Academic Engagement Highlights

July-December 2018

cATAPULT
Transport Systems

INTRODUCTION

Academic Engagement at the Transport Systems Catapult

Academic Engagement in the Transport Systems Catapult (TSC) has been always a priority which makes **our organisation the go to place for universities and researchers operating in the field of Intelligent Mobility (IM)**. Our ethos of collaboration instead of competition means synergies and symbiotic relationships are at the heart of the programme. We bring together academics and innovators, creating an environment for the breadth of multidisciplinary knowledge to tackle challenges faced by the future transport. By fostering relationships between academia and industry we help the UK to become a world leader in Intelligent Mobility (IM).

The Catapults are a network of world-leading centres designed to transform the UK's capability for innovation in specific areas and help drive future economic growth. Transport as a sector became one of the most complex, diverse and multidisciplinary areas and also one of the biggest market opportunities.

On the other hand, cities are growing at unprecedented rates. By 2050 over 80% of the world's population will live in urban areas. UK cities are already home to 83% of the population.[1]

The highlight of the year was the announcement of a new five year grant funding agreement for the Transport Systems Catapult and the Future Cities Catapult which would also see the two organisations come together to combine their knowledge, skills, expertise and experience to create an innovation powerhouse in April 2019.[2] This is a unique opportunity for both universities and businesses to join the mission of leading UK Innovation Centre and be part of world leading programmes and initiatives which tackle the problems of modern city living and shape the future of mobility.

The creation of the new catapult we will see more and more joint opportunities and enabling projects for researchers and entrepreneurs to work together in symbiotic relationships and build on each other's strengths. The TSC's Academic Engagement Programme is creating blueprints of initiatives with its partners which can be utilised by relevant stakeholders from academia, industry and government.

The TSC is not a funding body, but much more. We are connecting and linking individuals from extremely diverse backgrounds and organisations. Inspiring them with innovative approaches and methods to work together by complementing skills and assets to create world leading solutions for cities and IM.

In this document you will learn about projects and activities we are proud of from the past six months including the new Deep Academic Alliance with Cranfield University and the establishment of the Business Fellow Network.

BEATA SZOBOSZLAI
Strategic Initiative Lead
Head of Academic Engagement

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[1] https://futurecities.catapult.org.uk/about/
[2] £215 million additional investment for UK innovation centres, 23/10/2018: https://goo.gl/A1nJX2

ACADEMIC ENGAGEMENT TEAM

JULIA BRADY Academic Engagement Delivery Lead – *AE enables us to stretch the boundaries of what is considered possible and realistic in the future of mobility by influencing responsiveness of research to societal needs, identifying leading research and opening up new commercial opportunities in that space.*

ANTONY CHARNLEY Bid Lead – *AE initiatives help bridge the gaps that inherently exist during innovation advancement through the affectionately termed 'Valley of Death'. Placed firmly at the fulcrum of commercial viability, we take pride in assisting and enabling concepts towards an affluent marketplace.*

Dr LOVISA ERIKSSON Technologist – *Academic Engagement encourages collaboration between academia and industry, which helps accelerate the development of smart, responsible and holistic new transport innovations.*

Dr PATRIZIA FRANCO Senior Transport Modeller – *The AE Programme supports the Universities in steering their research towards Intelligent Mobility and exploiting latest trends in Connected and Autonomous Transport and New Mobility Services for a wider impact of the research developed.*

KONSTANTINOS MALANDRAKIS Automated Transport Systems Engineer – *I always felt it is important to work with academics and universities as they create novel and innovative ideas and it's exciting to convert these ideas into solutions to problems.*

ANDREA MANCINI Personal Assistant – *I am proud to be part of the Catapult network of elite technology and innovation centres where we bring together the brain-power of industry and academia to accelerate the development of the intelligent mobility market.*
AE gives me the opportunity to meet support staff and academics from universities all over the UK and it gives me an interesting insight into collaborative projects which will guide innovation to market.

ALAN NETTLETON Senior Technologist – *We are living in a complex, fast-changing world. Academia provides the crucial deep thinking and new ideas that will keep the UK at the forefront and help us benefit from new technology.*

ACADEMIC ENGAGEMENT TEAM

Dr ZEYN SAIGOL Senior Technologist – *Academic Engagement is a key way for us to grow UK companies, by helping industry adopt innovations coming from universities.*

VEENALI SHAH Communications Assistant – *Academic Engagement has supported so many fantastic projects and has continued to work with academics in Intelligent Mobility and Transport Innovation in a positive and supportive way.*

RAJINDER SHARMA Business Account Manager – *AE provides a pillar that helps us to drive impact in collaboration, cooperation and consortia with other stakeholders be it local government, corporations, SME's etc. It helps the TSC to have a unique role in helping to commercialise research and innovate technology.*

BEATA SZOBOSZLAI Head of Academic Engagement – *Academic Engagement is one of the most important role that a Catapult can play in the current innovation ecosystem and I am really proud to be part of the team who executes the activities.*

ADITYA THIRUNAVUKKARASU Technologist – *I believe the biggest value of academic engagement is the facilitation of open innovation of ideas and research coming from universities into the adoption of commercially applicable technologies.*

NICK WOODWARD Academic Engagement Coordinator – *Academic Engagement provides the opportunity to work with some of the worlds brightest minds to help develop and shape the future of intelligent mobility.*

£10 billion per year

UK Universities leverage in research and teaching funding for the development of early Technology Readiness Level projects.

ACADEMIC ENGAGEMENT PROGRAMME

The TSC has developed an ambitious Academic Engagement Strategy[3] which focuses on several ke
the Academic Network for Intelligent Mobility (ANIM) all provide excellent opportunities to collab

Deep Academic Alliance Update

Deep Academic Alliances are key partnerships between universities, industry and the TSC that aligns research, commercialisation and strategies. They play an important role in maximising the potential of SME networks and creating a strong group of universities who can influence the ecosystem and lobby for funding for Intelligent Mobility to develop capabilities with industry for the benefit of UK PLC.

The Academic Engagement Team are proud to have cemented its alliance with the University of Nottingham.[4]

Signing the strategic agreement.
From left to right: Professor Shearer West University of Nottingham Vice Chancellor and Paul Campion TSC CEO.

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DID YOU KNOW:
The University of Nottingham have 120 metres of dual-rail trackway on the roof of their Geospatial Building at the Jubilee Campus which can be used as a test platform for navigation systems.

[3] Academic Engagement Strategy, November 2017: https://goo.gl/mfhnmn
[4] Ground breaking agreement on smart transport research signed at University of Nottingham, 26 July 2018: https://goo.gl/67iRM7

ey initiatives. Deep Academic Alliances, Intelligent Mobility Hubs, the Business Fellow Network and orate with universities across the UK.

The work with the University of Nottingham (UoN) focused on creation of a one stop shop for industry, government and other universities to work with UoN in the field of Intelligent Mobility. As a result, we successfully launched Transport Mobility and Cities (TMC)[5] on 20th November 2018. TMC is focused on enhancing future transport modes within our future cities will require new forms of physical, civic and digital infrastructure to enable mobility. TMC brings together over 60 academics working across 12 university departments to support this vision. Academics and industry partners interested to find out more and engage with the TMC can do so via the TMC website.[6]

On 14th September 2018 we signed our third alliance with Cranfield University to jointly boost innovative economic activities. The collaboration – among others – will include joint activities related to the Digital Aviation Research and Technology Centre.

DID YOU KNOW:
Cranfield University is the only university in Europe to own and run an airport and to have airline status.

Signing the strategic agreement.
From left to right: Paul Campion TSC CEO and Sir Peter Gregson Cranfield University Vice Chancellor.

[5] Official website: https://www.nottingham.ac.uk/research/groups/tmc/home.aspx
[6] TMC Comprehensive Guide for Capabilities, November 2018: https://goo.gl/nDZdC1

BUSINESS FELLOWS NETWORK

The 'Business Fellow Network for Intelligent Mobility' is a network of experts co-funded by the TSC and the fellows university to enable collaboration with academics who have a strong record in transport research and innovation in UK universities.

The Fellows will be helping us to understand how the universities engage with industry, government and wider transport innovation ecosystem and establish their current regional, national and international impact. Business Fellows start in January working closely with the TSC for twelve months.

The aim is to bring research outputs closer to commercialisation and enable academics to increase their industry engagement, entrepreneurship and research impact. This initiative will also support universities to achieve their Knowledge Exchange Framework targets.

The TSC are proud to announce the first twelve Business Fellows:

Simon Barnes: University of Kent

Richard Barrett: University of Liverpool

Keith Bevis: University of Hertfordshire

Richard Bowden: University of Surrey

Soufiene Djahel: Manchester Metropolitan University

Paul Evans: University of Leeds

Liam Fassam: University of Northampton

Stefano Longo: Cranfield University

Liz Mullis: University of Lancaster

Ben Nichols: University of Nottingham

Erik Thomasson: University of Leeds

Tom Zunder: Newcastle University

Further information about the Business Fellow Scheme can be found on the TSC website.[7]

[7] Business Fellows Network Article by Transport Systems Catapult: www.ts.catapult.org.uk/news-events-gallery/news/business-fellows-to-drive-closer-links-between-industry-and-academic-research/

THE ACADEMIC NETWORK FOR INTELLIGENT MOBILITY (ANIM)

ACADEMIC ENGAGE

Academic Network for Intelligent Mobility update & networking event

ANIM gives individual academics, universities, businesses and other stakeholders access to a wide range of skills, knowledge and contacts across the Intelligent Mobility sector. Members of the network are added to our contact database. Their interests will be recorded on the national Academic Capability Map for Intelligent Mobility. We will also provide our members with details about forthcoming opportunities and events relevant to their research interests and focus areas.

Having started in early 2018, ANIM currently has 194 members from 49 universities.

Over the last six months our focus has been sharing high quality content with our members and developing ways in which we can quickly grow ANIM through new funding sources. We have also been growing the number of members within the network to allow the TSC to be agile in linking the UK's universities with industry partners.

The Academic Engagement team will be hosting three events in 2019 to bring our academic community together.

These will be held in the following locations and dates:

| Glasgow 26th Feb | Manchester 28th Feb | London 1st March |

(Correct at November 2018)

Researchers in Residence Round Up

The Researchers in Residence (RiR) programme helps to create synergies between universities and the Catapults. Engineering and Physical Sciences Research Council (EPSRC) funds the development of new collaborations through research residencies for university academics (and other eligible research organisations), who spend time embedded within the Catapult teams.

Mauro Vallati (University of Huddersfield)

During the last six months Mauro has had a paper published titled; *A Principled Analysis of the Interrelation between Vehicular Communication and Reasoning Capabilities of Autonomous Vehicles.*[8] The paper complements Mauro's work while collaborating with the TSC. Mauro's project with the TSC is titled AI4ME: Artificial Intelligence for maximising the exploitation of urban networks via personalised AVs route generation.

This project is based on the novel application of artificial intelligence (AI) approaches, specifically deliberative AI planning in the context of urban traffic control.

Zaili Yang (Liverpool John Moores University)

Zaili's project "Prioritising Vehicle Cleanliness" aims to develop and support a testing and scoring mechanism, to assess a green vehicle index encompassing all the relevant criteria affecting consumer choice (e.g. CO_2 and polluting emission, energy efficiency, performance, cost).

To help prioritise vehicle cleanliness a survey has been developed by Zaili and his team. It starts with some demographic related questions, followed by the section gathering some car purchase history information, and finally moves into a series of comparative questions.

We are proud to announce two new researchers in residence who have joined our team:

Dr Robert Houghton (University of Nottingham)

Research Topic: CAV occupant sensing for reassurance and remanufacture

Rob is an Assistant Professor in Human Factors in the Faculty of Engineering at the University of Nottingham. He specialises in cognitive and systems ergonomics and has carried out research in both laboratory and field settings relevant to topics such as digital economy services, distributed decision making and the development of mobile technology. This Researcher in Residency project will define an approach to how sensed data about Connected and Autonomous Vehicle (CAV) occupants can be collected and used to better meet the needs of both occupants and operators/manufacturers.

Dr Houghton's RIR is shared across High Value Manufacturing, Satellite Applications and Transport Systems Catapults.

Dr Frens Kroeger (University of Coventry)

Research Topic: Trusting technology with your life: Research and interventions to increase trust in Connected and Automated Transport

Frens is a Permanent Research Fellow at the Centre for Trust, Peace and Social Relations at Coventry University. In his project with the TSC, Frens will research trust in Connected and Automated Transport (CAT). Trust is central to the acceptance and adoption of CAT, but also poses a significant challenge; reservations and distrust of this new technology are widespread. Little research exists on this question so far, and this project will endeavour to begin to close this important gap. Frens will research reasons, dimensions, and types of trust and distrust in regard to CAT.

[8] A Principled Analysis of the Interrelation between Vehicular Communication and Reasoning Capabilities of Autonomous Vehicles: https://ieeexplore.ieee.org/document/8569953

PROJECTS WITH UNIVERSITIES

Project	Partners	Description
FLOURISH	Atkins, Age UK, Airbus, AXA, Bristol City Council, Designablility, Dynniq, Traverse, React AI, South Gloucestershire Council, Aimsun, University of the West of England, Bristol Robotics Laboratory, Burges Salmon and Cardiff University	The TSC is proud to be involved in FLOURISH, a multi-sector collaboration which is helping to advance the successful implementation of Connected and Automated Vehicles (CAVs) in the UK by developing services and capabilities that link user needs and system requirements.
CAV2: HumanDrive	Nissan, Hitachi, Horiba Mira, SBD Automotive, Cranfield University, Atkins, Aimsun, Highways England and University of Leeds	This major connected and autonomous vehicle (CAV) R&D project seeks to take autonomous technology to the next level in terms of end user experience. The most complex autonomously controlled journey yet attempted in the UK, the HumanDrive project will develop a prototype autonomous vehicle that will demonstrate a 200+ mile, end-to-end journey in a variety of settings (including country roads, A-roads, high speed roundabouts and motorways) through live traffic and different environmental conditions. This Grand Drive is scheduled for late 2019. https://ts.catapult.org.uk/innovation-centre/cav/cav-projects-at-the-tsc/humandrive/
CAV2: MuCCA	Applus IDIADA, Cosworth, Cranfield University, Westfield and SBD Automotive	Motorway pile-ups are costly – both in financial terms and in terms of human lives. MuCCA (Multi-Car Collision Avoidance) is a £4.6m, 30-month project supported by Innovate UK, which will develop a next-generation driver aid that aims to avoid multi-car collisions on motorways. If an accident cannot be avoided, the MuCCA system will attempt to minimise its consequences (both injuries and damage). https://ts.catapult.org.uk/innovation-centre/cav/cav-projects-at-the-tsc/multi-car-collision-avoidance/

Projects with Universities (continued)

Freight Share Lab	Heriot-Watt University, DVV Media International, Route Monkey	FreightShare Lab creates a platform of platforms where companies can share trucks and loads, thus potentially optimizing every truck journey. FreightShare Lab brings multiple companies and freight exchanges together and optimizes all of them as if they were one fleet. https://freightsharelab.com/freightsharelab2018/en/page/home
TrackWater	InTouch, University of Lancaster and Network Rail	The project's focus is on improving the performance of the rail infrastructure's drainage system - a critical, yet often overlooked element of the network infrastructure in order to help "design, build and operate railway infrastructure at reduced cost". https://www.intouch-ltd.com/special-projects/
Autonomous Valet Parking	Parkopedia and University of Surrey	As the automotive industry aims towards high levels of vehicle automation, one area which doesn't attract nearly enough attention is that of parking, which we believe is one of the first steps to fully autonomous driving. Industry expectations are that drivers will be dropped off in front of their destination and that the vehicle will then automatically find, navigate to and pay for parking. https://ts.catapult.org.uk/innovation-centre/cav/cav-projects-at-the-tsc/autonomous-valet-parking/
CORAM	Propelmee and Cranfield University	Project CORAM (Connected On-Road Autonomous Mobility) will undertake a feasibility study as part of CAV3 funding competition sponsored by Innovate UK and the Centre for Connected & Autonomous Vehicles (CCAV). CORAM will research how 'Look-Ahead' and 'Non-Line-of Sight' (NLOS) perception can be delivered to any Connected and Autonomous Vehicle (CAV) from infrastructure deployed sensors. CORAM will leverage connectivity to deliver NLOS and Look-Ahead perception using low-latency over-the-air messaging to autonomous vehicles. https://ts.catapult.org.uk/news-events-gallery/news/autonomous-vehicles-see-around-blind-corners/
MODLE	Esoterix, Bristol City Council, First Bus, University of West of England	The Mobility on Demand Laboratory Environment (MODLE) will develop, test and refine a service that combines the convenience of point-to-point journeys with the environmental and cost benefits of shared use. Think of it as a taxi-bus, intelligently routed by real-time and predicted demand. The key features of MODLE are that it will explore innovative business models to keep the cost of the service down and that it will integrate with existing public transport to make it easier to get from A to B sustainably. https://ts.catapult.org.uk/current-projects/mobility-demand-laboratory-environment/

CASE STUDIES

Following on from the third edition of the AE highlights document[3] Autonomous Vehicles: *WHAT CAN SOCIAL SCIENCE OFFER? – JULY 2018*

1   **AUTONOMOUS VEHICLES: WHAT CAN SOCIAL SCIENCE OFFER?**

INTRODUCTION TO THE PROJECT

There continue to be exciting developments in autonomous vehicle (AV) technology, however the move towards increasing automation is also a profoundly social matter. The roll-out of AV technology will lead to significant changes not only to how people and goods move around, but to how society functions. Furthermore, the mere process of developing AVs is both shaping and being shaped by its social context, which affects the way we think about the technology and what we make of it.

Through a day-long workshop, this project explored what social science can do to help ensure AVs are developed in line with the needs of people and society, which ultimately will help ensure the success of these technologies.
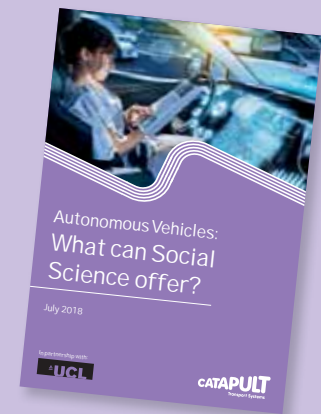
The key messages from the workshop were:

• Involve social scientists early in the policy, product, or service design process and keep them embedded throughout in order to maximise societal and economic value.

• Budget appropriately – high quality social research takes time. If you are limited on time, social scientists can also provide valuable advice based on existing knowledge about people and society.

• Policy makers – seek advice and evidence from a range of disciplines. This will give you a broader view of the societal implications of different policies and interventions and helps anticipate unexpected effects.

• Industry – embrace the constructive criticism from social science. Social scientists will likely challenge you to explain the why and how of your innovation, ultimately helping you develop better products and services.

• Industry – While understanding human machine interaction is imperative, consider also more broadly how products or services fit into society. In particular, this knowledge will help ensure that your future customers will accept, adopt, and desire what you bring to the market.

PARTNER

> People are excited about, and sometimes fearful of autonomous vehicles because they see that they might transform our lives. This means government and industry need to think hard about not just what these vehicles can do but how people might use them. The social sciences will be indispensable in helping get the best from the opportunities that this technology can bring.

Paul Campion, CEO, Transport Systems Catapult

[9] Autonomous Vehicles: What can Social Science offer? https://s3-eu-west-1.amazonaws.com/media.ts.catapult/wp-content/uploads/2018/08/06094104/00436_TSC-Academic-Engagement-Highlights-3rd-edition-WEB.pdf

2   SYNERGY – FEDERATED NETWORK OF SIMULATORS

INTRODUCTION TO THE PROJECT

The rapid change of urban areas and the strategic networks that connect them, and challenges in managing and integrating limited resources in short timescales requires new tools and models to manage this challenge.

Modelling the effects of Intelligent Mobility on transport systems is increasingly difficult in a period of transition towards full automation in vehicles and where provision of new mobility services is not complete. To tackle this problem, University of Leeds (UoL) is funding a new Centre for City Simulation, "Virtuocity" (which includes new-generation driving simulators), whilst the Transport Systems Catapult has created the Intelligent Mobility Platform (incorporating a driving simulator for autonomous vehicles and pedestrian and cycling simulators and several models across scales of many urban areas).

Both facilities constitute a safe test environment to assess new technologies and how people will perceive them, without the need for real-world deployment. SYNERGY will create a shared platform that will boost trials and rigorous tests through simulations and 3D real world environments. This will accelerate understanding and adoption of new technologies for intelligent mobility.

PROJECT HIGHLIGHTS

Synergy has advanced our joint capability to develop a "Digital Twin" of the real world. This digital twin needs to not only replicate one element of the real world (i.e., transport), but rather, it will seek to create a complex multi-dimensional model of the urban environment within which transport systems operate. For this reason, the ambition has been described as being the creation of a "Digital Urban Twin" and achieving this will open up the possibilities for its use in many virtual prototyping applications – not simply within a transport domain. *The wider vision of Synergy will:*

- Enable users of Synergy outputs to conduct testing, trials, studies and design in a collaborative, multi-user and co-creative way.
- Allow to share high value content between subscribers to Synergy, saving each user a substantial amount of effort, time and cost.
- The outputs of Synergy can be used extensively across the TSC projects as well as by our partners.

OUTPUTS

The experiment designed to test the success of the Federated network of simulators was a success in terms of its technical delivery, ease of use and stability. Due to the fact that the development of the Federation to date has been designed and developed to be saleable, it is feasible in terms of time and cost to further develop the outputs from Synergy for use across the TSC projects requiring multi-user virtual spaces.

A number of advancements have been identified that would greatly enhance and add value to this capability in preparation for deployment across project and academic partners. These advancements include improvements and refinements to the Photon integration to further reduce latency. Additional developments to this come in the form of an improved user experience through intuitive User Interface design and Unity Asset structure.

Additional to this, further considerations should be made around content production, workflows, connection process and user routines. To best inform this process, we should consult our academic and industry partners to assemble a concise list of use cases and functional requirements for the Synergy follow on work The outputs from Synergy are a leap forward in terms of low latency and stable connections between geographically separate simulators, however before this is deployed or included within projects we should allocate some time to fully review the Synergy outputs and devise a development roadmap which takes these outputs from experimental stage through to deployment stage.

PARTNER **UNIVERSITY OF LEEDS**

University of Leeds driving simulator used in the Synergy Project.

3   AUTODRIVE

UKAutodrive

INTRODUCTION TO THE PROJECT

The UK Autodrive project was born in direct response to the "Introducing driverless cars to UK roads" competition that was announced by the UK's innovation agency, Innovate UK, in 2014. Forming part of the government's commitment to "advance the research and development, manufacture and use of driverless cars in the UK", the competition sought to attract towns or cities that could "host trials of driverless cars and other road vehicles in a real-world environment and carry out research that leads to greater levels of understanding and promotes integration and acceptance of such vehicles into daily operation". The world leading consortium which the TSC was proud to be a member of, included four Universities.

KEY FINDINGS

It was evident by the end of the project that all the manufacturers had made major progress in terms of their respective connected and/or autonomous vehicle capabilities. The project was also useful in highlighting several remaining challenges that will need to be addressed in future development of autonomous vehicle technology, including:

• what levels of integration are necessary with road infrastructure, including traffic signals (particularly during future technology trials);

• minimising any issues related to time synchronisation between system components, with a key project learning being that distributed systems are highly reliant on their networking;

• the handling of pedestrians, with restrictions on areas where pedestrians' cross roads;

• the need to correct for three-dimensional 'imperfections' on real road surfaces compared to two-dimensional mapping software (e.g. potholes, speed bumps);

• the current unsuitability of GPS as the sole source of traffic lane-level localisation.

> " This country is in the early stages of an exciting and profound change and UK Autodrive is one of the organisations helping to put us at the forefront of that change.
>
> Jesse Norman, Future of Mobility Minister

PROJECT HIGHLIGHTS

The UK Autodrive project concluded its three years of trialling in spectacular fashion with three days of complex demonstrations spread across the two host cities of Coventry and Milton Keynes. In keeping with the collaborative, multivehicle nature of UK Autodrive itself, the final demonstrations included a potential future journey demonstration in which the project's connected and autonomous cars were able to link up with the self-driving pavement-based pods.

During the three days of the final demonstrations, a range of connected car features were successfully showcased showing the benefits that could be realised in the future if cars are enabled to "talk" to each other. This included several potential safety features (including Emergency Vehicle Warning and Intersection Collision Warning) as well as features that could improve traffic flow and reduce congestion (such as connected traffic lights and collaborative parking notifications).

The final demonstrations were also used to showcase the ability of the project's self-driving vehicles to function successfully in a diverse range of settings – from high-speed dual carriageways in Milton Keynes to more complex built up areas within Coventry city centre, and even out onto Coventry's notoriously

challenging ring road. As well as showcasing their ability to negotiate all sorts of road configurations and other road users, the self-driving Jaguar Land Rover also demonstrated its ability to end journeys with a successful autonomous 'valet parking' manoeuvre.

As the demonstration days (and the project as a whole) reached their climax, there was time for a final showcase involving the project's two separate vehicle types i.e. the connected/autonomous passenger cars and the pavement-based self-driving 'pods'. Providing a vision of how the pods could in future act as a form of 'last mile' transport – by enabling people to make the last leg of their journey via an on-demand, door-to-door service – the demonstration saw participants arriving at a car park in an autonomous car before transferring into a pre-ordered pod to complete their journey (in the case of the demonstration, by being taken to Milton Keynes train station).

Several of the connected car use cases, including the Emergency Vehicle Warning and Collaborative Parking features, were judged to have worked particularly effectively, and could be offering real-world benefits in the near future once sufficiently developed for use in production vehicles.

The First Public Attitudes Survey

UK Autodrive's Cities Research programme will examine several areas related to the wider roll-out of connected and autonomous vehicles, using research teams from the Universities of Cambridge and Oxford.

One strand of this research programme will look at public attitudes to self-driving vehicle technology, via a series of national workshops and online global surveys, the first of which was sent out in October 2016.

Other areas of study will examine the business case for self-driving 'pod' vehicles, how the technology can be scaled up, and how the eventual mass roll-out of autonomous and connected vehicles could affect congestion levels.

PARTNERS

4 TOWARDS A BUSINESS MODEL FRAMEWORK TO INCREASE COLLABORATION IN THE FREIGHT INDUSTRY

TheTransport Systems Catapult's Alix Vargas and co-authors Shushma Patel and Dilip Patel, both from London South Bank University, had a journal article published in October 2018.[10]

The paper investigates why freight companies are reluctant to work together and what the significant advantages there are to collaboration in the freight industry.

[10] Towards a Business Model Framework to Increase Collaboration in the Freight Industry: http://www.mdpi.com/journal/logistics/special_issues/logistic_systems

2019 EVENTS AND MILESTONES

Events, Activities	Date
ANIM Roadshow (Glasgow)	26th February
ANIM Roadshow (Manchester)	28th February
ANIM Roadshow (London)	1st March
Transport Café – Milton Keynes	13th March
Drones Conference	6th March

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