



Intelligent Transport Systems in the UK

**Report on Information on National ITS actions
envisaged over a five year period**

As required by European Union Directive 2010/40/EU

September 2012

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1. Introduction

As a world leader in Intelligent Transport Systems (ITS) the UK recognises the EU ITS Directive as an important opportunity to share skills and experience with fellow Member States, especially given the considerable investment the UK has already made in the development and deployment of ITS.

The following report is submitted by the UK Department for Transport (DfT) in accordance with Paragraph 2 of Article 17 of Directive 2010/40/EU which requires Member States (MS) to submit to the Commission by 27 August 2012 a report on national ITS actions envisaged over the following five year period.

The report is an update on the previous National Report which was submitted to the Commission in August 2011. It is structured around the 4 Priority Areas identified by the ITS Directive and has been drafted in line with the Guidelines for Reporting by Member States, adopted by the European Commission on 13th July 2011. Please refer to the previous National Report for more detailed explanation and description of the ITS systems currently deployed in the UK.

The Guidelines for Reporting state that the report on national ITS actions envisaged over the following five-year period should consist of a general report on the activities planned in the next five years related to deployment of ITS in the Member State, as well as relevant information on:

- The national approach on the development and deployment of ITS, including its main objectives;
- The technical and legal framework applicable to the development and deployment of ITS;
- The national priority areas for actions and related measures, including an indication of how these are related to the priority areas laid down in Article 2 of Directive 2010/40/EU;
- ITS deployment activities;
- The implementation of current and planned actions.

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2. National Approach to ITS

Our vision is for a transport system that is an engine for economic growth, but one that is also greener and safer and improves quality of life in our communities. By improving the links that help to move goods and people around, and by targeting investment in new projects that promote green growth, we can help to build the balanced, dynamic and low-carbon economy that is essential for our future prosperity.

We also want our roads to become safer, less congested and less polluted. So we aim to promote the more effective use of strategic roads by addressing the causes of congestion, and continue to improve road safety.

The UK national authorities provide leadership across the transport sector to achieve its objectives, working with regional, local and private sector partners to deliver many of the services.

As part of this, we encourage and support the introduction of the latest technologies, which have an important role to play in enabling the achievement of our transport objectives.

Technology is a vital tool for delivering policy objectives, but it should be recognised as a means to an end, not an end in itself. The UK therefore has no overarching strategy or architecture in relation to ITS, but has developed specific architectures to aid the development and deployment of systems targeted at achieving specific policy goals.

Future technological developments will mean that ITS will play an increasing role in contributing towards achieving transport policy objectives, though the costs, benefits and effectiveness of deployed technologies will vary between Member States according to national priorities, existing infrastructure and network characteristics. It is therefore vital that Member States retain the final decision on whether and where to deploy systems to ensure that they are fully aligned with national policy objectives and make the best use of available resources.

In choosing to develop and deploy ITS in the UK, 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 transport challenges.

This includes devolving decision-making on development and deployment to regional and local level wherever possible, as highway authorities are often best placed to judge where and how best to manage congestion and deploy traffic management systems. We do not believe that national government should impose new technologies from above.

We also work closely with industry, incentivising and removing potential barriers so that the private sector can innovate and progress rapidly to deploy ITS where it best delivers the goals we all agree on. The future deployment of ITS must therefore be not only policy led but backed by rigorous cost-benefit analysis and sound business cases focusing on value for money and the effectiveness of the ITS applications concerned.

Specifications and standards developed under the ITS Directive must also reflect the changed landscape in which we are now operating. Therefore, whilst standards can be helpful in supporting industry led innovation, it is vital that they should not impose unnecessary and unfair burdens. Likewise, the development of new specifications and standards must seek to avoid duplicating work already taking place elsewhere, in particular aiming to accommodate and build on the significant ITS infrastructure already deployed by Member States. In addition, specifications and standards should be open, performance based, and non-proprietary, developed through existing bodies and in consultation with the ITS Industry, as is set out in Annex II of Directive 2010/40/EU.

Finally the UK considers that existing EU activities in the field of ITS such as the EU ITS Directive and Action Plan and the EasyWay Project are sufficient to ensure the successful deployment and interoperability of ITS across Europe. Further frameworks in the field of ITS are therefore unnecessary and would represent further duplication of effort. Within existing frameworks common ground and differing objectives need to be recognised to ensure a fully joined up approach to ITS across all levels within the Union. This will be vital if the EU is to progress with the coordinated and interoperable deployment of ITS whilst minimising the economic and administrative burdens on Member States.

3. Technical and Legal Framework

3.1 Introduction

3.1.1 The UK has no overall ITS Architecture for the development and deployment of ITS but it has developed specific architectures where deemed necessary to tackle individual policy problems. Each context is considered on a case by case basis in order to optimise the overall benefits in responding to strategic and local policy needs. The UK Government works closely with both public bodies and private industry to establish a clear position where appropriate.

3.2 Legal Framework

3.2.1 The legislative framework for the development and deployment of ITS services varies across the UK. The Traffic Management Act 2004, for example, 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.

3.2.2 The Traffic Signs Regulations and General Directions (2002) 2002 (TSRGD)¹ prescribes signs that are placed lawfully on the highway in England, Scotland and Wales. These regulations define Variable Message Signs (VMS) and prescribe the messages that may be provided, together with the signs which form the basis of the pictograms displayed on VMS. Traffic signs in Northern Ireland are subject to the Road Traffic Regulation Order (Northern Ireland) 1997².

3.2.3 The managed motorway programme in England is delivered through secondary legislation. These Statutory Instruments permit variable speed limits and hard shoulder running at congestion “pinch-points” on the motorway – see for example the M62 Motorway (Junctions 25 to 30) (Actively Managed Hard Shoulder and Variable Speed Limits) Regulations 2012³.

3.3 Urban & European ITS Architectures

3.3.1 The UK has world-leading capability, facilities and experience in the Intelligent Transport sector. We have been an early adopter of systems, especially in the field of traffic and travel information. The development of these systems has required frameworks and standards to be adopted to ensure common standards and deployment.

¹ UK Statutory Instrument 2002/3113

² Northern Ireland Statutory Rules 1997/386

³ UK Statutory Instrument 2012/1865

3.3.2 The UK strongly supports the value of standards in facilitating the effective operation of an open supply market. We do this in a number of ways, including:

- Developing and maintaining de facto standards, through collaborative public-private bodies;
- Developing and managing national specifications;
- Participating in European or international standards through CEN/CENELEC/ETSI and ISO/IEC/ITU.

3.3.3 There are key standards and specifications in use within the UK for:

- Urban Traffic Management Control (UTMC) systems, which are used principally on the local road network;
- 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 (especially NaPTAN and TransXChange) and Transmodel “daughter” standards within CEN (SIRI, IFOPT, NeTEx etc) for public transport operations and passenger information – which enable data to be shared and exchanged and also for systems to be able to request and respond to enquiries giving a federated travel information and journey planning architecture;
- RTIG specifications (principally UK) for certain key interface in bus operations;
- RDS-TMC for traffic advisory systems;
- General ICT industry standards (fixed and mobile internet, fixed and mobile telecommunications) such as HTTP, GPRS etc;
- Local standards managed by the Highways Agency for highway mounted systems, especially covering safety issues.

National Priority Areas and Actions

4. European Priority Area I: Optimal Use of Road Traffic & Travel Data

4.1 Introduction

- 4.1.1 Accessible information on traffic and travel data is vital for enabling people and businesses to plan their activities, get easier access to markets and make strategic investment decisions. Such data therefore supports more effective logistics, infrastructure planning and better operations of our highway and public transport networks. The economic cost of inefficient travel and transport is high, and can be mitigated by open access to travel, traffic and road disruption data.
- 4.1.2 The UK has invested in ITS and the management of traffic data to provide more integrated services, better information to road users, and more efficient and safe operations of the highway network. The UK travel information infrastructure, for example, including the National Rail, Transport Direct, Traveline and car journey planners probably exceeds one billion requests per annum. Further details of this investment, and the benefits it provides, was reported in the first National Report. This section focuses on the further enhancements to systems since the Report and highlights the programmed improvements over the next five years.

4.2 Using ITS to enable transport users to make informed choices about their Journey

Transport Direct

- 4.2.1 Transport Direct (TD) is the cornerstone of the UK travel information system. TD is funded by central government with a build cost of £40m and annual operational costs of £7m. It combines all forms of public transport and enables users to compare with road journeys and offers some pricing information for trains, coaches and the cost of driving. It was developed by federating existing journey planners and data sources together and enabling their integration through common data referencing and information sharing protocols to ask questions and receive answers.

4.2.2 Journeys can be planned between over 30 million origins and destinations and users do not need to have any prior knowledge of their modal options. There are around 25 million unique sessions per annum including internet, mobile phone, smart phones, digital TV, kiosks and third party white labelled sites.

Progress since the National Report

4.2.3 In 2012 two major new features have been added to Transport Direct which are the integration of real-time information into car journey planning and batch processing of multiple requests.

4.2.4 The real-time information in car journey planning features the travel news service that has been part of Transport Direct since inception, where planned and unplanned disruptions are captured from a host of sources including technical and manual systems. These reports are then assessed for their extent and severity and they are also journalised into user-friendly format. The new functionality involves their association with a topological identifier on the road network that enables the report to be linked with a planned route. The report is then flagged on that route and the user can choose to re-route to avoid the incident or delay.

4.2.5 The batch processing capability enables users to request multiple journeys in a single request by submitting a series of origins and destinations, together with the date and time of the journey, and potentially a return journey in addition. The functionality has attracted considerable interest and usage ranging from developers, companies, groups, academics, individuals and public bodies such as the Crown Prosecution Service.

Future plans

4.2.6 The main Design, Build and Operate contract for Transport Direct comes to an end in 2013 and options for future provision of services are currently under discussion.

4.2.7 In developing these options it is important to note the many developments that have occurred in the ten years from the contract inception in 2003. These include major advances in journey planning algorithms, computing capacity and cloud computing, the emergence of new channels such as social media, smartphones and instant messaging and the changing expectation of users.

4.2.8 Finally the multitude of new application providers and the move to publishing data in an open and accessible format means that these need to be factored into the future provision. This is in terms of both delivery but also governance and the structure of the overall travel information market.

The London 2012 Spectator Journey Planner

4.2.9 The Spectator Journey Planner for London 2012 Games was launched in August 2011 having been commissioned as part of a Travel Demand Management Programme by the Olympic Development Authority. It is based on the Transport Direct functionality and data structures but has a number of new pieces of functionality to tackle a number of Games specific issues.

4.2.10 The Planner is provided in a cloud environment, to provide scalability and also to reduce the cost of hosting. Design features include the ability to plan trips to Olympic venues rather than to a specific geographical point. The model entailed defining gates, queuing, internal walking routes and crowding allowances. In addition, some 400 stations and other access points have been surveyed and accredited as being suitable for level access or where assistance is guaranteed to be available. The planner performs a series of yes/no checks for a suitable route that matches the user's stated requirements.

4.2.11 In order to keep spectators informed of incidents that may affect their journey new functionality enables reported road and public transport planned or unplanned events to be associated with the journey itinerary planned. For public transport this is an extension of the Transport for London (TfL) system where journey notes are associated and displayed with journey plans where the route passes through or interchanges at an affected location. The road journey planning functionality will be especially important on the mobile journey planner for spectators already on their journeys.

4.2.12 The Olympic Route Network will have a major effect on the operation of the road network, notably in London, around Heathrow Airport and on the route down to Weymouth. To show this effect on other road users a complex model of road identifiers, dated restrictions, altered priorities, direct delay attribution and areas of influence has been devised. This is applied to the road network models so that routes and timings can be moderated to take the games network into account.

Future plans

4.2.13 In legacy much of this functionality will be available to be included in the permanent journey planners such as Transport for London, Traveline and National Rail Enquiries.

4.2.14 Overall nine areas of legacy have been identified for future exploitation:

- Cloud hosting – in order to achieve scalability and efficiency of operation the SJP has been successfully hosted in a private cloud environment which importantly has also passed the very high security requirements required by London 2012, giving the potential for major savings in future service hosting;
- Travel Demand Management – to match predicted demand for services with the known capacity of routes and stations a series of routing rules has been drawn up to equalise these parameters. This could be applied to day-to-day operations with known capacity issues (e.g. Central London) and also to major event operations where short-term imbalance is likely to occur;
- Accessible Travel Planning – given the success of this facility for the SJP and the relative ease and cost of the implementation of the accessible network approach and the yes/no planning request, rolling this out to existing systems such as Traveline is seen as a priority;
- Planning to Venues – the traditional method of planning to a fixed point is not effective where there is a complex location with multiple access points and where demand needs to be spread for both operational and user benefit. This is likely to be applied to major events and also access to complex locations such as airports;
- Real-time in Car Planning – implemented in Transport Direct due to the lack of parking at Games venues, but developed to show the effect of the Games roads restrictions on car journeys, this shows how unplanned disruptions can be described, and then applied to journeys. Potential for major disruptions, congestion, dynamic routing and even unforecast weather;
- Real-time in Public Transport – an extension to the TfL system across the whole of Great Britain with the ability for multi-agency input and sharing via the Journey Web protocol, numerous potential applications from unplanned incidents to congestion and dynamic routing advice;
- Plotting of Major Planned Road Changes – the Olympic Route Network and the major road events were plotted and their effect on traffic flows modelled across a wide network. This has potential for major roadworks, major events and known regular traffic problems;
- Zonal Fares – the ability to identify legs of individual journeys that are covered by Zonal fares, in this case the Games Travelcard. This links to the work on smart and integrated ticketing and the combining of travel itineraries and relevant fares data;

- **Mixing Real and Synthetic Future Data** – the meshing of real-time data a year in advance of the Games for National Rail and TfL rail, with existing (2011) data for local bus services and other modes. This has potential for visualising the effect on new service provision on existing networks and also for an effective phased approach to data provision enabling pre-planning timescales to be lengthened.

Traffic England

4.2.15 The Highways Agency provides a traffic information website which makes details of, delays, closures, road works and other information publically accessible. This allows those undertaking journeys to use the site to help them plan future journeys, to avoid planned works (such as road works, planned closures etc) or check an imminent journey to verify current travel conditions.

Transport Scotland: Traffic Scotland Information Services (TSIS)

4.2.16 The Traffic Scotland Information Service (TSIS) provides real-time information about the Scottish road network to the travelling public. TSIS disseminates information across a variety of platforms, including, Variable Message Signs, desktop and mobile websites, smart phone applications, Really Simple Syndication (RSS) feeds, Twitter, a dedicated call centre, national, local and commercial media and via a streaming internet radio service. The purpose of TSIS is to help drivers make informed decisions about the timing, routing and mode for current and future journeys. TSIS shares information using DATEX II with the bordering regional roads authority, the Highways Agency, to help deliver a seamless cross-borders experience for the traveller. Furthermore, TSIS works, alongside Transport Scotland Network Operations Branch, with partners responsible for special events, for example 'T-in-the-Park' and the British Open Golf in order to develop and deliver dedicated event web sites, thereby proactively helping manage events which impact on the strategic network. TSIS is guided by the TSIS Development Strategy, which reflects the European, UK and Scottish policy framework and is constantly evolving in line with latest technological innovations. This ensures the continued efficient and effective delivery of a robust, reliable and relevant service to regional, national and European travellers.

Future Plans

4.2.17 In the coming years the main emphasis will be on reviewing the development strategy to ensure it reflects current policy priorities including:

- Continuing to improve the resilience of the service ensuring high availability at mission critical periods by ensuring back office hardware and software applications keep pace with growth in demand;

- Developing greater personalisation to help users get only the information that is relevant to their journeys;
- Enhancing weather related information;
- By further developing the offering to the mobile users to keep pace with improvements on smartphone technology platforms and capitalise on the developments in the devices themselves and their ability to process data faster e.g. through the availability of 4G networks;
- By extending the availability of journey time information to users both on VMS and mobile platforms through the use of new technology solutions; and
- Through extending partnerships with major cities to share data, maximising benefits of overall investment to the user.

Traffic Watch Northern Ireland

4.2.18 TrafficwatchNI is the traffic information website of the Department for Regional Development, Roads Service in Northern Ireland. It provides real time information on prevailing traffic conditions on the road network and also enables the public to view images from traffic monitoring cameras. Information on planned and emergency roadworks is also provided. The website is continuing to be further enhanced to include journey times and a route planner.

The Open Data Agenda and traffic/travel information

4.2.19 The UK Government has transparency and open data as a core policy driver and over the past two years has driven a wide range of measures to make government and public services more transparent and to release data for use and re-use by third parties.

4.2.20 The open data agenda presents opportunities to provide better information to the public to inform their travel choice. To date there have been a series of significant transport Open Data releases including:

- The NaPTAN dataset of all 350,000 transport access nodes in Great Britain (bus stops, rail stations, metro stations, tram stops, airports, ferry terminals etc);
- Rail Timetables – weekly set of rail timetables for Great Britain;
- Roadworks data for the Strategic Road Network (SRN) in England;
- Roadworks data for local authority roads in about 70% of English authorities;

- Real-time data about the operation of the SRN including speeds, incidents, traffic signs etc;
- Car Park register of over 20,000 car parks across Great Britain;
- Cycle routes across every local authority in England.

4.2.21 As part of this process, the Highways Agency has made available much of its traffic data. A service has been set up to allow partner organisations (for example local transport authorities, media organisations) access to the National Traffic Information Centre (NTIS see section 4.3).

Progress since the National Report

4.2.22 In May 2012 Government announced plans to establish the world's first Open Data Institute (ODI) as the leading centre in which the exploitation of Open Data is demonstrated. The ODI will incubate, nurture and mentor new businesses exploiting Open Data for economic growth and promote innovation driven by the UK Government's Open Data policy.

4.2.23 As a result of this open data policy, there are no licensing restrictions on its re-use. For example, the Highways Agency has entered in to an agreement with TomTom to supply the live traffic information from automatic traffic counters to motorists through their satnavs. There has also been a significant growth in the availability of data without recourse to the public sector. There are smart phone applications that allow the "crowd sourcing" of information on congestion conditions on the road network, information that is both inputted by motorists and automatically generated by the apps tracking the GPS location of the phones.

4.2.24 The UK public sector has demonstrated that it has a key role to play in opening up data, enabling developers and other third parties to access raw data which the private sector using to build new, innovative applications and services to provide improved information for the traveller. A couple of examples are demonstrated below.

ELGIN – open data for road works

4.2.25 ELGIN is a private company that aggregates data from over 90 local highway authorities, providing the largest dataset on road works conditions, publishing 1.7 million individual road works annually (1.1m unique to ELGIN, and the rest for the Highways Agency and TfL data which is fully integrated). It launched roadworks.org in March 2012 which publishes up-to-the minute information about local road works on a live map, which helps to reduce congestion and better co-ordinate road work planning.

Cycle Streets

4.2.26 Open data on traffic conditions can benefit all road users. Cycle Streets is providing a wide cycle journey planner system, currently in the testing stage, that allows the planning of journeys by cycle and will highlight busy sections of road and factor in the delay to journey times caused by road geometry and traffic signals. It combines a number of datasets including, crucially for cycling journeys, data from Ordnance Survey on the gradient of streets.

Future plans

4.2.27 In May 2012 the Government and public bodies announced their intention to make the following publically available, to help foster more innovative applications:

- Rail real-time information across all Network Rail (June 2012);
- Next Bus information for all 350,000 bus stops across Great Britain (May 2012);
- Bus timetables – weekly set of bus timetables for Great Britain (May 2012);
- Road condition data for the English road network (Dec 2012);
- Driving test data broken down by age and gender and by test centre (July 2012);
- Driving licences by age, gender, geographical area etc (July 2012);
- Rail performance at below franchise level (May 2012).

4.2.28 The Government has also issued an Open Data White Paper that sets out its intentions in this area over the future period. This includes a Presumption to Publish public data as Open Data but also stresses the importance of privacy (of individuals' data) and the need to effectively share data between public sector bodies.

4.3 Getting real time information to road users

The Highway Agency's National Traffic Information Service

4.3.1 The National Traffic information Service (NTIS) is the replacement contract for the pre-existing National Traffic Control Centre (NTCC) Contract. The new contract, which started in September 2011, required the continued delivery of the outputs from the initial service, these being to:

- Provide accurate real-time traffic information to the public using a number of different methods;

- Minimise the congestion caused by incidents, road works and events taking place near the motorway and trunk road network;
- Provide information on diversions to help motorists avoid the queues.

4.3.2 Furthermore the new contract is required to deliver:

- The ability to report on network performance through accurate data collection and processing;
- The ability to measure the effectiveness of HA interventions;
- Improved road user satisfaction through provision of better information services to the public;
- Enabling more efficient operations through;
 - (a) Automated incident detection
 - (b) System links to reduce manual processes
 - (c) Providing a single strategic overview of the network;
- A flexible solution that can be adapted to take advantage of more data and changes to operations, the organisation and new technologies delivered in-car (or through mobile devices).

4.3.3 To achieve the above objectives, traffic data is collected from CCTV cameras and on-road sensors. This is used together with the information supplied by Traffic Officers, Police Forces, Local Highway Authorities and Service Providers etc. This information is then processed, analysed and disseminated to the public in a number of different ways.

4.3.4 From the information collected the operators are able to identify events (either future or current), form strategies to manage traffic flows, set information signs to warn drivers or give diversion routes, inform partner organisations, advise the media and either through the media or directly with the public, inform travellers about conditions on the Highways Agency's network.

4.3.5 In addition to the Traffic England services (see paragraph 4.2.14), the following services were established through the NTCC Contract:

- **DATEX II** – This service allows partner organisations (for example local transport authorities, media organisations) access to the NTIS data. DATEX II delivers a data feed which is transferred between Information and Communication Technologies (ICT) systems without the intervention of control room operators or staff at the receiving end. This allows data to be taken from NTIS and added into partner organisation systems, which is then integrated with their own data. In terms of the media organisations this enables them to better inform the public. There are currently over 150 partners taking the DATEX II feed;

- **Incident Information** – Further services have been set up to allow direct liaison between media organisation reporting incidents and the NTCC. This allows media organisations the ability to obtain further incident details and incidents;
- **CCTV Cameras** - The HA owns over 2000 traffic cameras to assist with the management of traffic on the trunk road and motorway network in England for nearly 30 years. It has put in place licensing arrangements for access to motorway traffic cameras and this real-time information is now available via the internet through numerous channels (BBC Radio local web sites, Google etc) and private business who developing their own solutions; and
- **VMS** – These can be set to warn travellers of planned future or current events, (roadwork's, planned closures or major events such as concerts, sporting events etc). VMS are set so travellers can avoid future congestion, divert around current incident or be warned about queues ahead.

Future plans

4.3.6 In April 2011 the chief executives for both the Highways Agency and the Dutch highways authority, Rijkswaterstaat (RWS) gave their approval for a programme of work focussed on defining a new generation of traffic management systems, which may be jointly purchased by both organisations.

4.3.7 The programme is called CHARM (Common Highways Agency Rijkswaterstaat Model) and aims to define control systems solution(s) for use by the next generation of traffic management centres to:

- be flexible and scalable in order to meet current and future traffic management processes;
- enable technology resilience;
- prevent long term vendor lock-in by using open standards, commercial off the shelf (COTS) products and/or managed services; and
- significantly reduce the cost of ownership and number of supporting contracts.

4.3.8 In December 2011 a comparison of the business processes in both organisations was completed which showed that the Agency and RWS are sufficiently similar in the way they operate their strategic road networks that a common new generation of traffic management systems can be defined. The programme will build on this to define a set of common business requirements that will be used to define potential solution(s) for consideration.

4.3.9 The work will conclude in December 2012 with the delivery of a business case and procurement strategy for the new generation of traffic management system.

Transport Scotland: Traffic Scotland Control Centre

4.3.10 The construction of the new control centre is currently underway in South Queensferry. This will contribute to the delivery of the Traffic Scotland Service which has the following benefits:

- Improved journey time reliability;
- Reduced disruption caused by incidents and roadworks;
- Minimisation of the effects of congestion by the provision of alternative route advice;
- Ability of travellers to make informed decisions concerning route, time and means of transport by the provision of credible and accurate travel information;
- Improved safety and security for travellers;
- Continuity of the existing service and consolidation of all functions including those still located within Glasgow City Council premises;
- Replacement and consolidation of a existing facilities (some of which >25 years old) becoming increasingly inadequate in terms of space, facilities and access.

Future Plans

4.3.11 The new control centre is due for completion and will be fitted out in early 2013, and at this time the Traffic Scotland service will transfer operations.

Variable Message Signs

4.3.12 Variable Message Signs (VMS) are located at key decision points on the motorway and trunk road network. A large number of VMS have been placed across the UK (there are round 2,800 VMS on the Strategic Road Network in England alone) for several decades to help manage the network by providing advance warning to drivers of emergencies and incidents. They warn drivers of queues ahead by using sensors that automatically detect vehicle speeds ahead of the driver and warn of slow or stationary traffic; give strategic diversion around congestion, warn of accidents or road closures; warn of future major events that will impact upon journeys; and to give travel times on VMS (a sign giving a distance between junctions and the average time taken to travel that route).

Progress since the National Report

4.3.13 The majority of the south Wales M4 east-west corridor from the border with England at the Severn bridges to the ports in west Wales is covered by VMS with gaps being in-filled on a prioritised basis. In this area VMS installation is also underway to support the primary south Wales east-west diversion route (A465) and routes thereto should the M4 route be closed.

4.3.14 The north Wales east-west corridor A55 has VMS coverage, particularly in and around the A55 tunnels at Conwy, Penmaenbach and Pen y Clip. Infilling of the VMS is ongoing in accordance with the Welsh Government (Transport) strategy and route management plans.

4.3.15 Approximately €700,000 was invested in VMS design/installation in 2011/12.

4.3.16 In Northern Ireland there is extensive VMS coverage over the most heavily trafficked parts of the motorway network.

Transport Scotland: Variable Message Signs Deployment

Overview

4.3.17 Transport Scotland continues to invest in Variable Message Sign (VMS) technology, in line with the Transport Scotland ITS Action Plan.

4.3.18 By providing improved VMS coverage, Transport Scotland can continue to improve the Traffic Scotland service, improving the operator's ability to manage and operate Scotland's Trunk Road Network efficiently.

4.3.19 Deployment of VMS technology has been targeted across the Scottish Trunk Road Network, improving efficiency and safety while reducing emissions.

Future plans

4.3.20 Transport Scotland continues to identify and fill gaps in the VMS network across Scotland's Trunk Road Network, in order to improve the levels of real time traffic information and guidance provided to road users.

4.3.21 As part of the construction of the Forth Replacement Crossing, currently on track to be delivered in 2016, and related Fife ITS and Junction 1A projects, the following VMS equipment will be installed:

- 142 Lane Control Unit (LCU) Standard units;
- 44 LCU Enforceable units;
- 57 MS4 VMS;

- 1 Bus Shelter VMS;
- 10 Local VMS (Advanced Direct Signing);
- 2 Rotating Prism VMS;
- 2 Local VMS.

4.3.22 Furthermore, as part of the M8/M73/M74 Motorway Improvement Programme, estimated to begin construction in 2014, 20 Strategic VMS (MS4 6x23 cantilever) will be installed, as well as 35 gantries with VMS equipment.

Public Access CCTV

4.3.23 Traffic Cameras have been installed over many years to assist with the management of traffic on the trunk road and motorway network in the UK to monitor and manage congestion and incidents. The cameras give a bird's eye view of what is happening which helps the operator to decide on the support needed. Procedures have been established to deliver live information, from the cameras, to a variety of media sites to inform the public of travelling conditions. This allows citizens to consider, before they travel, whether to travel, to change route or mode of transport, or in-trip to divert onto a new route.

4.3.24 The Welsh Government spent approximately €300,000 in CCTV design/deployment in 2011/12.

Future plans

4.3.25 Roads Service in Northern Ireland aims to increase monitoring capabilities and incident detection rates through further deployment of CCTV cameras on critical routes on the strategic trunk road network in line with the ITS Deployment Strategy.

Transport Scotland: Deployment of CCTV

Overview

4.3.26 The primary objective of this project is to deploy monitoring infrastructure for the collation of images that are fit for purpose and help enable the Traffic Scotland Control Centre to monitor and operate the Trunk Road Network efficiently, as well as achieving an appropriate level of service throughout the TERN sections of the Trunk Road Network. Particular emphasis is placed on congested, safety critical spots and weather critical sections of the network.

Future Plans

- 4.3.27 Transport Scotland aims to further increase monitoring capabilities and incident detection rates by targeted deployment of CCTV cameras on critical routes on the strategic trunk road network in line with the ITS Deployment Strategy.
- 4.3.28 For example, as part of the construction of the Forth Replacement Crossing, currently on track to be delivered in 2016, and related Fife ITS and Junction 1A projects, 74 CCTV cameras will be installed.
- 4.3.29 Furthermore, as part of the M8/M73/M74 Motorway Improvement Programme, estimated to begin construction in 2014, 21 CCTV cameras will be installed.

In-vehicle driver information in the UK

- 4.3.30 The UK has a mixture of free to air and private traffic information services that can be received in the vehicle. There is an established UK market for private sector services feeding journey time and congestion data which is provided by sat-navs purchased by vehicle makers and providers of in-vehicle navigation systems to alert drivers to potential safety issues and disruption on the network. The information is delivered to vehicles by radio using the Traffic Message Channel (TMC) which has been in place for over ten years.
- 4.3.31 In the UK, there are now over 4 million UK RDS-TMC sat-nav users and this continues to grow as new vehicles are adopting TMC all the time. The cost of this service is included in the sat-nav or vehicle and there are no other costs to the user (i.e. it is free at point of use). The UK is working closely with the European Commission and its draft specifications for the EU ITS Directive to ensure that the mixed market approach, which successfully provides this safety related traffic data, is recognised and allowed for in the drafting of specifications.

In-car Satellite Navigation developments in the UK

- 4.3.32 The Department for Transport is working with ITS United Kingdom and ADEPT (formerly the County Surveyors' Society) to improve the accuracy of navigation information used in satellite navigation systems. A Joint Working Group has been established and during the next couple of years, a web resource will be created and maintained with the information highways authorities need in order to provide updates to map providers as simply and quickly as possible. This work is particularly geared towards helping to ensure that road freight vehicles receive appropriate routing guidance and use the most suitable routes, and the Road Haulage Association and the Freight Transport Association are both actively involved.

4.3.33 Hosted on the ITS United Kingdom website, the resource will include links to the web-based map updating tools offered by all major providers of map data into satellite navigation services. It will also provide relevant highways authority contacts.

4.3.34 There will also be a campaign promoting the use of appropriate and up-to-date satellite navigation services by freight transport, involving both service providers and the hauliers' representative organisations.

4.3.35 The Joint Working Group is also working with the ROSATTE European project which is active in the same area, to ensure that all relevant information is exchanged and synergies exploited.

Hands-Free Traffic Talker England App

4.3.36 The Highways Agency has collaborated with an American company by giving them access to free data to launch a new "hands free" alerting service for mobile phones (August 2012). The free APP is designed for Apple and Android smartphones and gives motorists access to real-time, personalised traffic and roadway travel information on major highways in England. The Hands-Free Traffic Talker England (HFT England) app broadcasts audible information about motorist's specific travel route and incidents on the network.

4.4 Highway authorities making use of ITS to assist/deliver their real-time traffic management interventions.

Managed Motorways

4.4.1 The term "Managed Motorways" covers a number of interventions the UK is making on the strategic road network which utilise data collection and traffic management technologies to make better use of existing road space and add capacity where it is most urgently needed. These include:

- Smoothing the flow of traffic using variable speed limits (e.g. on the M25) and dynamic use of the hard shoulder as a running lane at busy times (e.g. on the M42) to create a more managed, reliable network;
- Traffic loop detectors and CCTV cameras to monitor traffic flow and set mandatory speed limits accordingly, either by an automated system or by control centre operators.

4.4.2 The most visible element of managed motorways is hard shoulder running. This involves directing drivers to use the hard shoulder during busy periods, by way of signs above the carriageway and other variable message signage, which provide information and direction to drivers along the managed motorway stretch.

Future plans

- 4.4.3 The managed motorways design concept has been reviewed to find cost savings through reduced infrastructure and operational costs, whilst continuing to deliver capacity benefits. Using the knowledge and experience gained from the M42 and M6 managed motorway schemes, the Highways Agency is changing how future managed motorway schemes will operate.
- 4.4.4 A new managed motorways design has been produced which provides for conversion of the hard shoulder into a running lane on a permanent basis. It uses less infrastructure and is quicker and cheaper to build and operate. Less infrastructure means:
- Fewer overhead gantries, moving to verge signalling instead;
 - No need for the dedicated cameras and operating systems required for opening and closing the hard shoulder;
 - Increased space between emergency refuge areas.
- 4.4.5 All schemes commencing construction from late 2012 onwards will be subject to the new designs.
- 4.4.6 Managed Motorways are currently being introduced:
- Between junctions 10 and 13 on the M1;
 - Between junctions 8 and 10a on the M6.
- 4.4.7 In October 2010, the Secretary of State for Transport announced a significant strategic roads investment programme including 14 major schemes, 11 of which are managed motorways, including:
- The M1 in Derbyshire (junctions 28-31) – improving access to Sheffield using managed motorways technology;
 - The M62 near Leeds (junctions 25-30) – adding capacity between Yorkshire and the North West using managed motorways;
 - M60 Junctions 8–12 – provision of dynamic hard shoulder running on the 3.9-mile stretch of the M60 Manchester orbital motorway between junctions 8 and 12 adjacent to the Trafford Centre shopping mall;
 - M1 Junctions 32–35a – provision of dynamic hard shoulder running on the M1 motorway between junctions 32 and 35a serving South Yorkshire and in particular the urban areas of Sheffield and Leeds;
 - M1 Junctions 39–42 – provision of dynamic hard shoulder running on the M1 motorway between junctions 39 and 42 serving South Yorkshire and in particular the urban areas of Wakefield and Leeds. The scheme also connects to the M62 at Junction 42;

- M62 Junctions 18–20 – provision of dynamic hard shoulder running on the 5-mile stretch of the M62 between junctions 18 and 20 which connects to the M60 Manchester orbital motorway at Junction 18;
- M25 Junctions 5–6/7 – this scheme will provide additional capacity using hard shoulder running on the southern segment of the M25 running from the M23 to the M26.
- M25 Junctions 23–27 – this scheme will provide additional capacity using hard shoulder running on the northern segment of the M25 running from the A1M to the M11;
- M6 Junctions 5–8 – this scheme will provide additional capacity through hard shoulder running within the existing highway boundary on 9.7 miles of the M6 from junction 5 at Castle Bromwich in the south to Junction 8 Ray Hall in the north.

4.4.8 Two new managed motorway schemes were announced in the 2011 National Infrastructure Plan, on the M3 in Surrey and on the M6 along part of the route between Birmingham and Manchester.

Transport Scotland: M77 Hard Shoulder Running

4.4.9 Project 9 of Scotland’s Strategic Transport Projects Review (STPR) involves the introduction of enhanced ITS, principally Managed Motorways and Active Traffic Management measures on the trunk road network in Central Scotland and suggests measures such as hard shoulder running for prioritised users.

Future Plans

4.4.10 The M77 northbound between Junction 4 and Junction 1 has been identified as a suitable candidate for a scheme for a number of reasons:

- The proposed scheme represents further opportunity to establish the principle of hard shoulder running in a Scottish context, starting with bus priority. This scheme and the bus lane operation on the Forth Replacement Crossing will also provide further opportunity to build knowledge and contribute to the realisation of STPR Project 9 on other parts of the trunk road network;
- It is an area of the trunk road network already prone to congestion at peak times;
- Approximately 37 scheduled bus services travel north on the M77 within the limits of the pilot during the weekday morning peak;
- There are plans for a strategic corridor approach to bus Park & Ride along the M77 which are being developed in tandem with the pilot proposals; and
- The hard shoulder carriageway is already constructed to full strength.

Urban Traffic Management and Control (UTMC)

4.4.11 The UTMC initiative was launched in 1997 leading to the development of an open and modular approach to the design and implementation of intelligent transport systems in urban areas in the UK. It provides inter-operability, regardless of their source, of a range of components used in traffic management systems and related applications. The system is supported by a technical specification, compliance with which would ensure the inter-operability, regardless of their source, of a range of different components using a common database and communication protocols, such as traffic signal control systems, variable message signs, car parking availability information systems, CCTV, and air quality monitoring stations linking roadside equipment to traffic management centres.

Future plans

4.4.12 UTMC is one of the project partners within the European project POSSE (“Promotion of Open Specifications and Standards in Europe”) which has recently been approved for funding under INTERREG IVC. This project will engage with a range of highways authorities (or their representatives) in Spain, Italy, Lithuania, Czech Republic and Norway. Links have also been made with France. UTMC, along with its approximate equivalent in Germany (OCA), will contribute advice and guidance based on its experience of managing an open specification framework.

SCOOT (Split Cycle Offset Optimisation Technique)

4.4.13 SCOOT is an adaptive urban traffic control system which responds automatically to traffic fluctuations. It does away with the need for signal plans that are expensive to prepare and keep up to date. SCOOT has proved to be an effective and efficient tool for managing traffic on signalised road networks, and is now used in over 250 towns and cities in the UK and overseas.

4.4.14 The benefits of SCOOT compared to alternative methods of control have been well documented. Journey time surveys in Worcester and Southampton found that SCOOT control reduced delays substantially compared with Vehicle Actuation (VA) (i.e. non co-ordinated) signal operation. Typical delay reductions were 23% in Worcester and 30% in Southampton.

4.4.15 In addition to these savings in delay users can benefit from the many traffic management facilities that have been added. These enable users to customise the system to their needs by, for instance, giving priority to particular routes, modes of transport or particular network user groups such as pedestrians. SCOOT UTC systems can be linked to other traffic management and control systems:

- Variable Message Signs [VMS]: car parking; diversions;
- Emergency Green Wave Routes may be specified which can be implemented by remote request from, for example, fire stations;
- Fleet management systems for buses: the bus priority facilities in SCOOT can use bus positions from the Automatic Vehicle Location (AVL) part of fleet management systems to provide priority to buses;
- Fault Identification and Management: SCOOT based UTC systems can be integrated with Fault Management Systems to enable faults to be automatically recognised and passed directly to the relevant maintenance contractor;
- Diversions: SCOOT UTC systems can accept instructions from an external source to implement predetermined diversions, for example in response to a recurrent bridge closure;
- Fixed time plan: SCOOT UTC systems can operate fixed time plans where this is required;
- Estimate of Vehicle Emissions: SCOOT will provide estimates of the Carbon Monoxide (CO), Carbon Dioxide (CO₂), Oxides of Nitrogen (NO_x), particulates and Volatile Organic Compounds (VOCs) emitted by vehicles on a link node or region basis. It also estimates total carbon and fuel consumption;
- UTMC and SCOOT: SCOOT is at the heart of UTMC and it can be integrated into UTMC systems.

DRD (Northern Ireland) Roads Service: Foyle Bridge Safety Management System

Overview

4.4.16 The Foyle Bridge management system has been installed to inform drivers of restrictions to high sided vehicles, high wind speeds, or the bridge being closed for safety reasons. The aim is to restrict the use of or enable the closure of the bridge as and when necessary to improve road safety.

4.4.17 The system was funded by the DRD (NI) Roads Service with EU support.

4.4.18 The system can be manually operated or automated depending upon measured wind speeds. It is enabled for the warning of adverse weather conditions that affect driver's route choice.

4.4.19 Key features include:

- Installation of VMS;
- Installation of in-station equipment;

- Automatic operation of system.

Current status

4.4.20 The system is now installed and operational.

Future plans

4.4.21 In the future it is envisaged that the information may be fed back to the Traffic Information Control Centre (TICC) in Belfast, which is approximately 70 miles from the Foyle Bridge.

4.4.22 Future development may also include the addition and enhancement of driver information signs.

Transport Scotland: Forth Replacement Crossing

Overview

4.4.23 The Forth Replacement Crossing (FRC) is a major infrastructure project for Scotland, designed to safeguard a vital connection in the country's transport network.

4.4.24 Despite significant investment and maintenance over its lifetime, the current Forth Road Bridge is showing signs of deterioration and is not suitable as the long-term main crossing of the Firth of Forth. The FRC is designed to safeguard this vital cross-Forth connection in Scotland's transport network.

4.4.25 The FRC project will provide a range of ITS measures to help regulate the flow of traffic approaching and crossing the Forth.

4.4.26 Benefits of regulating the flow of traffic approaching and crossing the Forth include:

Journey Time Reliability

- Automatic Mandatory Variable Speed Control and metering of traffic joining the carriageway will help maintain a consistent flow of traffic and limit congestion to make journey times more reliable;
- There is clear evidence from similar schemes in England and across the world that ITS increases the operational efficiency and capacity of roads;

Traffic Management & Incident Control

- During incidents or periods of congestion when demand exceeds capacity the system will set signals and message signs to inform and advise drivers to effectively manage incidents and reduce queues;

- Evidence indicates that automatic queue protection can reduce accidents causing injury by up to 13%;

Public Transport

- The ITS system will support the operation of a Public Transport Bus link between Ferry Toll and Queensferry. While the FRC is being constructed, buses will be permitted to use the hard shoulder. In addition, when the existing Forth Road Bridge is closed, for example during periods of high winds, the ITS system will redirect bus traffic to the Forth Replacement Crossing and operate the hard shoulder as an integrated bus and refuge lane.

Current Status

4.4.27 All three main contracts that make up the FRC project have now been awarded and are underway. Fife ITS, Junction 1A and the principle crossing are currently on track to be delivered in 2012 and 2016 respectively.

Future Plans

4.4.28 The FRC ITS system will be monitored and controlled through the relocated Traffic Scotland Control Centre.

4.4.29 The ITS measures will extend along a 22km corridor from the M90 Halbeath Junction over the Main Crossing to the M9 north of Newbridge Roundabout (M9 Junction 1). Overhead signal gantries along the corridor will provide lane control, variable mandatory speed control and incident detection.

4.4.30 These gantries will provide strategic and tactical traffic information to drivers via VMS.

4.4.31 ITS allows mandatory variable speed limits to be applied so that vehicle speeds can be managed during congested periods and in response to incidents. The system can automatically detect incidents and provide information on the road network.

Variable Mandatory Speed Limits (VMSL)

4.4.32 DRD(NI) Roads Service has installed and commissioned a VMSL system on part of the M1 Motorway and the A12 all purpose road Westlink.

Current Status

4.4.33 The scheme is based on the Highways Agency Managed Motorways principle. It is innovative in that the Westlink section of the route already was subject to a 50mph speed limit.

4.4.34 It does not include hard shoulder running, but it can adjust speed limits based on speed/flow information gathered from closely spaced MIDAS loops.

Future plans

4.4.35 An evaluation exercise has to be undertaken.

4.4.36 .A Feasibility Study will report on other sections of the motorway network in Northern Ireland that could benefit from a Managed Motorway/VMSL scheme.

Journey Time Estimations

Current Status

4.4.37 DRD (NI) Roads Service has a cross border EU funded project with the National Roads Authority (NRA) in the Republic of Ireland to provide traffic monitoring and information on the strategically important Belfast to Dublin road corridor.

4.4.38 The system comprises CCTV camera for traffic monitoring and Automatic Number Plate Recognition (ANPR) cameras for estimation of journey times.

4.4.39 There is also a DATEX 2 link between the traffic control centres in Belfast and Dublin to exchange information on incidents and journey times.

Future plans

4.4.40 To develop the system to display end to end, (Belfast to Dublin) journey times.

Transport Wales: Variable Mandatory Speed Limits (VMSL)

Overview

4.4.30 Welsh Government (Transport) has installed a VMSL scheme throughout the busiest section of the Motorway in south east Wales (Junctions 24 to 28 – Newport).

Current status

4.4.31 The scheme (utilising elements of the Highways Agency Managed Motorway along with numerous site specific innovations) is in place and operational.

4.4.32 The system can modify speed limits based on speed and flow measurements from inductive loops installed at 500m intervals and is linked to a compliance system.

4.4.33 In addition to the VMSL indicators, the scheme is supplemented with numerous VMS to advise of the reasons for speed limit implementation or any other network management need.

Transport Scotland: Journey Time System Enhancements

Overview

- 4.4.34 An effective Journey Time System (JTS) is core to the Traffic Scotland Control Centre, allowing the Operator to effectively manage Scotland's Trunk Road Network.
- 4.4.35 Scotland's National Transport Strategy, December 2006, emphasised the need for improved and reliable journey times on the road network.
- 4.4.36 In line with Transport Scotland's ITS implementation strategy, during 2007-10, the JTS enhancements project included the extension and enhancement of the Journey Time System including fusion with the M77 and M8 Automatic Number Plate Recognition (ANPR) system, TMU (Traffic Management Unit) journey times and Passive Target Flow Measurement (PTFM) data, development of a journey time prediction algorithm and increased use of historic profile data.
- 4.4.37 Enhancements to the JTS allowed improvements to be made in how congestion, reliability and journey time reliability were measured on the trunk road network.

Current status

- 4.4.38 These enhancements have allowed for the provision of seamless journey time travel information to both the Traffic Scotland Operators and to pre/on-trip travellers via the Traffic Scotland web and mobile services. Providing such information allows the Traffic Scotland Operators to make informed decisions for the safe and efficient management of the network and allows pre/on-trip travellers to make informed route and mode choices.
- 4.4.39 This reduces congestion and associated emissions, while improving travel time reliability, for users of the Scottish Trunk Road Network. From 2007-11, the following deployments were made:
- Deployment of ANPR cameras on the M8 and A720;
 - Calculation of journey times on M8 and A720 from newly implemented ANPR cameras; and
 - Deployment on other key routes;
 - Selection and installation of a 6 Site trial system;
 - Journey time collaboration with City of Edinburgh (CEC); utilising both Traffic Scotland and City of Edinburgh Council ANPR journey time infrastructure between junction 4 (Whitburn) and Edinburgh City Centre via the M8, A720, A8 and A71 (and vice versa);

- Mobile ANPR system planned for use at road works to measure delay through road works;
- Additional VMS installation on the M8 east of Harthill Service Station, which is now providing journey time information to eastbound road users.

Future plans

4.4.40 Transport Scotland will be procuring a National Journey Time service via the new Traffic Scotland Operations and Infrastructure Services (TSOIS) contract. This will provide journey times across the trunk road network at intervals of approximately 15km.

4.4.41 This will build on our already successful JTS while at the same time ensuring the best value for money from new ITS infrastructure deployment.

4.4.42 In addition to this, and building on initial collaboration with CEC, there is now an agreed approach and methodology for the provision of seamless real-time journey times between the Trunk Road and strategic non-Trunk Road networks through partnership arrangements between Transport Scotland and Local Authorities. Three projects are underway that will utilise non-intrusive Bluetooth technology to generate journey times:

- City of Edinburgh Phase 2 – expanding on the successful service delivered under Phase 1; covering two further routes that traverse the trunk and local road network into and out of Edinburgh City Centre on the A702 and A1;
- Aberdeen City Council - for the first phase two routes have been proposed. Route 1 runs between the A90 South of Aberdeen, B9177 Riverside Drive and the City Centre. Route 2 runs from the A90 North of Aberdeen, the A956 Kings Street and the City Centre;
- Dundee City Council - initially one route has been proposed which runs between the A90 west of Dundee, A85 Riverside Drive and the City Centre.

4.4.43 As part of the construction of the Forth Replacement Crossing, currently on track to be delivered in 2016, and related Fife ITS and Junction 1A projects, 16 ANPR cameras will be installed.

4.4.44 Furthermore, as part of the M8/M73/M74 Motorway Improvement Programme, estimated to begin construction in 2014, 30 Journey Time Cameras will be installed.

4.4.45 The above equipment will continue to expand the information available to the Journey Time System in Scotland.

4.4.46 Two further VMS planned for construction on the M8 in April/May 2012 will be utilised to display journey times, as well as other traffic information and guidance to road users.

4.4.47 Sections of the A9 identified for journey time coverage are the dual carriageway section between Stirling and Perth and the mix of single and dual carriageway between Perth and Inverness, this section in particular providing a vital link to the Highlands and beyond. As there is no alternative coverage on the A9 between Perth and Inverness, this project will primarily involve the installation of Bluetooth non-intrusive detection technology delivering real-time data via GPRS.

Highways Agency: Use of the Internet Protocol (IP) in Roadside Telecommunications

Overview

4.4.45 The National Roads Telecommunications Service (NRTS) provides the telecommunications backbone that connects many thousands of roadside devices (emergency telephones, CCTV cameras, VMS etc.) alongside England's motorways to the Highways Agency's seven Regional Control Centres (RCCs). This network is made up of fibre optic and copper cables that transmit data and voice signals between the devices and the RCCs. The service was procured in 2005 as a circa €500m, 10 year Private Finance Initiative (PFI) including the upgrade of the previous telecommunications provision and ongoing management and improvement of the service.

4.4.46 During the first 2 years of the NRTS contract a new national core IP network was built covering all English motorways. Over recent years, a number of projects have been implemented under the NRTS PFI contract to enable use of the IP – a highly resilient, diversely routed, telecommunications network that can flex and expand to take advantage of developments in traffic management technologies and driver information provision in the future. An IP device may also be contacted remotely for maintenance purposes.

Future plans

4.4.47 An IP converter device is in the last stages of its on road trial and will shortly be rolled out across the whole SRN in England. Once in place, the use of the IP converter will extend many of the benefits of IP to the thousand of existing roadside devices with legacy communications interfaces.

- 4.4.48 All new devices added to the Highways Agency's network are fully IP capable and a project is currently underway to enable approximately 22,000 older non-IP devices to link to RCCs over an IP connection through use of an IP converter device that will replace around 1000 installations of legacy devices called transponders.
- 4.4.49 The NRTS project has recently undertaken tests connecting IP cameras directly into the NRTS network (existing Highways Agency cameras are analogue with codecs installed within the telecoms network) and are currently defining new CCTV services to accommodate such cameras and use open standards for their control and selection. A further project has begun to enable remote management of IP capable road side devices from a central point. Future plans are to utilise this remote management capability to provide detailed information to roadside equipment manufacturers and modernise the fault reporting capability of the roadside equipment.
- 4.4.50 In September 2012, migration of the remaining 1000 transponders to the new converter will commence and proceed region by region across the country. The migration is planned to complete in 2014.
- 4.4.51 Alongside other benefits, the converter (known as the IP Translator) provides full remote communications link monitoring facilities, allowing our telecommunications contractor to monitor the status and physical condition of the older non-IP communications links to the non-IP devices remotely from their operations centre.
- 4.4.52 Initial scoping and investigation is underway into a method of enabling remote access to roadside IP-capable devices. This will reduce the occurrence of roadside maintenance visits (and associated costs) by enabling maintenance contractors and suppliers to obtain detailed information on status and fault causes from office locations. This project is initially focused on the IP controllers used on Managed Motorways to control signs and signals.

Transport Scotland: System Architecture Improvements

Overview

- 4.4.53 System Architecture Improvements relate to the core Incident Management System (IMS) of Transport Scotland's Traffic Scotland Service.
- 4.4.54 System architecture improvements also include improvements to the supporting communications infrastructure and architecture to control road side devices such as Variable Message Signs; Traffic Monitoring Units; CCTV cameras, along the road network.

4.4.55 System Architecture Improvements include:

- Creation of separate Fault, Data and Incident Management systems;
- Creation of 'interim' Traffic Scotland Control Centre and supporting systems;
- Replatforming of core Incident Management System (IMS) onto Itanium based Host computers with OpenVMS operating system;
- Externalisation of system database onto Storage Area Network (SAN);
- Modifications of IMS structure to support future remote site system resilience and disaster recovery;
- Introduction of IP based roadside devices;
- Migration to converged IP roadside telecommunications;
- Migration from analogue to IP-based CCTV control system;
- Trial of GPRS telecommunications for roadside devices and remote laptop system support through dedicated resilient Access Point Name (APN) technology.

Background

4.4.56 Transport Scotland's key objective for system architecture improvements is to increase the efficiency and capacity of all aspects of information exchange on the Scottish Trunk Road Network. These improvements secure better information exchange between the network monitoring infrastructure and associated network management. Thus, IMS operators are able to identify and respond to incidents quicker, to maintain (and where possible improve) journey times and to improve the security of the network. Finally the system architecture improvements have facilitated closer integration with pre- and in-trip traveller information tools through the use of web based information systems, which have seen their own system architecture improvements over the last 5 years.

Current Status

4.4.57 The Traffic Scotland IMS is now based on a resilient cluster of Itanium based host servers on a supported OpenVMS system, with a remote/external disaster recovery host. An Oracle Real Application Cluster (RAC) system provides the IMS with an external and highly available database. Data storage for the IMS is provided through a Storage Area Network (SAN) that automatically replicates data to a remote external SAN connected to the DR host, providing enhanced business continuity and disaster recovery.

4.4.58 .System architecture improvements being worked on currently include IMS system modifications and IP based telecommunications changes to support the design and implementation of the relocation of the current 'interim' Traffic Scotland Control Centre to the new combined Contact and Education Centre/Traffic Scotland Control Centre being built adjacent to the existing Forth Road Bridge, South Queensferry. These modifications will also support the creation of a Traffic Scotland back-up/DR Facility (TSBF) in Glasgow to provide enhanced Service resilience and continuity.

4.4.59 Sections of the road network, including the M74/M8 TERN route and M80 have had their roadside communications replaced with IP based telecommunications along with the conversion to digital based CCTV communications. A current programme is underway to both convert the remaining legacy communications and provide new IP based telecommunications for the Forth Replacement Crossing, along with its associated major road improvement schemes of the M9 J1a and Fife ITS. Transport Scotland have introduced mobile telecommunications connected CCTV cameras and will be trialling the introduction of Thermal Imaging cameras to provide better incident detection in unlit sections of the road network.

Future Plans

4.4.60 Future system architecture improvements will continue to be focussed on delivering the IP based telecommunications infrastructure to control roadside devices on the Forth Replacement Crossing and its associated advanced road schemes. There will be new system functionality associated with this work, including the introduction of Variable Mandatory Speed Limits and bus lane with through junction running. This new functionality will take advantage of some new system architecture, such as the integration of CCTV control directly from the IMS Operator workstations. Other examples of system architecture improvements include the introduction of Highways Agency Digital Enforcement Cameras (HADECS).

4.4.61 System architecture improvements will deliver an operational CEC/Traffic Scotland Control Centre and Traffic Scotland Backup/DR Facility in 2013. Further architecture improvements will be made to improve the recovery time and point objectives along with operational endurance from the TSBF.

4.4.62 The Traffic Scotland web and information systems will continue to be improved through the introduction of virtualisation and application of SANs, along with the provision of remote system resilience from the TSBF. Transport Scotland will continue to investigate the use of social media tools to gather and disseminate both pre- and in-trip information to road users.

- 4.4.63 Additional major road scheme improvements, such as the M8/M73/M74 Network Improvements will continue to result in incremental improvements of the IP based telecommunications infrastructure.
- 4.4.64 A procurement exercise is underway which will see all Traffic Scotland Systems, including the IMS; web systems; Journey Time Systems; CCTV systems; Traffic Data System (formerly SRTDb); along with responsibility for future IP design and procurement, to be integrated into the one contract. This contract will be awarded in 2013. The intention of such an activity is to both, leverage the benefits of having one supplier and to encourage a stronger integration of the disparate systems, improving the Traffic Scotland Operator flow processes and response times.
- 4.4.65 Transport Scotland's key objective for system architecture improvements is to increase the efficiency and capacity of all aspects of information exchange on the Scottish Trunk Road Network. These improvements secure better information exchange between the network monitoring infrastructure and associated network management. Thus, IMS operators are able to identify and respond to incidents quicker, to maintain (and where possible improve) journey times and to improve the security of the network. Finally the system architecture improvements have facilitated closer integration with pre- and in-trip traveller information tools through the use of web based information systems, which have seen their own system architecture improvements over the last 5 years.

The Real Time Information Group (RTIG)

Overview

- 4.4.66 In the UK the Real Time Information Group is a community group providing a focus for those involved in the public transport technology community. RTIG has a wide membership drawn from local authorities, public transport operators and system suppliers. They aim to further the effective use of information and communication technology in the public transport sector by developing and disseminating standards, specifications and good practice.
- 4.4.67 RTIG was established in 2000 specifically to develop standards and good practice guidance for bus real time information, in a UK context. It has since built on that role by broadening its scope and remit, and now works in a number of areas with partners in other Member States.

Current status

- 4.4.68 RTIG was involved in the development of the CEN Service Interface for Real-time Information (SIRI), with RTIG's exchange protocol being one of the key source documents. Several major implementations have taken place in the UK.
- 4.4.69 RTIG has been involved in discussions on the CEN standard for the Identification of Fixed Objects in Passenger Transport (IFOPT) and the in-development standard NeTEx. Through an industry forum RTIG has guided the development of a national IFOPT profile which has been used in planning for Olympics 2012 travel information.
- 4.4.70 RTIG has developed a national standard for bus-to-roadside communications to achieve bus priority at traffic signals. This is now widely used, including across the whole of London's iBus fleet (over 8,000 buses).
- 4.4.71 RTIG has also developed a digital over-air protocol for vehicle-to-centre messaging, focusing on vehicle identification and location. The first deployment of this went live during Summer 2011 and recent survey data indicate that the majority of the UK bus fleet expects to be using this protocol by the end of 2013.

Future plans

- 4.4.72 RTIGs future plans involve developments in response to new technology opportunities, operational priorities and project integration needs.
- 4.4.73 New technologies include information provided to passengers and operational staff via personal mobile devices, the use of social media facilities for two way interaction between operators and passengers, and continuing work on cost-effective provision of relevant information to disabled and mobility-impaired passengers.
- 4.4.74 New operational priorities include focussing on the quality and channels of information provided during service disruption, support for dynamic management (routing, vehicle loading, pricing, etc) and improved metric for performance monitoring.
- 4.4.75 New integration needs include the alignment of bus and rail information systems for intermodal journey planning/management, improved links between bus service and highway management systems, and the integration of personalised (smart) ticketing data into operational planning and journey advice systems.

4.4.76 Some work has begun on information passengers during disruptions and the alignment of bus and rail systems. However this programme as a whole is expected to take 2-5 years to deliver.

4.4.77 The five year Greater Bristol Bus Network project runs from 2012 to 2017. It includes a **real time information** solution. The Bristol project aims to provide a significantly improved service for passengers, by upgrading 40 routes, 1,000 bus shelters and the creation of bus priority lanes. It includes a real time information system to distribute up to the minute transport information from over 175 buses, delivered to over 400 on street displays in Bath and North East Somerset, North Somerset, Bristol and South Gloucestershire. The system also will help to reduce journey times through the provision of intelligent bus priority at traffic lights to give a late running bus priority at junctions and help to ensure that buses keep to timetable. There is a general trend for real time information to be made available to an ever increasing proportion of the UK's public transport users.

5 European Priority Area II: Continuity of Traffic & Freight Management Services

5.1 Smart & Integrated Ticketing

5.1.1 The UK Government and Devolved Administrations have invested heavily in the ITSO specification for smart ticketing, with national interoperability as our goal. Integrating public transport in the UK with the rest of Europe has a number of issues associated with it, not least the physical barriers which separate our countries from others in the EU. In 2010 the EU Interoperable Fare Management Project proved that the three leading EU ticketing specifications - ITSO (UK), Calypso Network Association (Belgium) and VDV (Germany) - could be supported on a single card.

Future Plans

5.1.2 The UK Government has made a commitment to deliver, with operators and public sector bodies, the infrastructure to enable most public transport journeys to be undertaken using smart ticketing technology by December 2014.

5.1.3 The Department will achieve this by measures which include:

- Supporting and working with ITSO Ltd, which maintains the national open technical specification for smart ticketing;
- Supporting the ITSO on Prestige (IoP) project to enable passengers to travel into, within and across London using an ITSO smartcard by January 2014;
- Extending and speeding up the provision of smart ticketing to rail passengers in the south east of England through the South East Flexible Ticketing (SEFT) Programme. This programme will deliver hardware and software to suburban rail services and will build on the IoP project to allow the provision of more innovative and flexible ticketing for commuters into London. These products will give passengers more opportunities to match the tickets they buy to the journeys that they want to make (such as part time workers);
- Supporting authorities and operators to deliver smart and integrated ticketing schemes;
- Incentivising the roll-out of smart ticketing technology on buses through a Bus Service Operator Grant (BSOG) uplift and a forthcoming investment package;
- Including smart ticketing commitments in all new rail franchise agreements;

- Supporting integration, innovation and interoperability, including through addressing competition issues/barriers;
- Monitoring how wider technological developments (such as contactless bank cards) should influence our strategy;
- Providing a Managed Service to bus operators to install smart ticketing equipment on buses, supporting maintenance and back office support.

5.1.4 The West Midlands area of England will roll out a **public transport smartcard** with a simple e-purse to all operators on 9 September 2012. Seven public transport operators have signed up to accept the e-purse from the launch. Centro, the West Midlands public transport executive, is in discussion with all its other operators about accepting the smartcard. Centro is also looking to rollout multi-operator season ticket via direct debit subject to agreement with operators. It will continue to use the latest ticketing technology to continue to deliver its Smart and Integrated Ticketing Strategy.

5.2 Welsh National Traffic Data System (WNTDS)

5.2.1 Welsh Government (Transport) embarked on an all-Wales traffic data system (known as the WNTDS – Welsh National Traffic Data System) to collect speed, flow and journey time information at key nodes throughout the motorway and trunk road network. A number of data collection techniques are proposed to collect and provide an accurate overview of journey times through out the network.

5.3 Integrated Network Management

5.3.1 The objective of the project funded by the DRD (Northern Ireland) Roads Service with EU support is to enable the control of various diverse systems for both the urban and interurban networks from one location. The system provide information which is collected, collated and disseminated by a variety of means including the web site, VMS, AMIs, radio etc.

Progress since the National report/ Future plans

5.3.2 Works to develop WNTDS began in Mid 2012 and are programmed to be complete by March 2014.

5.3.3 Further systems integration may include weather monitoring, public transport information and data sharing with other Agencies.

5.4 Freight Management & ITS Applications for Freight Transport Logistics (eFreight)

5.4.1 There is a wide range of ITS systems commercially available in the UK and operators have freedom of choice to adopt the system best suited to their commercial needs. It will be important to ensure that any moves to introduce interoperability requirements take account of this and do not place limitations on freedom of choice or development.

5.5 Transport Scotland: Extension of Weigh-in-Motion

(WIM) Sensors for Automatic Traffic Counting Sites

Current Status

- 5.5.1 Transport Scotland has installed and commissioned WIM sensors at the sites specially selected from the network review before calibration was undertaken. The installation took place in three phases during 2007 and 2008 (autumn 2007 / spring 2008 / autumn 2008).
- 5.5.2 A number of sites are without a direct mains power supply. These sites are powered with solar and wind turbine generators to help Transport Scotland assist in its overarching objective “towards sustainable mobility” through pollution reduction.
- 5.5.3 In 2009 further implementations were added to increase the coverage of WIM sites across Scotland.
- 5.5.4 Increased network control in Scotland through WIM implementation contributes to network efficiency and helped reduce the adverse impact of overweight HGVs by reducing such occurrences.
- 5.5.5 Greater control of HGV loadings in Scotland impacted on neighbouring countries and TERN as a whole and improved the harmonisation of services across Europe.

Future Plans

- 5.5.6 Potential have been identified for expansion across the Trunk Road and TERN Network, as gaps in coverage have been identified at 8 significant strategic crossings, in particular, the M8 Kingston Bridge, the M90 Friarton Bridge and the A985/A876 Kincardine Bridges.

6. European Priority Area III: ITS Road Safety and Security Applications

6.1 eCall

6.1.1 The DfT is supportive of technologies that improve road safety and have been proved to represent value for money through measuring benefits against the cost of their implementation. The study commissioned in the case of eCall, the UK has not been able to establish a positive benefit to cost case for mandatory deployment. A link to the UK eCall Report can be found below.

http://www.trl.co.uk/online_store/reports_publications/trl_reports/cat_intelligent_transport_systems/report_uk_ecall_impact_assessment.htm

Future plans

6.1.2 While a voluntary approach to deployment, (offering consumers a choice) could be acceptable we would only consider implementation if no negative impact on industry or on our existing emergency services was assured. The UK would oppose any proposals for the mandatory fitment of eCall to new vehicles.

6.2 Reservation and Information Services for Safe & Secure Parking Places for Trucks & Commercial Vehicles

6.2.1 The DfT has no project in this area. However, it is currently considering a number of options for improving the quality, provision and use of truck stop facilities. These include dissemination of information about the location and quality of truck stops.

6.2.2 There is a wide range of ITS systems commercially available in the UK and operators have freedom of choice to adopt the system best suited to their commercial needs. It will be important to ensure that any moves to introduce interoperability requirements take account of this and do not place limitations on freedom of choice or development.

Future plans

6.2.3 UK Government will introduce a nation wide lorry road user charging scheme in 2015. While no firm decisions have been taken yet on how the scheme is to be monitored and enforced, a solution based on ITS deployment will be considered, most likely using the UK road network's already extensive ANPR capability.

6.3 Human-Machine-Interfaces, the Use of Nomadic Devices & the Security of In-Vehicle Communications

6.3.1 The UK Department for Transport supported the development of guiding principles on the essential safety aspects of the Human Machine Interface of In-Vehicle Information Systems (IVIS). This led to the publication of a European Commission Recommendation in 1999 of a Statement of principles on the ergonomic aspects of information systems, the latest version, published in 2008.

Progress since the National report

6.3.2 We supported work to update a checklist providing a structured approach to the assessment of IVIS products against EU guidelines. This information can be used both by manufacturers during the development of their products or by consumer groups to help identify and promote products which demonstrate best practice as set out in EU guidelines. The checklist is available online at:

http://www.trl.co.uk/online_store/reports_publications/papers_articles/cat_paper_intelligent_transport_systems/report_checklist_for_the_assessment_of_in-vehicle_information_systems.htm

6.3.3 A report on the development of the checklist is also available at:

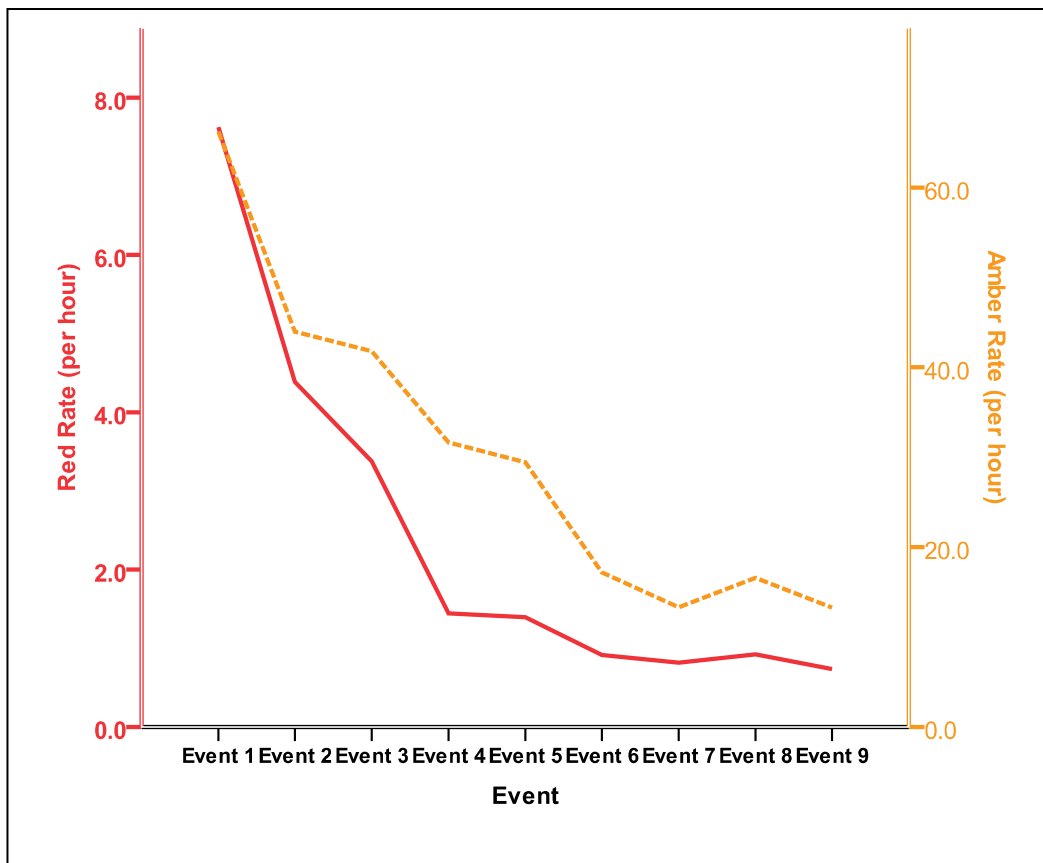
http://www.trl.co.uk/online_store/reports_publications/trl_reports/cat_intelligent_transport_systems/report_revision_of_the_checklist_for_the_assessment_of_in-vehicle_information_systems.htm

6.4 Bristol City Council & University of the West of England: Young Drivers & Social Marketing (Wheels, Skills & Thrills)

6.4.1 BCC and UWE looked at new techniques to address aggressive and anti-social driving among young men from areas of social deprivation. These drivers have a significantly higher involvement in road collisions than any other group. In Vehicle Data Recorders (IVDR) to measure changes in driver behaviour were used collect data and understand the factors which contribute to their driving behaviour and to develop a suite of interventions based upon these insights. The project was commissioned in 2009.

Progress since the last National report

6.4.2 The pilot project is now complete, with several months of post intervention IVDR data now analysed. The data clearly demonstrates that the initial significant improvement in driving performance has been sustained.



- 6.4.3 This graph shows the decline in red and amber events as shown by IVDR. These are the behaviours considered to be either dangerous or undesirable by IAM observers and can be considered as contributory factors in road traffic collisions.
- 6.4.4 The graph shows the changes in IVDR data following coaching events and also includes post trial data which demonstrates that behaviour change has been maintained post intervention. The data has been validated by Paul White at UWE.
- 6.4.5 The graph demonstrates a sharp and sustained decline in both red and amber events based on the parameters set at the outset to define desirable driving performance. The initial sharp drop in red events in particular precedes the start of coaching and suggests that engagement in the trial in itself had an immediate effect.
- 6.4.6 The initial coaching sessions, including the demonstration drive, also appear to have had a significant impact, while subsequent coaching seems to have maintained newly established driving patterns.
- 6.4.7 The improvement in driving behaviour indicated by the IVDR data is corroborated by the drive checks and subsequent performance by some of these drivers in the Skill for Life assessments.

6.4.8 In addition, several of the cohort have signed up for the full IAM Skill for Life course. Five of these have so far qualified as Advanced Drivers.

6.4.9 Project evaluation has identified key factors behind the success of the pilot:

- *Segmentation* – that sector of the target group (young men in areas of social deprivation) who were most likely to become engaged with the project;
- *Credibility* – recruitment of a trusted community member (in this case a local Connexions worker) who would have credibility with the target group and an inside knowledge of the community;
- *Co-creation* – engagement of members of the target group in designing and pre-testing the intervention;
- *Bespoke coaching* – adaptation of IAM Skills for Life coaching to focus on the key weaknesses of the target group's driving behaviour while eliminating potentially alienating elements;
- *Selection of observers* – careful selection of those observers best able to adapt their coaching methods to the particular attributes of the target group;
- *Social element* – karting sessions aided recruitment, but also helped to develop a social bond between participants, or to build on existing relationships. The coaching sessions also helped to build relationships between observers and the young men.

Future plans

6.4.10 Having identified those elements of the pilot that proved essential for success, the next stage will be to scale up the project to about 150 young men in areas of deprivation across the Bristol/West of England area. This will enable us to trial a redesign of the Wheels, Skills and Thrills model based on learning from the pilot. It will also test the robustness of the pilot results with a much expanded but comparable sample. Currently the team is researching funding opportunities in order to take the project forward.

6.5 Lancashire County Council: Lancashire Intelligent Speed Adaptation

6.5.1 Intelligent Speed Adaptation (ISA) is a driver support system which provides speed limit information into the vehicle. The ISA system trialled in this project consisted of an off-the-shelf satellite navigation system with the added functionality of displaying speed limits covering Lancashire, Blackpool, and Blackburn with Darwen, and of warning the driver visually and auditorily upon vehicle speed exceeding the speed limit. The trial collected over 2.8 million miles of driving data contributed by 402 participants.

Highlights of some of the findings

- When drivers chose to use advisory ISA, speeding was reduced by 30% on 30 mph roads and by 56% on 70 mph roads.
- Overall, being able to use the system (but not necessarily having it active) reduced speeding on 30 mph roads by 18% and on 70 mph roads by 31%.
- For drivers aged 25 and below, active use of advisory ISA resulted in a reduction in speeding of 22% on 30 mph roads and 37% on 70 mph roads.
- For drivers with less than three years of experience, active use of advisory ISA was associated with a 25% reduction in speeding on 30 mph roads and a 48% reduction in speeding on 70 mph roads.
- The effect of system availability on 85th percentile speed was observable but relatively small. This indicates that much of the speeding that was curtailed by the system was in a range that was relatively close to the speed limit.
- Two-thirds of the car drivers who took part in this trial would consider buying advisory ISA.
- On average, the car drivers were willing to pay around £100 for an advisory ISA system.

Future plans

6.5.2 The advisory ISA system trialled in this project was delivered by a nomadic device, which served the objective of cost effective deployment. However, system exposure relied on drivers making use of the device; i.e. bring the device into the vehicle and turning it on before commencing a trip.

6.5.3 The deployment of ISA as an integrated system would be more cost-effective (in terms of social costs) via the OEM route instead of by retrofit. The safety benefit of in-vehicle systems assisting the drivers controlling their maximum speed has been recognised by EuroNCAP (2009). A report will be published on the DfT's website.

6.6 Welsh Government (Transport) initiatives

- 6.6.1 Work continuing on the A55 and M4 with the deployment of average speed enforcement and tunnel safety systems.
- 6.6.2 Equipment installation is ongoing and details of overall requirements are being finalised via risk assessments. Emphasis is on incident (particularly fire) detection and emergency evacuation.
- 6.6.3 The systems utilise Commercial Off The Shelf (COTS) solutions possessing the necessary type approval, testing and configuration.
- 6.6.4 The systems will be utilised in areas with evidence of poor speed limit compliance and/or locations with evidence of elevated collisions. The systems will be overt (painted yellow, supporting signage etc) with the primary purpose of increasing compliance rather than simply capturing evidence of non-compliance.

7 European Priority Area IV: Linking the Vehicle with the Transport Infrastructure

7.1 Cooperative Systems

7.1.1 The DfT believes further advances in in-vehicle technology could dramatically change the way information and safety features are provided to drivers, by enabling communications between vehicles and the road infrastructure. The HA is monitoring developments in these technologies and exploring how they might be facilitated on the strategic road network.

Progress since the National report

7.1.2 The Highways Agency are involved in EasyWay and CEDR (European Conference of Roads Directors) groups on cooperative systems, and was a partner in the European CVIS project that ran from 2006 to 2010, funded by the European Commission's Sixth Research Framework Programme (FP6).

7.1.3 The HA have consulted with industry stakeholders to realise an immediate appetite for private sector funding to install roadside equipment for cooperative systems but the response did not reveal an immediate appetite to fund the installation of roadside equipment for cooperative systems, although there was interest in receiving traffic data for supporting cooperative services once there is a clear model for their delivery.

7.1.4 There was no definitive steer as to how such systems will eventually emerge and on what communications technologies they will be based (e.g. mobile, broadcast, short-range, WiFi).

Future plans

7.1.5 Highways Agency will be pursuing a number of actions in the short term to examine provisions for fast, good quality data for the future providers of CVHS services. Further no-cost opportunities will be sought to engage with potential future users of cooperative systems to determine what kinds of data and services they would find useful.

7.1.6 HA plans to maintain a watching brief over developments in wireless technologies and pinpoint those which the automotive sector is most interested in.

7.1.7 They will also explore the potential future effects of in-vehicle services on how they operate their network.

Transport for London

Background

- 7.1.8 Traffic Management operational capability is dependant on data received back from the network. This data comes from a variety of sources, including stable, fixed points, such as SCOOT loops, mobile data points such as rapid deployment cameras, or other sources such as Environmental indicators etc.
- 7.1.9 Data received from the network is analysed and a suitable action is taken, whether in real time, such as a SCOOT alteration, or timing alterations, based on historic information that is analysed over time.
- 7.1.10 As such, traffic management maintains a dependency on infrastructure for receiving reliable and timely intervention that informs it of what action to take. This infrastructure has a significant cost associated with it.
- 7.1.11 In addition, traffic management's technology is a reactive one rather than a predictive one. As advances in mobile technology continue, it is believed that their application in the area of traffic can reduce the significant ongoing costs to traffic management whilst at the same time enabling a predictive capability.
- 7.1.12 Using pervasive mobile technology, and developing real time granular data capture will allow TfL to create a connected, closed loop co-operative network. The network will link the user, the traffic manager and the technology seamlessly together in real time.

Key benefits of a Co-operative network

- 7.1.13 A co-operative network will have significant advantages including:
- a) Availability of granular data in real time, without the need for costly infrastructure. It will allow for a balanced approach to the disparate needs of people travelling on TfL's roads and beyond;
 - b) Exploiting this new data availability through proactive traffic management measures across the traffic corridors;
 - c) Improved journey time reliability and smoothing traffic through enhanced knowledge of the network;
 - d) Providing a two way link between the customer on the street and the traffic management through social media sites etc, making the customer part of the journey;
 - e) Predicting changes to the network in advance of it occurring, allowing for a proactive approach to movement of people and vehicles;

- f) Informing the traveller in real time about disruptions to the traffic network and providing suitable alternatives to them and aligned with traffic management;
- g) Engaging the on street user via social media sites to make them part of the transport journey;
- h) Reduced carbon footprint through the interaction of infrastructure to vehicles (such as alerting the vehicles about changing traffic light states) so as to encourage smoother driving, reduce braking (linked to emissions PMx) and reduce congestion.

7.1.14 The co-operative network will therefore contribute to key areas including:

- a) Contribute to improved Journey Time Reliability due to improved data availability and increased network awareness;
- b) Reduce carbon footprint of transport through vehicle to infrastructure (traffic network knowledge) interaction;
- c) Develop the predictive capability of the traffic directorate in order to be proactive to unplanned incidents on the network and getting a suitable strategy in place before it becomes an issue.

Time line for a Co-operative Network

7.1.15 A Co-operative Network is not something that is readily available. Significant amount of research is currently taking place across the world. TfL for its part is investigating aspects of what would constitute a co-operative network as part of its ongoing remit. This includes development an understanding of predictive capability as well as developing trial scenarios for other co-operative elements.

7.1.16 Following on from TfL's 'Co Operative Networks' Industry Day on the 18th April 2012, (advertised previously via OJEU) participants have been invited to attend a one-to-one session in July and August. These sessions are being used to improve TfL's understanding of what a Co Operative Network will look like in London and to share TfL's intentions in the next 12 months, 3 years, 5 years and looking further into the future.

7.1.17 These sessions have been informative and useful on both sides, highlighting the potential benefits developing a Co Operative Network will have for TfL and London's road users. The process is currently on hold for the Games period and will continue through August. Following on from the one-to-one sessions, TfL intend to run a series of trials of technology available but not yet in use in London that will help to achieve the targets of the Co Operative Network Programme:

- Improve situational awareness of our network and increase data granularity as to its performance;
- Reduce the dependency on on-street equipment where alternative, mobile based devices provide data sets that match or improve on existing ones.

7.1.18 Four potential trials that have been identified by the business will be undertaken, alongside the opportunity to trial something that is currently possible but not yet identified. Full details of these trials will be announced to the industry by TfL shortly.

7.2 MIRA and InnovITS-Advance Test Facility

7.1.19 [MIRA](#) (Motor Industry Research Association) are one of the leading Automotive development centres in the UK and they have an international reputation for excellence in Automotive testing. The [InnovITS](#) test facility is also located at MIRA.

7.1.20 .The innovITS-ADVANCE ITS facility provides a safe, comprehensive and fully controllable purpose built 'cityscape' test track environment to develop, validate and demonstrate new Intelligent Mobility innovations.

7.1.21 The track offers real time vehicle monitoring, modern communication technologies, private GSM and cellular networks, fully configurable wireless networks and state of the art vehicle communications based on draft 802.11p WAVE standard. The facility represents a major collaboration between MIRA, TRL and innovITS and through this partnership it is able to provide ITS solutions for the integration of vehicles, infrastructure and communication.

8 Glossary of Terms

AMI	–	Advanced Motorway Indicators
ANPR	–	Automatic Number Plate Recognition
APIs	–	Application Programming Interfaces
BCR	–	Benefits to Cost Ratio
CEN	–	European Committee for Standardisation
CENELEC	–	European Committee for Electrotechnical Standardisation
COBS	–	Control Office Base System
COMET System	–	Siemens Advanced Traffic Management and Information
DfT	–	Department for Transport
ETSI	–	European Telecommunications Standards Institute
ELGIN	–	Electronic Local Government Information (Website)
Euro NCAP	–	European New Car Assessment Programme
GPRS	–	General Pocket Radio Service
HA	–	Highways Agency
HAIL	–	Highways Agency Information Line
HGV	–	Heavy Goods Vehicles
HSR	–	Hard Shoulder Running
HTTP	–	Hypertext Transfer Protocol
IAM	–	Institute of Advanced Motorists
ICC	–	Interim Control Centre
ICT	–	Information and Communication Technology
IEC	–	International Electrotechnical Commission
IFOPT	–	Identification of Fixed Objects in Passenger Transport
IoP	–	ITSO on Prestige
IP	–	Internet Protocol
ISA	–	Intelligent Speed Adaptation
ISO	–	International Organisation for Standardisation

ITMC	–	Integrated Transport Management Centre
ITS	–	Intelligent Transport Systems
ITSO	–	Integrated Transport Smartcard Organisation
ITU	–	International Telecommunications Union
IVDR	–	In-Vehicle Data Recorders
IVIS	–	In-Vehicle Information System
MIDAS	–	Motorway Incident Detection and Automated Signalling
MS	–	Member States
NADICS	–	National Driver Information and Control System
NaPTAN	–	National Public Transport Access Node