

# Nottingham and Leicester Universities combine to develop 'intelligent mobility' across the UK's transport systems



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**From the start of the Industrial Revolution to the early part of the 20th Century, the UK's transport systems were transformed. New roads, canals and railways were built and vast numbers of goods and people were able to move at speeds hitherto unthinkable. The reduction in the time involved in moving people to their work and the speed with which products could reach their markets drove economic growth and increased wealth.**

Today, the volume of traffic on our roads is more than 10 times greater than in 1949 and our railways carry more passengers than at any time since the First World War. The result has been steadily increasing congestion.

The government is committed to invest heavily in infrastructure through schemes such as Crossrail and High Speed 2. There is also a realisation that unlike during the days of the industrial revolution, there is now also an opportunity to use

data to develop smart networks which connect vehicles, infrastructure and passengers in a way which was unimaginable a few years ago.

To explore these opportunities, the Transport Systems Catapult (TSC) was established by the UK's innovation agency, the Technology Strategy Board, to become the technology and innovation centre for 'Intelligent Mobility'. In simple terms, Intelligent Mobility is the optimised movement of people and goods; an emerging market which some experts estimate will be worth £900bn globally by 2025.

The TSC helps UK businesses develop solutions to public transport and freight needs. It harnesses emerging technologies to improve the movement of people and goods around the country by providing a network of expertise to help transform ideas into products and services. It will test the latest theories on how transport systems interact and function against real-world examples.

The TSC is one of a new network of technology and innovation centres established by the Technology Strategy Board as a long-term investment in the UK's economic capability. The Catapults aim to use cutting-edge research to help businesses compete in global markets tomorrow by transforming ideas into high value products and services.

Earlier this summer, fourteen universities were selected to support the TSC through the

University Partner Programme. The programme was launched in order to promote collaboration with businesses and focus on the development of products and solutions in the field of Intelligent Mobility.

Two of the universities taking part in the University Partner Programme are our own, the University of Nottingham and also the University of Leicester.

running events where they can learn about the latest developments, meet academic staff involved in the various research areas and find out how to access funding to develop new technologies and applications.

In addition, some of our leading researchers will also spend time at the Transport Systems Catapult's world-class



A graphic representation of the weight of traffic in and around London

Our two universities have come together to form the Impetus Partnership. The Impetus Partnership will focus specifically on three elements – the journey experience, intelligent infrastructure and future transport systems. Together we will be drawing on the academic expertise of colleagues across our universities, including those in other catapult centres such as Connected Digital Economy and Satellite Applications, with whom we have close links.

The Impetus Partnership will also be helping businesses of all sizes and from all sectors to get involved with the work of the Transport Systems Catapult, by

36,000 sq ft "Imovation" Centre (which combines Intelligent Mobility and innovation) in Milton Keynes, where they will work alongside other academics and industry experts from across the UK to help develop solutions to the ten main challenges identified by the TSC, namely:

- 1. Improving the traveller experience at transport modal changes** – making journeys easier and ensuring smooth transition from one type of transport to another.
- 2. Minimising the impact of disruption through the use of adjacent transport networks** – making passengers aware of



The Transport Systems Catapult aims to better use data to optimise the movement of people and goods

immediate alternatives when there is disruption.

**3. Incentivising the provision of a seamless journey through modal changes** – improving the design and management of transport interchanges so that they are easier to navigate and more pleasant to use.

**4. Providing personalised, contextualised and trusted information which improves the traveller experience** – taking advantage of increasingly sophisticated technology to help people plan and undertake their journeys.

**5. Developing insights from transport system information to improve the performance of the network** – transport systems generate huge amounts of data but very little is used to its maximum potential.

**6. Offering end-to-end mobility as a service** – to develop a global intelligent mobility market in which the UK is a world leader. Fundamental to this is a clear understanding and support for a traveller's whole-journey requirements, from departure point to destination.

**7. Integrating quality-of-life and city-economy benefits into transport decisions** – to help enable the decision-making process to consider the wider impacts and benefits of transport systems on individuals, communities, organisations and businesses.

**8. Enabling the whole-journey accessibility of transport systems** – ensuring that all travellers are able to make the journey of their choice, wherever possible.

**9. Taking a systems approach to investment and policy in transport infrastructure** – the transport sector works across a number of different areas in an inefficient and uncoordinated manner. A systems approach, where we can identify opportunities for effective collaboration, is key to delivering a better transport system overall.

**10. Delivering seamless freight** – encouraging freight-specific innovation and supporting effective, seamless, journeys for goods as well as for people.

A practical example of a



An early concept design of the driverless pods being trialled in Milton Keynes next year

solution aimed at the first objective of 'Improving the traveller experience at modal changes' can be seen in one of the demonstrations on display at the "Innovation" centre. A computer model visualises the stress levels of people travelling in and out of a train station, depending on the level of crowding. Various scenarios can be modelled to assess the impact which entrance closures at the station could have on the mood of the people in the area. Such data and models might be used to test layouts of future transport hubs to ensure they are built in the best way possible both socially and efficiently.

The man at the helm of the new Transport Systems Catapult also has a wealth of experience in the rail industry as well as the

transport on-demand services. A research vehicle, 'the pod' is being developed which can be used to trial new technologies.

Another major project is in the aviation sector. The Departure Planning Information programme (DPI), is aimed at connecting a large number of UK airports into the European Network Manager to share information. DPI is an airport's ability to share real time data about when aircraft plan to push back, and the time they are likely to take-off. This will improve information about demand, capacity and traffic flows. It will help integration with other transport modes such as trains and buses as well as reducing stacking time, CO<sub>2</sub> emissions and delays.

Even factors such as the impact of weather are being explored by



Transport Systems Catapult's Chief Executive Steve Yianni (right) shows an interactive table top "demonstrator" of Manchester City Centre's transport network to Business Secretary, Vince Cable.

automotive and transport engineering sectors. Before taking up the role of Chief Executive, Steve Yianni worked as Technical Director of Network Rail, where he played a key role in delivering the industry rail technical strategy.

Work with the TSC will also investigate the potential of new technologies in rail, road, aviation and water based transport modes. One project already under way by the TSC which could benefit road users is the Low Carbon Urban Transport Zone (LUTZ). This demonstrates the potential of driverless cars, cloud-enabled mobility and

research groups linked to the Catapult. 'Instant Weather' provides access to localised weather on a short timescale, helping councils and businesses to manage better problems such as disruptions, routing and impacts on infrastructure.

For more information about the Transport Systems Catapult and to find out how to get involved, visit [ts.catapult.org.uk](http://ts.catapult.org.uk)

For details about the work of The University of Nottingham and the University of Leicester's 'Impetus Partnership' contact Professor Sarah Sharples on 0115 95 14196 or email [sarah.sharples@nottingham.ac.uk](mailto:sarah.sharples@nottingham.ac.uk)