Starship Technologies – Written evidence (AUV0072)

1. What are the potential applications for autonomous vehicles?

The Starship Technologies application is an ecologically friendly, inexpensive and largely autonomous ‘personal delivery’ service, which can also enable less mobile individuals to enjoy more independence and self-reliance at home.

2. What are the potential user benefits and disadvantages from the deployment of autonomous vehicles?

Personal Delivery Devices (PDDs), such as the Starship robot, deliver goods across short distances of up to a couple of miles at very low cost, with large savings of time for suppliers and consumers and negligible environmental impact. Our conceptual aim is ‘zero pollution, zero time and zero cost’ – the financial saving being made through the fact that PDDs are much cheaper to operate than human delivery systems. The PDD sector, of which Starship is currently the primary example, offers the prospect of large-scale modal shift from human operated vehicles, such as cars and vans, to small, low ‘footprint’ devices which will measurably and safely reduce traffic congestion.

There are two further advantages. PDDs offer small businesses, such as sole trader shopkeepers, an affordable home delivery service. This means they can compete on a more level playing field with large retailers, without the need to employ human drivers and expensive, large vehicles. Secondly, citizens with mobility issues can live independently and with dignity at home for a longer period, instead of in staffed care homes, as the PPD’s can perform delivery services for them. This could save tens of thousands of Pounds per person per year, and sustain quality of life, which is cannot be quantified in pecuniary terms alone.

It is hard to see significant disadvantages with PDDs. They are not vehicles, they don’t use the roads, they don’t fly, they have little kinetic energy and they don’t carry people. PDDs coexist with pedestrians and always defer to humans, animals and other vehicles. They are extremely safe and will reduce the incidence of injury accidents on the UK’s roads by reducing traffic.

With the regulations for PDDs we propose, there should be no adverse effects from the PDD sector. As we will explain, this legislation is the single most helpful action the Committee could recommend to support the sector and ensure safe, responsible operations at no cost to the public purse.

3. How much is known about the potential impact of deploying autonomous vehicles in different sectors?

Various companies are experimenting with human-carrying autonomous vehicles. There is also a large body of information available in terms of sectors which already
use large scale automated systems. These include rail-based transport systems, plus the passenger aircraft industry, in which a Hawker Siddeley Trident aircraft made the first commercial automatic passenger-carrying landing on 10th June 1965. Thus there is already a significant body of evidence already.

Starship is now exploring the impact of the PDD with commercial testing running side-by-side with experimental research. The robot has operated autonomously in various geographies, including Estonia, America and the UK and the results are carefully recorded. The challenges for Starship are very much smaller than for human rated machines, which travel much faster and interact with other manually operated road vehicles. We now know enough to safely operate our device without incident.

4. How much is known about public attitudes to autonomous vehicles?

The Starship robot has travelled over 13,000 km and ‘met’ over 1.3 million members of the public, with a 97% approval rating. In the Royal Borough of Greenwich in London, which has been the lead location for our commercial trials, the public is now largely familiar with the existence and operation of the device - and the primary response is one of casually ignoring its presence, which one would expect as a new device becomes familiar.

Although it is not technically necessary to do so, Starship works closely with local authorities prior to commencing operations in any locality. Local authorities consistently register their approval for the robot’s operation in their jurisdictions. The firm also works with organisations such as the Royal National Institute for the Blind, to deepen our understanding of any potential issues, as well as benefits the PDD can provide to particular client groups. This work helps considerably in our understanding of the role of our autonomous device in the overall mix.

5 What is the scale of the market opportunity for autonomous vehicles?

Starship estimates the value of the sector at billions of Pounds per annum. The potential for replacing manually controlled deliveries with autonomous devices is so great that it will partially alleviate road congestion and air quality issues in urban areas. The commercial attraction of reducing the cost of deliveries by up to 90% will create a customer-led transition.

Research and Development

6 Is the scale of current and planned demonstration facilities for autonomous vehicles sufficiently broad and ambitious?

Starship is very satisfied with the current level of Government support. We are undertaking commercial operations with our business partners in the UK, and working with local authorities to ensure a partnership approach. Our exhaustive assessment of the law confirms our device can operate legally now, and thus we run
it in the ‘real world.’ It follows that the PDD sector does not need additional facilities from Government. We also have our own private research facilities and other PPD makers are likely to have similar facilities.

7 Is the Government doing enough to fund research and development on autonomous vehicles, and to stimulate others to do so? Should it be doing more to coordinate UK actions?

Starship has developed its business without the need for Government funding. For the PDD sector, it would not seem necessary for public funds to be allocated to this application of autonomous technology. Regarding coordination, the best assistance would be setting wireless connectivity standards, plus the PDD regulatory framework.

8. How effective are Innovate UK and the CCAV in this area?

Starship has enjoyed very good relations with both bodies. We have made an extensive submission to the CCAV’s consultation into autonomous vehicles, and also proposed a simple regulatory framework for the PDD sector, which, as already stated, we would be very keen to share with the Committee. The CCAV has been our main formal link to Government, and find the individuals proactive and highly accessible – with a ‘can-do’ outlook and culture.

9. Is the environment for small and medium-sized enterprises (SMEs) working in this sector sufficiently enabling?

As a fast growing SME, Starship was sufficiently impressed with the UK business and regulatory environment to base its first international division in Britain – specifically at the Digital Greenwich offices on the Greenwich Peninsula. The Digital Greenwich staff and the local authority have been a case study in proactivity, and this adds to our impression of the UK as a superb place to do business with our PDD.

The enabling mindset of the Government, together with the fact that PDDs already fit within the existing UK legal framework, have made this country, to the best of our knowledge, the first in the world where regular commercial activity is taking place with a PDD system. The Government is honouring its promise to be a world leader for promoting autonomous technology.

Real world operation

10. Will successful deployment of autonomous vehicles require changes to digital or physical infrastructure?

The UK’s digital infrastructure will need to be significantly expanded, to cope with the very large data requirements that extensive autonomous vehicle operations will demand. Starship itself is a relatively small data user, but could face competition for bandwidth with other users as more devices come on-stream.
We wish to avoid at all costs any data outages which could compromise the efficiency of our delivery system. For Starship, safety is NOT the concern as the vehicle is intrinsically safe, and has extensive autonomous safety features which operate regardless of connectivity. Yet a digital infrastructure strategy at State level is highly desirable. For example, the Estonian Government has made a certain level of connectivity a ‘human right’ and acted accordingly. Starship is already in conversations with UK digital infrastructure providers, and also with other autonomous device manufacturers, and we are happy to share our real world experience with the Committee.

11. How might a move from current levels of highly automated vehicles to their extensive deployment best be managed? What do you see as the key milestones?

For Personal Delivery Devices, Starship envisages an organic transition, led primarily by our business partners and public sector bodies – both motivated by financial and service considerations. In addition, those responsible for traffic management in the UK will be attracted to modal shift towards PDDs so as to reduce commercial vehicle operations. Since the majority of Britain’s pedestrian facilities are significantly underutilized, this shift will not cause congestion or inconvenience to pedestrians – a fact proved across thousands of kilometers of real world experience and over 1.3 million human encounters we have already recorded and analysed.

In terms of the milestones we envisage for PDDs, they are:

Phase 1: proof of concept through non-commercial trials;
Phase 2: commercial trials;
Phase 3: full commercial operations.

Starship is at Phase 2 in the United Kingdom, with actual commercial deliveries taking place. We are very willing to share our experiences with the Committee.

12. Does the Government have an effective approach on data and cybersecurity in this sector?

Security of the software and wireless communications are of paramount importance for PDDs – and, for that matter, autonomous vehicles.

The Government should work with the sector to establish agreed levels of cybersecurity and, where appropriate, protocols which mean businesses will not be exposed to notional changes in cybersecurity requirements. As Estonia is a world leader in cybersecurity. Estonia was the first country in the world to suffer an extensive and malicious cyber attack. Very important lessons were learned and applied to national systems. Note that the founder of Starship, Ahti Heinla, was a co-founder of Skype and has extensive knowledge of this field. The Committee may find our insights useful.
13. Are further revisions needed to insurance, regulation and legislation in the UK to create an enabling environment for autonomous vehicles?

Starship has secured full Public Liability Insurance for its operations across over 30 countries, and as such we have demonstrated a model of insurance is possible without regulatory change. We have also fully addressed the potentially difficult question of liability. Our model is easily transferable to all autonomous device operators, should they wish to adopt a similar approach.

In terms of regulation, Starship has researched the current environment extensively and concluded that we operate within UK law. Were this not so, we could not have secured authorization to operate in the jurisdiction of local authorities, nor have secured our insurance cover. However, we believe it would be helpful to introduce a relatively straightforward regulatory framework for PDDs, and we have submitted our proposal to the CCAV. The framework is not specific to the Starship robot but, rather, generic to the Personal Delivery Device sector. Under these proposals, existing and future designers and operators of PDDs are all subject to a sensible, light touch regulatory framework which ensures the sector evolves responsibly and safely, thus preventing less scrupulous operators from gaining advantage by cutting corners on safety or good practice.

Starship is already operating with commercial partners. It would seem prudent to put in place this framework expeditiously as the sector is already demonstrably existent. The single most helpful action which Parliament can take is to introduce the kind of statutory framework we have proposed – either as part of a larger Bill, or preferably sooner as a Statutory Instrument.

14. What, if any, ethical issues need to be addressed in the substitution of human judgement in the control of vehicles by algorithms and Artificial Intelligence?

The primary ethical consideration is one of liability. Starship takes a simple approach: the company accepts liability for the operations of all its robots. This is reflected in our insurance and also in our arrangements with local authorities. Our model holds that artificial intelligence should operate with the ultimate responsibility resting with a human. With our robot, the designated human controller can override the machine anywhere and at any time. Our device will never be 100% autonomous and this is a fundamental design feature built into our device and operating practice. The small level of human input resolves a very large number of practical and ethical challenges.

Wider governance

15. What does the proposed Modern Transport Bill need to deliver?
The Bill is, we believe, likely to focus primarily of large, human-carrying autonomous transport vehicles. As Starship already has a proposed regulatory framework, this could be incorporated as a section of the Bill, or alternatively passed as a Statutory Instrument separately from and in advance of the Bill. Starship strongly recommends this latter approach – which has the added advantage of providing further experience and knowledge of the effectiveness of such as regulatory system in the real world, in the case of PDDs with intrinsically safe devices which carry goods, not people. That may help Parliament with the framing of the Modern Transport Bill.

16. How effective is the UK’s education system in delivering people with the right skills to support the autonomous vehicles sector?

Starship has had little difficulty in finding staff in the UK who are capable of displaying appropriate skills. Most design work has taken place in Estonia, but this process is helped by the UK team. Possibly, relationships between the autonomous sector and schools could help to deliver the right skills set for this growing sector, and keep the UK at the forefront of developments. Starship has begun working with schools to test the benefits of this. We would be delighted to share our experiences with the Committee.

17. Is the Government’s strategy and work in this area sufficiently wide-reaching? Does it take into account the opportunities that autonomous vehicles offer in a wide range of areas, not just on the road?

Starship has found representatives and elected officials at National and Local Government level very responsive to PDDs, as we explain, demonstrate and operate it. Our activities in various parts of the UK including Greenwich, Glastonbury, Milton Keynes and elsewhere show the Government has created an environment in which our device is successfully being brought to market.

18. What are the implications of exit from the European Union for research and development and the autonomous vehicle industry in the UK? Are specific actions from the Government needed to support or protect the autonomous vehicles sector in the short term or after the terms of Brexit have been negotiated?

As long as the Government’s attitude and actions continue to support what we are doing, Starship intends to continue expanding its commercial operations in the UK, and to work in partnership with the authorities to generate social, environmental and economic benefits to the country as a whole.

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