Intelligent Transport Systems UK
Empowering Transport Technology

review

Annual Review 2023

its-uk.org

Iain Stewart MP of the Transport Select Committee: Government must reform our system of motoring taxation

Siobhan Campbell of WSP: ITS professionals must put people at the core of our climate change efforts

Nick Harris of National Highways: Our motorways and A-roads are undergoing a once-in-a-century transformation

The Future of Transport

In this issue, we explore the latest technologies and innovations that are shaping the way we move.

In this issue

Intelligent transport systems have never been more vital

Steve Norris
President, ITS UK and former Transport Minister

As we look ahead to a world in which fossil fuels are diminishing in significance so treasuries across the globe will need another way to replace the massive revenues earned from one of the easiest taxes to collect, namely fuel duty, taxed as the fuel leaves the refinery and one hundred percent efficient.

It turns out nobody has actually calculated the value of intelligent transport systems to the global economy but I suspect any attempt to do so would be an underestimate. It would certainly run to tens of billions. We can start with the value of human lives saved as a result of road safety measures ranging from speed detection through to early warning of dangers ahead and including in-vehicle safety related functions which are now standard across the globe. We could add the incalculable value to the global economy from reducing congestion and using road space more efficiently, or the use of pay-as-you-go ticketing to encourage more people onto the public transport network. And now we can add the value to travellers to be able to plan and almost always pay for their journeys using smart phone applications.

As we look ahead to a world in which fossil fuels are diminishing in significance so treasuries across the globe will need another way to replace the massive revenues earned from one of the easiest taxes to collect, namely fuel duty, taxed as the fuel leaves the refinery and one hundred percent efficient. But here in the UK as elsewhere fuel duties pay for far more than transport. They pay for schools and hospitals too. So as income falls governments of all colours will be looking for a new way to tax the UK's last great free utility, namely the use of our roads. That means road user charging and that will yet again be a major innovation generated through intelligent transport systems. As we commit to Net Zero, whether politicians will be brave enough is one

thing, but the technology will be there when they are.

At the start of this year ITS UK said a fond farewell to Jennie Martin who led the organisation with such dedication and commitment for more than two decades. We were delighted when she was awarded an MBE in recognition of her service. After a rigorous search we appointed her successor and our new Chief Executive, Max Sugarman. Those of us who selected him are delighted how clearly he is already proving his worth. For all of us involved in ITS, what we want from the organisation is a forum for the exchange of ideas linked to a proactive, effective industry body which gets our message across to governments at every level. We have a huge amount to offer but as in every industry the key is making society aware of how valuable our offering is. It turns out the Department of Transport is delighted that we have adopted this approach which bodes well for the future.

We now have regular dialogue with special advisors to ministers, we are offering members better access to decision makers and connecting members better to the policy trends they need to be aware of. ITS UK has never been more valuable to its members and as your President that makes me very proud. I wish every ITS UK member a successful future in a world in which what we offer has never been as valuable.

Steve Norris
President, ITS UK

FROM THE CHAIR

Better transport through technology

Transport is changing, and with that change comes opportunity. As we look to the future of transport in the UK, we must embrace the opportunities presented by intelligent transport systems (ITS) to create a better transport future for all. The coming year will see major decisions across different regions and transport modes. Planning for the next Road Investment Strategy, RIS3, is underway to determine the priorities and funding for England's strategic road network for the five years beginning in 2025 with an expectation that there will be a significant increase in focus and funding for data and technology, 'hybrid infrastructure', and provision of connected services. Rail's equivalent, Control Period 6, starts in 2024 with decisions being made on the £43Bn funding available up to 2029.

With Active Travel England established, we now see more resources for walking, cycling, and micro-mobility. ITS technologies offer significant opportunities for improving efficiency, reducing emissions, and enhancing safety in active travel. For example, Mobility as a Service (MaaS) platforms can integrate multiple modes of transportation, including micromobility options such as e-bikes and e-scooters, into a seamless, end-to-end journey.

Additionally, through City Region Sustainable Transport Settlements and other developments, local and regional authorities are gaining more powers and funding to implement integrated sustainable transport solutions, including important and much-needed improvements to our bus networks.

Freight transport is the lifeblood of our economy, supporting the movement of goods across the UK and the world. As we look to the future of freight, there are significant opportunities for the application of ITS technologies to help improve efficiency, reduce emissions, and enhance safety. Connected services and data can enable real-time monitoring and optimisation of freight movements, while autonomous and zero-emission trucks can reduce emissions and enhance safety.

As we make these important decisions about the future of transport investment, it's crucial that we recognise the value that transport technology can provide. To support this, ITS UK is taking a more external-facing approach, working with policymakers and informing politicians of all parties on the value of intelligent transport systems and encouraging an increase in support for the sector. With an election only 18 months away, this work will become increasingly important.

I am confident that the intelligent transport industry will only continue to grow and provide more value over the coming years. By engaging with ITS UK, we can help define what our transport system looks like well into the future. As I step down as Chair after three years, I am proud of the progress made by ITS UK and its members. We have saved lives, improved journeys, and reduced emissions.

In this year's annual review, we highlight some of this progress, from the use of ITS to improve real-time decision making to how the industry is tackling climate change. These examples illustrate the evolution of the sector to meet ever-changing expectations. Together, let's continue to promote the difference we are making and the tremendous value the application of ITS can bring.

Through ITS UK, we offer our members a unique opportunity to network with like-minded professionals, access cutting-edge technologies and knowledge, and collaborate with others to drive innovation and progress in the transport sector.

Best wishes to the ITS UK team and your new chair, and I look forward to continuing to work with the industry as an ambassador for our vision for better transport through technology.

Ryan Hood
Chair, ITS UK

Ryan Hood
Chair, ITS UK

FROM THE CHIEF EXECUTIVE

Ensuring the voice of intelligent transport is heard

Max Sugarman
Chief Executive, ITS UK

Intelligent Transport Systems (ITS) should therefore play a central role in national policy discussions and in thinking by politicians and policy makers around the future of our transport network.

The intelligent transport sector is of growing importance and value to the UK, with the industry conservatively estimated at £1.5bn of economic value, with a potential to support £15bn of further economic benefits.

The industry is also well placed to support the key challenges the UK and its transport network is facing, which we've termed the four 'Cs':

- **CATALYSING ECONOMIC VALUE:** The sector has huge economic potential, in terms of supporting investment, economic growth and highly skilled jobs. And it is also a major export, with UK expertise well-regarded around the globe.

- **CLEAN AND LOW CARBON:** The intelligent transport sector will be vital in decarbonising the road, rail, bus and wider transport network such as by supporting the roll out of electric vehicle charging, for example. Crucially, the industry can also help incentivise the travelling public to low carbon forms of transport.

- **CAPACITY BENEFITS AT LOW COST:** Intelligent transport can cost-effectively optimise the usage of our transport network, by making best use of current infrastructure assets, incentivising behaviour change and through the predictive maintenance of infrastructure, to name but a few.

- **CREATING SAFER TRAVEL:** Technology can support safer travel, both through incentivising

safer behaviours and through the enforcement of traffic rules. On public transport, intelligent transport technology is also helping curtail anti-social behaviour.

Intelligent Transport Systems should therefore play a central role in national policy discussions and in thinking by politicians and policy makers around the future of our transport network. With the speed at which technology is changing, it is becoming increasingly important for ITS professionals to be in the room where decisions are made.

At the end of 2022, when I was only a few weeks into the role of Chief Executive, I asked the ITS UK membership what they felt were the big priorities for the organisation as we looked towards the year ahead. The answer from members was clear: priority number one was "advocating on behalf of the sector to help boost the profile of and investment in intelligent transport", followed by "developing policy positions and setting out the future of intelligent transport".

Since then, we've developed our relationships with key policy makers. We've engaged with the Transport Minister Jesse Norman MP, Shadow Roads Minister Gill Furniss MP and the Liberal Democrat Transport Team, briefing them on the key issues of pertinence to members. We're regularly responding to consultations, whether on road, rail, active travel or wider transport policies. And, we're getting our statements picked up in the media on key developments impacting the ITS industry. Over the rest of 2023 and beyond, we

will continue to make the case for the sector and the value transport technology can provide.

What are calling for? With the right policy environment, we believe the ITS sector can provide even greater value to UK plc. We have five clear 'asks' from Government:

1. A NEW FUTURE TRANSPORT ACT

There are a number of innovations across transport that are being held back by a lack of clear regulation. These include in the areas of connected and autonomous vehicles, remote driving, e-Scooters, the use of drones, and more. Without an Act of Parliament, the UK will be left behind when it comes to transport technology, so its vital a new Bill is introduced speedily, before time runs out for it to get through Parliament.

2. MOBILITY PRICING

The UK transport system needs to better align price to the distance individuals travel. This means moving to a dynamic, national road pricing scheme and smarter, pay-as-you-go ticketing on the bus and rail networks.

On road pricing, there is an increasingly urgent need to set out a national scheme given the falling revenue from current road taxes, expected to lead to an around £35 billion black hole in tax revenue. Even with Vehicle Excise Duty being extended to electric vehicles from 2025, the Office for Budget Responsibility has estimated that the move will raise just £1.6 billion per year by 2027/28.

Similarly, on smart ticketing, there are currently some 55 million fare types across the UK railway network. The creation of Great British Railways provides the opportunity to deliver major fares reform, implement more pay-as-you-go ticketing across the network and support the roll out of more flexible pricing.

3. OPENING UP DATA

Transport authorities have access to more data sources than ever, whether through the use of connected vehicles, transport location apps, ticketing services or freight movements. Both historic and real-time data can be used to introduce and plan new transport

services and help the public make more informed choices around if, how and when they travel.

The DfT has now published its Data Strategy but further work is needed for Government to set out the regulatory framework for data services. This requires bringing together partners to collaborate, such as the work done on the Bus Open Data Service. And we would like to see current work prioritised, like on the digitalisation of traffic regulation orders (TROs) and National Parking Platform.

4. BETTER INTEGRATED TRANSPORT

The UK transport system remains siloed within modes, but the travelling public simply want better integrated, seamless transport. Increasingly, there

are opportunities for the roll out of Mobility as a Service (MaaS) schemes. The UK has made good progress with the £90 million Future Transport Zones, but longer term funding is required to roll out MaaS schemes with a shift from short-term trials to permanent schemes, to provide longer term benefits to the public.

5. TREATING TRANSPORT AS A KEY TECHNOLOGY SECTOR

Our transport network is essential for the functioning of our economy, but the sector behind it is an economic asset in its own right. Government should treat transport as one of its key areas for technological development, central to its aim of establishing the UK as a 'science superpower'.

There has never been a more important time for the transport technology sector to make itself heard. You simply need to read some of the articles in this Review to see the fantastic work taking place across the sector, and the many ideas the industry has, which policy makers should be considering. A big thank you to all who have contributed to this Review and

made it such a valuable, insightful and enjoyable read.

Through our engagement with policy makers, our line up of industry-leading events and our policy development, we aim to bring the sector together with one voice to make the case for ITS and the many benefits it brings. We look forward to working with you to ensure the voice of the industry is heard.

ABOUT ITS UK

Intelligent Transport Systems UK is the national voice of the transport technology sector

We support 150+ Members from across the intelligent transport sector, including multinationals through to start-ups, and both public and private sector organisations, with local authorities, national transport bodies and academia in membership too.

We support the sector to grow and thrive, enabling a better transport system both at home and abroad.

WHAT WE DO

- **Making connections:** We bring members together through networking opportunities and events. We host major conferences, dinners, receptions, seminars and more, helping to build the connections you need within the industry. Through our weekly newsletter, we keep members abreast of the latest developments, and our 15+ Forums cover everything from mobility as a service to active travel, road user charging to public transport, looking at the big trends and issues facing the industry.

- **Influencing Policy:** We support the sector to make its voice heard. We work with government, politicians, media and stakeholders to make the case for intelligent transport, raise issues of importance to our members and explain the value it can provide to the UK and society. We regularly feature in press, respond to consultations and produce thought leadership, policy reports and position statements, in order to better make the case for the sector.

- **Reach out across the globe:** We are part of a global family of ITS organisations across the world. We support UK businesses to develop their exports potential and to reach new markets overseas. We also work closely with our counterparts across the globe and have partnerships agreed with 35+ foreign ITS organisations. We are a founding member of the ITS Network of Nationals, a collective of European ITS bodies and regularly attend the ITS World and European Congresses.

- **Promote and celebrate:** We promote the work of the sector and act as a platform to showcase the industry's news, by highlighting stories and developments from members, and through our annual Awards, which bring together the industry to recognise the fantastic work our members do.

Membership is a great way to navigate the sector and keep up-to-date on the latest developments. Why not find out if membership is for you? **Get in touch via the details below - we'd be happy to chat!**

✉ contact@its-uk.org
🌐 its-uk.org
☎ +44(0) 207 709 3003
🐦 @its_uk_org

ITS UK Forums

Forums are open to all members and are a great way to keep up-to-date on the latest developments across the sector. Each Forum holds around two events a year, both in-person and online and held around the country.

If you're a member of ITS UK, you can sign up to as many Forums as you wish. **To join a Forum simply email contact@its-uk.org** letting us know which you'd like to join.

ACTIVE TRAVEL

The Active Travel Forum covers all aspects of intelligent transport's application in active travel and micromobility, including walking, cycling, eScooters and much more.

The Forum explores how we can use technology and data to increase the amount of active travel in the UK, working with key organisations like Active Travel England. The Forum provides updates and presentations regularly on the latest thinking within the active travel space.

CONNECTED VEHICLES

Cooperative Systems and Connected & Autonomous Vehicles are attracting huge interest. They potentially offer a new set of tools for traffic managers to improve capacity, safety and the environment, after current initiatives like ATM have delivered all they can. They also offer road users opportunities to use less fuel, have a more comfortable journey and avoid accidents. And they allow the vehicle industry to add value to their products and achieve better vehicle performance.

This is a very broad area - from guided vehicles to the simple sharing of information. This Forum is dedicated to looking at the Connected and Autonomous Vehicle space in all its forms, providing a place for the latest developments and thinking to be shared.

DATA

The Data Forum explores the ever-growing use of data from the transport network. That includes across different modes of transport and at local, regional and national levels. The Forum explores how public authorities can open up data to improve services, the commercial and policy environment around its use and how the industry can ensure it brings the public with it in using data appropriately. The Forum often discusses topics around data security and privacy too.

EARLY CAREERS

This Forum provides a focus for the younger generation of ITS professionals. It holds regular events to inform and create networks, and shares relevant information. It has a particular interest in training, career development and qualifications in ITS. It also enjoys a growing international participation which helps the UK participants build valuable networks for their future careers. The Forum provides advice and intelligence to the ITS UK leadership on recruitment, training and development issues.

ENFORCEMENT

The Enforcement Forum works to identify the factors effecting compliance to traffic regulations and laws, including enforcement, and to identify the requirements of the police, local authorities and other statutory bodies that may be helped by ITS technologies. It promotes awareness of ITS technologies available and needed to encourage compliance with, or enforce road traffic law or regulations, and seeks to correct misapprehensions and incorrect information in the public domain.

It also identifies and seeks to address the potential legal and institutional barriers to implementation of ITS technologies. Finally, it works to ensure that any international standards in compliance and enforcement technology are appropriate and workable from a UK viewpoint.

FREIGHT

The Freight Forum works to allow freight and logistics practitioners to access leading edge developments in telematics so as to illustrate what is or may be on offer, and to allow ITS members the opportunity to learn of the challenges and opportunities currently facing the logistics and freight industry.

INCLUSIVE MOBILITY

The Inclusive Mobility Forum brings together ITS professionals, implementers, suppliers, researchers, and end users, including a wide range of disabled and older people and their representative bodies. It has been successful in attracting the regular participation of disabled members who provide valuable insights and advice into how ITS can best be used to assist with their travel requirements.

The IMF informs implementers and the user community of the latest developments in ITS, whilst gathering advice on the needs of disabled and older people in the design, development and deployment of ITS.

LOCAL AUTHORITY

The Local Authority Forum provides a space for all ITS UK members with an interest in urban and local transport matters to meet, discuss their views and study the uses and benefits of ITS in the urban environment. The forum includes those interested in transport matters within large and small urban centres and the links to their surrounding hinterland. The Forum expects to be of value to local authorities and those responsible for the operation of transport networks, public transport operators, consultants offering services to these organisations, manufacturers and service providers, and also to universities studying the transportation needs of urban areas and local authorities.

MARITIME

This group works to identify the current passenger and freight logistics handling requirements of the ports, logistics companies and other bodies that may be helped by ITS technologies. It promotes awareness of available ITS technologies and how they may be used to enhance transfer of passengers and goods within and outside of ports and in the surrounding hinterland, including integration with the road and rail networks, and road and rail network management systems.

The Forum also highlights the use of new technology on board vessels and how this is likely to enhance the efficiency and environmental performance of the sector.

MOBILITY AS A SERVICE

Mobility as a Service (MaaS) is an area that is attracting huge interest and value. This group aims to cover the focus on providing travellers mobility solutions based on their travel needs, exploring how this can be delivered practically. The movement towards MaaS is complimented by a whole plethora of innovative and creative mobility service providers such as ride-sharing, e-hailing services, bike sharing and car-sharing programmes, all of which are explored within this Forum.

PUBLIC TRANSPORT

The Public Transport Forum provides a focus for ITS UK members and others who are interested in the use of ITS in public transport, including passenger information systems pre- and during trip, safety and security systems, fleet management, AVL, smartcards and other forms of ticketing, ticket retail systems, and more.

ROAD USER CHARGING

The Road User Charging (RUC) Forum is the UK's expert group in all RUC-related matters. It promotes best practice in the application of road user charging solutions that contribute to infrastructure improvement, congestion management and environmental benefits. Membership includes local authorities, industry suppliers, tolling operators, consultants and academics, and Government agencies. The group facilitates information exchange about the implementation of RUC, from the use of charging technologies to back office and central systems.

SMART ENVIRONMENT

The Smart Environment Forum provides a forum for all ITS UK members with an interest in effects of transport and environment related impacts on exposure, health and climate change. It enables them to share knowledge, discuss their views and investigate the feasibility of and resulting benefits from the application of ITS to manage the environment and deliver long term sustainability.

The group includes those concerned with the measurement and modelling of the environment, the climate change impact of travel choices and the distribution of goods, as well as establishing ways to deliver climate targets set by the Government.

USER BEHAVIOUR

The User Behaviour Forum advises the ITS sector on the needs and abilities of users in the design, development and deployment of ITS. It also utilises and promotes the skills and knowledge of the UK Human Factors community engaged in research, design and implementation of ITS.

WOMEN IN ITS

The Women in ITS group is for engineers and transport professionals seeking to promote the value of a career in ITS, especially for women. Its objectives are to inspire women in ITS, facilitate the professional development of women in ITS, improve women's image of ITS, promote ITS as a career, and contribute knowledge and experience from a woman's perspective to the professional debate.

10 Ways ITS UK Membership can benefit you

Whether you're a well-established ITS UK member, or new to membership, there is a huge amount going on at Intelligent Transport Systems UK and many ways to get value from your membership. Here are ten clear and simple ways to make the most of being an ITS UK member.

1. SIGN UP TO OUR MONDAY NEWSLETTER

The easiest way to see what we're up to each week is to join the ITS UK Newsletter. Sent every Monday morning into your inboxes, it gives you the latest news and insights from across the sector, including funding opportunities, standards updates and international opportunities, and it contains a jobs board too.

2. SEND US YOUR NEWS

If you have a press release or news story you would like promoted across the sector, send it to **press@its-uk.org** and we'll publish it on our website, across our social media channels and in our Newsletter. A great way to get your news out there.

3. JOIN A FORUM

We have 15 Forums covering everything from mobility as a service, to local authorities, data to road user charging. Each Forum meets on average twice a year, with meetings held in-person and online, and across the country.

If you'd like to find out about any of the opportunities above, or to see if membership is for you, **get in touch with ITS UK Membership Officer Wendy Irving at wendy.irving@its-uk.org**

4. TAKE PART IN A TRADE MISSION

We host a number of both inbound and outbound trade missions for ITS organisations across the world. Taking part is a great way to meet new contacts and develop opportunities overseas.

5. GIVE US YOUR VIEWS ON STANDARDS

We sit on the ITS technical standards committee EPL/278. Through our Monday newsletter, we offer the chance for members to comment on standard updates, as well as letting you know as and when new standards are published.

6. ATTEND AN EXECUTIVE DINNER

For Executive Members, we host a number of exclusive dinners throughout the year, with guest speakers like Nick Harris, Chief Executive of National Highways, Iain Stewart MP, Chair of the Transport Select Committee, and many more to be confirmed.

7. SUBMIT AN AWARD

Each year at the President's Dinner, we recognise the very best from the intelligent transport sector. The Awards are your chance to showcase your great work – so look out in the Summer for when Awards submissions open!

8. FEED INTO A POLICY DOCUMENT

We regularly publish consultations and policy documents to feed into Government policy. If you want to get involved in representing the sector, join our Advocacy and Public Affairs Group (email **contact@its-uk.org** to sign up) and we'll give you the opportunity to feed into our policy representations.

9. SPONSOR AN EVENT

For those members interested in gaining a profile within the sector, we provide a number of sponsorship opportunities, including on a range of our events. Sponsorship can help make sure your organisation stands out amongst your peers and can align you with thought leadership across the sector.

10. JOIN ONE OF OUR MAJOR EVENTS

Alongside are regular schedule of Forums and events, we host major meeting each year, such as our Parliamentary Reception and Annual Conference. These events are highlights of the industry calendar and are not to be missed – they offer great networking opportunities and the chance to hear from key decision makers.

Working together on the roads of the future

Nick Harris, CEO of National Highways, shares the organisation's vision for the future of the strategic road network.

At National Highways we're very proud to be an Executive member of ITS UK. The partnerships, insights and innovations we've developed are crucial to the success of our schemes and to achieving our vision for the strategic road network.

Today our motorways and A-roads are undergoing a once-in-a-century transformation thanks to the growth of digital, data and technology. We're determined to harness their power to design, build and operate safer, greener and smoother roads.

THE CHALLENGES AHEAD

We know that the UK's population is set to grow. We also know, decades from now, people will continue to undertake most of their journeys by road.

We absolutely support the use of public transport and active travel, but people still value the freedom of personal transport, particularly for long distance journeys, and we don't see that changing.

Then there's the surge in online shopping which has permanently changed the nature of distribution logistics and led to more commercial vehicles on our roads.

It's clear that the demands on our strategic road network will increase. Meanwhile we need to work towards achieving net zero carbon travel on our road network by 2050 while fulfilling our imperatives of safety, customers, and delivery.

DELIVERING DIGITAL ROADS

I'm pleased to say that our Digital Roads strategy, which we launched in 2021, is helping us to solve the many challenges we face.

At the heart of our strategy is our commitment to create one of the largest fibre networks in England. This will give us the connectivity 'backbone' we need to deliver the roads of the future.

We're using digital technology in more of our design and construction activities. For example, by using rapid engineering modelling we're increasing the speed, quality and safety of road design. This has reduced the time it takes to produce operational concepts for schemes from many months to a matter of weeks.

We're also using drones to build 3D maps of the network, and we're sharing these across project teams to streamline processes.

Offsite fabrication, modular construction and – soon – connected and autonomous plant will be helping us to improve safety, reduce network disruption and cut carbon emissions. Our ambition is for connected and autonomous plant to be the norm on our construction sites by 2035.

TRANSFORMATIONAL TECHNOLOGIES

As a trained engineer, I find digital twin modelling a particularly fascinating area and one that will revolutionise how we operate and maintain our many thousands of road assets.

Through our collaboration with partners, including fellow ITS UK members, the time is coming when we'll produce a digital twin for every new scheme. This digital version of a road or bridge will enable us to replicate what we plan to do with the asset in the real world so we can better manage its performance throughout its lifetime.

Meanwhile we're implementing the use of artificial intelligence and machine learning to prolong the life of bridges, structures and roads which can be monitored remotely. We're managing traffic flow more effectively through real-time data sharing and automated variable messages.

And we're improving how we communicate with our customers. We're exploring ways to enable seamless end-to-end journeys, working with other transport networks and journey planning providers so customers can access accurate information via their smartphone or sat nav.

MAKING CONNECTIONS

I've already touched on connected and

autonomous plant, but what about other connected and autonomous vehicles?

We've teamed up with other ITS members within the Connected Vehicles Forum to explore initiatives and undertake trials, including connected and autonomous vehicles infrastructure appraisal readiness (CAVIAR).

On the A2/M2 connected corridor we've tested in-vehicle signage, roadwork warnings and other services. We've also trialled HGV platooning technology elsewhere on the network through the HelmUK initiative. These activities have influenced our safety risk guidance for connected and autonomous vehicle trials, published in 2022.

If we can get this technology right and smooth out issues around data sharing, for example, we have a real chance to drastically improve traffic flow and reduce traffic incidents by around 90%. That will be a gamechanger for achieving our aim of zero harm on the strategic road network by 2040.

TOWARDS NET ZERO CARBON

I haven't yet touched on climate change, which poses an existential threat to every human on the planet, yet technology has massive potential to mitigate this change.

I'm very proud that National Highways is the first roads organisation in the world to achieve the globally recognised PAS 2080 accreditation. This highlights our commitment to reducing carbon during the design, construction and operation of our strategic road network.

We aim to achieve net zero for our own operations by 2030, to deliver net zero road maintenance and construction by 2040 and to support

net zero carbon travel on our road network by 2050.

MAKING THE JOURNEY TOGETHER

It's impossible to predict how the world will be in 100 years' time, particularly when we expect to see more change in the next decade than we have in the last century. What we can be sure of is that data, digital and technology will be fundamental to the many leaps forward that humankind will make. However, they alone won't guarantee success. Behaviour change will.

We must take our customers on the journey with us if we are to succeed. That means building partnerships and alliances and engaging with our stakeholders.

At National Highways we will be continuing our work with vehicle manufacturers and industry bodies, our supply chain, sub-national transport bodies, academia and the many communities and interest groups we engage with to improve customer awareness and drive change.

And, of course, we're looking forward to continuing our work with you, our fellow members of ITS UK. Your support will enable us to achieve our vision for Digital Roads, to deliver on many of our RIS2 goals and achieve our imperatives of safety, customer and delivery. And it will support our commitment to be net zero by 2050.

Above all, your support will be key to helping us achieve the government's ambition of the UK being a world leader in shaping the future of transport.

Nick Harris,
CEO, National Highways
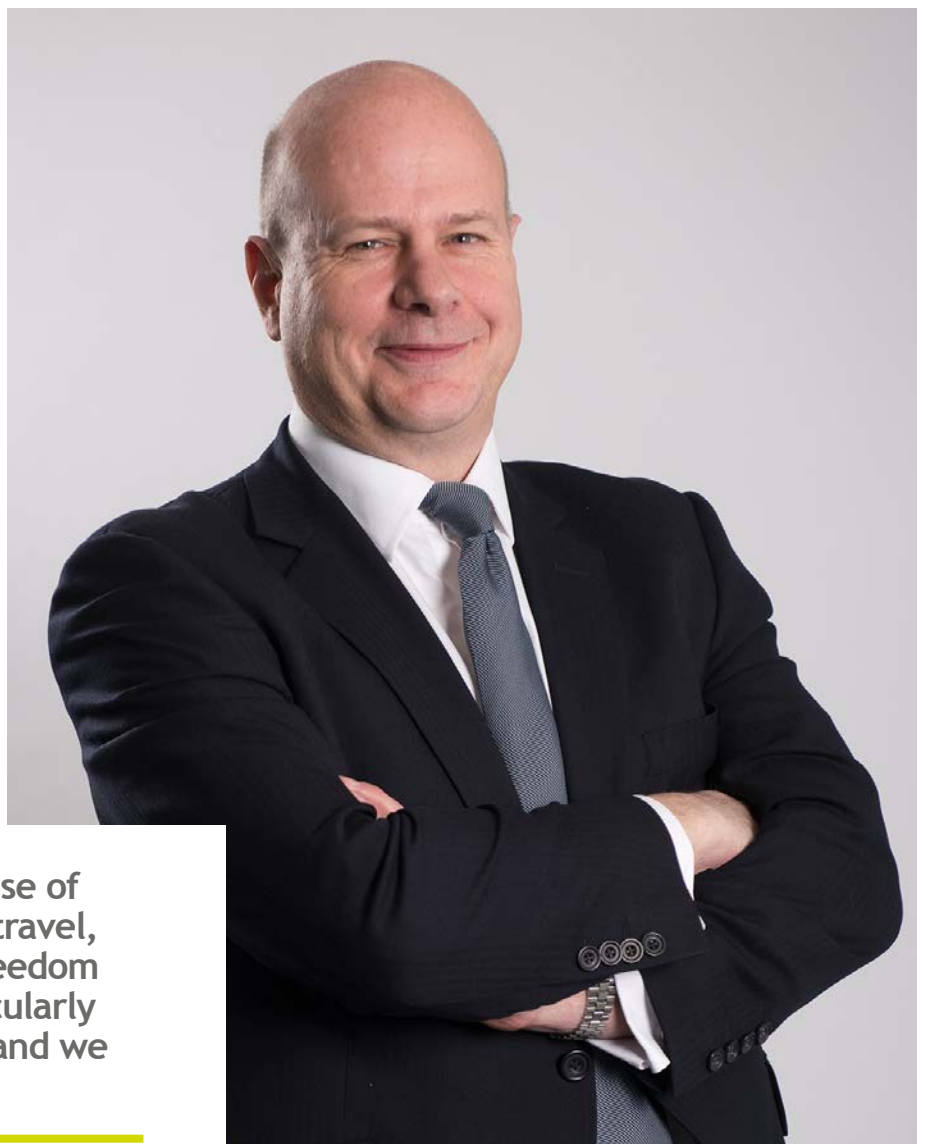
We absolutely support the use of public transport and active travel, but people still value the freedom of personal transport, particularly for long distance journeys, and we don't see that changing.

The Human Side of Climate Change

The Intergovernmental Panel on Climate Change (IPCC)'s recent Synthesis Report makes sobering reading. Without immediate significant action, the climate impacts we are already seeing across the globe will only worsen; there is a rapidly closing window of opportunity to secure a liveable and sustainable future for all.

Siobhan Campbell
Technical Director, WSP

The Report makes a clear call for the world to achieve urgent, system-wide transformations.

What does this mean for ITS and the Future of Transport? Our Net Zero ambitions are not new. We know that transport is the largest contributor to UK domestic carbon emissions; that transport emissions have been broadly flat for the last 30 years, even as other sectors' emissions have declined; that while elements of the system – primarily cars – have reduced their emissions their numbers and size means this has failed to dent overall emissions. We need urgent, system wide transformations to rapidly reduce carbon emissions (mitigation) and build the transport system's resilience to climate change (adaptation).

Here I look at these challenges from a person-centred perspective: why

it is crucial we as ITS professionals put people at the core of our climate change mitigation and adaptation efforts.

TAKING A PEOPLE-CENTRED APPROACH

So why are people important to the climate challenge? Fundamentally, we are not going to make progress if we don't bring people with us. Even if you believe that the UK can achieve net zero transport by 2050 through technology alone, technology involves people – wanting, buying, using and adapting to new technologies and changing their behaviours as a result. The reality is that major behaviour change and rapid technology development and roll-out are two sides of the same coin.

ITS, by putting people at the heart of the transport system, can accelerate climate mitigation and adaptation. We can achieve these direct goals alongside multiple co-benefits for transport users, such as improved air quality, health and places. Considering people at the heart of every aspect of our work – vehicles, technology, data, regulation, placemaking, corporate action, and infrastructure design and use – maximises the likelihood of

success, pace and ambition.

WHAT DOES PUTTING PEOPLE AT THE HEART OF ITS CLIMATE ACTION MEAN?

There is no magic formula, but there are a wide range of experts who offer different perspectives, skills and experience to help make this happen. Some basic principles are to:

• **Understand individuals and communities:** Understanding individuals and communities – their motivations, values, aspirations and potential barriers to change – are necessary building blocks for action. Recognising and responding to diversity will enable everyone to play their part in the climate transition and have their transport needs met.

• **Keep it local:** What works in one place won't necessarily work in another. Each community needs to be listened to, worked with, and be part of the solution. Collaboration, empowerment and engagement are the tools to bring communities on this journey. Consensus can be reached even on controversial aspects of climate action. Deep engagement, for example through Citizens Assemblies, can unlock new

solutions and increate the legitimacy of difficult actions.

• **Keep it fair:** As set out by the IPCC, 'transformational changes are more likely to succeed where there is trust, where everyone works together to prioritise risk reduction, and where benefits and burdens are shared equally'. UK climate research has shown a remarkable consistency in identifying equity and fairness as key themes from the public. We need to be careful that ITS climate solutions are equitable if we want public buy-in and support.

• **Watch out for habits:** Habits are sticky: people and organisations often fail to change, or quickly revert to old behaviours. Habitual behaviour needs consistent effort to be overcome. Readiness to change is also dependent on the circumstances of an individual or organisation at a particular point in time; identifying opportune moments to change can be the key to success.

• **Beware silver bullets.** Policies are unlikely to be successful if only one of the possible behavioural barriers is identified and addressed in isolation. As with all things ITS, the problem needs to be tackled as a system.

BEHAVIOURAL SCIENCE TO THE RESCUE

In terms of people, one size most certainly doesn't fit all. We need to understand and design for the richness and breadth of all transport users, and the wide range of reasons they rely on the transport system. There are a number of behavioural models that can help understand and respond to the individual, societal and wider context and help address people's capability, motivations and opportunities to change. Using learning from different sectors and of course deep community engagement, we can ensure people are a fundamental part of the planning, design, operation and maintenance of transport systems. By putting people at the heart of climate mitigation and adaptation solutions, ITS can go faster, with greater impact, and with more efficiency. It's not easy – both carrots and sticks are needed – but people are at the core of future success.

Regulation · Vehicles · Technology · Data · Places · Corporate action · Infrastructure · People: Individuals and Communities
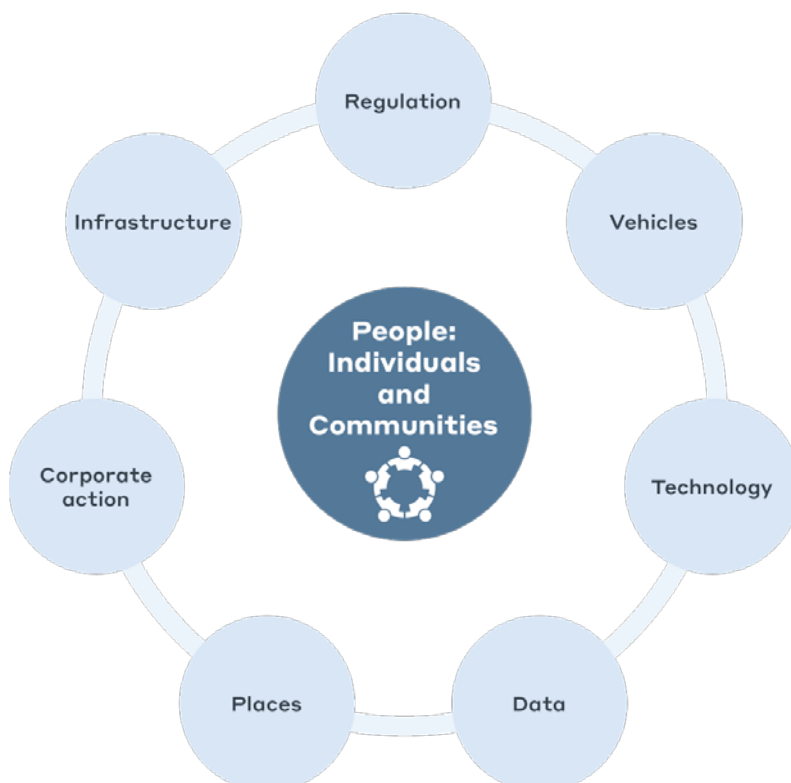
Strength in Numbers
Reflections from Women in ITS UK

The Women in ITS (WITS) UK is one of the 13 ITS UK Forums, providing platforms for members to share knowledge, to exchange ideas and meet fellow members with similar interests.

In particular, WITS UK hosts regular virtual and in-person events to support greater inclusion and representation of women within the ITS industry. Everyone is welcome to join, regardless of gender, and WITS aims to empower speakers and attendees to contribute to the Forum. This can be through the sharing of technical knowledge or career-related experiences.

On Wednesday 8th March 2023, WITS UK hosted our annual webinar in honour of International Women's Day, bringing together ITS professionals at a range of career stages. We were joined by speakers from two other highly active Women in ITS groups in Finland and Sweden.

In order to support newly formed and growing Forums, WITS UK discussed lessons learned from hosting in-person events in this hybrid-working world and how we recently updated our Terms of Reference.

Here is a summary of some of the key findings from the presentations and discussions on the day.

Why do you feel it is important to have a distinct Forum for Women in ITS?

Pia Wijk from Einride and Women in ITS Sweden – Kvinnor inom ITS (KITS) shared with us that KITS was established when women working for multiple organisations in the ITS industry felt a need to join forces and strengthen one another. As with the UK and Finland, KITS provides a platform to exchange perspectives and

Gemma Tredwell, WITS Chair & Arcadis

Olivia Cairns, WITS Co-Vice Chair & WSP

Rebecca Bollen, WITS Co-Vice Chair & 4Way Consulting

demonstrate what is possible during a career in this sector.

Leila Lehtinen from Women in ITS Finland (FITS) added that they are working to create a "positive spiral" by: identifying women with varying interests and skillsets; offering opportunities to create an impact, via attending / presenting at an event or collaborating through projects; building more awareness; and attracting more women to the Forum and the sector.

Women currently face significant barriers in accessing engineering and senior management roles that

steer critical development in the ITS industry. There is a strong appetite for change, but this will only happen when ingrained structures shift.

What does the industry gain by attracting more women to careers within ITS?

Saara Reinimäki, Head of Automation Unit at the Ministry of Transport and Communications, Finland and a member of FITS took us through the key themes of the Finnish Transport Roadmap and emphasised that women can be part of the success story. Saara stressed that no one size solution fits all. We need a transport system that

Everyone is welcome to join, regardless of gender, and WITS aims to empower speakers and attendees to contribute to the Forum. This can be through the sharing of technical knowledge or career-related experiences.

is customer-orientated and supports everyone, which in turn creates satisfaction and wellbeing.

Lena Smidfelt Rosqvist, CEO Trivector Traffic Sweden and a member of KITS added that "whilst men and women typically run the same number of errands, women tend to make more complex, chain trips" and therefore we need "a gender informed transport system". Every person's behaviour and attitude towards design should be considered in the planning and delivery of transport throughout the entire decision-making process.

WITS UK is fortunate to gain insight to a wide range of interesting case studies presented at the events that we host. We asked our speakers to tell us about some of the exciting ITS projects that Forum members are involved in.

We learnt about a particular scheme in Digbeth, Birmingham where street lighting is being used to give new life to a deprived area by providing both better lighting and a colour coded wayfinding design. This made people feel safer and highlighted local shops and businesses along the route; a key example of where technology is being used to improve the energy efficiency and experience for all users.

Pia Wijk shared with us the story of Tiffany Heathcott who is the world's first remote truck driver, operating and overseeing the control of an autonomous electric vehicle. This is supporting the decarbonisation of freight and carving out what the future of trucking can look like.

Our International Women's Day webinar ended with reflections from our current WITS UK Forum committee, Gemma Tredwell – Chairwoman and Arcadis, Olivia Cairns – Co-Vice Chair and WSP and Rebecca Bollen – Co-Vice Chair and 4way Consulting. "The last year has been exciting, positive and given the Forum new focus. Although our goals and objectives haven't changed, we have updated our Forum Introduction and Terms of Reference, giving us a direction and vision to refer back to…and drive us forwards! We have heard from many excellent speakers, connected with early career professionals and built new relationships to raise the profile of women in this industry. It is clear that by working together we can promote a strong and representative ITS workforce, and the Women in ITS Forum provides a platform to do so."

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Is it time for real-time data-based decisions?

It's no secret that technology has progressed almost beyond belief in recent decades. This also means the possibilities around the collection and use of data are now far more extensive.

Ian Hind
Commercial Director
AGD Systems

These possibilities will only keep growing as transport tech becomes even more impressive – presenting not only exciting new options, but also raising a challenge within the industry.

As those within the sector will be well-aware, there are already formal discussions taking place (and plenty of informal chats too) around consistent handling and presentation of data. The outcomes of these talks may not be known for some time, but what is clear is that we're approaching a junction

when it comes to transport data.

There are those who may look to take the traditional route (the road more travelled perhaps), where decisions are made on the basis of what has happened in the past, or what is predicted to happen in the future. Data may be collected and analysed, but always as a reflective, not a reactive, exercise.

Down the other route, we have the option of introducing real-time data decisions. It's something we're already seeing other countries adopting, and

something which could have huge benefits for all road users.

Adapting automatically to what's happening across the transport network, based on data being streamed instantly via the use of AI and Ethernet capabilities, has the potential to overhaul the way the UK's infrastructure operates. And this isn't something which could happen years down the line, it's something we have the technology to begin implementing now.

QUALITY NOT QUANTITY

Of course, there is little benefit in continuously advancing how much data can be collected – to the point where we're amassing billions of pieces of information which don't add much value to the decision-making process.

This is why, no matter how advanced AI becomes, human oversight will always be needed in order to assess the richness of the data streams being produced by radars and detectors, and which pieces of real-time data provide a significant benefit to us.

END-TO-END PROGRESS

Another key consideration as we move forward is whether all parts of the process are moving at the same pace. There is little use in the solutions being used at the road-side being capable of transmitting vast amounts of real-time data if the equipment receiving that information in the control room isn't able to effectively deal with all of it. Otherwise the time and effort put into developing data capacity at the beginning of the process has essentially gone to waste, because any instant benefits of this information are totally lost at the next stage of the process.

Where we see different manufacturers producing the equipment used at each

There is little use in the solutions being used at the road-side being capable of transmitting vast amounts of real-time data if the equipment receiving that information in the control room isn't able to effectively deal with all of it.
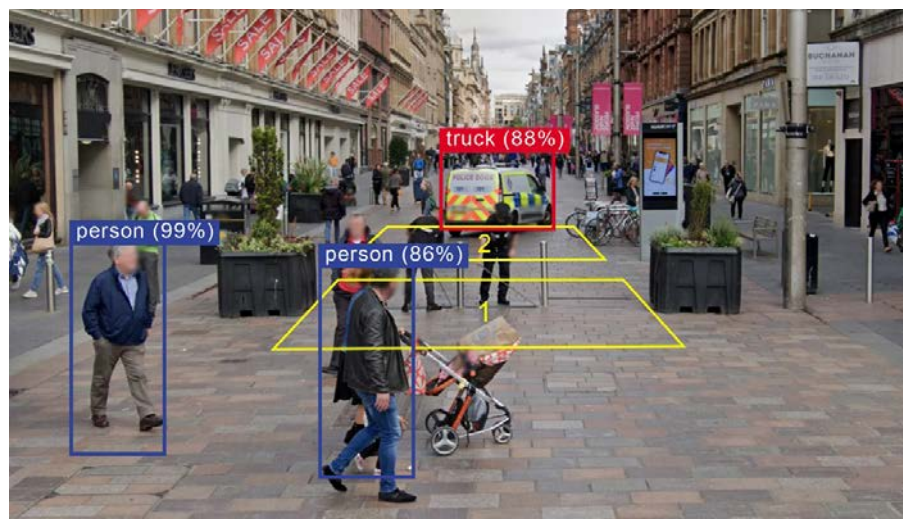
stage, then this further highlights the need for the industry to continue the discussions already taking place – so that we're all progressing at a similar rate. Everyone wants their product to be the most advanced, naturally, but nobody wants to be throwing data at a system which can't 'catch' it.

NECESSARY PROGRESS?

While questions of how and why we collect, share and use data remain on the table – there are those who are perhaps still distracted by a more fundamental question: why would we want to change the status quo?

For many years, reflective decision making has served the sector well, enabling us to progress the management of traffic across highways, town and cities with increasing insight. So there are those in the industry who query whether pushing for more real-time data to be available is even needed.

To answer that question, it's perhaps best to look at how increasing our use of data has served us well in recent years. Information collated on the increase in pedestrians and cyclists during and immediately after the pandemic enabled planners to decide whether and where additional routes for non-vehicular traffic were needed. Equally, the transition away from traditional 'rush hours' to a more consistent pattern through the day as people adopt hybrid ways of working and flexible office hours has also prompted changes in the way traffic flow is managed at different times of day.

Another recent change has been the introduction of new methods of transport such as e-scooters, again requiring decisions to be made around how best to integrate their travel needs with the needs of other road users.

But what if these weren't set decisions which had to be made and then rigidly stuck to? What if priority could be given to a certain type of vehicle because the technology in place recognised there had been an increase in volume, and was able to then trigger the necessary changes at that very moment?

What if we were no longer reflectively making decisions after pouring over weeks or months of data, because the technology was keeping pace with changes happening out there on the roads on not even a day-by-day basis, but a second-by-second basis?

There will always be a need for us to assess the quality and benefits of specific real-time data, and no one is condoning the production of this data merely because the technology is now available. But being able to rely on tech to improve the efficiency and safety of journeys by making instant use of information represents an exciting leap forward for the ITS sector, one the team at AGD are more than ready to take.

The Future of the Railways

ITS UK sits down with Anit Chandarana, Lead Director at Great British Railways Transition Team, to ask him about the new body being set up to guide the rail sector.

TELL US A BIT ABOUT YOUR ROLE AT GBRTT AND WHAT YOU'RE WORKING ON.

I'm responsible for leading the transition team that's working closely with government and across the rail industry to deliver the most ambitious changes to our railways in a generation.

We're creating a guiding mind for rail with strong local leadership and accountability – bringing together the whole railway - track, train and talent and unlocking the potential of the private sector.

Designing this new organisation is complex and detailed but incredibly purposeful work. Today the railway is not managed as a whole system, which leads to the host of problems outlined in the Williams Review – from inefficiency to a lack of customer focus.

Bringing track and train back together will support more holistic decisions because you're able to see the full balance sheet and link decisions about infrastructure with choices about operation. Given the industry's current financial position, it's even

more important that we're taking that whole picture into account so we can maximise revenue growth while also spotting opportunities to drive innovation that makes things better for customers and help us work more efficiently.

Crucially, we want to put customers at the heart of everything. It matters that we keep this top of mind at GBRTT because the choices we make now will carry through.

HOW IS PROGRESS GOING TO SET UP GBR AND WHAT CAN WE EXPECT TO SEE OVER THE COMING YEAR?

The first thing to say is that our new Secretary of State for Transport, Mark Harper, recently committed his unequivocal support to rail reform, including the creation of Great British Railways, and with the backing of the Prime Minister and the Chancellor.

This was really welcomed by the industry, and we look forward to seeing legislation brought forward, when

Parliamentary time allows. Legislation is important in transferring to GBR the powers to let and manage passenger train contracts – something which isn't possible under today's system. Without this you can't really bring track and train back together.

We are, of course, in the midst of designing Great British Railways and work continues apace. Alongside that design work we are also bringing the industry together to make improvements and bring the benefits of a guiding mind into the here and now. To pull out just a couple of things...

The Secretary of State recently confirmed the extension of Pay-As-You-Go ticketing and 52 more stations in the South East will benefit this year.

We're creating a guiding mind for rail with strong local leadership and accountability – bringing together the whole railway - track, train and talent and unlocking the potential of the private sector.

There will also be trials of single leg pricing and demand based pricing – both are really helpful building blocks in making fares much simpler, which will, in turn encourage travel and boost trust between passengers and operators.

We're also working on the first Long-Term Strategy for Rail. Due to be published by the end of 2023, it will bring a long-term view to decision making, supporting economic growth, levelling up and a greener railway. Among other benefits, it will give greater certainty to the rail supply chain about rail's long-term priorities, which we know is really important for helping businesses know where to target investment.

THE SECRETARY OF STATE MENTIONED IN THE GEORGE BRADSHAW ADDRESS THAT PAY AS YOU GO TICKETING WOULD BE EXTENDED ACROSS THE SOUTH EAST. WHAT WILL BE GBR'S APPROACH TO SMART TICKETING?

Train passengers have long said that buying a ticket is confusing. We want to make it easier, with increased digital ticketing options, including contactless, Pay As You Go technology, and simpler fares to make sure passengers get the best price.

The extension of the London Pay As You Go system to 52 more stations in the Southeast is just the start. We're planning more, to deliver Pay As You Go to hundreds more stations in urban centres across the country in the next few years.

Alongside this, we're working to give customers a simpler and more consistent ticket buying experience and we want to make it easier for more retailers to sell train tickets to increase competition and innovation.

THE SECRETARY OF STATE ALSO MENTIONED GETTING INNOVATIONS FROM THE PRIVATE SECTOR INTO THE RAILWAY SYSTEM. WHAT ARE YOUR THOUGHTS ON THIS?

We absolutely need to design a way forward that helps enable the private sector to bring its best to the railway. This is both a political imperative and a practical one. Roughly 80% of the money rail spends each year, £16bn, is spent with the private sector.

The challenges we face as an industry make it even more imperative that we unleash the full energy and expertise of the sector – to drive innovation that enhances customer experience, as well as finding ways to become more efficient.

For operators, we want to reinvigorate

Anit Chandarana, Lead Director at Great British Railways Transition Team

In designing and bringing to life this future guiding mind, the GBR Transition Team is seeking the sweet spot where greater coordination and consistency meets the innovation and commercial drive of the private sector.

competition in rail so new operators come into the market to run services. We believe all future contracts should empower operators to grow revenue and improve the bottom line sustainably, and reward them for doing so. This will look different on different parts of the network so that commuters and long-distance travellers get the best service according to their needs.

We've also heard loud and clear from businesses in the rail supply chain that siloes frustrate opportunities. That's not a criticism of any one part of the sector. Today, because of the way our industry is structured, each part of the railway tends to act rationally in isolation. Motivated by the targets against which it is measured. And that fragmentation makes innovation more difficult. That's why we need structural reform.

We're also working now to re-energise freight. The current private model has grown the rail freight market, and we continue to support that model whilst looking at how to introduce changes through GBR that enable it to deliver even more – providing clarity, effective leadership and clear targets to grow freight across the network. We know that there are significant growth opportunities if capacity constraints can be unlocked, journey times improved, costs reduced, and processes simplified.

In designing and bringing to life this future guiding mind, the GBR Transition Team is seeking the sweet spot where greater coordination and consistency meets the innovation and commercial drive of the private sector.

IS GBRTT THINKING ABOUT THE INTEGRATION OF RAIL WITH OTHER MODES OF TRANSPORT? HOW DO WE MAKE OUR TRANSPORT SYSTEM MORE CONNECTED?

Trains account for 10% of passenger miles but only 1% of transport related emissions, and each freight train removes 76 lorries from our roads. So rail has a huge role to play in decarbonising Britain's wider transport network – and better integration with other modes is crucial to that mission, making end-to-end journeys as easy as possible.

Building on some great pockets of best practice, GBR needs to be equipped to spot and jump at opportunities to integrate rail with other sustainable forms of transport. That means thinking differently about development, railway stations and service planning, and working together with a range of organisations.

Taking a long-term view, we want to support the integration of railway planning alongside wider public transport planning and spatial planning. Because GBR will be one part of a wider ecosystem of organisations making decisions about land and transport planning, and many of those decisions have a knock-on impact on how convenient on option rail is.

With the UK population expected to grow by several million over the next few decades and a shortage of affordable housing, there's a huge opportunity to get land use and transport planning working in parallel to create well-located homes and reduce car dependency for future generations.

OUR RAILWAY IS INCREASINGLY PRODUCING MORE AND MORE DATA. HOW WILL GBR MAKE BEST USE OF THE INSIGHTS THIS DATA CAN PROVIDE?

Transforming rail industry data and harnessing insights is critical to creating that simpler better railway we're talking about. There are cultural and contractual issues which prevent the active sharing of data today, and of course fragmentation compounds the challenges. The current set up means data is either not available or is not shared universally.

But with Great British Railways, we have the opportunity to bring together data and take a more open approach to sharing – one that can support private sector innovation and benefits passengers and freight customers.

Open data supports things like personalised live travel information or automated delay repay. And opening this up by default will stimulate innovation across the whole system, in areas that we can't possibly control (nor would we want to!). You only have to look at what City Mapper has done for urban transport mapping in London.

There are so many areas where data can help enrich our understanding and decision-making, and the good news is that we've already started that transformation journey as a transition team.

For example, as we're looking at growing industry revenue, we need to continue bringing that data together and putting it to work – informing an ever-better understanding of our customers. These insights are helping boost industry efforts to attract passengers back to the railway in the short-term, as well as to develop the right customer proposition in the longer term. It will help us to make intelligent investment decisions that have the most positive impact on customer experience.

We're also looking at better operational insights that help inform swift, intelligent interventions when things go wrong, letting customers know in the process to help them plan around disruption. Insights that can also help identify repeat problems and resolve them.

WHAT ARE YOU MOST EXCITED ABOUT IN TERMS OF TECHNOLOGICAL DEVELOPMENTS ON THE RAILWAY?

Customer information and the opportunities to make life simpler and better for the people who use the railway. And I say this because we have continually not put customers at the centre of our world, a culture we must change if we are to run the thriving industry we all want and the one the country deserves.

HOW CAN THE INTELLIGENT TRANSPORT SECTOR BEST WORK WITH YOU GOING FORWARD?

The most important thing to say here is that Great British Railways will very much be a guiding mind – not a controlling one. That mindset begins with GBRTT, so it's absolutely critical that we listen carefully to and work with as many people and organisations as possible. I would ask the sector to keep talking, keep working with us and keep probing – it will take many more people than me and the transition team to successfully deliver the wholesale reform of the railway which is so needed.

Railway Industry Association
The voice of the UK rail supply community

INDUSTRY INSIGHT PAPER
Data and Digital Technologies in Rail
Industry needs, opportunities, and priorities

SCAN TO DOWNLOAD >>>

An 'open by default' approach to data will be introduced, with common frameworks and standards across the sector created and led by a new Rail Data Service within Great British Railwayst
The Williams-Shapps Plan for Rail, 2021

RIA's SIX ASKS

To enable, expediate and ensure the success of the UK railway's digital transition, RIA has six clear asks of Government, policymakers and clients. We want to start a conversation with all parties about these issues and collaborate to identify the specific actions that different organisations will need to commit to.

At the cutting edge of common sense

Is the humble kerb the missing puzzle piece that unlocks the digital ecosystem needed to deliver social, environmental, and economic benefits for cities and accelerate fleet transition to EV?

Neil Herron
CEO and Founder
Grid Smarter Cities

Whilst some smart city thinkers have been looking skywards for inspiration and thinking aerial drone deliveries are a solution, others recognise the answer has been under our feet all this time. The kerb is currently a fixed two-dimensional asset where many interactions take place, whether it's pickup, drop off, loading zones, bus stops, clearways, cycle lanes or parking spots. With the first come first served jostling for position creating a complex, messy and often unsafe environment. It doesn't have to be this way. Kerb owners (mostly local authorities) need to be able to visualise and utilise their kerbside as a digitalised 3D gateway to enable the delivering of safer, greener, and cleaner places in which to live and work.

At Grid Smarter Cities, we believe that we are 'at the cutting edge of common sense!' as we have created a kerbside management platform Kerb® that provides the kerb owner with the ability to flex permitted use of its kerb by times of day and user types to better reflect local safety and prioritisation hierarchies. By adding a pre-bookable element it gives an increased degree of certainty of access and timing for kerb users (freight, servicing and delivery vehicles).

Dwell permissions can be tailored to industry need, whether they be physical bookable loading bays, virtual loading bays, zonal permits or dwell extensions and layered over the kerbspace as a 'digital wrapper' delivering the optimal outcomes for all stakeholders. The biggest environmental, social and economic gains come from this very practical intervention of re-prioritising the kerb from a first come first served 'free for all' to a dynamic and flexibly managed bookable asset.

Practical solutions such as Kerb, will allow the Amazons and DPDs to safely and more sustainably deliver 160 parcels in a day instead of 130, for example. Their interactions with the kerbside, known, understood and permitted, will lead to better network, less congestion, fewer miles driven, and reduced air pollution, and with lower driver stress and fewer parking tickets! These are the marginal gains from doing little things a little better and for the operator, this means greater margins.

The Brewery Logistics sector is different in that it works under strict safety guidelines when delivering. Its operational needs are therefore different from the parcel sector as they require prioritised access to the kerb close to the cellar doors, often in areas where loading may otherwise be prohibited. And if they have to deliver across a cycle lane to access the cellar then this inevitably brings in another layer of complexity and danger. This can be avoided right now by using technology to deliver safer and more efficient use of road and kerb space with pre-booked, risk assessed loading at specific times that least impact on the network.

WHAT ARE THE THINGS WE NEED TO THINK ABOUT?

We need not wait for new technology, policy or legislation to realise the early benefits. The technology and solutions are available now! The Department for Transport (DfT) recently commissioned a Kerbside Management Discovery Report which identified the enabling power of the kerb and significant outcomes that can be delivered in the short term whilst preparing the policy and legislative road map for a fully digital, flexible and dynamic approach to kerbside access.

The beauty for local authorities is that they don't each need to design their own solution. Kerb can be configured to easily address local, city, or region-wide challenges. Accelerating fleets transitioning to full EV by overcoming range and charger anxiety by linking the ability to pay for kerbside parking and charging in a single transaction.

Fleet transition to full EV will be accelerated by overcoming challenges of range and charger anxiety, and by linking the ability to book and pay for kerbside parking and charging in a single transaction. The ability to book a charging slot is also going to be key

for the kerb owner and chargepoint operator when deciding where to install a charger to optimise the asset value. With the most obvious 'graze' users being the ones already dwelling at the kerb whilst making a delivery.

To transition, fleets will require charging certainty and a guarantee of access as part of the last mile consideration and this complements the emerging strategy of dedicated charging and parking hubs adjacent to city centres as part of a mid-mile strategy.

Grid's dynamic kerbside management solution with Chargerie™ concept.
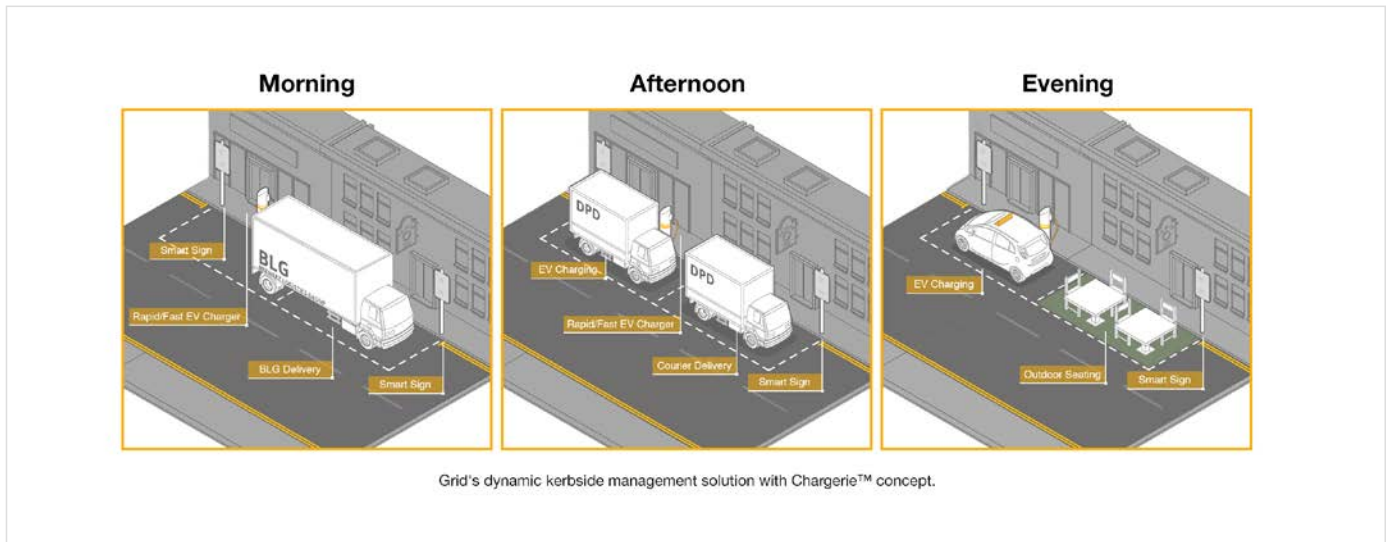
HOW CAN WE PROGRESS?

Progress can be made quite rapidly, with beneficial outcomes demonstrated, proved and then taken to scale. Much of the groundwork has been done by Government and local authorities to highlight the need to digitise Traffic Regulation Orders which will enable the layering of 'solution additionality' over their existing fixed two-dimensional kerbside assets.

BENEFITS

A mid to large scale demonstrator evidencing a kerbside management solution for freight, servicing and delivery vehicles, delivering social, environmental, and economic benefits for both the kerb owners and the kerb users.

EV TRANSITION

Recognising the kerbspace is the missing jigsaw piece to enable decarbonisation of fleets. Integrating EV strategy with mid-mile and last mile, and complementing on-street graze charging with off-street park and charge.

CERTAINTY

Pre-bookable kerbside slots creates both certainty and increased throughput of only those vehicles that are need to be there. Providing certainty of access and charging to commercial fleets in the day and residents at night signposts the flexible and dynamic approach to delivering future policy goals.

Whilst the number of stakeholders may appear to be complex, if we view the landscape as an interconnected, interoperable digital ecosystem then the kerb is uniquely placed as a strategic enabler as can be seen from the diagram on the right. Progress can be made quite rapidly, with beneficial outcomes demonstrated, proved and then taken to scale. Much of the groundwork has been done by Government and local authorities to highlight the need to digitise Traffic Regulation Orders which will enable the layering of 'solution additionality' over their existing fixed two-dimensional kerbside assets.

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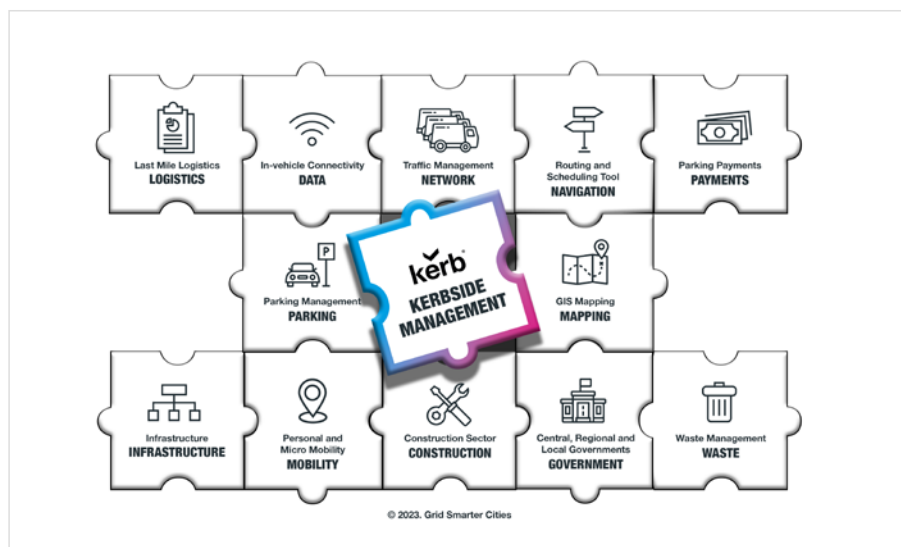
Kerb Owner Benefits

Reduce CO2 emissions by 15,500 tonnes per annum (more than the 12,300 tonnes for CO2 saved by ULEZ per annum)

Equivalent to removing 12,600 cars off the road per annum

The scheme could generate up to £140 million in revenue for London per annum and substantially improve safety on the capital's road

Kerb User Benefits

Saves over 3 million hours in wasted delivery driver time per annum by removing the hassle of finding safe and available kerbside locations to park

Enables 21% more deliveries by improving operational efficiency

Reduces freight, servicing and delivery kilometres by 20 million per annum in London helping to ease congestion and improve safety in the capital

About the Author: Neil Herron

A serial entrepreneur founded award-winning Grid Smarter Cities in 2015, developing new propositions in the smart, connected urban ecosystem space in particular addressing the issues of kerbside management to help deliver optimisation and efficiencies for co commercial operators and reduced congestion, improved air quality and Net Zero and decarbonisation strategies for cities. Former European Campaigner of the Year influencing government policy and named inventor behind 15 granted patents delivering digital innovation in the areas of parking, journey planning and waste management.

A regular commentator on kerbside management, contributing to the recent Department for Transport Kerbside Management Discovery Report as part of the expert panel. He is a Department for International Trade Export Champion.

Transport Investment, Road Pricing and the Future of Transport

Iain Stewart MP, Chair of the Transport Select Committee, provides a look at what the Parliamentary Committee have been exploring over the past few months.

Recent announcements from the Government on Transport have been a mixed bag. While the November Autumn Statement confirmed the DfT's budgets for the current spending review, inflationary pressures in the sector will have to be met from within that budget. While we eagerly await full details from the Secretary of State as to how spending will be apportioned between the different transport modes, and the prioritisation of spending within each, we have had the announcement of delays to parts of HS2 and the programme of road infrastructure projects, referred to as Road Investment Strategies (RIS), which run for five years a piece.

The decision came at an uncanny time for us on the Transport Committee, as we are midway through our inquiry into the RISs. This strand of work was prompted by a highly critical NAO report, which pointed to shortcomings by National Highways and the Department for Transport. Mandarins

at the two bodies were charged with failing to grasp how inflationary pressures – rising costs of raw materials, energy and labour – would cause projects in RIS2 (from 2020-25) to collectively go billions over budget, and face being delayed. Eleven out of the original 69 RIS2 projects have been scrapped altogether.

It is now likely that various projects from RIS1 and 2 will be shunted into RIS3 (2025-30), with some possibly being rolled into RIS4 (2030-35).

What is likely to determine each project's fate is deliverability, meaning complex megaprojects are less likely to be embarked upon. There will be debate about whether it may be most beneficial for the economies of affected regions to instead focus resources on simply maintaining the Strategic Road Network – England's 4,300 miles of motorways and A roads.

The Budget, meanwhile, contained some good news for maintenance of local roads, with an additional £200 million allocated, and for motorists with the extension of the Fuel Duty cut. Also noteworthy was the commitment to publish an updated National Infrastructure

and Construction Pipeline, plus new initiatives to support infrastructure investment via the UK Infrastructure Bank and leveraging greater contributions from institutional investment funds. We await further details of these, and what they may mean for road and rail investment projects, with interest.

I'm also keen to see what the impact will be of proposals to extend the powers and funding of for some Mayoral Combined Authorities, and what this will mean for transport projects in those areas.

As is usually the case, my Committee has heard a range of opinions on road investment during our current inquiry. Consequently the reactions of stakeholders to the Budget will be mixed. Every spring Budget has its winners and losers.

As inflation and other rising costs curtail the amount of cash in DfT's coffers, my colleagues and I are reminded of the Committee's Road Pricing report, published in February last year, in which we cautioned the Government it must reform our system of motoring taxation.

We argued that as electric vehicles become more prevalent – which must be encouraged to cut emissions – the tens of billions of tax revenue generated by Fuel Duty will evaporate year on year. Meanwhile, the Office

The Budget contained some good news for maintenance of local roads, with an additional £200 million allocated, and for motorists with the extension of the Fuel Duty cut.

for Budget Responsibility forecasts that levying Vehicle Excise Duty on EVs from 2025, a measure announced last autumn, could only raise £1.6 billion a year by 2027/28.

The Treasury should heed our warnings and assess options for a new form of taxation, applicable to all motor vehicles, to plug this hole in the public finances. So it was disappointing when the Chancellor responded to us with a short letter saying, discourteously, that he "does not currently have plans" to get on the front foot and do so.

In challenging times for the economy it is even more important to get this right, not least because revenue from motoring taxes actually funds hospitals, schools, police and everything else. Only £7 billion of the £35 billion collected in 2020/21 was used to maintain the country's roads.

Another strand of the Committee's work that is giving me reason for optimism is Our Future Transport, a crowdsourcing exercise that has seen 227 academics, charities, firms and think tanks flood our inbox with their ideas on what our next in-depth inquiry should look into.

We were hoping people would tell us about technological innovations that look set to transform the way we do transport in the years or even decades to come, so that we can look at them from a public policy perspective. DfT is said to be working on legislation to keep up with the advent of self-driving vehicles, which 10 years ago would have seemed like pie in the sky to many. So what could the next big outside-of-the-box idea coming down the tracks be? Very soon we'll be holding a Dragon's Den-style public meeting to hear pitches from those who sent some of the best submissions. It promises to be a fascinating session and I look forward to the debates I'll no doubt have with colleagues over which to adopt as our next inquiries.

←

Iain Stewart MP, Chair of the Transport Select Committee

We were hoping people would tell us about technological innovations that look set to transform the way we do transport in the years or even decades to come, so that we can look at them from a public policy perspective.

Early careers & the people behind the future of transport

Intelligent Transport Systems play a key part in everybody's day to day lives and the technology used is often taken for granted.

James Hornsby
ITS UK Early Careers Director

This technology is being used to simplify and offer new routes to the public, provide users with more information, automate processes, optimise operation, and improve maintenance requirements. This is all while helping to reduce our carbon impact and digitise how we operate and manage transport systems.

With the continual development of this technology, it is important that those working within the industry keep up to date with the skills required to utilise these new ideas and products. Though it's not just about upskilling those currently working within the industry but also about encouraging new members that can offer a different perspective. The ITS industry is full of people with a variety of skillsets and backgrounds which is why it is an exciting industry to be a part of.

To help encourage new members we need to continue to show off the amazing work that everyone is doing so that more people can see how important ITS is to people's daily lives. This would also help those from outside the industry understand how they can utilise their skills. If we are also able to publicise the industry to those studying then it can start the idea of a career in ITS from a young age, allowing them to choose suitable subjects to study and develop the right skillset to kickstart their careers.

Creating opportunities for new Early Career members to join the industry is also just as important as publicising it. This can be carried out at various levels through several ways including apprenticeships, T-levels, creating entry level jobs for people wanting to change careers and by ensuring that there are the right academic opportunities for students. Once the opportunities are created there needs to be a clear path for people to develop, which can be carried out through training courses, development plans, chartership and other Continuing Professional Development opportunities.

There is no set definition of being an Early Careers member of industry and it is also important to recognise that it isn't based on age. There could be someone starting an apprenticeship at 18 or someone having a career change in their 50's. This is one of the reasons behind the rebranding from the Young Professionals to Early Careers Forum in an effort to be all inclusive. No matter who they are, being an Early Careers member is something that should be embraced as it is where you can define

To help encourage new members we need to continue to show off the amazing work that everyone is doing so that more people can see how important ITS is to people's daily lives.

"The plenary conference has been strategic for our Early Careers Forum, with a number of themes coming out of it. With networking and knowledge sharing being at the heart of our forum initiatives, the plenary has opened up a number of avenues for our future activities rejuvenating our mission and vision; particularly strengthening the need for a greater focus on relationships with universities, professional bodies, technical ITS UK member organisations and other ITS UK Forums for greater focus on promoting academic research, CPD/chartership support and technical know-how (including site-visits) catering to university students, apprentices and early careers members within the industry."

Ashik Nazar, Early Careers Forum Chair

your career path. To help embrace the opportunity that Early Career members have, those with experience should be sharing their knowledge and mentoring others but there is also a chance for Early Career members to help each other.

> "With many of our members having spent the early years of their careers in multiple lockdowns, it is more important than ever to create opportunities for Early Careers Professional to come together to network, share ideas and socialise with other likeminded professionals. Our Forum aims to create an accessible space for these activities and I think it plays an important role in ensuring the long-term future of ITS UK by engaging with members at a key point in their careers."

Laurence Penn, Early Careers Forum Vice Chair

ITS UK's Early Career Forum is focused on providing the best for the industry's Early Career Members and creates a platform for them to be heard, expand their network and develop their knowledge across the various areas of ITS. It is also managed by people with experience of being Early Career members themselves that understand how to maximise the opportunities ahead of them. This is reflected in the Forums mission which aims to educate and inform its members while also being able to showcase their work and track developments within the industry. Hosting events for development and networking is also a key part of the Forum's plans going forward.

To help ensure that the Forum is doing the best for its members, a Plenary session was held back in January which was hosted in Arup's Solihull office as well as providing a hybrid option to dial in online. The plenary was widely attended with members from a broad range of consultants, local authorities and universities attending both in person and online. The plenary was split into three parts. The first part had

presentations on using data to make active travel feel safer, the Connected and Autonomous Vehicle scoring index and an Early Careers perspective on the ITS world congress 2022. Then we heard from the three finalists of the 2022 poster competition and announced the winner. The final part was a discussion and reflection session where we invited the Forum's members to provide feedback on what they want from the Forum in the future and what has previously worked well. This was a valuable session that allowed those in attendance to express their thoughts and ideas which the Forum management team have recorded and are exploring the best ways to implement them.

It is very exciting to be part of the ITS industry and this excitement will only grow with the developments that are being made. I encourage everyone reading this to get involved with the Early Careers Forum, whether you are wanting guidance on where your career can take you or help contribute to developing other. This engagement will only benefit the ITS industry and continue to improve the future of transport.
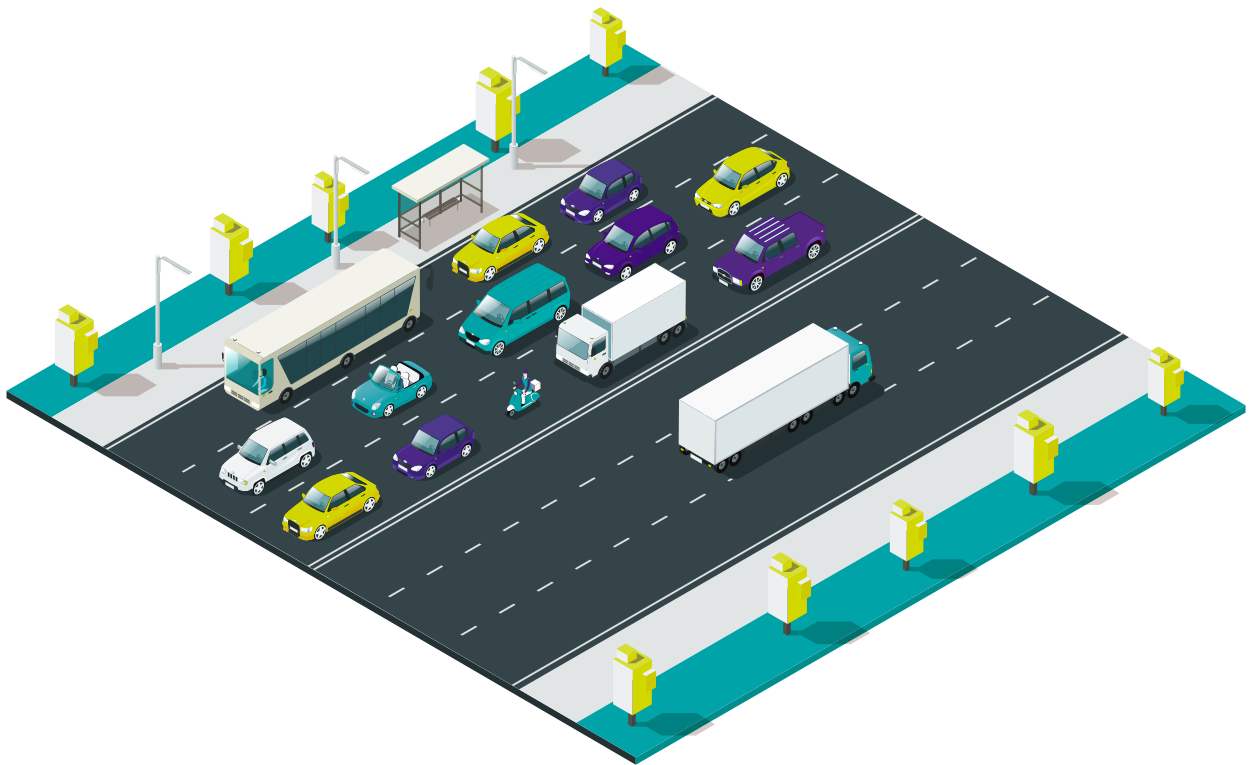
Like Clockwork

John Ball, Senior Product Manager at SWARCO, discusses how Traffic Management Systems (TMS) can be utilised to further improve and enhance bus priority schemes to reduce journey times and maintain reliable bus services, as well as helping to reduce harmful emissions.

John Ball
Senior Product Manager at SWARCO

By definition bus priority schemes aim to reduce journey times and improve the reliability of services for passengers. Equally important is the role they can play in reducing emissions. More use of buses and other public transport coupled with less use of private passenger vehicles can lead to a more efficient transport system, with improved traffic and environmental conditions for all.

While there have been some concerns over the potential knock-on effect for other road users, with some predicting priority for buses would slow other traffic and cause greater levels of congestions, well-designed bus priority schemes are proving good for everyone, and allow more people to move more quickly even on busy routes.

Creating an effective bus priority scheme that reduces journey times, congestion and service reliability, that benefits all road users, is not as simple as increasing the number of bus lanes. Equally, there is not a one-size-fits-all solution. There are a number of tactics and strategies, including segregation, traffic signal control and bus stop upgrades, that can be utilised in combination to increase reliability and efficiency. Intelligent Transport Systems and solutions, such as Traffic Management Systems (TMS), can also play a key role.

TMS

Traffic Management Systems are a form of Urban Traffic Control (UTC) system that can be utilised to monitor and control urban traffic. TMS allows for better traffic performance from a road network by reducing delays to vehicles and the number of times they must stop. And can also be used to balance capacity within a traffic network, attract or deter

traffic from specific routes or areas, prioritise specific vehicles such as public transport, arrange for queuing to occur in suitable, less busy parts of the network, and enhanced fault monitoring and maintenance of equipment.

What is important with any TMS is that operators can monitor and control all elements of the network, which is why SWARCO TMS is equipped with SCOOTview, a web-based graphical user interface enabling the user to ensure that appropriate control strategies are being implemented according to time of day or traffic conditions. The system supports a mixed approach to signal control; Fixed Time UTC (with or without SAPS), SCOOT, MOVA and remote monitoring. This enables the optimum strategy to be selected, supporting the need for efficient network performance, reduced congestion, and improved air quality.

TMS enables users to coordinate, control and monitor a region's signalised traffic intersections. SCOOTview brings together equipment status monitoring 'at a glance' and intuitive access to the full suite of tools, minimising the effort required to monitor system operation.

PRIORITY MEASURES

There are multiple ways in which TMS can be used to support and further enhance bus priority. Segregation typically means dedicated bus lanes. In the context of bus priority, TMS can alter the timings and sometimes even the sequence of traffic lights to help buses pass through junctions with minimal delay.

Bus locations are reported to a back-office system using GPS and wireless communications. The equipment to do this is typically integrated with the ticketing machine or system.

TMS is playing a key role in centralising bus priority schemes and helping to improve service reliability and journey times to the benefit of all road users.
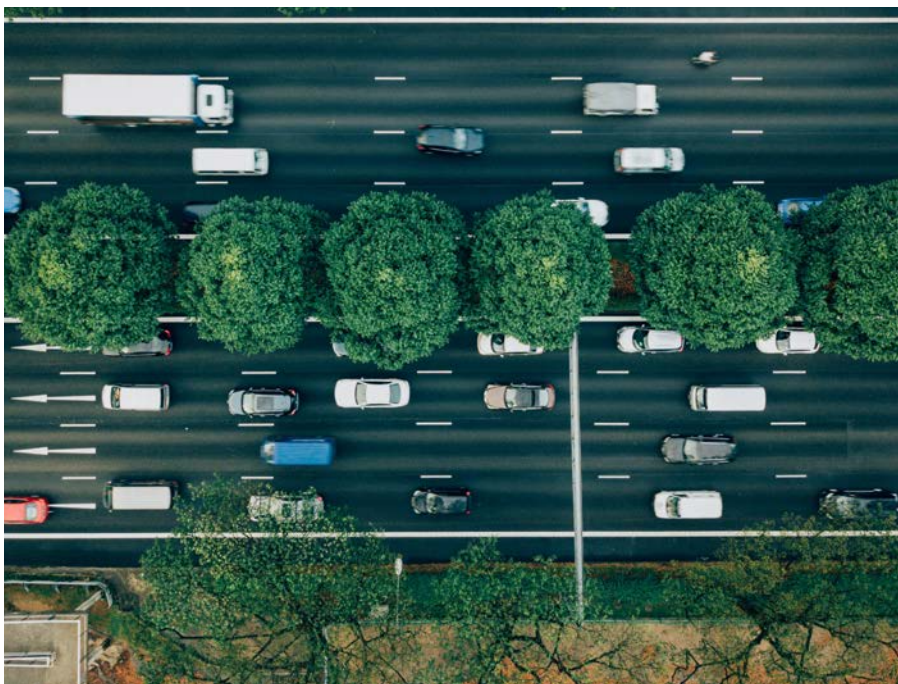
Predefined virtual detector locations can trigger a priority request when the bus reaches that position. The back-office system sends a priority request message to TMS, using the Real Time Information Group (RTIG) T031 bus priority protocol that lets the system know that a bus is approaching and from what direction.

If a bus is approaching a set of traffic lights at green, TMS can be used for extensions to prevent the lights from changing until the bus has passed, which can significantly reduce delays. If the bus has already missed the green light, then TMS can be used for recall, returning the lights to green more quickly than usual. Priority is often only granted when a bus is running late, or if the request message is marked as being urgent. This mechanism allows TMS to intelligently manage conflicting requests from two or more buses approaching from different directions, with priority given to the bus that is running behind schedule. If both buses are late, priority is given to the bus that is running further behind.

Priority requests that TMS receives are fed into intelligent algorithms, such as SCOOT or MOVA, that help to optimise traffic management, to provide and manage the recovery of the traffic network as and after buses pass through. Derbyshire County Council is just one example of a local authority using this functionality of SWARCO TMS to help deliver its multi-million Bus Service Improvement Plan (BSIP) unveiled in 2022. Within the first three years of the BSIP, the majority of traffic signal junctions in Derbyshire will have automated bus priority, and by 2027 all signalled junctions in Derbyshire will have bus priority as 'standard'.

CONCLUSION

There are several tactics, strategies and measures that can be utilised to implement bus priority schemes but they do not have to be dependent on additional bus lanes, redesigning road networks, undertaking major works or requiring capital investment. The smartest solution is found in the intelligent transportation systems which allow schemes to be easily rolled out at scale, as well as providing the flexibility for local authorities to prioritise the most urgent routes and ultimately resulting in a future proof solution that is cost effective to maintain. TMS is playing a key role in centralising bus priority schemes and helping to improve service reliability and journey times to the benefit of all road users.

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Key

Listings in purple are for Executive Members

- **A** Academic research
- **B** Automotive
- **C** Human machine interface
- **D** Cooperative systems and autonomous vehicles
- **E** Communications technologies
- **F** Enforcement and road safety
- **G** Security
- **H** Logisitics
- **I** Central or local government
- **J** Assisted mobility
- **K** Traffic management and UTMC
- **L** Driver information
- **M** Passenger information
- **N** Public transport ticketing
- **O** Fleet management
- **P** AVL (automatic vehicle location)
- **Q** Parking
- **R** Tolling
- **S** Emissions and noise reduction
- **T** Policy
- **U** Rail
- **V** Hub and interchanges
- **W** Ports and marine
- **X** Vehicle & pedestrian detection
- **Y** Non-intrusive detection
- **Z** Recruitment / project resourcing / executive search and selection
- **Z1** Consultancy

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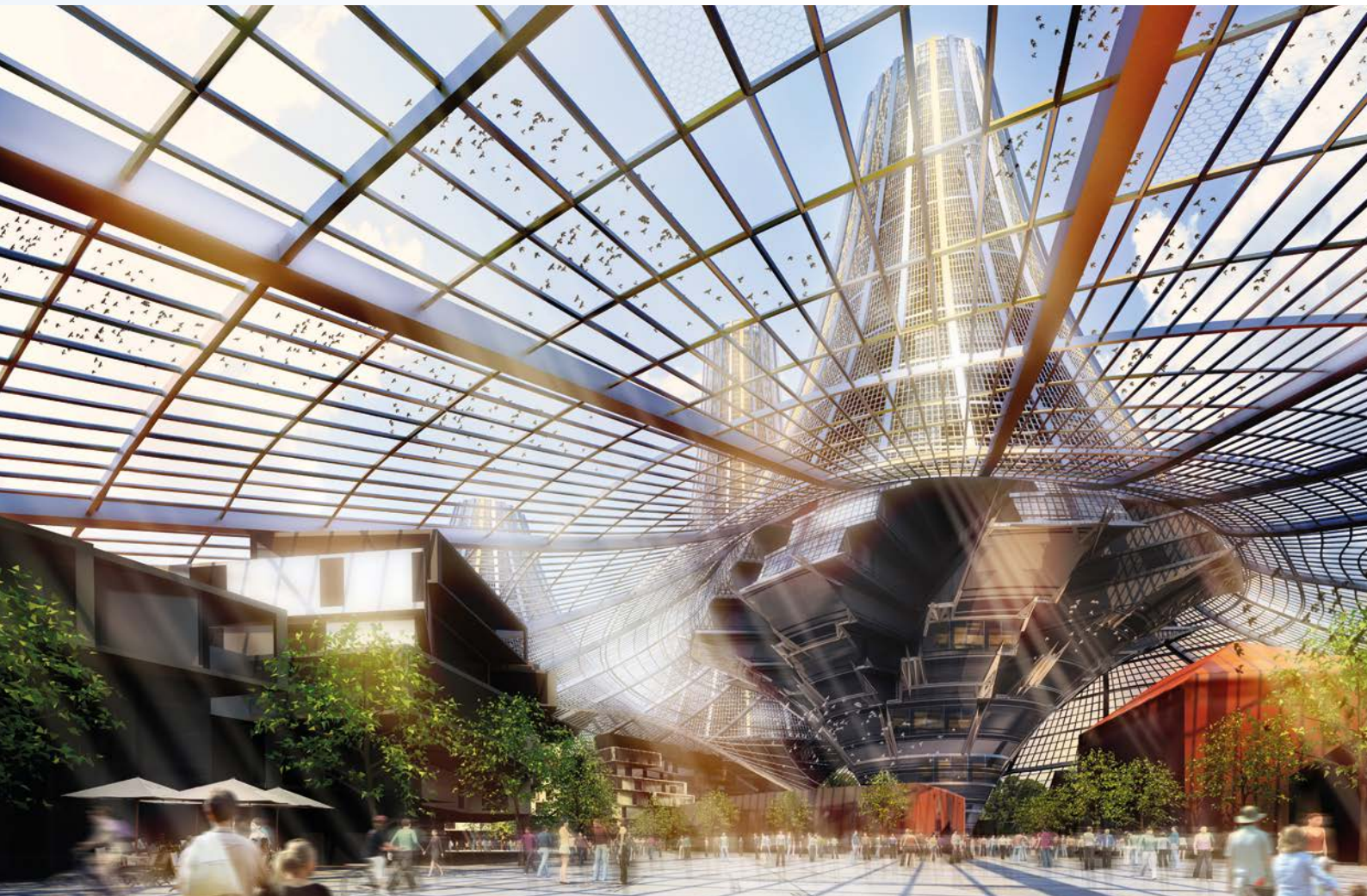
We're used to speed cameras making our roads safer by reducing the numbers of people breaking the speed limit, but using technology to spot other bad drivers has always been more difficult. However now, thanks to advanced video technology and artificial intelligence, this has changed, and those who use hand-held phones and drive without a seat belt can also be automatically identified, as Geoff Collins explains.

S-AI-fety solution

Geoff Collins
General Manager UK at Acusensus and Chair of the ITS UK Enforcement Forum

There's no doubt that speeding is a major cause of crashes on our roads, but collision statistics show that distracted driving, particularly use of a mobile phone at the wheel, is a major issue. Next time you're on the road, either driving, a passenger or a pedestrian, look out for people swerving, or randomly changing speed, and you'll quickly see the driver gazing down at their devices thinking they can still safely control their vehicle.

The simple fact is, you can't. If you can face seeing some horrific images, search an excellent BBC online documentary "Deadly Browsing: The Lorry Driver" to see what can happen when a driver is distracted by their phones. Once you have seen this, you will never think of looking at your phone whilst driving again.

DANGERS

Drivers using a mobile, either to their ear or in their hand, is a serious issue which the road safety charity, Brake, says is four times more likely to lead to an accident as drink driving. Furthermore, these people risk not only their own safety, but all fellow road users.

Given that Police have so many other pressures on their time, it is vital technology can help them deal

with this dangerous problem. A new generation of AI-powered cameras are helping them.

The cameras, designed by Australian company Acusensus and now being piloted in the UK, capture hi-res images of people in vehicles as they drive by. In these tests, the 'Heads-Up' system has been mounted on a mobile van, but it can also be installed on relocatable trailers for days at a time (and will be, in expanded operations later in 2023), or permanently located on street furniture such as gantries.

OFFENCE

The images are automatically analysed in near real-time, and are optimised to flag up likely violations involving people holding a phone or not wearing a seat belt. When a possible case is identified by the software, anonymised images are sent to a secure cloud for later human review, which can look at the picture to decide if a potential offence has occurred. A further secondary check will validate this and then allows for the creation of an offence file, which can be used by the police for prosecution, and indeed has as part of the early trials.

The tests have been taking place across the UK for nearly two years with Acusensus working alongside AECOM and National Highways at more than 60 locations, in counties including Warwickshire, Devon, Cornwall, Merseyside, Bedfordshire and Sussex. In one of the trials on the M6, National Highways identified more than 750 seat belt and mobile phone offences along a short section in Merseyside in just a few hours – the highest number at a single site in a study which has also visited numerous locations across England. At one point, a high-visibility camera placed in the roadworks south of junction 23 at Haydock, was spotting an offence every 90 seconds, compared to the average at all other sites of one every six minutes.

BEHAVIOUR

The exciting thing is, the technology works in changing driver behaviour. In Australia,
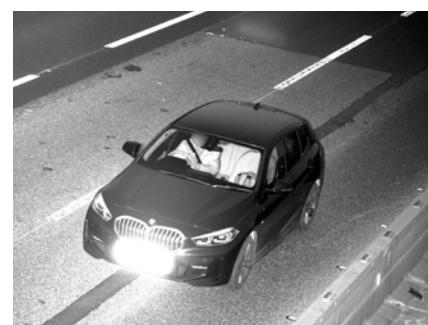
the first state-wide scheme rolled out in New South Wales in 2019 has had a significant impact on driver behaviour as people discovered that the technology existed and they face the real prospect of being caught if they broke the rules. The number of mobile phone detections have dropped by a factor of six, from 1 in 82 drivers in 2019 to 1 in 478 drivers in 2021. A subsequent programme in Queensland has similarly started to show active changes in behaviour.

As I mentioned, the same technology can simultaneously identify people driving, or in the passenger seat, who are not wearing a seat belt. This, too, is a key road safety issue, with PACTS reporting that three in ten vehicle occupants killed in road collisions found not be wearing a belt. In our tests, we found around four times more people were non-compliant with seat belt laws than mobile phones, and reducing this would be a significant contributor to reducing the road trauma toll.

Furthermore, the technology has the potential to spot other forms of annoying and irresponsible driving such as tailgating and driving in the middle lane when there is nothing in the inside lane.

I have always hated the newspaper headlines claiming automated enforcement is somehow a "war on the motorist". It is not, but it is fighting a war on bad and dangerous driving, and anyone who watches the video I mentioned above will agree, this is a war we must fight and win.

Given that Police have so many other pressures on their time, it is vital technology can help them deal with this dangerous problem. A new generation of AI-powered cameras are helping them.

Get in touch with Geoff Collins at

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The Chartered Institute of Logistics and Transport – one of the best kept secrets of the transport profession!

The Chartered Institute of Logistics and Transport (CILT) is the professional home for anyone involved in moving or managing the movement of people and things around the country and internationally be it by rail, road, water, air or even space!

Sharon Kindleysides
Chief Executive, CILT (UK)

CILT(UK) has more than 12,500 members and is a part of the international CILT family that boasts more than 30,000 members worldwide. Well connected with government, private sector and industry bodies – we pride ourselves on our contacts and ability to provide unbiased and relevant advice across the profession.

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Get in touch with us at membership@ciltuk.org.uk and find out more!

The Future of Intelligent Transport?

ITS UK drops in on an online conversation with Arup's intelligent transport experts to hear their thoughts on the future of the industry.

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RH

Ryan Hood
Ryan is Arup's Digital Highways Leader, where he focuses on the application of data and technology. Ryan is also the volunteer chair of ITS UK, representing the interests of our members.

AB: Hi everyone, as we know, the transportation landscape must change to address the global environmental crisis. Solutions such as single occupancy ICE vehicles and significant new infrastructure builds must be a thing of the past and shared/public transit must become the solution for the majority, where possible. We can use the Avoid-Shift-Improve model to help focus on fit-for-future solutions but need to recognise that modal and propulsion changes create a different economic proposition and government resources will likely have significant shortfalls in terms of taxation from traditional fuels or vehicle excise duty which may mean that the topic of mobility pricing becomes a far more influential feature of our transport networks.

What key market drivers do you see affecting the market in the next 5 to 10 years and what can we, as Arup, do to influence things?

YM: Hi Alastair, the pandemic was a clear demonstrator on how sensitive transport is to consumer behaviours, in particular safety, convenience and accessibility. Moving forward, I see several factors likely to influence the transport market, including how, where and when we work, how our future city and town centres (e.g., high streets) will look and be used; as well as the increasing desire to use more sustainable and cost-effective travel.

KF: For me, cost and availability of transport will affect the market and therefore consumer choice and decision making. Growing awareness around climate change and the need to reduce carbon is likely to impact investment and day to day decisions which in turn influence purchasing and travel choices. What type of car should I buy - What is the price difference and how easy will each be to use? What is the price difference and how easy will each be to use? Should I travel by sustainable modes of transport rather than getting into my own car – because it is the right thing to do?

NB: And the cost of living and affordability are likely to change people's travel choices and preferences and potentially detract from the need to decarbonise the network, making it imperative to review equity impacts of policy. This will generate a need to understand long term behavioural change post-pandemic to ensure reliable and relevant services. Arup is helping answer long term questions about road pricing, micro-mobility, and decarbonisation pathways and bring them together in an integrated way.

RH: All good points, the outcome we want to achieve with transport remain largely consistent – safer, cleaner, more accessible, lower cost, more efficient, more integrated, and more convenient transport. What's really changing is the data and technology landscape.

AB: What technological development do we see during the next 5 to 10 years?

RH: Definitely, the data and technology landscape are set to change, and rapidly - digital is everywhere and driven by sheer volumes of data! There are many exciting developments we can see already which will likely drive further innovation in the next few years further innovation in the next few years. Take DANCE trends as an example: algorithm developments including advanced data science techniques such as ML; networks – the means by which we are moving data whether it be 5G, fibre or new Satcom solutions such as Starlink; cloud and the related exponential growth in computing power... these developments are enabling us to think very differently about how we achieve better transport outcomes, whilst simultaneously providing challenges, with respect to organisational change and meaningful user adoption.

AB: It's a difficult balance - vehicle connectivity and data sets available from current fleet could perform a lot of the functions of roadside tech, but networks need designing for the lowest denominator (to a point), and transition to network operation based on entirely third-party data sets is a difficult step for road authorities. Overall, connected vehicle data and AI solutions that go around this (and can be overlaid with existing technology services such as CCTV) must be the most powerful technology developments that will redefine how we gather information as well as augment data sets to inform network operations.

KF: And, technology is evolving all the time - history confirms that. New technology will emerge in various forms to assist with design and operations of all elements of the transport network. One of the barriers around introducing new technology is whether people are ready or not to adopt it – you do get the 'innovators' and 'early adopters' but the mainstream market often takes time. The concept of social proof shows us that often the majority of people need to be doing it before others will copy and adopt it as well.

AB: OK, so what is happening of influence in the data space?

RH: I think we are fast moving towards an instantaneous view of our transport network, particularly in the road sector, fuelled by what has been termed extended floating vehicle data, connected dashcams, ADAS systems and generally much greater levels of connectivity and automation. We are seeing 'swarm intelligence', 'Digital Network Operator' and 'Digital Asset Manager' emerge from concepts to reality within major automotive and transport authorities, with opportunities for much wider situational awareness, improved operation and maintenance of the road network. There are many real-world examples of this – for instance in Manhattan, New York they now have a street view 'of the road network every 8 minutes, collected from connected dashcams. This data is used to check the status of roadworks in near real-time - such advances are an indication of where we are heading.

Type a message

YM: What about end users? We have all seen how quickly data has changed the way we live our lives, but we tend to focus on the wider benefits without fully understanding or appreciating the impacts on the end user. This is and will be no different for transport, where vast data sets need to be tailored appropriately to remain valuable and relevant to consumers, including potential repurposing and reallocating existing streets to prioritise people over vehicles.

KF: Collecting more data on user preferences or needs would be of value – we already know a lot, but there is a lot more that can be done. This could enhance user acceptance – do users want all their personal data to be collected and used? Any data collected needs to be providing useful outputs and benefits to the user in order for them to share it confidently and transparently. What do you think Nick?

NB: You right Kate, data on users and passengers will be more complex to access – as a result of increasingly complex data privacy rules however, larger scale data sets will become more widely available (e.g., mobile network data). I'd like to see the census replaced by something more regular and able to respond to changes – resolving the 2021 census' pandemic bias before 2031 should be a priority. Transport planning needs to be far more proactive in examining options. The early stages of the planning lifecycle need to take a wider view of solutions across modal silos and examine a wider range of scenarios. Scenarios need to consider what we are trying to achieve; journey time savings on their own need to be relegated to one factor among many, and the impacts of changes broken down to see who wins and loses. Analysing these outcomes in addition to key factors like network performance, decarbonisation, and revenue are key for building successful, long-term policies in our ever changing and faster paced world. These assessments need to be continuous throughout the rest of the lifecycle, and we need the data and tools to revisit our decisions as the context changes throughout long lifecycles.

AB: We talk a lot about the transition from 'Infrastructure Builders' to 'Network Operators' to 'Service Providers' and the latter is where I see a lot of TAs ending up. The advent of autonomous vehicles probably provides the best backdrop to exploring what a TA may end up doing – provision of data to inform decision making and providing the essentials of a well-maintained road or rail network is likely, although there's a lot to think about in terms of corporate liability etc when you start looking under the bonnet.
What do you see the role of transport authorities in the future, in relation to data?

RH: Transport is a system which needs to be tuned to achieve the outcomes we want from it as a society – the priority being to get people and goods from A to B as intelligently and sustainably as possible. Hence, I think the role of the transport authority of the future will continue to be to get the best outcomes from the system as efficiently as possible. We are seeing a mindset shift and the need for new capabilities - moving away from the simple answer of 'build more capacity', to how to use existing capacity more efficiently. Data and technology have a key role to play in this.

YM: I see transport authorities becoming the 'guardians' of data, working with key stakeholders such as transport companies (buses, rail, taxis, etc), technology and data providers to help improve and monitor their transport services, including safety, congestion and sustainability. This data will also help them shape their policies to ensure that the data is being stored, processed and shared correctly when taking GDPR, etc into consideration.

KF: Yes Yousef, transport authorities are already using forms of data as part of control room operations. This is already happening today, but the next step will be to make this more and more proactively focused and able to predict what might happen. Intervening before it does would support safety and efficient delivery.

NB: Authorities will need to be more deliberate in how they use data and be more prepared to defend specific uses. We need to work out how to solve problems using appropriate data, not try and shoehorn the data we have into any problem. We will also need to see more data aware individuals in senior leadership roles if we want to really embrace the promise of data.

AB: None of this is easy though is it? What do you see as the greatest challenges and risks?

RH: People! As we redesign and improve our transport system through the increased use of data and tech, we need to do so ethically and to consider all demographics and abilities. Emphasising a human centred design approach will put people and stakeholders at the heart of the process. We need to engage and educate along the way – whether the travelling public, freight community or the transport authorities. I can't emphasise this enough!

KF: Yes, people and behavioural change is one of the biggest challenges - is enough being done? Is there enough investment in place to support this interest? New technologies are already out there and continue to emerge while infrastructure is continuously improved and upgraded. A key example is for active travel schemes but these will only be used if people adopt and change behaviours wherever possible. People need to see the benefits but one of the most important elements is that it needs to be easy to use (make it easy to comply and hard not to!). There is no silver magic bullet for this, and each situation/context is likely to need a tailored response – this is where data and research comes in as the more we know about people and their needs / preferences we can introduce the right solutions to encourage the right behavioural change.

AB: On a global scale the challenges are very different, looking at work we are doing in Hong Kong and Africa, there is still a lot to be done in achieving connectivity and accessibility to create inclusive transport networks. In the UK I see the main challenge in influencing customers to make the right decisions (providing the right incentives, penalties and fundamentally improving shared transit solutions) and transitioning to a 'new norm'. It is managing transport networks in this transition phase that I see as the most interesting challenge to resolve.

Type a message

YM As we transition from traditional to more future focussed modes of transport and data continues to be more instrumental, there will be interoperability challenges when integrating and sharing data across different modes and transport services. There is also the risk that there are still many legacy systems that may not be compatible with the latest technology and data standards. To ensure confidence with road users, aspects such as cybersecurity and data privacy will also need to be prioritised.

NB Many leaders within the industry don't have the confidence to really engage with the potential of technology and data, losing out on opportunities to improve outcomes for everyone using our transportation networks. We also need to break down silos and take a truly integrated view – across modes, across geographies, and across different groups of people. Finally, we must acknowledge that many transportation problems are, in fact, land use problems, and more tightly integrate land use and transportation planning.

Thanks for the chat everyone, lots to think about and a complex picture! It's clear to me that technology and data-led solutions, using an increasingly diverse set of real-time data sources are fundamental to improving the performance and sustainability of existing transport solutions, making them more user-focussed and tailored to individual needs. It's also clear that we can't just focus on the tech though – we need solutions which address user needs and encourage a huge shift in behaviour, not only in users, but also within transport authorities. ITS, as an industry, is shifting rapidly from a 'nice-to-have' to a critical component of transport which needs to be better understood and consistently applied across our networks. This is a major challenge, especially when put in the context of the 'transitionary' stage we find ourselves in where the uptake of new technology is creating probably the most varied transport fleet we have ever seen. Who doesn't love a challenge though eh? **AB**

Type a message

If you're interested in continuing this discussion with us, do not hesitate to contact any of the contributors – we look forward to catching up with all of our colleagues across the ITS UK community over the coming 12 months.

The Future of Transport

Campaign for Better Transport's vision for the transport network

Michael Solomon Williams
Campaigns Manager
Campaign for Better Transport

2023 is a significant year for Campaign for Better Transport, being our fiftieth anniversary. When we were founded in 1973, the future for transport was not bright, with the looming threat of the largest road-building programme since Roman times and planned rail cuts threatening to surpass the impact of the Beeching cuts. It is a source of pride to us an organisation that we were able to help prevent those potentially calamitous plans and to have established ourselves since then as a widely respected and authoritative voice in guiding innovative transport policy development at all levels. Always incorporating the complete transport picture, our most recent report on the British public's view of vehicle taxation reform has moved the issue of road user charging up the agenda, and this will now be integral to the future of transport, incorporated into a holistic

vision with public transport at its heart.

Public transport provision by region acts as a useful indicator of wider inequality. While 25% of journeys in London are by car, the average elsewhere is around 75%, so we urgently need a truly bold vision for the future which ensures that public transport is not a minority pursuit. The future of transport must incorporate a significantly more equitable provision of public transport. One of our visions for the future of transport fifty years ago was a unified multimodal transport authority for London, and TfL now acts as a model not just nationwide, but worldwide, yet this is only just beginning to be replicated across the UK. The future therefore must have transport funding ringfenced for local authorities so that all regions benefit from integrated networks between train, tram, bus, shared transport and active travel.

Innovative technology must play a central role. Smart ticketing can enable multimodal contactless travel in all city regions, ensuring that public trust and confidence in the value of the service which is so integral to increasing ridership. Tech developers are ready to enable wholesale reform of rail fares and ticketing nationally which can ensure best value, flexibility, instant delay repay and loyalty schemes, so long-awaited

While 25% of journeys in London are by car, the average elsewhere is around 75% , so we urgently need a truly bold vision for the future which ensures that public transport is not a minority pursuit.

fares and ticketing reform must herald a new era of trust, efficiency and expansion of public transport provision. Given access to data, capacity on rail, tram and bus can be managed to ensure that services are filled, passenger experiences positive, and intelligent transport tech innovators can lead the way to service expansion, using data mapping and

modelling to show how capacity can be filled and more created – the right sort of induced demand!

Real Time Information will reach such a level of sophistication that public transport will be easy to use and often more attractive than the alternatives. Bus services will be expanded, reducing social isolation and eliminating Transport Deserts . Buses, trams, taxis, cars and bicycles will flow smoothly at safe speeds, with traffic flow increasingly well managed. Trams and light rail will be revived and expanded beyond previous levels. Public transport will carry positive status associations for all ages and demographics, symbolising health, wealth and happiness, with more polluting and congesting forms of transport no longer carrying the associations of glamour and liberty which they enjoyed for decades.

Mobility as a Service will mean that complete multimodal journeys can be seamless and affordable, enabling easy interchange between all modes. Shared transport will play an important role in filling gaps and reducing car ownership, not supplanting public transport and active travel but ensuring a reduction in air pollution and congestion, with consequent improvements in personal and public health. Street space will be allocated such that cycling is safe and normalised. Rail freight will ease congestion and pollution, while local deliveries will be made by sustainable e-cargo bikes and e-vans, replacing congestion caused by deregulated deliveries, with wide expansion of carrier-agnostic local collection points encouraging active travel and reviving high streets and communities .

We will see one of the biggest changes to transport in our lifetimes through comprehensive vehicle taxation reform enabling a smooth transition to electric vehicles, with smart per-mile road user charging

incorporated and local congestion charges and levies seamlessly linked into a national model. Car clubs and car rental will replace car ownership for many, offering new options for those currently without a car through their increasing availability. Scrappage schemes, with funds raised going directly back into public transport, will further ease congestion and enable all modes of transport to flow smoothly.

There will be a political paradigm shift, with the recognition that every taxpayer benefits from public transport. The language used will be of investment, not of subsidy, and government will be bold enough to embrace progressive examples of local transport funding which work worldwide such as the French 'versement transport' (also celebrating 50 years this year) a levy on employers which ensures that local public transport is consistently supported and resilient. A close equivalent in Nottingham has recently been transformational and this must be facilitated in all regions with government support.

Finally, one of the good news stories of this year is that rail travel has surpassed air on the Edinburgh-London route thanks to simple low-cost tickets, open access operators competing healthily with effective national operators, and frequent, easy to use services. In the future we must see this replicated across the country such that rail travel always beats domestic aviation. This will need to be replicated internationally, with high-speed routes and sleeper services ensuring that rail is always the first choice for travel across Europe. In summary, public transport will be more widespread, affordable, and frequent, active travel and shared transport will be integrated into a holistic model for the future of transport with smart technology at its heart, and people with vision, passion and expertise will, as they were fifty years ago, be the voices to whom industry and government turn for inspiration and guidance. This is our vision for the future of transport, and for a better, greener, fairer society. See you there!

4way delivers specialist technology consultancy advice and support, working with clients who provide high-quality transportation and mobility solutions for their customers.

We collaborate with our clients, designing and delivering innovative digital solutions which make Connected Roads, Smart Cities and Future Mobility a reality.

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ERTICO's vision for ITS globally

Key trends in the international market

Joost Vantomme, CEO of ERTICO-ITS Europe gives an update on what the organsiation is doing to support intelligent transport globally.

ERTICO - ITS Europe is a public–private partnership with over 120 members from eight sectors aiming to bridge the gap between Research & Development and the real-life deployment of intelligent transport systems and services. Founded in 1991 by 15 industry leaders and the European Commission, ERTICO runs numerous European co-funded projects and many innovation platforms under four thematics: Cooperative, Connected & Automated Mobility (CCAM), Clean and Eco-Mobility, Urban Mobility and Transport and Logistics. Across these focus areas, ERTICO establishes long-term relationships with key stakeholders to develop, promote and expand the deployment of innovative mobility solutions in Europe and beyond.

Sharing knowledge and lessons learned are also key pillars of ERTICO that help to address emerging challenges while promoting the development of new technologies and innovative solutions and services. Every year, ERTICO organises renowned ITS Congresses for the broader community: every second year, a European Congress and every third year, a World Congress in the Europe, Middle East and Africa (EMEA) region. These unique events are delivered in association with the host city and the European Commission, as well as the ITS America and ITS

Joost Vantomme, CEO, ERTICO

Asia-Pacific. The 15th ITS European Congress will be hosted in the Portuguese capital of Lisbon, from 22 – 24 May 2023 and next year, from 16 – 20 September 2024, the ITS World Congress will be held in Dubai.

ADVOCATING FOR SMART AND SUSTAINABLE MOBILITY

ERTICO helps shape the way forward through a holistic approach, enabling ITS voices to be heard by institutions and policymakers. As thought leaders, ERTICO engages with key stakeholders from all around the world, connecting the dots across continents with regional ITS America and ITS Asia-Pacific. Through its Partnership, ERTICO leads the digitalisation of transport and seamless mobility to bridge the gaps between industries.

Active dialogues with European and international institutions sets the scene for further cooperation. To name a few, ERTICO participates with the European Commission Platforms

It is clear that transport and mobility has become horizontal whereby ERTICO has developed partnerships with the telecoms, road and energy sectors.

and Expert groups such as C-ITS, 5G corridors and on topics around Urban Mobility to provide technology and policy recommendations for the development of its roadmap and deployment strategy for smart and sustainable mobility in Europe and beyond. The Digital Transport and Logistics Forum is another example in which ERTICO contributes to develop a European vision for further digitalisation of freight transport and logistics.

Together with the European Parliament, ERTICO places emphasis on specific issues such as electro-mobility, truck platooning, multimodality, Start-up Prize and Mobility as a Service (MaaS). These are also reflected across the international market, but beyond this active engagement on the

European front, ERTICO also builds stronger connections with worldwide stakeholders to keep pace with the changing mobility scene. The ITS community across the globe is facing similar challenges whereby common actions are best supported by sharing new ideas and best practices. In line with requirements set by European funding bodies, ERTICO bridges the gaps with the world, working with many non-European Partners.

ERTICO's strong foundations for cooperation are critical to pave the way for a changing mobility world.

Memoranda of Understanding have been signed with the International Road Federation Geneva (IRF), the Traveller Information Services Association (TISA) and the Institute of Electrical and Electronics Engineers (IEEE), and a Memorandum of Intent with the European Space Agency (ESA).

Together with the IRF and other leading organisations in the mobility ecosystem, we co-signed a Joint Statement on Climate Action, and mitigation addressed to the 2022 United Nations Climate Change Conference COP 27.

The CAICV China (Connected and Automated Vehicles ecosystem) cooperation was key for ERTICO to align European and Chinese roadmaps on technology evolution and regulations. Beyond this scope, ERTICO also partnered with the United Nations World Forum for Harmonisation of Vehicle Regulations (UN-ECE WP.29) and the International Transport Forum (ITS), part of the OECD.

ERTICO engage actively with Australia and New Zealand. Australia's government is in regular discussions on data sharing systems in Europe for ITS and road safety, and we contributed to work by ITS New Zealand and its members. This included providing speakers for the Forum on automated vehicles.

Last year, ERTICO contributed to work on key international standards which led to the ISO specification 23795-1 for extracting trip data from nomadic

and mobile devices to help estimate fuel consumption and CO2 emissions. The advantage of the new proposed procedure - developed and validated in our flagship projects AEOLIX, 5G-LOGINNOV and FENIX Networks.

ERTICO also initiated a Forum of Platforms to create a new dialogue with 20 platforms and trade associations at the EU and international levels. The aim is to build bridges across verticals by identifying and exchanging ideas on horizontal topics, reflecting joint initiatives, strategies and policy developments in ITS and smart mobility.

PREPARING NOW FOR THE FUTURE OF MOBILITY

It is clear that transport and mobility has become horizontal whereby ERTICO has developed partnerships with the telecoms, road and energy sectors. The demarcation lines between the various sectors has blurred. The ecosystem pleads for safe, smart, decarbonised and inclusive mobility. That is why we invest in new platforms for data sharing, connectivity, automated driving and sustainability.

Supply from industry with the impetus from policy makers is one. User demand and acceptance is two. We need to create the equilibrium and orchestrate expectations and tangible deployment. Multimodality and focus on services is paramount.

Finally, the art of delivery is based on cooperation. It takes three to tango. That is why I strongly believe in the network of ITS Nationals. ITS UK is a great example of the dynamics in our ecosystem. I am pleased to see a strong endorsement from our outreach to the ITS National organisations. They are a key partner to deliver ITS on the ground floor in the national landscape.

Want to get more inspiration? Visit the ERTICO Website and get in touch to explore potential partnership opportunities.

✉ j.vantomme@mail.ertico.com

Less is more

Want to improve driver behaviour around road incidents? Remove surplus information provided to road users. Wen Atkinson of Arcadis IBI details why reducing real-time travel information to the immediate vicinity of an incident can improve customer experience and trust, having a positive impact on safety and road performance.

Wen Atkinson
Associate Director
Arcadis IBI Group

ncident management on strategic roads has two main aims:

- safe, swift incident removal, and
- restoration as quickly as possible to normal traffic flows.

Closely related to that is congestion mitigation and better environmental performance. However, the latter is often misunderstood. It should perhaps be better appreciated that keeping as much of a road in operation for as long as possible will reduce queueing and stationary traffic, and carbon/ particulate emissions.

A better balance needs to be struck. A challenge is that over-concentration on managing the incident leads to the maintenance of capacity becoming secondary. From a purely safety perspective, there is an inclination to attempt to manage traffic flows over larger geographical areas around an incident. However, when viewed from both safety and environmental perspectives this may not be the best solution. Counter-intuitively, more

constrained traffic management can work better.

A major issue is trust — or, rather, the absence of it. Constantly providing road users with real-time information actually becomes counter-productive.

LONG-RANGE FORECASTING

For several good reasons, lane and even whole road closures are common when incidents occur. This is because the safety of operatives and casualties is maximised, any necessary evidence-gathering can be conducted quickly and without interference, and normal operations can be resumed as soon as possible.

However, the road users' perspective can be rather different. Kilometre after kilometre of Variable Message

Signs (VMS) giving warnings and instructions to change lanes appear to lead to nothing, with the result that successful incident clearance, and a clear road, comes to be seen as poor or incompetent traffic management.

When an incident occurs on the UK's Strategic Road Network, upstream management of traffic typically begins at around 3.5km. Sometimes it can be from as much as 5km out. Trials in the East and East Midlands have shown that reducing this to around 1.5km can have significant benefits.

In order to gain a better understanding of road users' responses to VMS messaging, Arcadis IBI took a number of different approaches. Driver simulation studies were conducted in conjunction with AECOM and the University of Leeds. Arcadis IBI also completed DMRB GG 104 safety risk assessments and these were combined with other data supplied by the client, National Highways, to build a more complete picture.

It was found that some drivers comply with instructions almost immediately. Whilst laudable, from a capacity maintenance perspective, this is undesirable. Some drivers, in the absence of any apparent issues, start to move back into the closing lanes. This too is undesirable as it has clear safety implications farther down the road and closer to the incident.

Arcadis IBI also looked at the attitudes and motives of Regional Operations Centre (ROC) operators and Traffic Officers (TOs). Here, too, there were contrasts. Quite reasonably, ROC operators were focused on safe incident management. TOs were focused on incident management but also had a greater recognition, by virtue of being on the ground, of the need to maintain lane capacity.

ON-ROAD TRIALS

On-road trials which took place over June-December 2021 and June-December 2022, set out to see how shortening the geographic extent of warnings, and the notice given to drivers, would affect congestion around incidents.

The essential message to drivers was "Prepare to move over safely" and the aim was to maintain capacity availability and usage for as long as possible.

The signalling algorithm for VMS was altered to reduce the number of upstream warnings/instructions in advance of incidents.

Previously, typically, there would have been three sets of VMS repeating a combination of red 'X's, lane divert instructions and speed restrictions. The changes resulted in the removal of at least one and occasionally three or more sets of instructions. The changed algorithm also brought a new level of flexibility. From the ROC operatives' perspective, managing an incident led to a fixed set of warnings being posted on VMS, often over several kilometres.

> **In order to gain a better understanding of road users' responses to VMS messaging, Arcadis IBI took a number of different approaches.**

The new algorithm results in a smaller set of warnings being posted but adds flexibility — if a ROC operator feels that more signs need to be activated, this can be done quickly and only where needed.

The results have been better capacity utilisation upstream of incidents, less queueing, no negative impact on safety, and fewer instances of drivers moving back into closing lanes.

Using National Highways journey time savings methodology the trials demonstrated potential journey time savings, across the trial area, of £2.3m per annum.

This demonstrates how innovative use of current technology on the SRN may be used to influence driver behaviour, support operational management and improve customer journeys.

National Highways plans to roll out the change in 2023-24.

Decarbonisation in Transport:
The Hydrogen Hype

The world continues towards both a climate and energy crisis through its unwavering economic reliance on fossils fuels. To combat this, decarbonisation strategies often point towards alternative clean fuels like hydrogen.

Jason Loader
Future Mobility Discipline Lead
4way Consulting

The UK has published its UK Hydrogen Strategy (Aug 2021), while 'hydrogen' is mentioned over 500 times in its Net Zero Strategy: Build Back Greener (Oct 2021).

In transport, attention on hydrogen fuel cell electric vehicles (HFCEVs) is increasing, and consumer expectations are rising on quality-of-life advantages over current battery electric vehicles (BEVs):

- Refuelling is much quicker.
- Hydrogen is more energy dense, for lighter vehicles or extended mileage range.
- The fuel cell is less sensitive to changes in ambient temperature, for more consistent mileage range.

HFCEVs also share many benefits in common with BEVs, including instant torque, regenerative charging, and 'zero' tailpipe emissions (HFCEVs produce pure water). However, there are significant challenges around hydrogen production and use that are frequently overlooked. This article considers these issues to present our perspective on the future of hydrogen in transport.

Hydrogen is the most abundant element in the universe. On Earth, it mainly exists combined with other elements, like oxygen (as water) or carbon (as hydrocarbons). Industrial processing is required to isolate pure hydrogen from these compounds.

Steam Methane Reforming produces 'grey' hydrogen. Water and methane are reacted at temperatures over 1000°C to form hydrogen and carbon dioxide. The perfectly efficient chemical reaction requires 5.7 MWh of heat energy to produce 1 tonne of hydrogen with 5.5 tonnes of carbon dioxide waste. Methane is also burnt

Hydrogen is the most abundant element in the universe. On Earth, it mainly exists combined with other elements, like oxygen (as water) or carbon (as hydrocarbons). Industrial processing is required to isolate pure hydrogen from these compounds.

to generate the heat required to drive the reaction, which produces an additional 1 tonne of carbon dioxide. This, and similar processes with other hydrocarbons, account for 94% of the world's hydrogen production.

Grey hydrogen is reclassified 'blue' where 80% of the carbon dioxide is successfully captured and stored. This class of hydrogen is currently popular as it aligns with other decarbonisation strategies. Nevertheless, the production process remains reliant on fossil fuels, and analogous carbon capture and storage mechanisms apply to the fossil fuel industry directly. Consequently, grey nor blue hydrogen are considered environmentally acceptable.

Another production process is Water Electrolysis to split water. The perfectly efficient chemical reaction requires 39.7 MWh of electrical energy to produce 1 tonne of hydrogen with 8 tonnes of oxygen. There are no environmentally harmful waste products; oxygen is valuable and can be sold alongside the hydrogen. Due to the huge electrical demand, only 5% of the world's hydrogen is produced

this way. Hydrogen produced from 100% renewable sources of electricity is classified 'green'; this is the utopia that perpetuates the hydrogen hype.

Water electrolysis consumes 7x more energy per tonne of hydrogen than that for steam methane reforming. While no industrial processes are perfectly efficient, these energy requirements are chemically fundamental and cannot be circumvented through engineering or technology. For context, Ofgem estimates that the average annual UK household electricity consumption is 2.9 MWh. Therefore, the production of a single tonne of green hydrogen consumes enough electricity to power over 13 households for an entire year: this is the magnitude of the energy challenge in producing green hydrogen.

Green hydrogen is required to realise the maximum environmental benefit from a HFCEV: akin to charging a BEV with 100% renewable electricity. But

the two are not equal in their mileage efficiency. For example, the 2015 Toyota Mirai on-board 4.5 kg capacity hydrogen storage tank provides up to 300 miles (66,700 miles per tonne of hydrogen). While a BEV has a typical efficiency of 4 miles per kWh: scaled up (equivalent to per tonne of green hydrogen), 39.7 MWh of battery charge would enable 158,800 miles. Therefore, it is more than twice as efficient to utilise electricity directly in BEVs rather than use it to produce green hydrogen for HFCEVs.

Decarbonisation strategies typically focus on electrification as the primary carbon reduction mechanism; hence recent interest in BEVs, renewable energy sources, and heat pumps. However, many sectors of the economy are ill-suited to electrification, including heavy industries (materials and chemical manufacturing), and the aviation and maritime sectors

where current battery technologies are unable to deliver the power and mileage range required without prohibitive size and weight penalties. In such power intensive applications and sectors, decarbonisation via green hydrogen is likely the only viable alternative to electrification.

This article focused on the huge energy cost of green hydrogen. As the world struggles to shift to renewable energy sources for our current electricity demand, it is likely that hydrogen will become a precious and scarce resource, not by availability as with finite fossil fuels, but by the energy required to produce it. Consequently, we propose that electrification is likely to lead the decarbonisation future, complemented with green hydrogen reserved for specific applications and sectors ill-suited to electrification; of which consumer vehicles are likely excluded.

Steve Parsons
Sales Director UK & Ireland,
Kapsch Traffic-Com

In 2022, the average UK driver spent 115 hours stuck in traffic. For perspective: in that time, they could watch every single episode of Downtown Abbey. Twice. With time left to watch every single episode of Black Mirror (as a palate cleanser, perhaps).

In London, which was recently voted the most congested city in the world, that number rises to a staggering 227 hours spent in traffic – that is more than a week of sitting in an unmoving vehicle. In that time, you could watch

How long will our cities be stuck in traffic?

Congestion is a massive issue for UK & Ireland cities – but there are solutions to the problem

every single episode of Doctor Who since its restart in 2005. Also twice. Alternatively, you could use that time catching up on your reading list, learn to play an instrument, or perhaps even spend some time with your loved ones.

All that is to show that this time stuck in traffic is not only annoying and boring, but also time that would be better spent doing something else.

SO WHAT DOES THE TREND SAY? IS THIS LIKELY TO GET BETTER?

Well, not by itself. If you look at demographics and behavioral analysis, there are a few facts that jump out

immediately. The UK population has grown by close to 20% in the last 50 years, and growth rates are expected to further accelerate in urban centres like London, Manchester and Liverpool. While that in itself is not an unexpected development, recently public transport use fell by 14% between 2019 and 2022. This is of course likely due to the pandemic, but so far there are no signs of a trend reversal, which means that many more people are relying on their vehicles to get about their daily lives.

In combination, these factors mean a massive influx of cars into existing road infrastructure, causing even more congestion in urban areas and posing challenges for cities in the UK and Ireland. They´re under the pressure to find the right solutions

WHY IS THIS A BAD THING?

It may seem that this is merely an individual issue as people decide to drive based on their own free will.

Leaving out the socioeconomic and urban planning-related factors forcing people to drive, however, there are still several negative consequences associated with congestion.

• Health impact

For one thing, congestion has a massive impact on health. The WHO estimates that for more than 80% of people living in urban areas, air pollution exceeds limits. On a more morbid note, in London alone, over 9,000 premature deaths are attributed to bad air quality each year. It is obvious that cars play a major role when it comes to air pollution,

and we are not just talking about internal-combustion-engines here: Just recently, it was discovered that car tyres produce much more toxic particulate emissions than exhausts, and with vehicles becoming larger and heavier (particularly when it comes to electric vehicles), emissions are a growing issue that cannot only be addressed by switching to electric. As mentioned before – the trend is clear, car usage remains high. Can cities really migrate the car user to use more public transport? Can their improve our air quality as lives of their citizens depend on it?

• Economic impact

Another factor is economic. According to a report by global transportation analytics INRIX, the cost of congestion in the UK was estimated to be a staggering £6.9 billion in 2019. In London, the traffic within the City cost London's economy £5.1bn a year which means £1,211 per individual driver. This cost includes not only the time and fuel wasted by drivers stuck in traffic, but also the economic impact on businesses and the environment. For cities, a big question is how do they survive. In 2021 and 2022, fuel tax bought in £25.9Bn. 2030 grows closer, migration to EV leaves a big hole.

• Environmental impact

The third big factor is environmental. Congestion causes a large share of total emissions with the least possible return, as vehicles are simply standing still while burning fuel. In fact, it is estimated that about 20% of global GHG emissions are caused by road traffic, ranking it among the biggest contributing factors to global emissions.

SO WHAT CAN BE DONE ABOUT THIS?

The good news is that the solution to this problem already exists, and it is called Road User Charging. What that

means is that a driver is charged based on the distance that they drive on the road network. While the concept itself is quite old, the first UK congestion charging system was introduced by the city of Durham in 2002, the consequences were massive: Within 12 months, traffic had fallen by 85%. Shortly after that, London introduced its LEZ (the predecessor to the current ULEZ) and in the first year alone, congestion was reduced was 30% and average travel speed was increased. Today, London is considering expanding ULEZ in 2023 to a larger geographical area.

The data paints a clear picture: by proactively managing traffic and distributing the road use costs more fairly, negative consequences for all stakeholders can be reduced, from less time wasted to increased air quality to fewer accidents. The technology gives cities a lever to manage traffic in a way that reduces congestion, frees up resources for investment in public infrastructure and increases the quality of life of citizens. Many cities around the globe are already implementing such systems, and there are even some countries that are looking to introduce nationwide Road User Charging schemes to combat falling fuel tax revenues.

Looking ahead, these are two

illustrations of how key cities are trying to address the challenges mentioned above. This list is by no means exclusive – there are other processes and projects in pipeline as well.

Transport for London (TfL) have made a couple of public announcements and they are exploring various solutions of road user charging, particularly the pay per mile concepts being explored under instruction from the Mayor. The key objectives is to reduce car traffic volumes in the capital and to meet zero-emissions targets, which will require a drop of 27% in motorised vehicles. And this distance-based charge must also consider the usage of the public transport to ensure the continuity in the mobility migration and the pricing. Overall, Mayor Sadiq Khan wants London "to be a global leader" stating he is "not willing to stand by and wait". He has handed this initiative to TfL to explore road user charging, with as the date in mind for introduction. According to the UK legislation every new vehicle purchase on the network by 2030 will be either electric or hybrid vehicle. And by 2035, this extends by allowing only electric vehicles to be purchased.

In Ireland, the Transport Infrastructure Ireland (TII) is exploring the BRUCE project (Better Road User Charging

Evaluation). The key objectives are to encourage transport decarbonisation leading to air quality improvements and to secure the future of the road network and its economic stability to re-invest in roads. They are also looking to improve journey times through Demand Management solutions for congestion improvements.

ROAD USER CHARGING AT KAPSCH TRAFFICCOM

Kapsch TrafficCom has the experience and technology required to design, develop, implement and operate such systems, both for cities and on a national level. From the satellite-based heavy vehicles-tolling in Bulgaria, to a congestion charging covering 150 million vehicles yearly in Gothenburg, to a recent app-based Road Use Charging system test in Norway, the company is always engaged in pushing the technology forward.

The tools to do that are there, but we cannot do it alone. That is why cities must rise to their responsibility and address this issue head-on – for a healthy world without congestion.

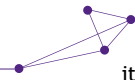**Get in touch with Steve Parsons at**
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🌐 **www.kapsch.net**

CALENDAR 2023

Intelligent Transport Systems UK

Intelligent
Transport Systems UK
Empowering Transport Technology

January	February	March
10th – Connected Vehicles Forum (Redhill)	21st – Make the most of your Membership Webinar	1st – Freight and Maritime Forum Joint Event (London)
26th – Early Careers Forum (Solihull)	23rd – Executive Dinner with Nick Harris, National Highways	6th – Advocacy & Public Affairs Group (location tbc)
26th – ITS UK Council (Solihull)	27th – MaaS Forum (Birmingham)	7th – Public Transport Forum (Milton Keynes)
		8th – Women in ITS event for International Women's Day (Online)
		15th – Active Travel Forum (online)
		16th - Inclusive Mobility Forum (online)

April	May	June
4th – The Big ITS Conversation (online)	12th – Advocacy & Public Affairs Group (London)	6-8th – Traffex (Birmingham)*
5th – Data Forum (online)	16th - User Behaviour Forum (Coventry)	13th – Enforcement Forum (Camberley)
18 - 19th – Interchange*	17th – Intelligent Transport Address & AGM (London)	14th – ITS UK Parliamentary Reception (London)
19th – Road User Charging Forum (online)	18th – Transport2030 Webinar (online)	15th – London Tech Week Event with techUK
20th – ITS UK Council (SRL, Nottingham)	22-24th – ITS European Congress (Lisbon)*	22nd - Women in ITS event for INWED (in-person tbc)
25 - 27th – Transport Technology Forum (Leeds)*		21-22nd – MOVE (London)*
28th – Nigerian Trade Delegation to the UK		TBC – Joint Public Transport & Connected Vehicle Forum (Edinburgh)

July	August	September
4th-5th – LCRIG Innovation Festival*	TBC – MaaS Forum (location tbc)	11-15th – Maritime Forum (London) part of International Shipping week
11th – Advocacy & Public Affairs Group (location tbc)		5th – Transport2030 Webinar (online)
19th – Transport 2030 Webinar (online)		14th -15th – JCT Symposium*
In Quarter 4 (dates tbc) Early Careers Forum, Public Transport Forum, Inclusive Mobility Forum, Data Forum, Local Authority Forum, User Behaviour Forum, Smart Environment Forum		

October	November	December
18-19th – Highways UK*		Date TBC – Christmas Drinks (location tbc)
24th – Advocacy & Public Affairs Group (location tbc)	7th – Transport 2030 Webinar (online)	
31st – Annual Conference & President's Dinner	28-29th – Road Expo Scotland (Glasgow)*	
	TBC - Maritime Forum (location tbc)	
In Quarter 4 (dates tbc) Enforcement Forum, Smart Environment Forum, Road User Charging Forum, Data Forum		

Want to attend one of these events?

✉ contact@its-uk.org or visit
🌐 www.its-uk.org/events

Please note, dates and location are subject to change.
Please check the ITS UK website for the latest information.
*Trade Shows not organised by ITS UK, but at which we will have a presence.

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