers are still struggling in this area. Much work is therefore required to understand the limitations of the current technology, and to target improvements in integrity across a broad range of driving conditions.

As a commercially neutral organisation which is not permanently aligned to any one manufacturer or technology provider, the TSC can certainly help in this regard. Having

been asked to oversee the LUTZ Pathfinder programme on behalf of the UK Automotive Council and the Department of Business, Innovation & Skills, we have initially teamed up with Milton Keynes Council, Oxford University's Mobile Robotics Group and Coventry-based firm RDM Group who are respectively providing the "urban laboratory" setting, the on-board detection and navigation systems and, of course, the pods themselves. The vehicles are being designed, however, with an open architecture that will allow for control systems and sensors provided by other research teams and manufacturers to also be trialled.

This collaborative approach could help tackle some of the other technological challenges, such as the need for standardisation and data-sharing. Rival companies will of course be vying with each other for market share as the autonomous vehicle industry grows, but safety concerns will demand that different manufacturers' cars are still able to recognise and communicate with each other, before the general public can let go of their steering wheels.

The question of public acceptance is one of the many other challenges that must be met, with many other related issues – including cost, human and vehicle behaviour, legislation, insurance, and the overall effect of driverless cars on society – still to be seriously addressed.

Our task at the TSC is to ensure that the UK continues to play a leading role in the development of autonomous transport systems, as part of our wider remit to promote intelligent mobility. We believe that with the strong, combined support of government, industry, research bodies and the general public, the transportation of tomorrow can be both smarter and greener.

*Neil Fulton is programme director for the LUTZ Pathfinder autonomous pods programme at the Milton Keynes-based Transport Systems Catapult*

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*The Transport Systems Catapult is one of seven Catapults set up by Innovate UK (formerly the Technology Strategy Board) to promote "intelligent mobility" – defined as the smarter and more efficient movement of people and goods.*