



Department
for Transport

Intelligent Transport System Technologies in the UK

*Directive 2010/40/EU
Progress Report 2022
UK*

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Foreword

The following report is submitted by the UK Department for Transport (DfT) in accordance with Paragraph 3 of Article 17 of Directive 2010/40/EU, following the initial report, a report every three years on the progress made in the deployment of the actions referred to in Article 17 (1). This report is an update on the previous National Report which was submitted to the Commission in August 2017.

National Approach to ITS

Transport is largely a devolved policy area. The UK government develops policy and provides funding for local transport in England, but much of the funding and policy decisions are made at a local level, including buses, walking, cycling, local road maintenance and parking. At a national level, the Devolved Administrations of Northern Ireland, Scotland and Wales have responsibility for transport operations and transport infrastructure within their borders. Maritime and aviation transport are primarily run by the private sector, with ports and airports being privately operated and maritime freight, ferry services and commercial airlines operating in a largely unregulated market. However, COVID-19 stands to have a transformational societal and economic impact, with new implications for the UK's transport system, changing travel demands and patterns, as well as shifting the role of DfT in transport markets.

The UK's vision of future transport is set out in the Department for Transport's Department for Transport, 2020):

The Department for Transport's "Outcome Delivery Plan: 2021 to 2022" sets out its priority outcomes:

- Improve connectivity across the UK and grow the economy by enhancing the transport network, on time and on budget.
- Build confidence in the transport network as the country recovers from COVID-19 and improve transport users' experience, ensuring that the network is safe, reliable, and inclusive.
- Tackle climate change and improve air quality by decarbonising transport.
- Increase the UK's global impact - increasing influence and maximising trade by having an innovative, outward-facing approach

Future technological developments will mean that ITS will play an increasing role in contributing towards achieving the UK's transport policy objectives. The Government is supportive to promote the UK as an ITS leader, to encourage growth in the UK's academic and science base, and to create opportunities for inward investment in the research industries in the UK. In choosing to develop and deploy ITS in the UK, the Department for Transport (DfT) is clear that legislative and administrative burdens must be kept to an absolute minimum. The UK sees the role of National Governments as enabling and encouraging the development and deployment of effective solutions to address today's mobility challenges.

This rapid pace of technological development offers the prospect that motoring will change significantly in the next quarter century. Increased automation and connectivity of driving functions has the potential to increase mobility for citizens and help ensure it is a socially inclusive transport network.

Commented [SR(1): Please refer to **Item 1, 2, and 3** of the separate review excel document 'EC Directive – ITS Technologies in the UK – DRN DfT comments v5':

Action on DfT to rewrite Foreword to correctly state DfT's current objectives.

Document Outline

The document structure follows the recommended '2020 template national ITS Directive 2010/40/EU Progress Report'

Section	Description
Section 1: Introduction	<p>The introduction provides a brief description of the National Approach to ITS, the strategies of the devolved regions, the UK's Technical and Legal framework including variances in the devolved regions, and the Standards within which the UK works.</p> <p>It also gives an overview of progress since the previous National Report and summarises key activities, initiatives, and exemplar projects; detailed further in Section 2.</p>
Section 2: Projects, Activities, and Initiatives	<p>Within Section 2 for each priority area, relevant projects, activities, and initiatives are briefly described. These brief summaries are supported by more detailed descriptions contained within the Section 5: UK Compendium Annex.</p> <p>Progress since the last report is described for each priority area, and information on additional reporting provided on implementing Delegated Regulations is provided.</p>
Section 3: Key Performance Indicators (KPIs)	This section provides available KPIs.
Section 4: Reference documents annex	This section provides links to key documents referenced within the report.
Section 5: UK Compendium annex	This section contains a comprehensive collection of ITS initiative, and project case studies, whereby a large portion are referenced throughout the report.
Section 6: UK Delegated Regulation Reports annex:	This section contains the UK's reports and responses to the European Commission, covering the reporting requirements under the Delegated Regulations referenced in Section 2.1 and 2.3.



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Table of Acronyms

Acronym	Definition
3G	Third generation cellular radio network technology complying with IMT2000/3G standard
4G	Fourth generation broadband cellular radio network technology complying with IMT2000/4G and ITU IMT Advanced standards
5G	Fifth generation broadband cellular radio network technology complying with IMT2000/5G and 5G New Radio (5G NR) standards.
AA	Arc Atlantique
ALR	All lane running
ANPR	Automatic Number Plate Recognition
APDS	Alliance for Parking Data Standards
ARTSM	Association for Road Traffic Safety and Management
BEIS	Business, Energy and Industrial Strategy (UK government department)
BODS	Bus Open Data Services
BSI	British Standards Institute
CAV	Connected and Autonomous Vehicles
CCAV	Centre for Connected and Autonomous Vehicles
CCTV	Closed Circuit Television
CEDR	Conference of European Directors of Roads
CEF	Connecting Europe Facility
CEN	European Committee for Standardization (Comité Européen de Normalisation)
CENELEC	European Committee for Electrotechnical Standardization (Comité Européen de Normalisation Électrotechnique)
CHARM	Common Highways Agency Rijkswaterstaat Model
CINEA	EU Innovations and Networks Executive Agency
C-ITS	Cooperative Intelligent Transport Services
COBS	Control Office Base Station
CPC	Connected Places Catapult
CVS	Connected Vehicle Services
DATEXII	DATEX II is the electronic language used in Europe for the exchange of traffic information and traffic data
DCMS	Department for Digital, Culture, Media & Sport
DfI NI	Department for Infrastructure Northern Ireland
DfT	Department for Transport
DG-ENER	European Commission's Directorate General for Energy
DG-MOVE	European Commission's Directorate General for Mobility and Transport (Mobiliteit en Vervoer).
DG-TREN	Previous European Commission's Directorate General for Energy and Transport, now split into DG-MOVE and DG-ENER
DMRB	Design Manual for Roads and Bridges (UK road construction standard)
EMV	Europay, Mastercard, and Visa (EMV is a payment method based upon a technical standard for smart payment cards)
ETSI	European Telecommunications Standards Institute
EU IP	European ITS Platform
EV	Electric Vehicle
FoMUS	Future of Mobility Urban Strategy
FVD	Floating Vehicle Data
GDPR	General Data Protection Regulation



GLOSA	Green Light Optimised Speed Advice
GNSS	Global Navigation Satellite System
GPRS	General Packet Radio Service
GPS	Global Positioning System
HATMS	Highways Agency Traffic Management System
HGV	Heavy Goods Vehicles
HTTP	Hypertext Transfer Protocol
I2I	Infrastructure to Infrastructure
I2V / V2I	Infrastructure to Vehicle / Vehicle to Infrastructure
ICT	Information and Communications Technology
IEC	International Electrotechnical Commission
IFOPT	Identification of Fixed Objects in Public Transport
ISO	International Organization for Standardization
ITS	Intelligent Transport Systems
ITS-G5	A form of Wi-Fi used for vehicular communication, defined by IEEE 802.11p and ETSI ITS-G5 standards, the "5" indicates operation in the 5 GHz radio band.
ITSO	Integrated Transport Smartcard Organisation
ITU	International Telecommunication Union
ITxPT	Information Technology for Public Transport
IVS	In-Vehicle Signage
KPI	Key Point Indicator
LA	Local Authority
LAMP	Local Authority Mobility Platform
LTE	Long-Term Evolution (A telephone and mobile broadband standard)
MaaS	Mobility as a Service
MIDAS	Motorway Incident Detection and Automatic Signalling
MOVA	Microprocessor Optimised Vehicle Actuation (Traffic Signal Algorithm)
MSAs	Motorway Service Area
NAP	National Access Point
NaPTAN	National Public Transport Access Network
NeTEx	Network Timetable Exchange
NH	National Highways (formerly Highways England; operator of UK's Strategic Road Network)
NMD	Network Management Duty
NPP	National Parking Platform
NTIS	National Traffic Information Service
NTOC	National Transport Operations Centre
OEMs	Original Equipment Manufacturer
ONVIF	Open Network Video Interface Forum
PVD	Probe Vehicle Data
RDS	Radio Data System
RTCC	Regional Transport Co-ordination Centre
RTIG	Real Time Information Group
RWW	Road Works Warning
SAE	Society of Automotive Engineers
SCOOT	Split Cycle and Offset Optimisation Technique (Traffic Signal Algorithm)
SHADAR	Stopped vehicle Hazards – Avoidance, Detection and Response
SIRI	Standard Interface for Real-time Information
SRN	Strategic Road Network
SRTI	Safety Related Traffic Information



STREETWISE	Seamless Travel Environment for Efficient Transport (a body coordinating ITS between nations of United Kingdom and Ireland)
TEMPO	A DG-TREN multi annual indicative programme operating between 2001-2006 to fund ITS deployment studies.
TEN-T	Trans-European Transport Networks
TfL	Transport for London
TfWM	Transport for West Midlands
TICC	Traffic Information and Control Centre
TII	Transport Infrastructure Ireland
TMC	Traffic Message Channel
TN-ITS	Transport Network ITS
TOPAS	Traffic Open Products and Specifications
TransXChange	UK national XML based data standard for the interchange of bus route and timetable information
TROs	Traffic Regulation Orders
TSC	Transport Systems Catapult
TSIS	Transport Scotland Information Service
TTF	Transport Technology Forum
UIC	International Union of Railways
UKCITE	UK Connected Intelligent Transport Environment
UTC	Urban Traffic Control
UTMC	Urban Traffic Management Control
V2X	Vehicle to everything
VMS	Variable Message Sign
WG	Welsh Government
XML	eXtensible Markup Language



1 Introduction

1.1 General overview of the national activities and projects

The centrepiece of the Government's work on ITS has been the creation in 2015 of the Centre for Connected and Autonomous Vehicles (CCAV), a joint unit between the DfT and the Department for Business, Energy, and Industrial Strategy (BEIS). It was established to ensure the UK is kept at the forefront of the development and deployment of Connected and Autonomous Vehicle (CAV) technology, and is responsible for the following:

- leading innovating policy development in this sector
- delivering a programme of research, development, demonstration, and deployment activity, worth up to £200 million; through Innovate UK (a research and innovation agency that provides funding and support to organisations for new products and services)
- providing co-ordination across DfT, BEIS, and the rest of government by being the single contact point for stakeholder engagement
- publishing a call for evidence on the UK's testing ecosystem for CAVs
- launching a consultation on advanced driver assistance systems and automated vehicle technologies
- launching the BEIS £30 million collaborative research, development, and feasibility study competition

The UK Government is also engaging with a wide range of industry and academic stakeholders, including system suppliers, vehicle manufacturers, relevant trade and research bodies, innovators, and operators, through formally convened forums and on an ad-hoc basis, to ensure the successful implementation of innovation and technology in local areas. Further details on these, and the CAV funding programmes, are included in the UK Compendium Annex.

The Connected Places Catapult was established to transform ideas into new products that generate economic growth. The Catapult provide a supportive environment allowing the best of the UK's businesses, scientists, and engineers to work side-by-side on R&D. The Government also undertakes a range of horizon scanning and technology watch activities. Working with specialist groups Catapult look for new and emerging technology and areas where the products can be applied to, such as Smart Cities and micro-mobility.

The Government's role in providing the right environment and support to allow new technologies to flourish, is vital. The Government has direct responsibility for the Strategic Road Network (SRN) and will be carefully considering the vision for and the role of technology and information in the future operation, management, and improvement of the performance of the SRN as part of its Digital Roads Strategy. The National Highways Delivery committed £150 million of innovation between 2015 and 2021. Additional funding for innovation will be provided by National Highways research and development programme. The £150 million Innovation Designated Fund is being used to support key priorities set out in the Road Investment Strategy. These consisted of trials of CAV technologies, including the completion of the A2/M2 London to Dover Connected Vehicle Corridor national pilot (part of the European funded InterCor project), and the provision of better information to customers, and improved management of National Highways' network and infrastructure assets.



The projects being supported through the Innovation Designated Fund are spread across all areas of innovation. National Highways is also collaborating with Rijkswaterstaat, operator of the strategic road network in the Netherlands, to deliver innovative solutions to customers through the CHARM project which is defining and delivering a new generation of agile traffic management systems.

1.1.1 Initiatives in the wider transportation sector

In June 2019, the UK became the first major global economy to legislate for net zero by 2050. The UK's ambitious target to reduce the UK's emissions by at least 68% by 2030 – The UK's Nationally Determined Contribution (NDC) under the Paris Climate Agreement – is among the highest in the world and commits the UK to cutting emissions at the fastest rate of any major economy so far. The UK has also set in law an ambitious climate change target for the UK's Sixth Carbon Budget, cutting emissions by 78% by 2035 compared to 1990 levels.

In March 2020, the Department for Transport published "Decarbonising Transport: Setting the Challenge", kicking off the departments work to prepare a Transport Decarbonisation Plan. In August the Department published the Transport Decarbonisation Plan – the first such Plan in the world – which will set the transport sector on the path to net zero by 2050.

This Plan brings together all the work that has been done so far – across all modes of transport – and sets out a series of actions, commitments, and timings to decarbonise the entire sector to meet UK's climate targets and provides world-leading ambition on many fronts.

There are significant policy proposals regarding consulting on phase out dates for the sale of new non-zero emission road vehicles, improvements to public transport and increased support for active travel, committing to a fully zero emission rail network, and ambitious commitments to decarbonise the aviation and maritime sectors.

The UK want to use technology to decarbonise non-zero emission vehicles, and the Plan announces exciting steps. This includes a commitment to set phase out dates for all remaining non-zero emission road vehicles, setting a path to a time when every vehicle on the roads will be zero emission. But also encourage crucial change in the way people choose to travel. The UK wants to make public transport, cycling and walking the natural first choice for all those who can use these options, and the Plan sets out measures which will help to make this a reality.

Accelerating modal shift to public and active transport was one of the six strategic priorities identified for the development of the Transport Decarbonisation Plan. In Summer 2020 the Prime Minister launched ambitious plans to boost walking and cycling, with a vision that half of all journeys in towns and cities are walked or cycled by 2030. This includes a £2 billion package of funding for active travel over 5 years.

The first £250 million of the £2 billion was allocated in 2020/21, with much of this going to local authorities. This has enabled local authorities to deliver safe walking and cycling routes in their area, such as protected space for cycling, widened pavements, safer junctions and cycle and bus-only corridors.

Decisions on the allocation of the rest of the £2 billion are yet to be determined and will be made in due course. The Government will also provide over a quarter of a billion pounds for cycling and walking this financial year.

Scotland's National Transport Strategy focusses on the Scottish Government's ambitious climate change targets. It acknowledges that there needs to be a range of activity, including technological change to ultra-low emission vehicles, altering people's travel behaviour through improved use of public and active travel modes, as well as a reduction in the demand for unsustainable transport.



Northern Ireland Department for Infrastructure's 'Planning for the Future of Transport' – Time for Change outlines the Department's priorities for the future planning of transport across the North and how these can be translated into decisions on how the transport networks will be managed and developed in the next 10 to 15 years.

The Welsh Government's 'Llwybr Newydd: the Wales Transport Strategy 2021' lays down the vision for how transport systems can help deliver the 5 key priorities set out in the Wellbeing of Future Generations (Wales) Act 2015. This describes the short-term priorities and long-term ambitions, and how the Welsh Government and its representatives can deliver across the different transport modes and sectors. A large focus of the strategy is achieving the target of net zero by 2050 by changing the way we travel and encouraging the uptake of active travel and implementing further accessible, sustainable, and efficient transport systems options.

1.1.2 Technical and legal framework

At a national level the UK has no formal published ITS strategy, although some devolved administrations have published ITS strategies.

Technical standards, interoperability standards, and frameworks are used to tackle individual policy problems. The context of each problem is considered on a case-by-case basis to optimise the overall benefits in responding to strategic and local policy needs. Where necessary, existing legislation is modified, or new legislation enacted to permit the application of new technologies and policies. The UK Government works closely with both public bodies and private industry to establish a clear position where appropriate and encourages focused development in key areas through grant funding.

1.1.2.1 Legal framework

The legislative framework for the development and deployment of ITS services varies across the UK, due to both the devolution of statutory powers and historically different legal systems, for example:

- The Traffic Management Act 2004 places a Network Management Duty (NMD) on traffic authorities in England and Wales to make sure road networks are managed effectively to minimise congestion and disruption to vehicles and pedestrians
- In Scotland, powers and duties of road authorities and control of roads are contained in the Roads (Scotland) Act 1984
- In Northern Ireland, similar requirements are contained within the Road Traffic Regulation (Northern Ireland) Order 1997
- The Traffic Signs Regulations and General Directions 2016 prescribes the lawful placement and operation and display parameters of signs that are placed lawfully on the public highway in England, Scotland, and Wales; within ITS these regulations define the form and use of Variable Message Signs (VMS) and prescribe the messages that may be displayed
- In Northern Ireland Traffic Signs, including VMS, are subject to the Road Traffic Regulation Order (Northern Ireland) 1997
- The 'smart' motorway programme in England is delivered through secondary legislation called 'Statutory Instruments' which enable specifics of legislation to be defined as the needs of society evolve



- ‘Statutory Instruments’ permit variable speed limits and hard shoulder running at congestion ‘pinch-points’ on the motorway, for example the M62 Motorway (Junctions 25 to 30) (Actively Managed Hard Shoulder and Variable Speed Limits) Regulations 2012
- The Road Vehicles (Construction and Use) Regulations 1986 defines the approval process for the design and construction of motorised vehicles

1.1.2.2 ITS architecture and standards

The UK has world-leading capability, facilities, and experience in the ITS sector. The UK have been an early adopter of systems, especially in the fields of urban traffic control, motorway control, and traffic and travel information. The development of these systems has required frameworks and standards to be adopted to ensure interoperability.

The UK strongly supports the value of standards in facilitating the effective operation of an open supply market and is carried out in several ways, including:

- developing and maintaining de facto standards, through collaborative public-private bodies e.g. [British Standards Institute \(BSI\)](#), [Traffic Open Products and Specification \(TOPAS\)](#), and [the Association for Road Traffic Safety and Management \(ARTSM\)](#)
- developing and managing national specifications
- participating in European or international standards through CEN/CENELEC/ETSI and ISO/IEC/ITU

The key standards and specifications in used within the UK include:

- Urban Traffic Management Control (UTMC), designed to allow the different applications used within traffic management systems communicate and share information with each other
- TRAFFIC OPEN PRODUCTS AND SPECIFICATIONS (TOPAS) for traffic control equipment
- DATEX II (European) which is used principally on the Strategic Roads Network (SRN) for traffic management systems
- ITSO (principally UK) and EMV (international) for smart ticketing
- Transmodel-based UK specifications (NaPTAN and TransXChange) and Transmodel “daughter” standards within CEN (SIRI, IFOPT, NeTEx etc.) for public transport operations and passenger information
- RTIG specifications (principally UK) for certain key interfaces in bus operations
- RDS-TMC for traffic advisory systems
- General ICT industry standards (fixed and mobile internet, fixed and mobile telecommunications) such as 3G, 4G, 5G, LTE, G5, GNSS, HTTP, and GPRS

The Design Manual for Roads and Bridges (DMRB) contains information about current standards relating to the design, assessment, and operation of motorway and all-purpose trunk roads in the United Kingdom.



1.1.3 National policies

There are policies which directly influence ITS deployment and ones which indirectly influence ITS, typically around digital transformation and open data.

The following are key policies which influence ITS deployment, listed in alphabetic order.

Industrial Strategy Policy

The [Industrial Strategy](#) published in 2017 sets out [Grand Challenges](#) to put the UK at the forefront of the industries of the future, ensuring that the UK takes advantage of major global changes, improving people's lives, and the country's productivity. The Future of Mobility is one of the four global trends, alongside AI & Data Economy, Clean Growth, and Ageing societies.

The UK aims to be at the forefront of the design and manufacture of zero emission vehicles and sets an ambition for all new cars and vans to be effectively zero emission by 2050. To achieve this goal, investments include £1 billion over 10 years for development of low carbon powertrains through the Advanced Propulsion Centre, and £246 million for the Faraday Battery Challenge to develop safe, cost-effective, and high-performance batteries for electric vehicles. Further grant schemes for the public, for EVs and EV charging infrastructure, will also be implemented.

In terms of progress so far (January 2021), the UK has:

- published the Road to Zero strategy setting out comprehensive plans to support the transition to zero emission vehicles
- hosted the world's first Zero Emission Vehicle Summit in Birmingham
- launched the Poland-UK e-mobility declaration, at the UN climate COP24 negotiations
- passed the Automated and Electric Vehicles Act, giving the government new powers to improve the customer charging experience
- invested in a UK Battery Industrialisation Centre in Coventry
- allocated £78 million from the Industrial Strategy Challenge Fund (Stephenson Challenge) to drive the electric revolution

Government Transformation Strategy

The [Government Transformation Strategy](#) sets out the next stage of digitally-enabled transformation, and includes three broad components:

- Transforming whole citizen-facing services to continue improving the experience for citizens, businesses, and users within the public sector
- Full department transformation, enabling organisations to deliver policy objectives in a flexible way, improve citizen service across channels and improve efficiency
- Internal government transformation, which might not directly change policy outcomes or citizen-facing services, but is vital if government is to collaborate better and deliver digitally enabled change effectively

For example, by joining multiple data sets and commodity components, combining location, maps, and open real-time public transport information, a cloud-hosted service can create a service that tells people the quickest way to reach their destination.



Services can be linked to payments, profile and/or identity, notifications, and messaging. Innovation is now limited by the vision and route to market, not by how long it takes to construct the technology.

This strategy aligns with the way that new technologies are disrupting other industries, for example the significant shifts in transport, such as drones, driverless cars, and advances in rail technology.

Northern Ireland's Intelligent Transport Systems (ITS) Vision 2025

The [Northern Ireland Intelligent Transport Systems \(ITS\) Strategy 2025](#) was published in 2018 in support of the delivery of the draft Programme for Government (PfG), and places a high priority on the application of ITS. It aims to maximise the use of the road network for all users, and to encourage a change of travel mode from the private car to public transport and other sustainable modes such as walking and cycling. Some of the Department's objectives for ITS over the period of the strategy are to:

- provide credible, reliable, and timely traffic information that meets the customer's needs
- review and upgrade [TrafficwatchNI](#) with additional functionality e.g. improved social media integration, additional camera feeds, congestion mapping
- expand journey time information (on-trip & pre-trip) to road users by expansion of the Automatic Number Plate Recognition (ANPR) system
- continued partnership with the PSNI
- investigate alternative third-party providers

Transport Scotland's Future Intelligent Transport Systems Strategy

The core aim of [Transport Scotland's Future ITS Strategy](#) is to outline priorities for the provision of ITS to contribute to the safe and efficient operation of Scotland's trunk roads and motorways. It provides a framework for the development of action plans and funded delivery plans over a five-year period.

The strategy considers new technological innovations and societal changes which are likely to emerge and to take advantage of opportunities to work with partners across the transport modes. Six strategic themes are covered representing best thinking of the areas that will need to be facilitated, developed, and delivered in ITS provision to achieve Scotland's objectives. These include asset management & operational services, quality traffic & travel information, environment and sustainability, intelligent mobility (which includes CAVs), connectivity & freight, and data.

Transport Scotland's Smart Ticketing Strategy

Transport Scotland's current [Smart Ticketing Strategy](#) aligns with the wider intent of MaaS by moving towards account-based ticketing and travel. However, where MaaS endeavours to cater for the whole journey end to end, the challenge will be to address separate provider offerings into a single user account for that full end to end journey user experience. Today, the Scottish Public want modern, digital, or electronic options for tickets and/or payment, no matter which operator or mode of travel.

Transport Scotland's Smart and Integrated Ticketing Team's role is to support anyone with a public transport remit - authorities, operators, partnerships, and providers, to modernise their services through interoperable multi-modal, smart ticketing, and electronic payment systems, making travel easier, more accessible, and sustainable. An initial strategy has detailed how to deliver this vision and aims to bring all interested parties up to a common level of understanding regarding smart ticketing, in non-technical language, and to stimulate interest, discussion, and feedback.



Transport Scotland's Road Safety Framework to 2030

Scotland has produced a [Road Safety Framework](#), whereby Scotland's ambitious aim is to have the safest roads in the world by 2030. To achieve this, Scotland have identified twelve key areas of interest on which to concentrate their efforts, including speed, climate, funding, change in attitudes, technology, active & sustainable travel, knowledge & data analysis, enforcement, health, education, infrastructure, and reduced inequality. Many of these areas will rely on CAV and C-ITS technologies.

The Framework places great emphasis on the potential of emerging technologies, considering the benefits and challenges of novel technologies in the context of road safety. New technology is also being used in road-based infrastructure systems to mitigate overall risk to the network, and Scotland's ITS eco-system already makes use of VMSs to improve user journeys and safety.

Wales' Climate change targets and carbon budgets policy & strategy

In March 2021 the Welsh government approved a net zero target for 2050 and set out a [policy & strategy](#) on how to tackle the climate change emergency using a framework of key targets and carbon budgets spread across various industries. The transport industry plays a large part in Wales' net zero goal, as it is responsible for sizeable portion of Welsh carbon emissions. Autonomous vehicles are acknowledged to have the potential to radically shift the way road users own and share cars. The Welsh government will work to increase its understanding of the potential impact of CAVs on sustainable transport. Cardiff city council are also currently looking at the options for Clean Air Zone (CAZ) covering the Cardiff economic area.

1.1.4 Overview of National Activities and Projects

1.1.4.1 Priority Area I: Optimal use of road, traffic, and travel data

Within this Priority Area there has been an increased focus on the Future of Transport, driven by the climate agenda including the Future of Transport Programme, Future of Mobility: Urban Strategy and Future Transport Zones. Work has continued on Open Data initiatives, including detailed travel information during COVID, National Access Points, Bus Open Data Sets (BODS), Street Manager (National Roadworks data), Multimodal Journey Planning, the National Transport Information Service, Digital Traffic Regulation Orders, Northern Ireland's COBS / UTC interface, and National guidance to Local Authorities on the provision and sharing of open traffic data. Much of the motorway network has been upgraded to Smart Motorways, with much enhanced ITS facilities.

1.1.4.2 Priority Area II: Continuity of traffic and freight management

Within this Priority Area the majority of effort has been on data exchange initiatives including Convex, Arc Atlantique, the National Parking Platform, creation of the APDS parking data standard, Development of the urban interurban components of the Control Office Base Station (COBS), Northern Ireland's cross border DATEX II link with the Republic of Ireland, and Off-slip GLOSA.

1.1.4.3 Priority Area III: ITS road safety and security applications

Within this Priority Area there have been a range of advances in road safety and security. This includes the National Parking Platform, the European Data Task Force, the continuing support the UK is giving to raise awareness of eCall, both within the UK and in collaboration with our European colleagues, and Scotland's Road Safety Framework.



1.1.4.4 Priority Area IV: Linking the vehicle with the transport infrastructure

Within this Priority Area there have been a wide range of V2X initiatives including UK CITE, National Highways' (formerly known as Highways England) Digital Roads initiative, CAV Forth, the European ITS Platform (EU EIP), A2M2 C-ITS Pilot (part of the InterCor and C-Roads projects), CAV and 5G test beds, and work under the CCAV government organisation.

1.2 General Progress since 2017

The UK has made excellent progress since 2017 in all priority areas and in particular in Priority Area I.

Across all Priority Areas progress has focused on:

- delivering CCAV programme
- initiating Future Transport Zones
- piloting Mobility as a Service (MaaS)
- Covid Data Collection
- collating a wider range of transport data
- making data available to a wider range of users
- standardisation and specification of data formats
- Open Data initiatives
- collaborative working
- proving earlier research through on-road trials
- operational roll-out of ITS across the road network

Government sponsored bodies such as CCAV, Catapult, Innovate UK, and TTF have helped guide policy by encouraging directed research and dialogue.

1.3 Member State Contact Information

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2 Projects, Activities, and Initiatives

This section covers key and exemplar projects, activities, and initiatives covering Priorities 1 to 4 and other initiatives. Each Priority Area is broken down into Initiatives, Policies, and Projects.

For brevity a summary of each activity is provided within this document, with the required quantifying data and further details provided within [Section 5: UK Compendium annex](#).

In many cases projects, activities, and initiatives have components within multiple Priority Areas, the projects are described here within the Priority Area relating to most of the activity, the Compendium other Priority Areas associated with an activity.

2.1 Priority Area I: Optimal use of road, traffic, and travel data

Priority action (a), (b), and (c)

This Priority Area covers the projects, initiatives, and policies the UK has carried out or introduced to cover the specifications and standards for an optimal use of road, traffic, and travel data.

It covers EU multimodal travel information services; real-time traffic information services; the collection of road and traffic data and their provisioning to ITS service providers; traffic and transport services data used for digital maps available to digital map producers and service providers, and the provision of road safety related travel information.

Further detail on initiatives & projects can be found in [Section 5: UK Compendium annex](#).

2.1.1 Description of National Activities and Projects

2.1.1.1 Initiatives

The Future of Transport Programme

The Department's Future of Transport programme was created to respond to simultaneous radical changes coming to transport. It fosters the development and deployment of technology, ensuring the benefits are spread to all areas of the UK, targets emissions cuts from new and existing mobility services and encourages modal shift.

The main objectives of the programme are to:

- Stimulate innovation in the UK transport sector
- Prepare the UK for the opportunities that are now coming
- Create new zero-emission transport markets and their enabling frameworks
- Realise a safe, secure & accessible transport system that is fit for the future and helps people get around and get on
- Secure the UK's position within the mobility market



Technology is already driving radical changes, with profound implications for transport users and businesses from digital connectivity, artificial intelligence, automation, and data innovation. Electrification, connectivity, automation, and real-time data collection and analysis are driving the development of new modes of travel and new ways to do business.

Some of these changes – such as transport apps, electric vehicles, drones and early vehicle automation – are already here; the rest are likely to ramp up dramatically between now and 2030.

Improving how the UK does business and how the UK travels brings opportunities to:

- advance decarbonisation
- improve air quality
- tackle congestion
- improve UK communities and make them better places to live

By better understanding people's different needs and preferences, including motivations for, and barriers to, using these technologies, the Future of Transport programme can encourage changes in behaviours and more sustainable travel to increase the pace of decarbonisation.

Key aspects of the Future of Transport programme are:

- Future of Mobility: Urban Strategy
- A regulatory review, which included a consultation on MicroMobility, flexible bus services and mobility as a service (MaaS)
- Trials of e-scooters
- Future transport zones

Future of Mobility: Urban Strategy

"The Future of Mobility: Urban Strategy" (published in March 2019) sets out the principles that will guide Government's approach to emerging mobility technologies and services in cities. It supports cities harness the opportunities and address any challenges presented by emerging mobility technologies and services. The [future of mobility urban strategy](#) which includes commitments to active travel, future mobility and open data in its nine principles below:

- New modes of transport and new mobility services must be safe and secure by design.
- The benefits of innovation in mobility must be available to all parts of the UK and all segments of society.
- Walking, cycling and active travel must remain the best options for short urban journeys.
- Mass transit must remain fundamental to an efficient transport system.
- New mobility services must lead the transition to zero emissions.
- Mobility innovation must help to reduce congestion through more efficient use of limited road space, for example through sharing rides, increasing occupancy or consolidating freight.
- The marketplace for mobility must be open to stimulate innovation and give the best deal to consumers.



- New mobility services must be designed to operate as part of an integrated transport system combining public, private and multiple modes for transport users.
- Data from new mobility services must be shared where appropriate to improve choice and the operation of the transport system.

Future Transport Zones

Testing new technology and business models at scale is an important way to establish risks and benefits. That is why the Department has invested £92m in four [Future Transport Zones](#) (FTZs), joining the existing West Midlands FTZ, to support local leaders and industry to trial new approaches. The FTZs were launched on 1 July 2020 and will run for four years in these areas:

Derby and Nottingham	<p>Awarded over £16 million for the delivery of three distinct measures:</p> <ul style="list-style-type: none"> • An open access MaaS platform • A data sharing platform to pool and standardise data held by local authorities • Six e-transport hubs in neighbourhoods, depots and campuses – building on existing successful EV initiatives in the area
Solent Transport, Southampton	<p>Awarded over £28 million for a range of initiatives across two cities including:</p> <ul style="list-style-type: none"> • Personal transport – Mobility as a Service (MaaS), integrated ticketing, mobility credits, Demand Responsive Transport (DRT), e-bikes, car and lift sharing • Urban logistics – drones, freight delivery consolidation, last mile logistics • Underpinned by local transport hubs and interchanges (funded from the Transforming Cities Fund)
West of England	<p>Awarded over £24 million for a future transport living lab in four locations to include:</p> <ul style="list-style-type: none"> • A data hub to bring together new and existing datasets to drive MaaS • DDRT and wider traffic control • A MaaS platform • Transport hubs
West Midlands	<p>As the pathfinder FTZ, West Midlands was awarded over £20 million for a range of initiatives across the region including:</p> <ul style="list-style-type: none"> • Building data capability • Expansion of modes • Mobility credits • Deployment of a MaaS model

The four FTZs are providing real-world testing, allowing innovative businesses to work with a range of local bodies such as councils, hospitals, airports, and universities to test new ways to transport people and goods.



The FTZs will stimulate the market and develop viable business models, leading to the creation of new services and commercial opportunities. Despite some of the challenges of the past year, launching and testing of services is currently underway and has proved successful in several areas. Across all FTZs, the launch of e-scooter trials has allowed new MicroMobility operators to provide services, often showcasing innovation and best practice. The innovations within each FTZ will be underpinned by the guiding principles in the 'Future of Mobility: Urban Strategy'.

National Access Point (NAP)

The National Access Point (NAP) is a catalogue of transport metadata used to index road data, originally mandated by the regulations arising from the EU Directive 2010/40/EU. By sharing in the available knowledge and experiences of European Member States (MS) that have already implemented NAPs the DfT have been able to build on the original intent to better suit the UK's requirements. The DfT has undertaken significant user research to design and define its Find Transport Data Catalogue. The Catalogue will go "live" shortly and will detail all road-based data, which far exceeds the use cases defined by the ITS Directive regulations. The intention is to expand the catalogue to include all data for all modes, being a truly multi-modal transport data catalogue.

In the UK, road data is historically not easily accessible or discoverable, and there's no unified platform for organisations to know what data is available. The centralisation of a data catalogue is an unprecedented innovation in the UK which, at a global level, has only been explored in the past decade.

A single point of a holistic set of transport data accessed through the realisation of NAP accelerates the development of a wide array of mobility technologies, in the domains of interconnectivity, electrification, and automation. The NAP is in effect facilitating the democratisation of data which is a critical pillar for the digital age.

DfT National Transport Data Strategy

The Department for Transport is creating a data strategy which will focus on supporting the wider transport sector to share and make better use of data. It will also ensure that it is used effectively. The strategy will explore areas of data governance, accessibility, quality, and standards.

COVID data collection

For the first time, transport data, including parking and cycling, was collated nationally and presented daily to measure Covid impact. This was a significant breakthrough in data collection because of the previous disparate way that data has been collected and stored by road authorities.

Real-time Local Authority highway traffic data – Covid 19: The DfT has placed real-time transport data at the heart of its Covid 19 analysis, and this highlighted areas where real-time data was either not available or not openly available. It became apparent there was a lack of consistent real-time and historic traffic data held for the local road network. The DfT issued a request to local authorities and private companies to provide whatever data the organisations could to help. The response from local authorities was extremely positive, with data provided initially from 26 providers, geographically covering 35 local authority areas. The data is now organised on a cloud-based database making it more easily accessible to third-party applications.

The DfT is building a dataset of Local Authority and private sector parking data and reports on trends, providing a catalogue of rich data sources. One of the major private sector contributors provides real time and classified parking data for over 50% of the Motorway Service Areas in the UK.

Authorities from cities, towns, and counties across England are continuously sharing urban traffic control and automated traffic counter data, as well as information on cycling routes.



The DfT collects walking and cycling statistics through surveys and individual travel diaries and this data formed part of the COVID Survey.

Bus Open Data Service (BODS)

The Bus Open Data Service (BODS) initiative was initiated in 2019 to provide a central platform for the collection of accurate, up to date bus data (timetable, fares, and real-time vehicle locations). Since creating the [public service vehicle open data regulations](#), bus operators across England (outside of London) have been mandated to comply with the requirements, that is to say all buses have to be fitted with RTPI equipment conforming to the standard. As a result, BODS is working with data consumers to transition using this service. Two new free-to-access data tools have recently been implemented, 'Publish Bus Open Data' and 'Find Bus Open Data' addressing gaps in market provision (timetable and fare tools).

BODS also created new standards to address the gaps in fare data including products, tariff coverage, conditions, and prices by utilizing NeTEx. NeTEx is intended to provide a European wide standard for exchanging public transport data for passenger information. It provides a general-purpose format capable of exchanging timetables and fares for rail, bus, coach, ferry, air, or any other mode of public transport. It includes full support for rail services and can be used to exchange UIC (International Union of Railways) data. NeTEx is based on the CEN Transmodel standard which specifies a Conceptual model for Public Transport data. The schema is free to use, and its development is managed by the CEN standards process.

BODS mandated the use of existing standards using [TransXChange](#), a UK nationwide standard for exchanging bus schedules and bus related data. The variety of information that can be exchanged through TransXChange schemas includes, bus timetables (and associated meta-data such as stops, routes, departure times), fare stages, on-board ticketing systems data, bus stop accessibility data, and much more.

Street Manager – National Road Works Open Data Platform

Street Manager is a new digital platform, designed and introduced by the DfT, to enable the co-ordination and management of street and road works from early planning stages, providing accurate information about works when on site and for inspections long after works have finished. This enables information about street/road works to be held in one central place. The DfT has access to this information and can be used to inform policy decisions.

Open Data on live and planned works is now available for free to anyone who wants to use it. Previously this was held separately by over 150 Highway Authorities, and updates to the legacy system/technical specification happened once every several years, often driven by changes to the legislation. With Street Manager, there is a programme of continuous improvement, driven by users via the Governance Group.

Connected Places Catapult

Connected Places Catapult connects innovation-seeking industry asset owners and local government and place leaders with carefully selected SMEs who can provide innovative products and services. Further to that, Catapult work with academic partners to support and implement cutting-edge innovation research.

Places thrive on their ability to connect people to resources, opportunities and to each other. New technologies have enabled ever-increasing levels of physical, social and digital connectivity.

- Physical connectivity – improved through the application of new materials and engineering techniques.
- Social connectivity – enriched by urban design, civic infrastructure and innovations in governance systems.



- Digital connectivity – exploded with successive waves of telecommunications, IOT, and powerful data processing.

Catapult recognise that there are 6 closely related domains:

- Built Environment
- Critical Infrastructure
- Decision Making
- Mobility
- Public Space
- Wellbeing

Connected Places Catapult, work across all six domains of place to develop opportunities for innovation within each and build bridges between them.

Transport Technology Forum (TTF)

The [Transport Technology Forum \(TTF\)](#), formed in 2016, helps meet the need for action to deliver the future of mobility by driving more effective and efficient management of existing and new road networks. The TTF provides a neutral meeting place for those who are investing in technology for road management and operations. The Forum's remit includes, but is not limited to, Intelligent Transport Systems (ITS), Connected ITS (C-ITS), automotive, smart mobility & Mobility as a Service (MaaS), smart cities and communities, logistics, and ICT & related developments including Cloud computing and Big Data.

The Forum works with a wide range of partners on a pro bono basis, whereby most outputs and activities are delivered through distinct working groups, consisting of experts from the private sector, public bodies, academia, trade associations, and other key stakeholders. The Forum also facilitates regular Local Authority User Group meetings and seminars to encourage a free flow of information and ideas, encouraging a more collaborative way of working among the UK's road operators.

The TTF produces a weekly digest as part of its remit to drive more effective and efficient management of existing and new road networks, as a key national opportunity; this has been maintained throughout the Covid-19 emergency. Authorities from cities, towns, and counties across England are continuously sharing urban traffic control and automated traffic counter data, as well as information on cycling routes and car parks. The TTF has produced guides to help the operations of road authorities and scheme providers, which include 'Cyber Sign-Posting Guidance' and 'Procuring Intelligent Transport Systems'.

The 2020 TTF report: ['The State of the Connected Nation'](#) set out the current state of connected vehicle and infrastructure trials within the UK.

TTF 'The State of the Connected Nation'

The TTF 'State of the Nation' report looks at how the nation is helping vehicles and infrastructure to cooperate. It looks at connected vehicle projects run by local authorities and funded by the DfT. These projects have been initiated to improve traffic flow, reduce accidents and casualties, maximise capacity, reduce emissions and maintenance costs.

The report looks at the learning from these projects in a way that is useful to technology suppliers and highway authorities highlighting the value that C-ITS may bring. The report also focusses on how these technologies can improve communications and the response of emergency services, vehicle rescue services and road authorities.

The report looks at:

- the bigger picture of government initiatives and policy development



- the challenges to be addressed and the national business case
- wider government initiatives to address these
- the technology tools used and example pilot projects
- how co-operation between stakeholders has delivered benefits
- the insights from users of the technology
- lessons learnt from the pilot projects
- next steps and recommendations for actions

Connected Vehicle Data Research

The [Connected Vehicle Data Research report](#) explains the current and near-future opportunities for Connected Vehicle (CV) data to improve traffic management operations. It describes a framework and strategy for realising the benefits of using CV data, including the interventions required. The capability and needs of traffic management and other relevant systems to store, analyse, and provide future predictive capability is considered throughout and is core to the development of the framework.

The report is part of the [Future of Transport programme](#), which aims to shape transport innovation and secure the UK's position as a leader in the transport sector of the future.

This strategy aims to be a call to action addressed to government, identifying what UK should invest in to progress the benefits of CV data at scale. It can be applied nationally, covering local authorities and national strategic highways, and it could also be appropriate to the devolved nations. The DfT's aim is that it will form part of a wider government approach, aligning with the European Commission and UK government strategies, and policy, including the Future of Mobility: Urban Strategy.

While the framework is agnostic about the communications technology connecting the vehicles and is focussed on CVs rather than automated vehicles, the DfT recognises that CV data services may in future support autonomous driving.

STREETWISE

STREETWISE (Seamless Travel Environment for Efficient Transport), created in 2000, is a long running cooperation between UK and Ireland road operators, namely National Highways (NH), Transport Scotland (TS), Welsh Government (WG), Department for Infrastructure Northern Ireland (DfI NI), Transport for London (TfL), and Transport Infrastructure Ireland (TII). Areas of common interest in the field of ITS are monitored, addressed and, where necessary, coordinated, and it also acts as the administrative body through which partner reporting and payments are managed in relation to co-funded EU ITS Actions.

STREETWISE coordinates and manages extensive UK and Ireland ITS deployment programmes (such as the Arc Atlantique ITS Corridor), coordinate and manage STREETWISE partner involvement in horizontal EU study programmes (EU EIP, DATEX II, etc.), facilitate knowledge exchange between all partners, and executes all reporting in relation to European Commission programmes.

Since 2019 STREETWISE has provided the administrative measure through which coordination between UK nations on the ITS Directive is informally managed, in lieu of a formal framework, and provides a mechanism for administering UK partner compliance with legislation relating to the ITS Directive.

TN-ITS

The mission of TN-ITS is to facilitate and foster, throughout Europe, the exchange of ITS-related spatial data between public road authorities as data providers, and map makers and other parties as data users.

TN-ITS is concerned with the exchange of information on changes in static road attributes. Static meaning that the attributes are of a more or less permanent nature, even though they may sometimes change. It is



important that digital maps for ITS are up to date for attributes that are critical in terms of safety and efficiency.

The solution is to retrieve the information on changes from the road authorities. As they create the changes, they are the most efficient and immediate source for such information. This requires digital storage and maintenance on the side of road authorities, and some kind of flagging of changes. With governments going more and more digital, systems for such digital storage and maintenance are increasingly available. However, a common exchange format is needed, enabling creation of plugins to existing (legacy) systems for extraction of information on changes in road attributes. Immediate updates from authorities to map makers only make sense if the second half of data chain from map makers to end user devices will also be in place.

2.1.1.2 Projects

CHARM

The National Highways and Rijkswaterstaat (Directorate-General for Public Works and Water Management in the Netherlands) are in charge of the operation and maintenance of their respective motorway and strategic road networks. National Highways and Rijkswaterstaat have collaborated to ideate requirements for a new generation of traffic management centre systems. Setting up this architecture is being executed under the CHARM programme.

The CHARM Pre-Commercial Procurement project aims to create new modules for the CHARM architecture that offer major traffic management services improvements. The development of innovative modules will contribute to optimizing the performance of the road network, improve user safety, and reduce CO2 emissions.

National Traffic Information Service (NTIS)

NTIS provides real-time and historic data services. The interface connects to the various subsystems of the National Highways Traffic Management Systems at Regional Control Centres throughout England. These interfaces provide access to unplanned incidents, loop-based traffic data, and CCTV images. It is also able to set and receive VMS and Signal settings.

Details of National Highways' near-real time services are published by NTIS in DATEXII (as required by regulation) on National Highways' DATEX site. The DATEX site also contains details of services from Scotland, Wales, and Northern Ireland to provide coverage of the Strategic Road Network, which includes most of the TEN-T in the UK.

For public access, National Highways has developed [Traffic England](#), a traffic information website.

Multimodal Journey Planning

Derbyshire developed a technology demonstrator for strategic-level traffic management on the County Council's road network utilising Floating Vehicle Data (FVD) for traffic detection. A trial was successfully carried out on Derbyshire's roads in 2018. Strategic and tactical driver information was automatically delivered to both a mobile app in the test vehicle and to mobile Variable Message Signs (VMS).

Through this system, the end goal was to deliver real-time traffic information automatically to drivers through mobile app or mobile VMS. Information generated by the system from FVD was published for display in-vehicle via a mobile app, and on mobile roadside message signs.



Mobility as a service (MaaS)

The DfT is keen to work closely with companies and Local Authorities developing MaaS platforms and new business models and help to shape their evolution to meet government policy goals. To support this, the DfT have awarded £92m to four Future Transport Zones in the UK, all of whom are developing MaaS models and associated data platforms.

The DfT recognise the importance of access to data from transport operators for MaaS platforms to develop. The department have a programme of work underway to open up data across modes, working with a variety of stakeholders and are contributing to the Department's Data Strategy.

The Future of Mobility Urban Strategy published in March 2019 announced a regulatory review of MaaS. This work is considering the regulatory changes that may be necessary to support the integration of different modes of transport into a single mobility service. The review will examine the case for Government to do more to shape the development of MaaS platforms.

Following the Future of Transport Regulatory Review Call for Evidence, the Department has committed to consult on a MaaS Code of Practice, signalling the UK's intent for MaaS delivery.

Local Transport Data Discovery Project

In 2018, the DfT conducted an independent review of the local transport data landscape. The [discovery project](#) identified the main opportunities and challenges for key transport user groups to maximise the benefits of accessible Local Authority transport data.

Local Authorities are a significant provider and manager of transport services and are responsible for 97% of national road networks. Local Authorities consequentially store large amounts of static and real-time transport data.

Opening data and removing barriers to effective data use across the public and private sector is a priority as the UK looks to evolve and improve transport services. Barriers such as concerns around GDPR compliance, data control, and accessibility not only restrict the ability to open up transport data but also impact Local Authorities' ability to capitalise on the benefits that open data can provide.

The discovery concluded that there is high value local authority transport data but most data is closed. The DfT has initiated a series of actions to improve local authority data including the provision of new national guidance, "Guidance for opening local authority transport data"; funding eleven local authorities to open and share data; developing standards and national framework for parking data exchange and digitising traffic regulation orders.

Digital Traffic Regulation Orders

Traffic Regulation Orders (TROs) define where specific rules apply to the use of a specific piece of road; including speed limits, loading and unloading restrictions, parking bays and restrictions. TROs are generally created and held by Local Authorities (state owned roads being an exception) and are the only definitive source of speed limit data.

The legal procedures for making TROs are paper based, process heavy, and costly, in addition TRO data provision is inconsistent and non-standardised. TRO data can be a challenge to locate for organisations who would benefit from such data, including utility companies, navigation providers, and event organisers.

The DfT's Future Mobility Urban Strategy prioritises a regulatory framework that evolves with transport technology and advocates data sharing to improve the transport system. Digitising TROs will support new services, digital mapping, and the digital infrastructure for connected and automated vehicles.



Transport for West Midlands (TfWM) Regional Transport Co-ordination Centre

The West Midlands Regional Transport Co-ordination Centre (RTCC) provides a wide and holistic view of TfWM's road network and how it is operating. It was delivered through the DfT's Transforming Cities Fund and supports road operators with day-to-day operations.

Prior to scoping the RTCC, there was a lack of data sharing and collaboration between local authorities and other major transport stakeholders. Major investment was required to unlock the benefits of having an integrated and collaborative system, while addressing the region's increases in travel demand and congestion.

The RTCC now takes in vast amounts of real-time data from a variety of modes of transport, sources, and organisations, enabling it to successfully manage various critical services, ranging from emergency and major incident response to diversion support.

Smart Motorway Schemes

Smart Motorway schemes promote the wider implementation of ITS systems, and form a part of National Highways' toolkit, which comprises of a series of innovative technologies developed over several years that are proven to meet legal, technical, and outcome requirements in terms of impact on traffic. The technologies are deployed in a predefined way to ensure compliance with traffic regulations, enabling the enforcement of variable mandatory speed limits.

Smart Motorway schemes enable mandatory variable speed limits and message signs on motorways to be optimised in the most efficient way possible through semi-automation. All lane Running (ALR) motorways enable the permanent conversion of the hard shoulder into an additional lane for traffic.

European ITS Platform (EU EIP)

The European ITS Platform (EU EIP) is the EC CEF co-funded horizontal ITS study platform incorporating all engaged EU Member States, industry, and policy stakeholders across the breadth of the European ITS community. It was launched in 2015 following the preceding TEN-T EIP and EIP+ study programmes and encompasses a broad range of activity and policy areas in the field of European ITS.

The DfT, National Highways, and Transport Scotland have all been directly involved and have an established channel for knowledge sharing on areas of common interest between the wider UK partners via the STREETWISE consortium.

The UK has been an active member and key contributor within key EU EIP technical activity areas to date, including monitoring and dissemination, ITS deployment guidelines, NAP harmonization, and many more.

UTMC Data Warehouse

Bedford's UTMC data warehouse, part of the 'Transporting Bedford 2020' initiative, works towards developing an intelligent highway network. It collects traffic count data, signal data, and offline models into a single platform. Open access to the data in a standardised format provides opportunities to develop digital based products which will bring benefits to businesses and the public. Once complete, the data warehouse will be able to receive feeds from the UTMC common database and allow 3rd party software apps to connect with it, while also enabling offline road scenario testing.

SCOOT – London Strategic Road Network (TRL)

The Transport Research Laboratory's (TRL) new UTC system is now integrated with the latest SCOOT 7 software. Split Cycle and Offset Optimisation Technique (SCOOT) is a system that controls and optimises traffic signals to enable a more efficient flow of traffic through transport networks. SCOOT leverages real-



time data collected from various vehicle detectors, allowing traffic signals to quickly adjust, in turn reducing vehicle delays. In areas where SCOOT 7 has been implemented, it has delivered over £100k of benefits per junction.

Siemens Mobility and Transport for London have recently announced the deployment of FUSION, which will build on the success of SCOOT 7 by using much richer data sources from a variety of transport modes, including third party data from CAVs and buses.

Surface Intelligent Transport System (SITS)

Transport for London (TfL) need to be aware of incidents and any action that is happening on the capital's roads to keep them running smoothly and to ensure that the appropriate response is being taken to protect users and those affected by the network. TfL have started the SITS project that will: integrate with UTC SCOOT to help smooth traffic flow, overhaul the way that TfL manages London's roads and reduce pollution, congestion, and physical harm. SITS will analyse multiple sources of information from new sources of traffic data as well as more established equipment.

TN-ITS GO

TN-ITS GO is a Programme Support Action (PSA) for the implementation and facilitation of seamless spatial data exchange which are essential for the deployment of ITS/CAV applications. The duration of the action was spread over 48 months in order to give time to Member States to plan and implement their ITS spatial data supply chain strategy right from the source all the way to the open TN-ITS interface and into the map database of the end user. The UK along with six member states were involved in the original project joined by other member states in the second phase. The main aim was to carry out proof of concept and develop a suitable national deployment model within each state.

The TN-ITS GO project and the previous pilot project have demonstrated that a flow of data and the publication of change intelligence can be created and maintained to a TN-ITS format. From the original pilot improved methodology in conventions have been used to improve the API service. The reliance on Traffic Regulation Orders in a consistent format to a common data standard will be key to developing a future UK wide TN-ITS service.

Connected Car Data

In 2017, through funding from the UK Government's Innovation Fund, the feasibility of real-time vehicle data sharing within a decentralised system was assessed, and included a variety of data producers and consumers, making use out of data from connected vehicles. The company Thingful successfully designed, developed, and tested an early-stage prototype of an Internet of Things (IoT) system capable of discovering and accessing sensor data feeds from a telematics system in a fleet of cars on demand, using a decentralised system design. The project was successful in demonstrating how vehicle data can be made discoverable and accessible to a variety of third parties via a transaction management system founded on drivers' explicit consent and incentivisation.

2.1.2 Progress since 2017

The main progress since 2017 has been in:

- developing a comprehensive future mobility strategy addressing the climate crisis
- gathering a wider range of transport data through collaboration between Stakeholders
- making data openly available
- collaborating with the development of agreed standards for data exchange
- rolling out large scale ITS deployments



In addition, trials to prove diverse methods of data collection and dissemination have advanced the UK's technical knowledge.

2.1.3 Delegated Regulation (EU) 2017/1926 on the provision of EU-wide multimodal travel information services (priority action a)

[Traveline](#) have been providing travel information services since 2000 and is now truly multimodal. Traveline is a partnership of transport companies, local authorities and passenger groups which are working together to provide information on routes and times for all travel in Great Britain by bus, rail, coach, and ferry, and to present it on many different platforms for greater distribution; allowing users to plan their journey from door to door across Great Britain.

Please refer to a summary and update of the National Access Point in section 2.1.1.1 for additional information, while also expanding on the UK's activities that relate to this Delegated Regulation.

2.1.4 Reporting obligation under Delegated Regulation (EU) 2015/962 on the provision of EU-wide real-time traffic information services (priority action b)

This has already been reported on and approved, and can be found in Section 6 'UK Delegated Regulation Reports annex' titled:

UK Report - Commission Delegated Regulation (EU) 2015/962 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services.

2.1.5 Reporting obligation under Delegated Regulation (EU) No 886/2013 on data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users (priority action c)

This has already been reported on and approved, and can be found in Section 6 'UK Delegated Regulation Reports annex' titled:

UK Report - Commission Delegated Regulation (EU) No 886/2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users



2.2 Priority Area II: Continuity of traffic and freight management ITS services

This Priority Area covers the projects, initiatives, and policies the UK has carried out or introduced to cover the specifications and standards for the continuity and interoperability of traffic and freight management services, on the TEN-T network and other important UK roads.

It covers the definition of the measures required to develop an EU ITS Framework Architecture, addressing specifically ITS-related interoperability, continuity of services, and multi-modality aspects, including multimodal interoperable ticketing; the continuity of ITS services, in particular for cross-border services, for the management of passenger transport across different modes of transport; the continuity of ITS services for the management of freight along transport corridors and across different modes of transport; the interoperability and compatibility between the urban ITS architecture and the European ITS architecture.

Further detail on initiatives & projects can be found in [Section 5: UK Compendium annex](#).

2.2.1 Description of National Activities and Projects

2.2.1.1 Initiatives

Initiatives in this area are of a general nature, around the open provision of data and have previously been described in [Section 2.1: Priority Area I](#).

2.2.1.2 Projects

Convex

[Convex](#), is a data exchange platform funded through Innovate UK and delivered by TfWM. It is a virtual marketplace for the dynamic exchange of data to facilitate innovation in the development and deployment of new technologies and services pertaining to the connectivity, automation, electrification, and shareability of transport.

Convex stands as one of six Connected and Autonomous Mobility (CAM) testbeds in the UK and supports the emergence of the West Midlands as a leader in the CAV space.

Convex sits at the intersection between connected and autonomous vehicles, transport network operators, and mobility service providers, enabling integrated solutions that rely on data exchange.

Convex's dynamic data sharing services tackle many of the barriers that prevent innovation and the growth of new mobility solutions.

Transnational European ITS Corridor: Arc Atlantique Traffic Management Corridor

The UK national road authorities along with six European partners joined to implement a Trans-European ITS Corridor on the primary and secondary Trans European Road Network. The project was a response to an EU CEF Call for investment in the strategic route to increase efficiency, safety, and environmental improvement.



A range of the latest detection equipment were deployed on the network to analyse traffic characteristics and automatically implement traffic management schemes, with European wide real time traffic and travel information using Enhanced VMS and in car devices. The Arc Atlantique project in the UK included the extension of digital communications networks, traffic control room upgrades and interoperation using DATEX II.

Creation of APDS parking data standard – to be adopted as ISO standard.

Creating a consensus-built international standard will establish a common language for data elements and definitions in the parking, transportation, and mobility sector that will facilitate seamless integration, compatibility, and communication between parking entities, the automotive industry, IT developers, map and app providers, as well as other stakeholders.

In April of 2019, APDS approached ISO to formally consider the APDS standard for adoption. This would include establishing a global standard for parking data terms and definitions, as well as a common global baseline for parking applications to be utilized by governments, municipalities, suppliers, operators, regulators, enforcement agencies, service providers, technology platforms, automotive interests, and ultimately users worldwide.

Following a formal review and consideration process, ISO's 30 contributing National Standard Bodies voted strongly in favour of developing and adopting the APDS standard as an ISO Technical Specification.

This work, based on APDS specifications, began recently, and will be followed by a period of expert contributions. ISO development program will follow a 24-month standard track, but with the main technical solidification of the technical content over the next year.

Northern Ireland Development of a COBS/UTC Interface

Traffic management of the urban network within Northern Ireland is managed using traffic signals and VMS through the Siemens Urban Traffic Control (UTC) system (STRATOS). The motorway network is managed using VMS, motorway signals, and Motorway Incident Detection and Automatic Signalling (MIDAS) through National Highways' Integrated Traffic Management System (HATMS) using a Control Office Base Station (COBS). The strategic road network has closely spaced motorway and numerous urban network interfaces.

A link was developed that would allow triggers to be sent between the two systems. These triggers introduce actions on each system depending upon the nature of the trigger. For example, when the MIDAS system detects congestion on the motorway due to exit capacity, a message can be sent from HATMS to the UTC to impose amended signal timings that helps to reduce delays. This was the first link of its kind to be used for this purpose.

DATEX II link with Republic of Ireland to transmit journey time and incident information

INSTANT is the Information and Management System adopted for multimodal transport in Northern Ireland and the Republic of Ireland. The INSTANT project has a variety of systems and services that provide benefit to road users, the use of DATEX II to relay journey time information and VMS settings between servers in both countries.

The exchange of ideas and co-operative thinking continues in the management of the M1/A1 Corridor, with live traffic information being exchanged across the border. The use of DATEX II enables operators from both sides to manage their respective road networks more effectively and safely, while ensuring road users are informed about travel conditions before and during their journey.



Off-Slip GLOSA

This National Highways Air Quality Innovation project aimed to reduce the number of vehicle stop-starts when leaving the SRN, ultimately improving air quality for local communities, junction operation, and improving awareness of the effects of GLOSA. GLOSA is a system for informing drivers of the exact time traffic signals will change, providing a countdown and recommended speed to transition the signals without having to stop.

Results showed that operating a GLOSA service for vehicles can reduce emissions of NOx (up to 17%) and CO2 (up to 27%) for both light commercial and Heavy Goods Vehicles (HGVs).

2.2.2 Progress since 2017

The main progress since 2017 has been similar to Priority Area I:

- gathering a wider range of transportation data through collaboration between Stakeholders
- making data openly available
- collaborating with the development of agreed standards for data exchange
- deployment of real-world cross border and urban/inter urban ITS solutions

2.3 Priority Area III: ITS road safety and security applications

Priority Action (d), (e), and (f)

This Priority Area covers the projects, initiatives, and policies the UK has carried out or introduced to cover the specifications and standards for ITS road safety and security applications.

It covers the harmonised provision of an interoperable EU-wide eCall; road safety related 'universal traffic information'; ITS based information and booking services for safe and secure parking places for trucks and commercial vehicles; measures to support the safety of road users with respect to their on-board Human-Machine-Interface; measures to improve the safety and comfort of vulnerable road users for all relevant ITS applications.

Further detail on initiatives & projects can be found in [Section 5: UK Compendium annex](#).

2.3.1 Description of National Activities and Projects

2.3.1.1 Initiatives

Transport Technology Forum (TTF) – Parking dataset

In response to the current Covid crisis, the DfT commissioned the collection of transport data which provides insightful analysis of transport and travel impacts. It is building a dataset of Local Authority and private sector parking data and reports on trends, providing a catalogue of rich data sources. One of the major private sector contributors provides real time and classified parking data for over 50% of the Motorway Service Areas in the UK.

Consideration is being given to the extension of this data collection, reporting and cataloguing capability to provide other sources of lorry parking data acting as another feed to the National Parking Data Platform and NAP.

2.3.1.2 Projects

Provision of the National Parking Platform

The National Parking Platform (NPP) is a major publicly owned initiative funded by the DfT, hosted by Manchester and Liverpool City Council, using data provide by parking & service providers. By improving the digitisation of parking, it enables Local Authorities and private companies to exchange data and help guide users to available parking spaces based on its price and quality, with hope to deliver multi-vendor and automated transactions.

The NPP also covers on and off-street parking and incorporates a lorry parking module, enabling real-time lorry parking data availability to be shared on an open platform. The platform is designed to enable direct input and cataloguing for the roads-based NAP.

Discovery and alpha phases were carried out, applying the Alliance for Parking Data Standards (APDS) and exploring the models that would ensure that the platform is robust, sustainable, and supports interoperability with truck parking, electric vehicle charging, micro-mobility data services, and potential integration with MaaS initiatives.

Commented [SR(2): Please refer to **Item 44 and 45** of the separate review excel document '*EC Directive – ITS Technologies in the UK – DRN DfT comments v5*':

Action on DfT to provide text and edit the contents of the 'Provision of the National Parking Platform' project to correctly reflect its current state. This will need to be reflected in the project's entry in the 'UK Compendium annex: UK Intelligent Transport Systems - Initiatives and Projects'



Data Task Force

As part of the Data Task Force, National Highways has worked closely with European Member States, service providers, vehicle manufacturers, and suppliers to discuss data exchange in the field of Safety Related Traffic Information (SRTI). To comply with EU directive 886/2013, OEM's must now provide SRTI data free of charge to road authorities and road users as defined in the regulation.

Data Task Force members created the SRTI Ecosystem for the exchange of data and information. Data is exchanged within the SRTI Ecosystem for the sole purpose of road safety and will only be used to create SRTI.

The development of a shared C-ITS platform on the A2/M2 corridor, enabled the testing of CV services with Universal Traffic Messages (UTMs) during a series of test events on live roads in London, Kent and Europe (more information on the A2/M2 project can be found in [Section 2.4: Priority Area IV](#)).

eCall

eCall went fully live in 2018 (relating to priority action d). The UK is now processing over 8000 eCalls per month with about 10 calls per day for airbag activations. Work is ongoing to upgrade the UK's 999 facility from a PSTN to a SIP based infrastructure, enhancing connectivity to a wider range of user devices.

The current solution is unable to decode the complete eCall minimum data set and the last two location fields, road and direction of travel are not available to the call handler. As part of the SIP implementation, this data will now be made available allowing the UK to fully comply with the requirements.

With over 80% of new cars in UK now equipped with the eCall button, many calls are false negatives. This has prompted the need for an education campaign and National Highways, working alongside the RAC, RAC Foundation, DfT, and industry experts have produced a social media campaign which was scheduled for the autumn of 2021.

The UK is continuing to work with Member States to find a solution to the problem posed by the proposal to turn off 2G and 3G cellular networks across Europe when these are the channels used by current vehicles to provide the eCall service.

As part of the Conference of European Directors of Roads' (CEDR) "Call 2019 Safe Smart Highways" program, the UK is coordinating 'The Stopped vehicle Hazards – Avoidance, Detection and Response' (SHADAR), working with Dutch and Austrian partners who are currently researching how to use multiple sources of data, including eCall, for stopped vehicle detection.

Furthermore, the UK is helping to define the standards and specifications to pave the way for the deployment of aftermarket eCall systems, as part of the SAFE project. This formulation of specifications and respective standards will provide a base for the certification scheme. The certification scheme will ensure quality and reliability, which is the key in preventing false activation and creating trust in proper functionality.

2.3.2 Progress since 2017

Progress in this Priority Area has been more focused, whilst conforming to the overall model of more data, better data, Open Data, and standardisation:

- Deployment and operation of eCall
- Collation of a database of available parking, including specific HGV provision and on street HGV parking
- Development of a platform to utilise parking data
- Participation in Data Task Force to develop SRTI ecosystem



2.3.3 112 eCall (priority action d)

It is the UK's understanding that formal reporting of UK eCall compliance is no longer appropriate following the UK's departure from the European Community.

2.3.4 Reporting obligation under Delegated Regulation (EU) No 885/2013 on the provision of information services for safe and secure parking places for trucks and commercial vehicles (priority action e)

This has already been reported on and approved, and can be found in Section 6 'UK Delegated Regulation Reports annex' titled:

UK Report - Commission Delegated Regulation (EU) NO 885/2013 supplementing the Intelligent Transport Systems Directive with regard to the provision of information services for safe and secure parking places for trucks and commercial vehicles.

2.4 Priority Area IV: Linking the vehicle with the transport infrastructure

This Priority Area covers the projects, initiatives, and policies the UK has carried out or introduced to cover the specifications and standards for linking vehicles with the transport infrastructure.

It covers measures to integrate different ITS applications on an open in-vehicle platform, and further progress in the development and implementation of cooperative systems.

Further detail on initiatives & projects can be found in [Section 5: UK Compendium annex](#).

2.4.1 Description of National Activities and Projects

2.4.1.1 Initiatives

Centre for Connected and Autonomous Vehicles (CCAV)

The UK Government believes that CAVs have the potential to profoundly change the way the public travel, making road transport safer, smoother, more economical, and more accessible. To this end, CCAV, a joint BEIS and DfT policy team, was established in 2015 to secure the UK's position at the forefront of this change for the safe development, production, and use of this technology.

CCAV continues to work with government, industry, academia, and regulators – such as International Vehicle Standards – to make the UK one of the world's premier development locations for CAVs. To support this vision, and to ensure the UK is ideally placed to take advantage of, and capitalise on both its strengths and opportunities, CCAV currently focuses its work on three functional areas:

- Regulation: ensuring a welcoming regulatory framework to keep the UK at the forefront of real-world testing, and using & evaluating CAV technology
- Research and Development: collaborative R&D grants for developing cutting edge technologies that help achieve the UK's vision
- Testing infrastructure: matching funded grants to develop world leading testing ecosystem that's easy to access for organisations involved in the space of CAVs

National Highways Digital Roads

National Highways' [Introductory publication](#) for their new [Digital Roads](#) initiative lays out National Highways' vision for the future operation and monitoring of the SRN. As road infrastructure is becoming much more digitised, it provides an opportunity to make roads safer, and support the UK Government's wider plans for net zero.

Digital Roads will harness data, technology, and connectivity to improve the way the SRN is designed, built, operated, and used, ultimately enabling safer journeys, faster service delivery, and an enhanced customer experience for all. The new technology implemented will be flexible enough to meet new challenges such as the detection of stopped vehicles and next-generation road signage, and road users will be better informed as data becomes richer and more accessible. Furthermore, as more vehicles are using CAV technology, there is a need to look at ways of providing data to self-driving systems.

Digital Roads supports a wide range of UK Government policies and commitments, providing a common approach for realising shared strategic ambitions.



Data Task Force

The Data Task Force was set up in 2017 to improve the sharing of safety related data between OEMs and UK road authorities. National Highways is a partner to a Data consortium consisting of seven vehicle manufacturers, several European Road Authorities, and other data suppliers such as HERE and TomTom. The consortium was formed to enable OEMs to comply with EU directive 886/2013, meaning the consortium must provide Safety Related Traffic Information (SRTI) free of charge to road authorities and road users. This enables the ingestion of vehicle data into National Highways Data as a Service (DaaS) platform and allows vehicle data to be harmonised with other data sets within the existing DaaS platform.

Due to more vehicles having connectivity built in, there is an opportunity to use vehicle data to improve road safety, reduce congestion, and give a better service to customers by providing improved information, accessible for all, to support their journeys. Usage of vehicle data is restricted by the consortium through a multiparty licence agreement which sets the scope of usage for this data set.

Connected Services (Digital for Customers)

National Highways seek to expand their operational technology capabilities by deploying enhanced CV services (also known as Co-operative Intelligent Transport (C-ITS) Services) at a wide scale, building on the learnings from previous trials and pilots.

As part of the National Highways' Digital Roads delivery programme, this project seeks to implement a C-ITS platform that enables the deployment of a phased programme of prioritised in-vehicle services. This essentially meets the changing expectations of customers for more granular and tailored services, while reducing the need for roadside equipment and supporting infrastructure; reducing costs, environmental impacts, and risks to workers.

A2/M2 Corridor Testbed

The DfT has established a partnership between Kent County Council, Transport for London (TfL) and National Highways to pilot a linear 100 km connected and digital corridor on the A102/A2/M2 (in essence between central London and the Channel ports). The Corridor consists of a testbed combining different types of roads including a major urban tunnel, motorway, rural dual carriageways, London urban roads and link roads in Kent. It is also one of two TEN-T Corridors linking the centre of London to the rest of Europe, whereby most of the route is on the SRN, and forms part of the UK's wider CAV ecosystem.

The testbed first was used to enable European partners to contribute innovative usability ideas on an equal platform during a series of trials forming part of the InterCor and C-Roads platform projects, described in [Section 2.4.1.2](#) below.

Multiple key C-ITS services have been developed, including Road Works Warning, Greenlight Optimised Speed Advisory (GLOSA), and many more. This new set of communication standards enable borderless I2V, V2I, and V2V comm's, providing the foundations for connected transport, across Europe and potentially the world.

2.4.1.2 Projects

UKCITE

The UK Connected Intelligent Transport Environment (UKCITE) project enabled the development of an advanced environment for Connected and Autonomous Driving (CAD). Automotive, infrastructure, and service companies were all able to trial their CV technologies, while also testing state-of-the-art connected infrastructure services. Plans have now been proposed to have the UK CITE moved into the West Midlands Future Mobility Programme.



By testing novel connected technologies such as vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and vehicle to 'everything' (V2X) communications (4G LTE, ITS-G5, Wi-Fi), key mobility challenges were tackled such as traffic congestion, road safety, and road user satisfaction, as well as providing in-vehicle data for a better visibility of traffic behaviour. Post testing on 40 miles of road, several use cases were established, ranging from emergency electronic brake lights to roadworks warning.

MultiCAV

MultiCAV facilitates the trialling of passenger-carrying autonomous vehicles on Milton Business Park and public highways in Didcot, providing links to local public transport at Didcot Parkway station. At first, user behaviour and commercial viability was assessed to determine the feasibility of deploying a sustainable CAV-based multi modal mobility solution, with aims to improve quality of life, shared mobility, and greater social inclusion.

After four years of development, the project will soon be incrementally deploying the UK's first multi-modal MaaS system with an integrated range of level 4 and 5 autonomous EVs, providing personalised transport choices for users. Major progress has already been made through the delivery of an electric bike hire service, and FirstGroup (a leading UK transport operator) have already trialled autonomous shuttle bus services on public highways.

AutoAir - 5G Testbeds and Trials

The [5G Testbed Projects](#) is major UK Government Program, purposed with harnessing areas where the UK has a competitive advantage – such as in scientific research, engineering talent, and the UK's rich variety of technology businesses.

AutoAir is one of six key projects supported by the Department for Digital, Culture, Media & Sport (DCMS), funded through the 5G Testbeds and Trials Programme (5GTT). AutoAir was able to deliver two different small celled 5G testbed networks. In dense transport and road networks where it is impractical to run fibre across every available node, it successfully demonstrated mmWave backhaul, presenting an economic way of delivering efficient 5G networks. It also showed how both networks could work on a neutral host basis, giving shared access for public and private applications.

The project also sought to support transport networks through 1 Gigabit/s services while trialling various Connected and Autonomous Vehicle use cases.

A2/M2 Corridor Trials

The development of a shared Cooperative Intelligent Transport Systems (C-ITS) platform allowed the testing of connected vehicle services during a series of test events on live roads in London, Kent, and Europe. Hybrid communications (cellular and ITS-G5 'Wi-Fi') were tested and four services demonstrated with real users, using existing traffic data: This project formed part of the European InterCor and C-Roads platform projects.

- In-Vehicle Signage (IVS) – reproducing roadside Variable Message Sign (VMS) messages on in-vehicle displays
- Road Works Warning (RWW) – providing accurate location-based hazard warning messages about road works
- Probe Vehicle Data (PVD) – testing the ability to securely receive data from vehicles
- Green Light Optimised Speed Advice (GLOSA) – provides speed advice and countdown timer on approach to traffic lights



Transport for West Midlands (TfWM) A45 GLOSA

This project, funded by the DfT's C-ITS Innovation fund, provides an operational implementation of a GLOSA service on the A45 Coventry Road. GLOSA technology has been deployed on multiple junctions, with data being sent to smartphones alerting them of the optimal speed to reach the following signal on Green. This has now been expanded to data being shared via a public web API available to all developers, OEMs, and other organisations.

The primary aim was to explore how GLOSA and data sharing, could reduce journey times, traffic congestion, emissions, and accidents, and deliver a better user experience. As a result of this implementation, the project showed a 10-14% reduction in stop-starts over the 6km testing route, including 10 junctions, and a consequent reduction of 5-7% in journey times for the test vehicles. By using existing web technologies, cellular and Wi-Fi communications, little investment in CV infrastructure was required.

The project is predicted to be expanded soon to enable traffic signal data sharing for autonomous vehicles.

V-VMS

The V-VMS project evaluates delivery of in vehicle signage normally delivered by road-side VMS. Looking at current standards from traffic control systems and connected vehicle standards, and also developing a V-VMS cloud hub. V-VMS utilises Urban Traffic Management Control (UTMC) systems in local authorities using a DATEX II feed to distribute useful in-vehicle Information via existing infrastructure, thus reducing the need for brand new C-ITS DNIs.

The V-VMS project will also run a trial, where live data will be extracted from Bristol City Council and UTMC systems and delivered to an Android app.

CAVForth

CAVForth is a collaborative project which will provide a globally significant demonstration of UK autonomous bus capabilities along a 14-mile route across the Forth from Fife to Edinburgh in Scotland, using the dedicated Public Transport Corridor across the Forth Road Bridge.

The project has enabled the design, development, and trial of a fleet of full-size autonomous buses and will provide a valuable new transport connection for communities, commuters, and tourists, integrating with retail, education, leisure, bus, passenger rail, and tram.

PATH – Performance Analysis Trajectory Help

PATH, also part of the DfT's GovTech Catalyst process, is a project focussed on experimenting with individual GPS tracks to map 'paths' through traffic signals. It is led by connected transportation analytics company, Inrix, in the City of York, who have successfully completed an initial feasibility/prototype phase.

Studies through the TTF showed that many existing UK traffic signals do not work optimally, despite recent technologies like SCOOT and MOVA. In response, Inrix plan to test a web-based toolkit, in collaboration with 10 other authorities to undertake an Alpha phase using V2I communication.

PROACT – Predictive & Real-time Operational Alerts for Congestion Transformation

PROACT, funded by the DfT's GovTech Catalyst process, is focussed on using data to better understand and respond to road traffic congestion. It will allow local authorities, with a virtual assistant, to monitor their road networks and evaluate their performance, providing real-time intelligent alerts about unusual traffic behaviour, combining a wide variety of data inputs.



Through V2I communication, PROACT will act as a watchdog to flag incidents and provide next-generation real-time forecasts to enable decisive proactive decision-making. This capability will be delivered through a collaborative partnership between lead partner Vivacity Labs, FlowX, Siemens, and Bournemouth, Christchurch & Poole (BCP) Council.

Central London Testbed

The Central London Testbed (CLT), funded by the DfT, was set up to investigate how 5G networks could work and communicate with other technologies such as ITS-G5. The CLT was integrated into the 5G Research Lab at Kings College, London, and one Roadside Unit (RSU) was mounted on top of the Kings Building in the Strand, consisting of a large coverage area of around 1.35 miles. Data from the RSU was sent to an ITS-G5 server, and then plotted on a Google Earth map. Findings of project showed that it is entirely feasible and beneficial to integrate 5G and ITS-G5 networks regarding C-ITS, hence creating an amalgamated and interoperable vehicle network, at a reasonable cost.

2.4.2 Progress since 2017

The main progress since 2017 has been in large live traffic trials of connected and autonomous vehicles, learning how to use the large quantities of data generated by connected vehicles, establishing testbeds for proving future solutions, and developing the foundations to ensure future infrastructure is capable of supporting CAVs.

2.5 Summary of Other Initiatives

The following initiatives do not fit tidily into the Priority Areas but represent allied progress in the spirit of the Directive and Delegated Regulations.

Further detail on initiatives and projects can be found in [Section 5: UK Compendium annex](#).

2.5.1 Description of other National Initiatives and Projects

2.5.1.1 Initiatives

Local Authority Mobility Platform (LAMP)

Outputs and recommendations from the DfT's Local Transport Data Discovery Project (Priority Area I), showed that a Local Authority framework was required to equip public bodies with the right skills and services, to support and provide them with new mobility options, initiatives, and behaviours.

The Local Authority Mobility Platform (LAMP) helps Local Authorities by supporting them in procuring and implementing digital transport services. The framework provides various tools and resources, including a mobility solutions toolkit with relevant standards and policies, technical guidelines, content on use cases, and procurement guidelines to ensure alignment between the DfT's and Local Authorities' strategic objectives.

This is a good example of the UK approach of guiding rather than mandating compliance in the area of ITS.

Hard shoulder bus lanes in Northern Ireland

The M1/A12 Westlink, M2, and M3 motorways, which are key sections of the SRN in Northern Ireland, are connected through a complex arrangement of traffic signals at York Street in Belfast. Construction on the proposed York Street Interchange (YSI) scheme has caused significant congestion and delays for traffic travelling at peak hours. The junction will come under increased pressure to deal with traffic in the future and dedicated bus lanes were identified as a way of encouraging greater use of public transport, freeing up road space.

Measures to mitigate the scheme's wider impacts include the introduction of hard shoulder bus lanes on the M1 and M2 motorways into Belfast, along with the provision of new IP-based CCTV cameras for traffic monitoring purposes by the Traffic Information and Control Centre (TICC). VMSs are also provided to give clear communications to road users on the status of the bus lanes, and any emergency or maintenance closures.

A regulatory review, including a consultation on MicroMobility, flexible bus services and Mobility as a Service (MaaS)

Through the Future of Transport Regulatory Review, the Department for Transport is seeking to modernize old regulation, address gaps and remove barriers to transformational change. In practice this means:

- Removing outdated regulation that is a brake on innovation
- Updating regulation to address new approaches and business models
- Introducing new regulation to manage change for consumer benefit.



As part of the DfT's Regulatory Review a [call for evidence](#) was held in 2020 which focused on three priority areas; MicroMobility, flexible bus services and Mobility-as-a-Service (MaaS). There were also questions to inform department's wider work on the Review. Stakeholders stated that the pandemic provided a moment to consider how to reshape transport, including in context of building back greener to make the economy more sustainable and resilient. The Government response was published on 24 November 2020.

Following a 2020 Call for Evidence, a further consultation was launched in September 2021. This is the third opportunity to gather stakeholder views on the Future of Transport Regulatory Review. The DfT are currently seeking views on Future of Flight, Regulatory Sandboxes, Maritime Autonomy and Remote Operations, Zero Emission Vehicles and Modernising Vehicle Standards.

Ultimately the regulatory review may conclude that substantive legislative reform is required. The DfT will continue to engage with stakeholders as plans develop and as the DfT determine areas where changes to primary legislation are necessary. Where that is the case, the UK would look to bring forward legislative proposals as soon as Parliamentary time allows.

2.5.1.2 Projects

Micro-mobility and creating a national standard/procurement framework

The DfT announced new regulations for rental of e-scooters. This follows an accelerated consultation into e-scooters, which was launched in May to support the government's £2 billion investment into green transportation initiatives. The new regulation will allow local authorities and devolved administrations to operate (or permit the operation of) e-scooter rental schemes. This is a significant expansion of the original proposal to run trials in four designated zones in 2021, and will allow the DfT to actively monitor the benefits of e-scooters as transport networks open up after the sustained period of lockdown caused by COVID-19. Existing regulations regarding the design, safety and use of e-scooters were amended.

Guidance for the trials state it as a time-limited opportunity for areas and operators, and emphasises that, to take advantage of this period, they must work together to learn how best to integrate and deliver the benefits of e-scooters.

The trials will run for a 12-month period, commencing on the day that the e-scooters are made available to the public in the area.

On Highway / Off Highway Communications and Safety System Analysis

As agricultural mechanisation continues to innovate towards automation, machines large and small will inevitably need to use public highways to move from field to field due to the dispersed nature of UK agricultural farmland.

Through funding by Innovate UK, a feasibility study was conducted whereby it aimed to understand the crossover of technologies and communications that could enable agricultural robots to share the highway. These technologies may also enable autonomous farm machinery to work together safely in groups within agricultural fields.

The research started with an investigation into current operating standards, state-of-the-art automation, and novel Vehicle-to-Everything (V2X) systems. It ended with the identification of the most suitable technology for agricultural robots to operate at Level 4 autonomy in both field (off road) and road conditions.

Hinkley Point C - GLOSA

Hinkley Point C (a new nuclear power station) is one of the largest construction projects in Europe, set in a rural coastal location. 750 HGV movements are expected every day at site, with traffic is split between



two designated routes. In addition, up to 5,600 construction workers daily are estimated to be transported from park and ride facilities. Route repeatability and journey frequency presented a valuable opportunity for GLOSA technology to be deployed.

Through the DfT's innovation fund, GLOSA was implemented to mitigate the impacts of construction to vehicles on site. This has reduced the impact of HGV movement through the more efficient control of vehicle start/stop cycles, by enhancing existing traffic signals and deploying GLOSA technology in HGVs and PSVs.

2.5.2 Progress since 2017

Outside the Priority Areas developments in ITS have focused on:

- reducing public dependence on personal internal combustion vehicle use
- reducing/managing congestion by encouraging modal shift
- efficient use of road space
- supporting Local Authorities in the deployment of ITS
- Clean Air Zones (although not listed as projects, clean air zones have been established in Birmingham and Manchester relying heavily on ITS for enforcement and the London Ultra Low Emission Zone has been extend to 18 times its original size)



3 Key Performance Indicators (KPIs)

The UK does not gather statistics in the format stipulated in 'Intelligent Transport Systems Key Performance Indicators for the EU' as required in the '2020 template national ITS Directive 2010/40/EU Progress Report'.

Investigation of available statistics shows it is not possible to use them to generate equivalent statistics.



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5 UK Compendium annex: ITS in the UK - Initiatives and Projects

The UK Compendium is a separate document jointly submitted entitled '*EC ITS Directive – ITS Technologies in the UK - Initiatives and Projects - Compendium Annex*'.

This stand-alone document is an annex to the EC ITS Directive 2022 Progress Report, providing the dimensioning information requested and more detailed initiative & project descriptions.



6 UK Delegated Regulation Reports annex

The UK Delegated Regulation Reports annex is a separate document jointly submitted entitled '*EC ITS Directive – ITS Technologies in the UK - UK Delegated Regulation Reports Annex*'.

This stand-alone document acts as an annex to the EC ITS Directive 2022 Progress Report, providing the information requested under the EU Delegated Regulation reporting obligations.