TECHNOLOGY STRATEGY | 2016

FOR INTELLIGENT MOBILITY

Think big, take small steps, learn fast.

CATAPULT
Transport Systems

"We need to make sure that Catapults insert themselves into the existing British institutional nexus, are close to market and have diverse sources of funding to ensure both their resilience and sensitivity to real business challenges."

Will Hutton, "Catapult to Success"

The Transport Systems Catapult (TSC) has been established to create an environment that will make the UK a world leader in transport systems innovation. Our mission is to drive UK global leadership in Intelligent Mobility (IM) – promoting sustained economic growth and wellbeing through integrated, efficient and sustainable transport systems. Intelligent Mobility gives the UK a tremendous opportunity but, to take advantage of this, there needs to be a shared vision with strong links and collaboration across industry, academia and government.

The launch of this Technology Strategy marks an important milestone for the TSC. Following many months of work, we are pleased to be publishing our view of the global opportunities and to be highlighting where the UK needs to focus in order to maximise the economic potential of Intelligent Mobility innovation and technologies. We hope that this document will help to foster a shared vision and direction for all organisations interested in Intelligent Mobility.

In developing this Technology Strategy, we have consulted widely with our stakeholders, customers and partners. We are grateful for their invaluable insights. Our next step will be to work closely with the Intelligent Mobility community to deliver the vision outlined in this document.

Together, and with a shared vision, the Intelligent Mobility community can positively impact the UK economy by driving transport innovation and boosting UK business competitiveness.

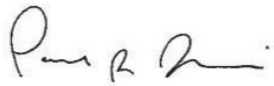
Steve Yianni
Chief Executive Officer

The way we move people and goods around the globe is undergoing a radical change. It is being driven by technological advances such as wireless communications, smart devices, Open Data, the Internet of Things and more recently artificial intelligence. The digital transformation of transport is creating amazing opportunities as well as significant challenges.

The UK is well placed to take advantage of these momentous changes and should aspire to be at the forefront of the global Intelligent Mobility (IM) market, estimated to be worth around £900bn by 2025. The challenge is to acknowledge the uncertainty surrounding existing means of transport and to enable the transition towards a better future. We need to embrace change, collaborate and focus our investment towards areas where the UK has the best chance of succeeding on a global stage.

The TSC has an exciting mission and our market-aligned Technology Strategy will guide our work over the next few years. It captures eight Intelligent Mobility goals that will provide clear direction for all those working in this field. We also identify the market sectors where we believe the UK can compete on a global scale, and we define the assets that are needed to make the UK the leading place to develop new Intelligent Mobility products and services.

This high-level view of the TSC's Technology Strategy is also supported by detailed research that addresses market alignment, UK capabilities and roadmaps. I encourage all our stakeholders to engage with us and take full advantage of our online repository with its wealth of resources for the benefit of all organisations participating in the growth of the Intelligent Mobility market.



Paul Zanelli
Chief Technology Officer

TSC **VISION**

To create an environment that will make the UK a world leader in transport systems innovation.

TSC **MISSION**

Drive UK global leadership in intelligent mobility promoting sustained economic growth and wellbeing through integrated, efficient and sustainable transport systems.

THE FUTURE OF TRANSPORT:

A NEW ERA OF OPPORTUNITY AND CHALLENGE THAT IMPACTS EVERYONE

Transport in 2030 will look very different than it does today. Intelligent Mobility will have a profound impact on the way we move people and goods around the globe. To create a people-centred, smart, sustainable and safe travel system, we need to prepare for the opportunity and challenge ahead.

The opportunity for the UK is to be at the forefront of innovation in new transport products and services. This will not only improve transport in the UK but also better enable UK industry to capture a large share of the fast growing global Intelligent Mobility market.

The challenge is to navigate through existing uncertainties around the future of transport in such a way as to not hinder progress. The UK needs to embrace this challenge and turn it into its biggest opportunity.

We're asking ourselves how we use innovation to allow Ford to help tackle some of these large societal issues around congestion and transportation. And that is why we're thinking of ourselves as not only a car and truck company, but also as a mobility company.
Mark Fields, CEO Ford

Sustainability can't be like some sort of a moral sacrifice or political dilemma or a philanthropical cause. It has to be a design challenge.
Bjarke Ingels, Architect

A developed country is not a place where the poor have cars. It's where the rich use public transportation.
Mayor of Bogota, Colombia

More change to come in the next 5 -10 years than in the last 50 years.
Mary Marra, CEO General Moters

Transport will be hit by a tsunami wave of change on par with the digital revolution in communications. Soon, commuters will be able to purchase mobility plans, as they would a cell phone service, at rates according to their needs.
Sampo Hietanen, CEO MaaS Finland

Together we will build a better future by redefining traditional car ownership.
John Zimmer, Co-founder of Lyft

People may outlaw driving cars because it's too dangerous.
Elon Musk, Entrepreneur

If we can get you a car in five minutes, we can get you anything in five minutes.
Travis Kalanick, CEO Uber

The key word for transportation in the 21st century is choice.
Anthony Foxx, US Secretary of State for Transportation

We still live by the rules of the industry when the phone was created. But we live in the smartphone era and things need to catch up.
Beth Stevens, Sidecar

Electric cars are going to be very important for urban transportation.
Carlos Ghosn, Renault

In the decades to come, filling up a car with petrol will sound as backwards as the horse and cart is today.
Richard Branson, Virgin

I believe public transport has a great future, it has a major role to play in helping Europe and the rest of the world meet the challenge of climate change.
Brian Souter, Founder of Stagecoach

Intelligent Mobility market is forecast to reach £900 billion globally by 2025, which corresponds to about 1 percent of the projected global GDP.
Transport Systems Catapult

ARE YOU READY?

PREPARING FOR THE FUTURE:

TAKING A MORE TARGETED APPROACH TO EXPLOITING INTELLIGENT MOBILITY OPPORTUNITIES

Intelligent Mobility is not an incremental advance that supports or maintains the status quo; instead it represents a radical overhaul of the entire transport market. The UK must not just participate in this, but aspire to be at the forefront.

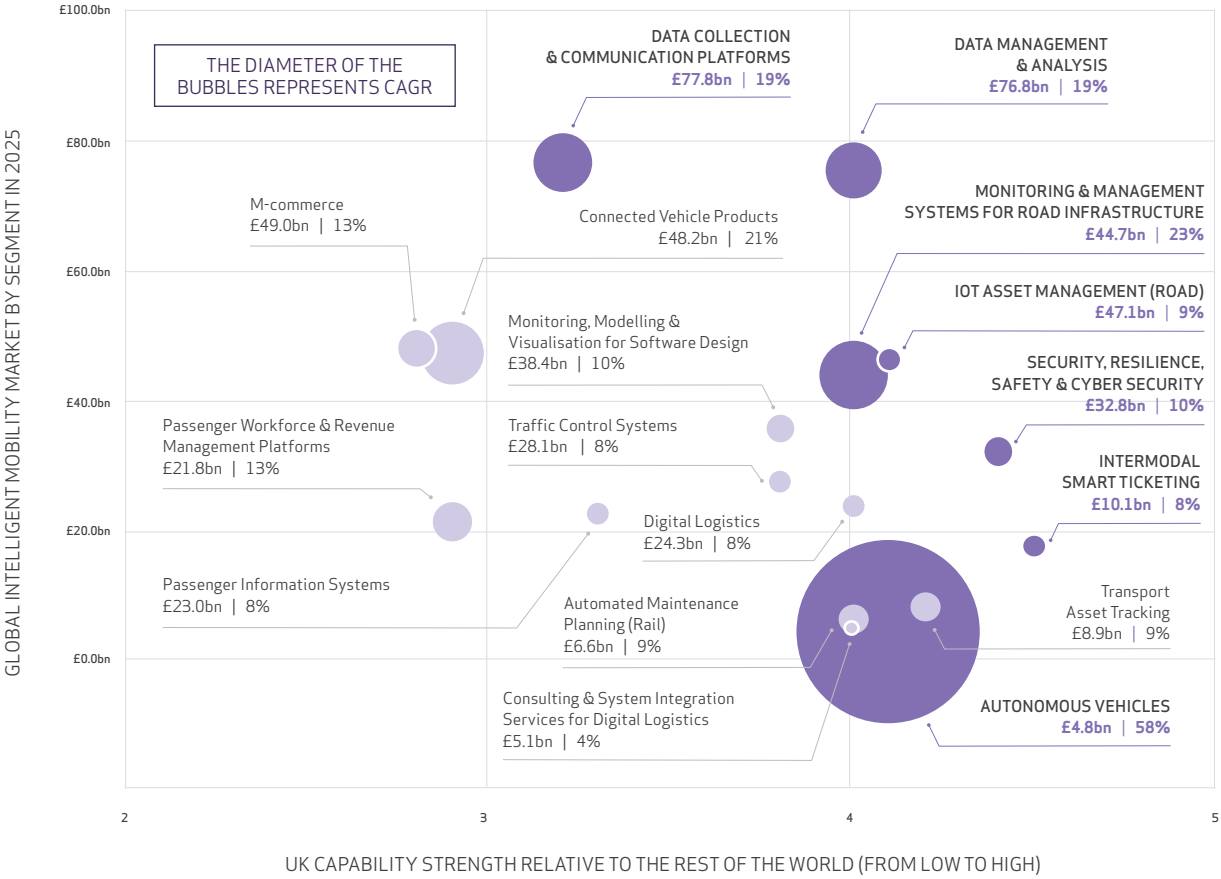
Intelligent Mobility is the future of transport. It is about harnessing innovation and emerging technologies to create more integrated, efficient and sustainable transport systems. It marks an exciting meeting point between traditional transport and the new products and services that are emerging as we start to exploit vast amounts of multi-layered data. As such it offers us a remarkable opportunity to make much more efficient use of networks and to revolutionise transport, all driven by the needs of the end user.

Intelligent Mobility is also an exciting global market with immense potential that the TSC has broken down into constituent market segments. Each segment is associated with an extrapolated Compound Annual Growth Rate (CAGR) of between 5% and 25% over the coming decade – with the exception of the autonomous vehicles segment, which is predicted to grow at 58% over the same period.

This Technology Strategy assesses the UK's capability in these market segments to better understand the UK's competitive advantage and to identify where investment would achieve the greatest impact. The methodology we used has been independently verified - we have selected market segments that are already large (or where growth rates are forecast to be large), and in which the UK has significant strengths.

The Intelligent Mobility market size is not due to new spend but a redistribution of the market spend away from traditional transport to Mobility as a Service.

Market segments where the UK should focus its efforts include: intermodal smart ticketing; security, resilience, safety and cyber security; Internet of Things asset management; monitoring and management systems; data management and analysis; data collection and communication platforms; and autonomous vehicles.



INTELLIGENT MOBILITY:
SHARING THE VISION

Our vision for Intelligent Mobility is expressed in eight Intelligent Mobility goals that provide focal points for the industry. Each goal is associated with a technology roadmap and takes into account potential developments in the next 15 years.

These roadmaps enable us to engage and collaborate with our staff, partners and stakeholders.

MAKE TRAVELLING AN END-TO-END USER-CENTRIC EXPERIENCE

- From ownership and single journey to Mobility as a Service (MaaS)
- More personalised and tailored transport services
- Increasingly connected and automated transport

MAKE OUR TRANSPORT SYSTEM MORE SUSTAINABLE AND REDUCE ITS ENVIRONMENTAL IMPACT

- Collaboration leads to reduced journey numbers
- Optimisation efficiencies lower emissions
- Increased measurement and awareness of eco footprint

SAVE MANY LIVES

- Connected and automated vehicles reduce the opportunity for human error
- Context and location-specific information engenders better awareness of local safety risks
- Dynamic management of emissions improves the wellbeing of people suffering from health problems linked to air pollution

GENERATE BILLIONS WHEN MOVING PEOPLE AND GOODS

- Data-driven network optimisation improves cost reductions and efficiencies
- Innovative businesses created on mobility platforms generate new revenue streams
- Trust-building technologies create transparency, enhance collaboration and reduce costs

MAKE OUR TRANSPORT SYSTEMS MORE RESILIENT

- Data-driven insights into the operation and use of transport improve contingency planning and design of resilient systems
- Dynamic response to disruptions minimises the impact of adverse events
- Connected and co-operative systems self-manage the response to disruptions at a network level

MAKE OUR TRANSPORT ASSETS MORE PRODUCTIVE

- Cross-modal innovation and data sharing provides opportunities for significant increases in asset utilisation
- Enhanced modelling, data collection and analysis yields better prediction and design of transport systems and networks
- Shared-use mobility services help relieve pressure on existing assets

IMPROVE ACCESSIBILITY FOR ALL SEGMENTS OF SOCIETY

- Societal and demographic changes drive the demand for new transport services in diverse market segments
- Collaborative systems and dynamic data platforms increase transport choice and enable more flexible services in remote areas
- Innovative solutions increasingly provide more efficient means of delivering transport to vulnerable users

MAKE TRANSPORT OF PEOPLE AND GOODS QUICKER

- Data-driven understanding of travellers' needs and behaviour allows the design of faster transportation systems
- Seamless and frictionless transition across modes reduces user travel time
- Connected and co-operative systems optimised across an extensive network reduce average journey times

FIND OUT MORE

Data behind this Technology Strategy is available on our online repository. To explore further visit: **TSCtechstrategy.co.uk**

OUR TECHNOLOGY STRATEGY:

A CATALYST FOR ACCELERATING INTELLIGENT MOBILITY GROWTH

There is a risk that the UK will have a relatively uncoordinated and slow response to the Intelligent Mobility market compared to international competitors, and hence fail to capture its full potential share of the market.

The TSC developed its Technology Strategy to champion the Intelligent Mobility vision by articulating an end-state that:

- Helps to exploit and improve UK expertise in key areas of Intelligent Mobility, focused on those market segments which are large or grow rapidly;
- Maximises the impact of the UK as a thought leader in the transport space by maintaining a coherent vision and high-level architecture for Intelligent Mobility and associated capabilities;
- Has a coherent portfolio of offerings that can be used by our industrial and academic stakeholders and partners, built on top of our unique assets.

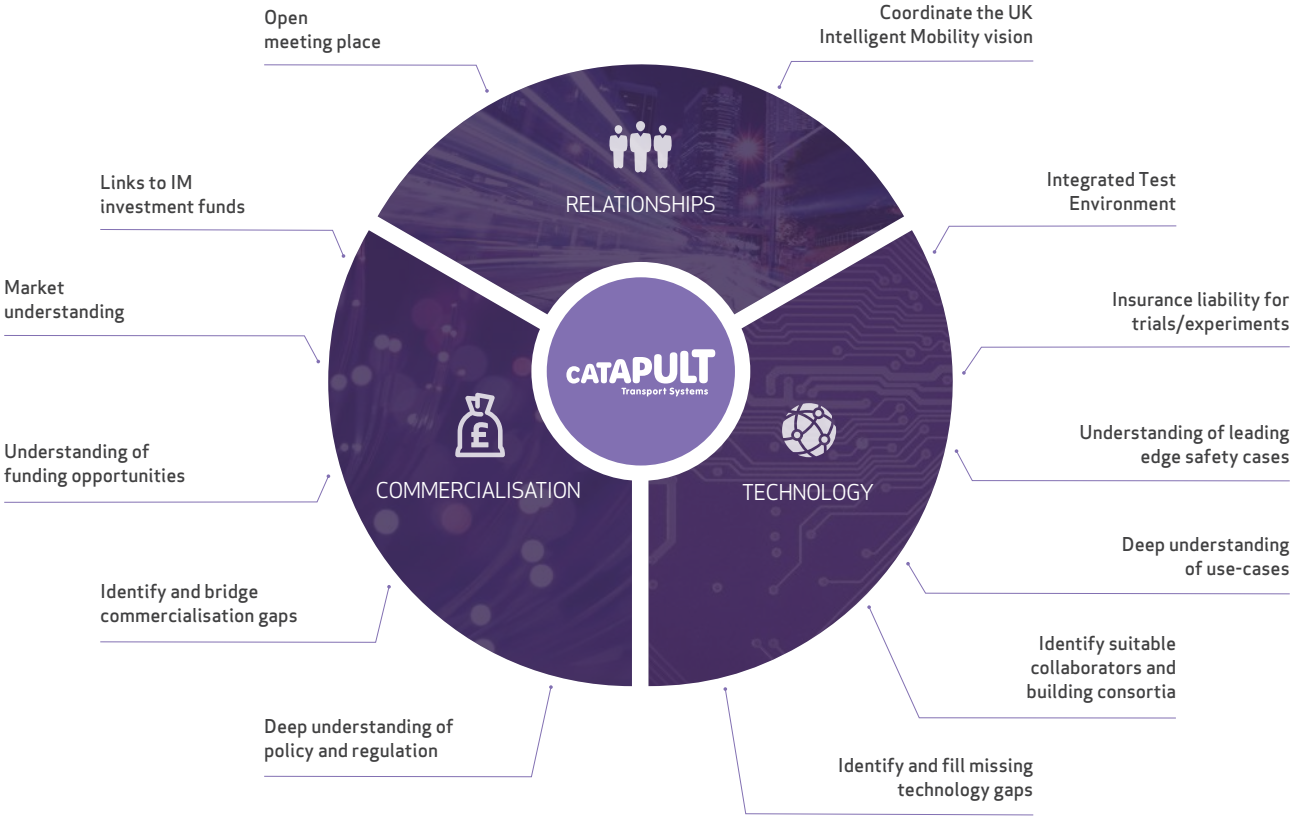
THE ROLE OF THE TSC

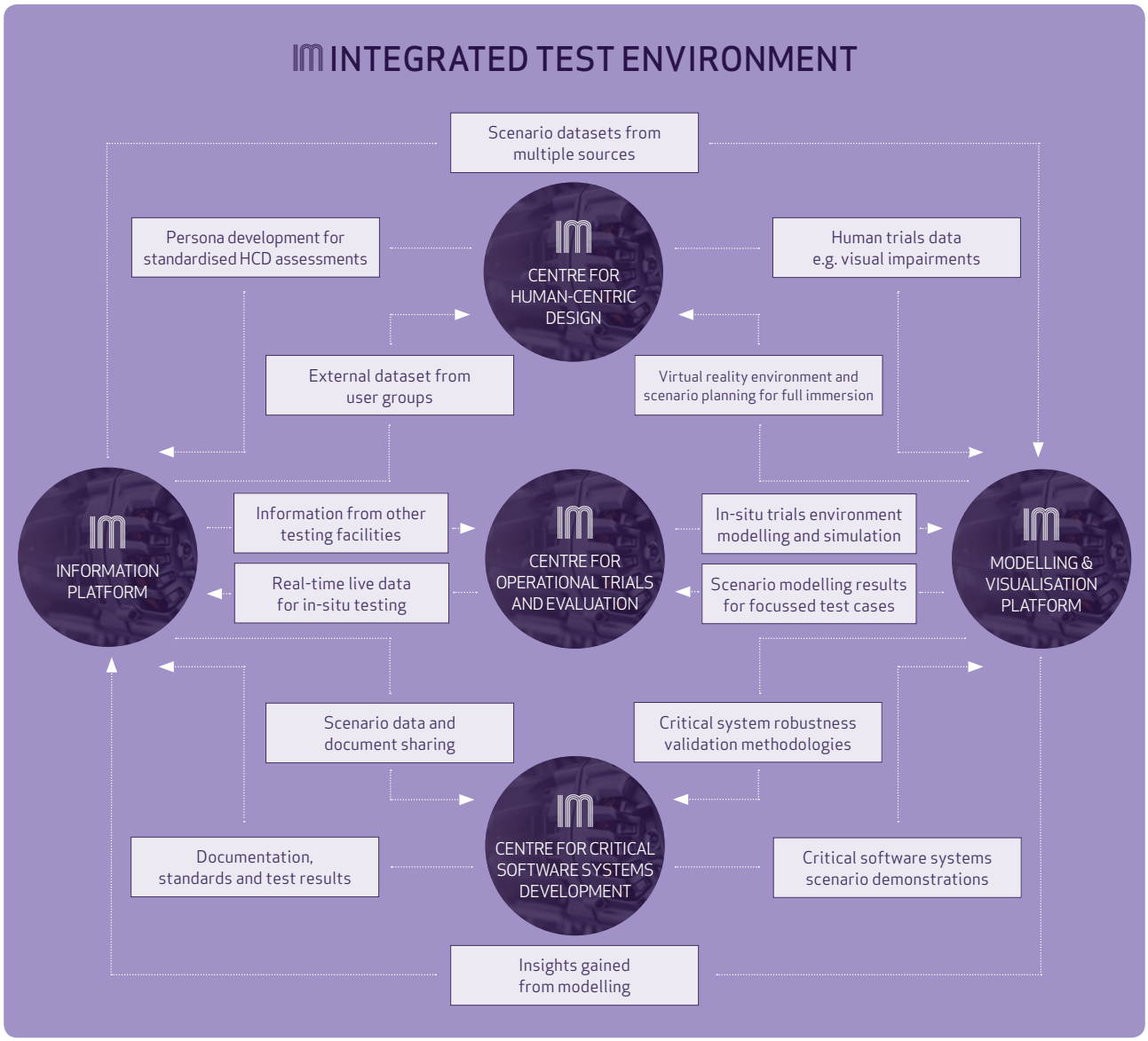
The TSC was established to provide an impetus to the Intelligent Mobility market. Its role is to help stimulate growth and jobs, support businesses to increase the UK share of the global market, improve journeys, provide thought leadership and build a sustainable business.

We will support the Intelligent Mobility community by working with them to exploit our shared know-how and experience, invest in areas that offer the biggest potential benefits, and put the user at the heart of everyone's work.

We believe that the areas where the TSC can add maximum value fall into three broad categories:

- **Relationships** – Facilitating communication and collaboration between UK government, industry, transport providers, SMEs and academia;
- **Technology** – Providing opportunities to de-risk new Intelligent Mobility technologies, products and services;
- **Commercialisation** – Providing support for the creation and development of new businesses as well as scaling up existing ones.





INTELLIGENT MOBILITY: ACHIEVING THE VISION

It is our aspiration that by developing a set of unique assets, collectively labelled the "IM Integrated Test Environment" (ITE), we can:

- De-risk innovation and help firms to go beyond their existing capabilities and what they can achieve with their own resources;
- Catalyse collaboration between universities, government, industry and other organisations;
- Enable knowledge, resources, intellectual property and skills to flow between businesses and academic institutions with speed and intensity.

The ITE comprises physical, virtual and knowledge-based elements covering the processes, people and tools needed to support the transition of technologies from the research base into marketable products and services in Intelligent Mobility. It will leverage and bring together existing capabilities where possible, with the TSC creating only those aspects that are not already being provided elsewhere. The design of the ITE is centred around the market segments identified within this report as being key for the UK. The ITE assets will be unique, in that they will go beyond what is already available in the UK.

We will underpin the ITE with **IM Accelerator** services to support start-ups and new business ventures, or to scale up of existing businesses. These services will include intellectual property management, business modelling, systems engineering and collaborative working.

IM CENTRES AND PLATFORMS

Our IM Centres and Platforms will be world-leading facilities designed to pool expertise and enhance research, as well as develop, test and evaluate Intelligent Mobility innovations.

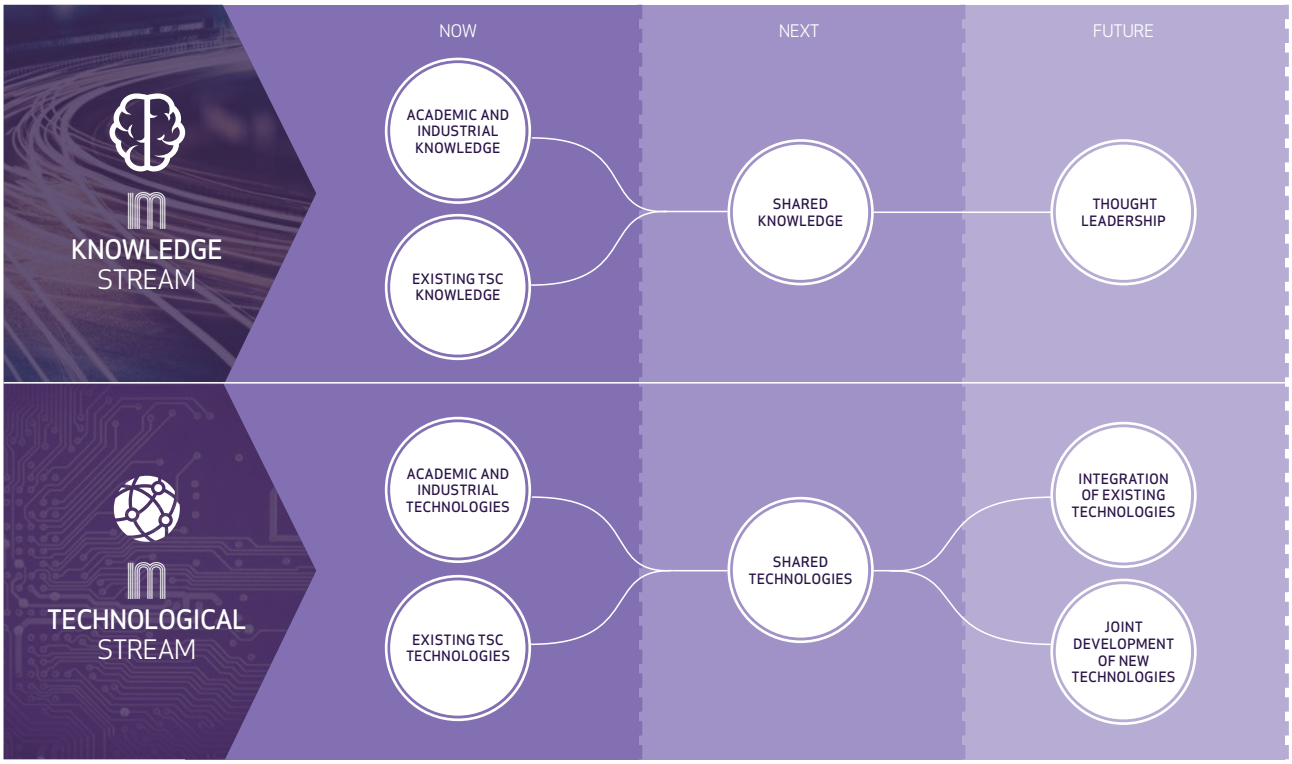
- **IM Centre for Operational Trials and Evaluation** – Advancing a national integrated network of cyber and physical assets that supports end-to-end testing and evaluation of Intelligent Mobility technologies and solutions;
- **IM Centre for Human-Centric Design** – Enhancing and enabling IM technology innovation by placing user needs at the heart of the design and development processes;
- **IM Centre for Critical Software Systems Development** – Establishing evaluation and validation techniques, methodologies and processes for critical software systems;
- **IM Information Platform** – Providing a platform for the storage, sharing and analysis of all forms of information, and facilitating ubiquitous data fusion between Intelligent Mobility stakeholders;
- **IM Modelling & Visualisation Platform** – Building a world-leading capability of people, processes and computational tools to develop and demonstrate Intelligent Mobility innovations using virtual worlds.

DEVELOPING THE UNIQUE ASSETS

The TSC will take an evolutionary approach to the development of the five unique assets that comprise the ITE and the IM Accelerator. This will allow us to manage progress from the current level of maturity of each of the assets towards the full completion of a series of unique capabilities. The speed of progression through the development phases will vary across each unique asset.

There are numerous opportunities for external partners to engage with the TSC and contribute their world-leading skills, facilities and capabilities towards developing the Integrated Test Environment and the IM Accelerator.

To find out more detail about the ITE and the IM Accelerator, the roadmaps for the development of each of the assets that make up the ITE, and the high-level implementation plan, visit our online repository at **TSCtechstrategy.co.uk.**



FIT FOR THE FUTURE:

OUR PORTFOLIO OF PROJECTS

Since the TSC was formed in 2013, we have built a portfolio of 71 projects addressing a wide range of Intelligent Mobility challenges and opportunities, and the number of projects continues to grow.

Progress is being made to realise the Integrated Test Environment and exploit the opportunities of Intelligent Mobility as the following examples demonstrate.

Thanks to the work of the TSC, an extra £359m is being invested in Intelligent Mobility in the UK economy.

62
Industry Partners

23
Research Base Partners

21
Public Bodies

25 Completed Projects

46 Ongoing Projects

£359m
Invested in Intelligent Mobility in the UK

FIT FOR THE FUTURE:
CASE STUDIES

TRAVELLER NEEDS STUDY

The TSC Traveller Needs and UK Capability Study revealed an increasingly progressive attitude among the UK's transport users, which also reflects attitudes towards autonomous vehicles. UK travellers are increasingly connected; the study found that 54% of participants now consider a smart phone an essential part of their journey, while 57% would share personal data to improve their journeys.

75%

of all journeys made in the UK are subject to negative experiences (pain-points). Multi-modal journeys (those which involve several different means of transport) are perceived as particularly troublesome, calling for significant improvements in end-to-end mobility

THE CHALLENGE

There was a need to develop shared knowledge of what UK travellers value as part of their journeys, what pain-points they encounter and how they make decisions with regards to their travel options, while acknowledging that there needs to be an end user willing to pay for products and services.

OUR APPROACH

We developed a rigorous methodology that provided an objective assessment of travellers' needs, pain-points and attitudes as well as capability needs. To represent the UK population, we used a large market research sample of 10,000 online questionnaire respondents, 100 expert interviews and 50 company interviews. This study was jointly funded by Innovate UK, Department for Transport and Department for Business, Innovation and Skills.

BENEFITS DELIVERED BY THE STUDY

The study identified unmet transport lifestyle needs across a range of traveller types. It captured these needs and opportunities as 12 key challenges that, when addressed, would improve mobility in the UK and potentially unlock a number of revenue opportunities for innovators in Intelligent Mobility.

HOW IT LINKS TO THE INTELLIGENT MOBILITY INTEGRATED TEST ENVIRONMENT

The Travellers Needs Study forms part of the Centre for Human Centric Design as it provides an initial understanding of what the traveller actually wants.

62%

of young city professionals would consider using a self-driving vehicle if one was available, compared to

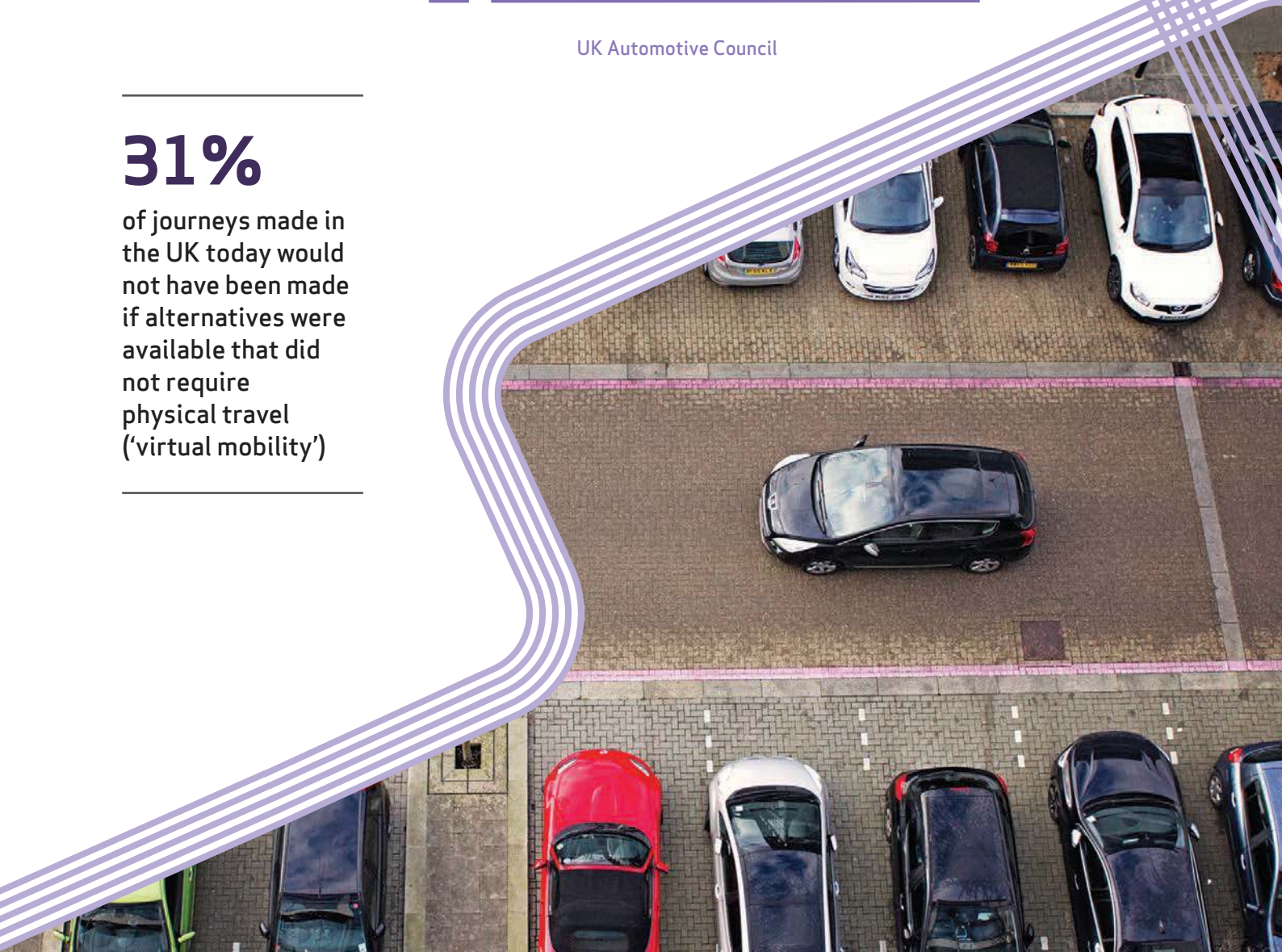
39%

in the UK as a whole

> Increasing the flows of people and goods, improving road safety, and enhancing the travel experience, whilst simultaneously reducing consumption, pollution, and congestion.
>
> UK Automotive Council

31%

of journeys made in the UK today would not have been made if alternatives were available that did not require physical travel ('virtual mobility')



FIT FOR THE FUTURE:
CASE STUDIES

DEPARTURE PLANNING INFORMATION

Maximising the efficiency of UK airspace and reducing delays is essential if the UK is to ensure its competitive edge in an age of increasing global travel. The TSC is helping to increase the sophistication of air traffic control systems at airports across the country, and putting the UK at the forefront of European air space efficiency.

The 5 London airports combined accounted for

48%

of UK air traffic movements,

61%

of passengers and

78%

of freight tonnes in 2013

THE CHALLENGE

To develop a cost-effective and scalable way of extending the Departure Planning Information (DPI) capability to UK regional airports, allowing air traffic control to improve airspace management.

OUR APPROACH

The TSC acts as an independent broker to bring regional airports and aviation authorities together. As part of an initial phase, we worked closely with the UK's largest air navigation services provider NATS and European air traffic coordinator EuroControl to upgrade the air traffic control systems at seven large airports with electronic flight progress strips: London City, Stansted, Manchester, Edinburgh, Glasgow, Aberdeen and Luton.

As part of the next phase, we ran an open tender procurement process and appointed a supplier to develop and deploy the DPI system to a number of regional airports that do not yet have air traffic control systems integrated with the European network for messaging. We worked with Future Airspace Strategy group to secure funding to deploy the system in up to 20 further UK regional airports.

BENEFITS DELIVERED BY THE PROJECT

A review of the expected cost savings of DPI carried out on behalf of the Department for Transport has estimated that the technology will save the UK air transport network at least £10 million over the next three years. It will also improve the efficient use of UK airspace – reducing passenger delays and cutting noise pollution and carbon emissions.

HOW IT LINKS TO THE INTELLIGENT MOBILITY INTEGRATED TEST ENVIRONMENT

DPI can feed into the IM Information Platform as it generates real-time information about the departure of aircraft.

There were

228m

terminal passengers (arrival and departure) at UK airports in 2013, an increase of

3.5%

compared to 2012

Departure Planning Information is reducing inaccuracies in aircraft departure times by roughly

60%

(from about ten minutes down to about four), which helps to optimise airspace efficiency

> DPI is about making the operation as efficient as possible. The advantage of the Transport Systems Catapult is that it was able to act on behalf of lots of stakeholders, to bring together a group of airports to go through a project together, rather than doing it piecemeal.

Andy Shand, NATS General Manager of Customer Affairs

FIT FOR THE FUTURE:
CASE STUDIES

FORMING A SPIN-OUT COMPANY

TSC spin-out Immense Simulations Ltd and computational technology developer Improbable, were successful in their application to the Innovate UK Connected and Autonomous Vehicles call for a Collaborative Research and Development project, to create a new solution for the coordination of autonomous vehicle fleets.

THE CHALLENGE

To stimulate the creation of new businesses and drive forward the commercialisation of research outcomes and technical work in Intelligent Mobility and so provide a means for developing products and engaging with the marketplace.

OUR APPROACH

Building on existing research in cooperative routing, fleet operations, predictive vehicle health management and real-time traffic management, the TSC spun out a new company, Immense Simulations Ltd. The spin-out partnered with Improbable to combine its latest thinking with their world-leading SpatialOS distributed simulation platform. The Collaborative Research and Development project team also includes Cubic Transportation Systems, a leading integrator of payment and information technology and services for transportation authorities and operators.

BENEFITS TO BE DELIVERED BY THE SPIN-OUT

The project enables developers to build massive, detailed simulations that run on thousands of machines in the cloud, helping overcome developers' inability to integrate and scale existing models, or to run them at massive scale or in real-time. These simulations will help optimise autonomous fleets and offer solutions to radically change urban traffic and economic planning.

HOW IT LINKS TO THE INTELLIGENT MOBILITY INTEGRATED TEST ENVIRONMENT

Immense Simulations will become part of the ecosystem for the IM Modelling & Visualisation Platform and will buy access to the platform to accelerate their development.

16,000

transportation companies were started in 2014, a birth rate of

17.5%

and amounting to

4.6%

of all UK start-ups

> Research in autonomous vehicles has so far centred on the technical problem of removing drivers. This ambitious project will fill a much needed gap: how we then optimise these vehicles on a huge scale to ensure they fulfil the promise of greater efficiency. Equally, little effort has been made in understanding the indirect consequences of introducing the autonomous vehicles. The ability to simulate the potential effects of these fleets will be invaluable to the industry.

Herman Narula, CEO of Improbable

> Fleet operations and logistics planning are well-established elements of the value chain for fleets of vehicles. It is expected that autonomous vehicles will have a huge impact in this area, and that this project will help the industry prepare for this eventuality by developing solutions for operating fleets of autonomous vehicles. The Transport Systems Catapult spin-out, Immense Simulations, is designed to meet the needs of this project.

Steve Yianni, CEO of TSC

FIT FOR THE FUTURE:
CASE STUDIES

LUTZ PATHFINDER

Driverless cars are being developed around the world. The UK is uniquely placed to accelerate this process because of its highly advanced research base, innovative design and manufacturing industries, flexible and forward-looking local authorities and regulatory frameworks. Through the LUTZ Pathfinder project, the TSC is helping the UK become a world leader in developing autonomous vehicles for personal transport.

THE CHALLENGE

Many of the developments in automated vehicles have focused on road-going passenger cars. The concept of Mobility as a Service (MaaS) requires vehicles capable of being operated by untrained users in uncontrolled environments, both on roads and in shared pedestrian spaces. For "last mile" operation, the user would order a pod via an app or from a kiosk; the autonomous pod then comes to collect the user and transport them to their destination. The challenge is doing this safely and reliably.

OUR APPROACH

The LUTZ Pathfinder project is the first UK trial of automated vehicle technology in public pedestrianised spaces, and uses designated stretches agreed with our partners at Milton Keynes Council. The pods will operate in public spaces, sharing the environment with cars, cyclists and pedestrians. Extensive research and trials are planned to better understand all aspects of the system. The pods were designed and manufactured by Coventry-based automotive innovation firm RDM and equipped with autonomous control systems developed by the University of Oxford's world-leading Mobile Robotics Group.

BENEFITS DELIVERED BY THE PROJECT

The project has successfully enhanced the national and international reputation of Milton Keynes as a leading smart city and transport innovator. It has kick-started the testing and evaluation of systems that could cope better with a low density urban environment than conventional public transport – combining the advantages of bespoke, personal mobility with those of mass public transit. In the longer term, the development of ubiquitous and commercially viable systems could also provide cost-effective alternatives for community transport.

HOW IT LINKS TO THE INTELLIGENT MOBILITY INTEGRATED TEST ENVIRONMENT

The pods, and the associated operating procedures and frameworks, will form the basis of developing an "urban laboratory" as a key component of the IM Centre for Operational Trials and Evaluation. The data they generate will become a component of the IM Information Platform, and experience of how users interact with and come to accept the pods will support human-centric design of autonomous vehicles. Testing and evaluation of large fleets of pods will exercise the IM Modelling and Visualisation Platform, and the development of complex autonomous control systems for the pods will be a test case for the Centre for Critical Systems Software Development.

An independent poll found that

61%

of adults living in Milton Keynes would be interested in using the electric-powered two-seater 'pods' for making 'short hop' journeys

> Technologies such as these [autonomous vehicles] represent a huge area of growth for the UK's automotive industry, with the potential to deliver 300,000 new jobs within the next 15 years. The LUTZ Pathfinder trial is not only an innovation in itself but will provide invaluable data, experience and learning for the whole sector.

Mike Hawes, Chief Executive of the Society of Motor Manufacturers and Traders

> Automated and connected vehicles offer an exciting future, enabling more efficient movement of people and goods, as well as improving road safety. It is pleasing to see a UK firm [the TSC] playing an active role in the evolution of the automobile, and [Lutz Pathfinder] is an important part of the journey towards fully automated cars on the road.

Rob Rickell, President of Group Technology, GKN plc

OUR TECHNOLOGY STRATEGY:
WHAT DOES IT MEAN FOR YOU?

INDUSTRY

Intelligent Mobility has the potential not only to transform our transport networks but also to grow businesses through job creation, increased exports and the commercialisation of innovation. In order to deliver shareholder value and profitability, it is essential to have insight into the possibilities of Intelligent Mobility, and to be able to spot market opportunities and manage risk.

The TSC can assist industry in looking across relevant markets and industries to spot opportunities for cross-selling. Our unique assets will enable you to reduce risk, thereby allowing you to deliver more mature technologies and innovations through access to expertise, prototyping and testing.

The establishment of joint project teams with universities and research institutions can provide you with access to expertise, capabilities, tools and facilities to help develop research that is market-ready. As a neutral partner in Intelligent Mobility, the TSC can facilitate these collaborations between businesses and academia to ensure a constant exchange of ideas, and to match business needs to skills and expertise.

We can also help industry and academia to match business needs to graduate skills – enabling universities to design and deliver programmes that are relevant to current and future business requirements.

ACADEMIC COMMUNITY

To be successful in global Intelligent Mobility markets requires cutting-edge research and the ability to transform ideas into high-value products and services. The academic community is an essential partner, developing new ideas and testing the latest theories on how transport systems interact and function against real-world examples.

We can help academic research staff unlock the commercial potential of their research by bridging the so-called "valley of death" – where great ideas are born but fail to "make it across" into commercial reality. In addition to helping you engage with commercial organisations, we can also advise and collaborate with you to help you make the most of the commercial opportunities, value chains and routes to market.

Enhancing your links with industry and policy-makers can result in future collaborative research and development activities that have a clear positive impact on the UK. Through our network of expertise, we can assist you in accessing funding to develop new technologies and applications, writing future funding proposals, demonstrating pathways for impact and minimising the administration burden. By facilitating engagement with other Intelligent Mobility stakeholders, we can help you disseminate research, enabling your expertise to reach potential academic and business partners, the media and the wider public for greater economic and social impact.

Academia represents a diverse set of institutions, each with its own portfolio of research and business support capabilities. Ensuring that there is collaboration between academia, industry and policy-makers will help develop research-informed leaders in both universities and industry, ensure a constant exchange of ideas, and match business needs to graduate skills through the design and delivery of programmes that are relevant to current and future business needs.

RESEARCH COUNCILS

Intelligent Mobility has the potential to improve road congestion, reduce environmental pollution, support new public and private business models and create wealth through jobs, economic growth, exports and the commercialisation of research.

Achieving the Intelligent Mobility goals requires the best engineering and scientific research, skills, and training the UK can deliver. Research is a major UK strength. We can help you target Intelligent Mobility research that has an impact on the growth, prosperity and societal wellbeing of the UK. We can also help you engage with the Intelligent Mobility community to increase the chances that your research outputs are taken through to commercialisation.

GOVERNMENT

The TSC's Technology Strategy will help ensure that the UK Government delivers value for money and maximises its return on investment in Intelligent Mobility. Our knowledge and expertise mean that we understand where the market opportunities lie, and how best to work with our stakeholders to ensure that we deliver our vision to create an environment that will make the UK a world leader in transport systems innovation.

The keys to this are our independence, integrity and neutrality. These enable us to add value as your trusted advisor in determining policy and legislation about Intelligent Mobility and transport. Together with industry and academia, we can accelerate the uptake of Intelligent Mobility for the greater good of the UK.

The TSC consulted with

149

senior individuals from

81

organisations across industry, academia and government on this Technology Strategy

GENERAL PUBLIC

Whether you live in a city or a dispersed rural community, Intelligent Mobility will have an impact on the way transport systems are run, and the way you think about them. You will have access to travel products and services that can help you plan your journeys, reduce congestion, improve fuel efficiency, increase road safety, and improve travel time predictability.

The UK has a talent for innovation and engineering. As a nation, we have poured our energies into transport infrastructure and invention: think of the Channel Tunnel linking Britain with the rest of Europe, George Stephenson who built commercial steam locomotives for the first railways setting a standard adopted worldwide, or Sir Christopher Cockerell who invented the hovercraft.

Successful innovation depends on being able to take advantage of market opportunities for commercial gain. It is also important to take account of the views of all stakeholders.

OUR NEXT STEPS

The Technology Strategy was developed with the involvement and support of our stakeholders through an extensive consultation programme. We believe that we have captured what the UK needs in order to advance its position in the Intelligent Mobility market.

We are heading towards an exciting future. Intelligent Mobility can create a joined-up transport service based on your needs – with the UK at the forefront of this global transport revolution.

Following the launch of this Technology Strategy, the TSC's next focus will be on influencing and developing the next set of projects and programmes to deliver the unique assets at the required scale and pace. We will leverage and bring together existing capabilities where possible, building only those aspects that are additional and not realised elsewhere.

This document is a starting point. We will continue to engage stakeholders from across the community to specify in detail the work that will deliver the vision outlined in these pages.

FIND OUT MORE

Please visit: **TSCtechstrategy.co.uk**

TECHNOLOGY STRATEGY | 2016

FOR INTELLIGENT MOBILITY

Think big, take small steps, learn fast.

Transport Systems Catapult
The Pinnacle
170 Midsummer Boulevard
Milton Keynes
MK9 1BP

TSCtechstrategy@ts.catapult.org.uk
ts.catapult.org.uk

CATAPULT
Transport Systems