Transport Direct

Catalogue of standards
for travel information and retailing

CC-PR149-D005-1.0

Cover + 99 pages

28 November 2007

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1 Introduction

1.1 About this document

1.1.1 This document has been prepared under the Transport Direct initiative for the UK's Department for Transport (DfT) by Centaur Consulting Limited, with the assistance of Kizoom. It presents an update on the 2001 catalogue of standards and standard-like initiatives relevant to travel information and retailing, with the context being the present and the foreseeable future in the UK.

1.1.2 This document has no statutory or other force. It has been prepared purely as an informative collection of information regarding standards which may be of relevance to those undertaking, or planning to undertake, projects in this area. The aim is that organisations delivering transport information and retailing service will understand what standards might be important and valuable to them, in working with other organisations and delivering to the public.

1.1.3 All information given is accurate as of March 2007. Where details may change, URLs have been given of pages where the information was taken from.

1.1.4 The authors would like to thank all those that have assisted in the development and validation of information presented herein.

1.2 Intended readership

1.2.1 There are two primary classes of people to whom this Guide (and the associated Catalogue and Review) is addressed:

- The direct audience is those involved in establishing and providing travel information services, or travel retail. The documents cover the standards relevant to these areas, particularly for non-specific services (ie independent of specific transport providers).

- There is an important indirect audience too: those whose role includes the collation and provision of necessary 'back office' data, without which travel information services cannot happen. This includes the provision of network data, operators' fare tables, information on current incidents etc.

1.2.2 Note that this guide does *not* address the full standards needs of this indirect audience. Operational standards are only included where there is a clear impact on "travel information and retailing". There are many standards applicable to transport technologies which relate to network management, logistics, enforcement etc, and which are not included here; the focus of this work is firmly on the interaction with the end user.

1.3 The Standards Catalogue

1.3.1 The Standards Catalogue is presented in five annexes.

- Annex A provides an overview of the key organisations involved in producing or disseminating relevant standards.

- Annex B provides a summary of the range of relevant activities underway in the key committees of the main formal standards bodies: CEN (the European Standardisation Committee) and ISO (the International Standards Organisation).

    – Annex C provides a brief list of some key projects and activities that have, or are likely to have, a major or dominant effect on parts of the UK travel information and retailing community. These include both major national/international research projects, as well as projects to deliver unique national systems.

    – Annex D provides an overview of the large number of general-purpose technology standards/initiatives which may have a role in Transport Direct.

    – Annex E describes individual transport-related standards/initiatives, in the form of a 'data sheet' for each standard.

1.3.2   In each of these areas, the aim has been to give only a basic level of information about individual standards, to the point where the interested reader can determine whether seeking further information is worthwhile. To assist this contact points have been provided, as far as possible, for each relevant standard/initiative.

1.3.3   Associated with this Standards Catalogue are two additional resources:

    – It draws on, and should be read alongside the Guide CC-PR149-D006-1.0.

    – It has been used to inform the Review CC-PR149-D004-1.0.

1.4   Additions and updates

1.4.1   The current document is a snapshot of the state of play as seen by the compilers around the beginning of 2007. To maximise its utility, the document has been developed so that it may be updated by relevant experts as circumstances develop.

1.4.2   First, it is recognised that although every attempt has been made to present an accurate and balanced picture, there may remain errors and omissions. Second, and equally importantly, real-world developments will mean that the picture changes over time: some standards currently relevant will decline in importance, while others not yet widespread will grow.

1.4.3   The intention, therefore, is to make some of the key information in this catalogue available online to users, in the form of page submissions to Wikipedia. These pages will be available for editing by the community when new developments arise. For further information on how wikis work, please visit the Wikipedia site (http://www.wikipedia.org).

A   Standards organisations

A.1   Introduction

A.1.1   This section presents catalogue information for the following:

- Formal Standards Development Organisations;
- Other international bodies developing definitive core specifications;
- Other important international bodies;
- Other UK bodies developing definitive core specifications;
- Other important UK bodies.

A.1.2   All entries are accurate as of March 2007 but are subject to change.

A.2   Formal Standards Development Organisations

Organisation	International Standards Organisation (ISO)
Contact	ISO Central Secretariat 1, ch. de la Voie-Creuse Case postale 56 CH-1211 Geneva 20 Switzerland. Tel: +41 22 749 01 11 Fax: +41 22 733 34 30 E-mail: central@iso.org
URL	http://www.iso.org
Description	ISO is a network of the national standards institutes of 157 countries, on the basis of one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system. ISO standards specify the requirements for technical products, services, processes, materials and systems, and for good conformity assessment, managerial and organizational pratice. ISO standards are designed to be implemented worldwide. ISO is responsible for the TC204 work programme which focuses on transport.

Organisation	Comité Européen de Normalisation (CEN)
Contact	CEN 36 rue de Stassart, B - 1050 Brussels Tel: + 32 2 550 08 11 Fax: + 32 2 550 08 19 Email : infodesk@cen.eu
URL	http://www.cen.eu
Description	CEN, the European Committee for Standardization, was founded in 1961 by the national standards bodies in the European Economic Community and EFTA (European Free Trade Association) countries. Now CEN is contributing to the objectives of the European Union and European Economic Area with voluntary technical standards which promote free trade, the safety of workers and consumers, interoperability of networks, environmental protection, exploitation of research and development programmes, and public procurement. CEN is responsible for TC278 work programme which focuses on ITS (Intelligent Transport Systems).

Organisation	**British Standards Institution (BSI)**
Contact	BSI 389 Chiswick High Road London W4 4AL United Kingdom
URL	http://www.bsi.org.uk
Description	BSI British Standards is the UK's National Standards Body (NSB). It represents UK economic and social interests across all of the European and international standards organizations and through the development of business information solutions for British organisations of all sizes and sectors.
	British Standards works with manufacturing and service industries, businesses, governments and consumers to facilitate the production of British, European and international standards.

A.3   Other international bodies developing definitive core specifications

Organisation	The International Air Transport Association (IATA)
Contact	IATA Head Office
	Tel: +1 (514) 874 0202
	Email: corpcomms@iata.org
URL	http://www.iata.org
Scope	To develop and maintain international air standards for a global industry
Description	The International Air Transport Association (IATA) is a global trade organisation. Over 60 years, IATA has developed the commercial standards that built a global industry. Today, IATA's mission is to represent, lead and serve the airline industry.
	Its members comprise some 260 airlines - the world's leading passenger and cargo airlines among them - representing 94 percent of international scheduled air traffic.
	IATA's aim is to help airlines help themselves by simplifying processes and increasing passenger convenience while reducing costs and improving efficiency.
	The IATA produce a number of standards that are relevant to Transport Direct and they are outlined in Section D of this document.
Region	Worldwide
Applicability	Airports, airlines and travel agencies

Organisation	**Union Internationale des Chemins de fer (UIC)**
Contact	UIC 6, rue Jean Rey 75015 Paris France Phone: + 0033 1 44 49 20 20 Fax: + 0033 1 44 49 20 29 E-mail: info@uic.asso.fr
URL	http://www.uic.asso.fr/uk/
Scope	To promote global cooperation between railway enterprises and to carry out activities to develop international transport by rail
Description	UIC prepares standards, regulations and recommendations to facilitate international rail traffic. It co-ordinates numerous projects, particularly in the field of international passenger and freight transport, infrastructure management and research and promoting the exchange of information and experience and international training.
Region	International but strongly European
Applicability	Rail Operators, Rail Network Managers

Organisation	European Broadcast Union (EBU)
Contact	European Broadcasting Union 17A Ancienne Route 1218 Grand-Saconnex Switzerland Tel: + 41 (0)22 717 2111 fax: + 41 (0)22 747 4000
URL	http://www.ebu.ch
Scope	The European Broadcasting Union (EBU) is the largest professional association of national broadcasters in the world.
Description	Working on behalf of its Members in the European area, the EBU negotiates broadcasting rights for major sports events, operates the Eurovision and Euroradio networks, organizes programme exchanges, stimulates and coordinates co-productions, and provides a full range of other operational, commercial, technical, legal and strategic services. Cooperation in the technical sphere is one of the EBU's major activities. The Union is in the forefront of research and development of new broadcast media, and has led or contributed to the development of many new radio and TV systems: radio data system (RDS), digital audio broadcasting (DAB), digital television (DVB), high- definition TV (HDTV). The EBU also produces a number of XML Metadata Specifications for the exchange of electronic information. These are available for download on the EBU website. The EBU has 74 active members in 55 European, North African and Middle Eastern countries and 43 members in countries further a field
Region	Worldwide
Applicability	Broadcasters of travel information

Organisation	**The World Wide Web Consortium (W3C)**
Contact	ERCIM
	2004, route des Lucioles BP 93 06902 Sophia-Antipolis Cedex France
	General Tel: +33.4.92.38.50.76 Fax: +33.4.92.38.78.22
URL	http://www.w3.org
Scope	International consortium for the development of web standards
Description	The World Wide Web Consortium (W3C) is an international consortium where Member organizations, a full-time staff, and the public work together to develop Web standards.
	W3C's mission is to lead the World Wide Web to its full potential by developing protocols and guidelines that ensure long-term growth for the Web.
	W3C primarily pursues its mission through the creation of Web standards and guidelines. Since 1994, W3C has published more than ninety such standards, called W3C Recommendations. W3C also engages in education and outreach, develops software, and serves as an open forum for discussion about the Web.
Region	Worldwide
Applicability	Web developers, transport authorities, VASPs

Organisation	**Open Travel Alliance (OTA)**
Contact	OpenTravel Alliance 1255 23rd Street, NW Washington, DC 20037-1174 Phone: (202) 521-6777 Fax: (202) 833-3636
URL	http://www.opentravel.org
Scope	OTA provides an essential forum where all sectors of the travel industry work together toward the common goal -- creating unified and integrated information exchange specifications, in order to effectively promote e-commerce and serve travellers more efficiently.
Description	The OTA is dedicated to helping the travel industry take full advantage of near universal access to the Internet. Internet and related technologies can significantly affect the way the travel industry operates and reaches customers throughout the global economy. Travel industry business and technology leaders responsible for product distribution are working together through the OTA to transform the travel industry into one global supermarket of products and services. This will be realized through development of a commonly accepted communications process using XML (Extensible Markup Language).
Region	Global
Applicability	Airlines, travel operators

Organisation	**Open Geospatial Consortium (OGC)**
Contact	Open Geospatial Consortium, Inc 35 Main Street Wayland MA 01778-5037
	Phone: +1 508 655 5858 Fax: +1 508 655 2237
	Email: creed@opengeospatial.org
URL	http://www.opengeospatial.org/standards
Scope	Geospatial technical standards
Description	The Open Geospatial Consortium, Inc (OGC) is an international industry consortium of commercial, governmental, nonprofit and research organisations, participating in a consensus process to develop publicly available interface specifications. These OpenGIS Specifications support interoperable solutions that "geo-enable" the Web, wireless and location-based services, and mainstream IT.
	The OGC has a close relationship with ISO/TC 211. The OGC abstract specification is being progressively replaced by volumes from the ISO 191xx series under development by this committee.
Region	Worldwide
Applicability	Travel information, journey planning

Organisation	Organization for the Advancement of Structured Information Standards (OASIS)
Contact	OASIS PO Box 455 Billerica, MA 01821 USA Phone: +1 978 667 5115 Fax: +1 978 667 5114 Fax Email: info@oasis-open.org
URL	http://www.oasis-open.org
Scope	Web services standards
Description	OASIS is a not-for-profit international consortium that drives the development, convergence, and adoption of e-business standards. The consortium produces Web services standards for security, e-business, and standardisation efforts in the public sector and for application-specific markets. Founded in 1993, OASIS has more than 5,000 participants representing over 600 organisations and individual members in 100 countries. An overview of standards published by OASIS is available at http://www.oasis-open.org/specs/index.php
Region	Worldwide
Applicability	Travel information, journey planning, e-business

A.4   Other important international bodies

Organisation	National Transportation Communications for ITS Protocol (NTCIP)
Contact	NTCIP Coordinator National Electrical Manufacturers Association 1300 N.17th Street, Suite 1847 Rosslyn Virginia 22209-3801 USA Fax: 001 703 841-3331 E-mail: ntcip@nema.org
URL	http://www.ntcip.org (related sites: http://www.aashto.org and http://www.ite.org)
Scope	To define methods of communication throughout the US transport management systems
Description	The NTCIP is the key US traffic management communications standardisation initiative. It has developed a non-proprietary protocol suite to meet "*existing and future traffic control requirements, supports transportation management communications, and accommodates future development in information technology and communications*". The NTCIP Joint Standards Committee oversees development activities, and ensures that these standards are recognised internationally by promoting NTCIP to the International Standards Organisation (ISO). NTCIP information standards are still under development and appear at present to be US oriented although some have proved applicable to the UK and are incorporated in the UTMC Technical Specification. NEMA, AASHTO and ITE have all been involved in developing NTCIP standards.
Related Standards	UTMC (Urban Traffic Management and Control), TCIP, ISO/CEN, Internet standards
Region	USA
Applicability	Transport Agencies, Network Managers

Organisation	**Object Management Group (OMG)**
Contact	140 Kendrick Street Building A, Suite 300, Needham, MA 02494 USA Tel: +1 781 444 0404 Fax: +1 781 444 0320 Email: info@omg.org
URL	http://www.omg.org
Scope	Standards-setting consortium
Description	OMG has been an international, open membership, not-for-profit computer industry consortium since 1989. Any organization may join OMG and participate in the standards-setting process. Its one-organization-one-vote policy ensures that every organization, large and small, has a effective voice. OMG membership includes hundreds of organizations, with half being software end-users in over two dozen vertical markets, and the other half representing virtually every large organization in the computer industry and many smaller ones. OMG's modeling standards, including the Unified Modeling Language™ (UML®) and Model Driven Architecture® (MDA®), enable powerful visual design, execution and maintenance of software and other processes, including IT Systems Modeling and Business Process Management. OMG's middleware standards and profiles are based on the Common Object Request Broker Architecture (CORBA®) and support a wide variety of industries.
Region	Worldwide
Applicability	System suppliers

Organisation	**Verband Deutscher Verkehrsunternehmen (VDV)**
Contact	VDV Verband Deutscher Verkehrsunternehmen Kamekestrasse 37-39, D - 50672 Köln Phone: +0049 221 57979-0 Fax: +0049 221 514272 E-mail: info@vdv.de
URL	http://www.vdv.de/
Scope	Aims to improve public transport and freight operations in Germany
Description	VDV provides a platform for the development and exchange of information and best practices recommendations. It publishes reports and recommendations that cover a broad variety of transport issues. Reports are based on specialised subjects whereas recommendations are more substantial and generalised. The areas addressed by each recommendation group are: General/Planning of Transport Facilities, Vehicles, Information Technology/Information Process, Electrical Power Installations, Rail Construction, Operation, Depots and Workshops, Economy and Law.
Region	Primarily Germany, but with significant support from some other European countries
Applicability	Transport Operators, Transport Authorities and their suppliers

Organisation	EuroRoadS
Contact	Ulf Sandgren
	Email: ulf.sandgren@lm.se
URL	http://www.euroroads.org
Scope	GDF based approach to road network description
Description	A now completed project that set out to build a platform for a European road data solution through a specification framework consisting of a road data structure, description of data content, data exchange mechanisms and interoperability specifications.
	The project framework was built on identified user requirements and tested through demonstrators.
	The results of the project comprised:
	• A framework of specifications describing an information model, core data content, as well as an exchange model and exchange format for European road data
	• A model for handling evaluation and quality control of road data in the information chain (from data producers to end users)
	• A metadata catalogue
	• A terminology catalogue
	Results from practical demonstrations verified that the specifications function works well for likely use cases, that the quality model gives expected results and can be used in practice, and that the metadata catalogue can be implemented in a practical solution and give expected information to users.
Region	EU
Applicability	Highways agencies, Local Government, traffic information providers

Organisation	MOST Cooperation
Contact	MOST Cooperation Bannwaldallee 48 D-76185 Karlsruhe Germany Phone: +0049 721 966 50 00 Fax: +0049 721 966 50 01 contact@mostcooperation.com
URL	http://www.mostcooperation.com
Scope	Continued development of the widely adopted MOST multimedia networking standard.
Description	The MOST Cooperation is based on a partnership of Car Makers, Set Makers, System Architects and Key Component Suppliers that has defined and continues to enhance a common multimedia network protocol and object model. The MOST technology is an industry de facto standard for low cost, high bandwidth data communications in consumer, telecommunications and computing applications. Global partnership of more than 80 companies
Region	International
Applicability	Transport Agencies, Car users, Car Manufactures

Organisation	**European Environment Agency (EEA)**
Contact	EEA Information Centre European Environment Agency Kongens Nytorv 28 DK-1050 Copenhagen K Denmark Tel: (+45) 33 36 71 00
URL	www.eaa.europa.eu
Scope	The EEA aims to support sustainable development and to help achieve significant and measurable improvement in Europe's environment.
Description	European Environment Agency (EEA), agency of the European Union devoted to establishing a monitoring network for the monitoring of the European environment. It is governed by a Management Board composed of representatives of the governments of member states, a European Commission representative and two scientists appointed by the European Parliament, assisted by a committee of scientists. It was established by EEC Regulation 1210/1990, as amended by EEC Regulation 933/1999; and became operational in 1994. It is headquartered in Copenhagen, Denmark. As a EU body, member states of the European Union are automatically members; however the Council Regulation establishing it provided that other states may become members of it by means of agreements concluded between them and the European Community.
Region	EU
Applicability	Environmental modelling

Organisation	EC Directorate-General for the Environment
Contact	Environment Directorate-General European Commission B-1049 Brussels
URL	http://ec.europa.eu/dgs/environment/index_en.htm
Scope	The Directorate-General for the Environment (DG Environment) is a Directorate-General of the European Commission, responsible for the European Union policy area of the environment.
Description	The DGs main role is to initiate and define new environmental legislation and to ensure that measures, which have been agreed, are actually put into practice in the Member States. The overall mission statement for 2005 is: "Protecting, preserving and improving the environment for present and future generations, and promoting sustainable development".
Region	EU
Applicability	Environmental monitoring

Organisation	**European Rail Agency (ERA)**
Contact	European Railway Agency BP 20392 F-59307 Valenciennes Cedex Tel: +33 327 096-500
URL	http://www.era.europe.eu
Scope	Promotion of safety and interoperability in the EU
Description	The European Railway Agency has the mission of reinforcing safety and interoperability of railways throughout Europe, and thus adding a strong new momentum towards the shared vision of a truly integrated, competitive European railway area. As part of its common transport policy, the Community has adopted legislation to pave the way for gradual establishment of an integrated European railway area, both legally and technically. This involves the development and implementation of Technical Specifications for Interoperability and a common approach to questions concerning railway safety. The Agency's main task is to manage the preparation of these measures. Agency structure, main tasks and working methods are outlined in European Regulation No 881/2004. The Agency is governed by an Administrative Board composed by one representative of each Member State, four representatives of the Commission, and by six representatives of the Railway sector. The Executive Director is appointed by the Administrative Board. The Agency is operational, with about 90 members of staff, mostly professionals from the European railway sector.
Region	EU
Applicability	Rail operators, rail infrastructure operators

A.5   Other UK bodies developing definitive core specifications

Organisation	Department for Transport (DfT)
Contact	Department for Transport Great Minster House 76 Marsham Street London SW1P 4DR Tel: 020 7944 8300 Fax: 020 7944 9643
URL	http://www.dft.gov.uk
Scope	UK Department for Transport
Description	The Department for Transport provides leadership across the transport sector to achieve its objectives, working with regional, local and private sector partners to deliver many of the services. The Department is also responsible for a number of key UK transport standards such as TransXchange, Journey Web and NaPTAN. The DfT also provides the Transport Direct portal and has recently developed the electronic bus registration service for bus operators.
Region	UK
Applicability	Local authorities, bus operators

Organisation	Ordnance Survey (OS)
Contact	Ordnance Survey Romsey Road Southampton SO16 4GU
	Tel: 08456 05 05 05
	Fax: 023 8079 2615
URL	http://www.ordnancesurvey.co.uk
Scope	Geographic data, information and mapping
Description	Ordnance Survey (OS) is an executive agency of the United Kingdom government. It is the national mapping agency for Great Britain, and one of the world's largest producers of maps.
	The Ordnance Survey's flagship digital product, launched in November 2001, is OS MasterMap. This is a database that records every fixed feature of Great Britain larger than a few metres in one continuous digital map. Every feature is given a unique TOID (topographical identifier), a simple identifier that includes no semantic information. Typically each TOID is associated with a polygon that represents the area on the ground that the feature covers, in National Grid coordinates. MasterMap is offered in themed "layers", for example, a road layer and a building layer, each linked to a number of TOIDs.
	OS also produce the Integrated Transport Network layer for MasterMap, an accurate, detailed and up-to-date digital map for Great Britain's road structure.
Region	Great Britain
Applicability	Transport operators, satellite navigation, traffic control

Organisation	Rail Settlement Plan Ltd (RSP)
Contact	Mostafa Gulam ATOC Ltd 3rd Floor 40 Bernard Street London WC1N 1BY Tel: 020 7841 8117 Email:mostafa.gulam@atoc.org
URL	http://www.atoc.org/rsp
Scope	To improve retail and ticketing within the rail industry.
Description	Rail Settlement Plan (RSP), part of ATOC, provides central retail support services to the UK Train Operating Companies (TOCs). This includes the distribution of fares and timetable data, the provision of other retail information to all National Rail retailers and the allocation and settlement of rail revenue to operators. RSP accredits all devices that retail rail products, about 10,000 nationally. RSP procures these services on behalf of the TOCs and manages their operation by third party suppliers. As all are outsourced to large systems integrators and service operator companies like Atos Origin, Fujitsu, Thales and Capgemini. Its staff is small (27) and turnover only £30m, but it is responsible overall for the annual allocation of £4.8 billion of rail revenue monies.
Related Standards	Industry and UIC standards for reference data, codesets, timetables, fares, reservations, and sales data. RSP accreditation also depends on EMV and ITSO standards.
Region	UK
Applicability	Rail Operators, VASPs, Rail Users

Organisation	**National Rail Enquiries (NRE)**
Contact	National Rail Enquiries Selectapost 31 Rotherham S97 3ZX
URL	http://www.nationalrail.co.uk
Scope	UK rail information service provider
Description	National Rail Enquiries are the official information service for National Rail. National Rail is the collective name for the train companies who operate Britain's rail service. NRE provide impartial advice on rail travel, and our performance is strictly regulated by the Department for Transport. The National Rail Enquiries service is provided by NRES Limited. NRE provides impartial advice on all aspects of journey planning; fares and buying tickets, live train running updates and other information. NRE operate a number of channels, including: • A network of call centres • The National Rail webste • The National Rail WAP site • TrainTracker™ - an automated voice service giving arrival and departure details. • TrainTrackerText™ (the SMS version of TrainTracker™) • TextMe JourneyPlanner – mobile phone service. • Provide data feeds from the content held on the NRE website e.g for station information.
Region	UK
Applicability	Travellers

Organisation	**ITSO Limited**
Contact	ITSO Limited Room 122 Centro House 16 Summer Lane Birmingham B19 3SD 0121 233 2598
URL	http://www.itso.org.uk
Scope	ITSO Ltd was formed to build and maintain a specification for secure and loss-less 'end-to-end' interoperable smartcard ticketing transactions.
Description	ITSO manages the implementation and development of an open national standard for Smartcards used for transport ticketing and payment, supported by the DfT. ITSO provides the operational requirements for data exchange protocols and the technical specifications of the card and reader, as well as back-office messaging, and security key management. ITSO standards comply with ISO and CEN Standards for transport smartcard applications. ITSO runs a full testing and certification service to validate media, Point of Service device and Back Office systems compliance with the specification, together with the security key management service to Licensed Operators. ITSO can also securely support other potential applications of Smartcards, for example driver authentication, road user charging, congestion charging schemes and car parking in transport; also retail purchases, loyalty schemes and social uses.
Region	UK; under consideration in a number of other countries
Applicability	Transport Operators, Travel Authorities, Retailers, Travellers, Suppliers

Organisation	UTMC Development Group (UDG)
Contact	Ken Laughlin UDG Chair Monument House 5 Upper High Street Winchester Hampshire SO23 8UT Tel: 01962 846893 Email: ken.laughlin@hants.gov.uk
URL	http://www.utmc.uk.com
Scope	To develop and promote modular and open traffic management systems for the ITS market
Description	UTMC has helped local authorities achieve their traffic management goals by adopting an appropriate, but not over constraining, set of standards to allow users, suppliers and integrators of UTMC systems to plan and supply systems cost-effectively in an open market. Today UTMC is the preferred ITS platform for UK towns and cities. The UTMC Development Group (UDG) of stakeholders facilitates the development and implementation of UTMC systems. The UTMC Suppliers Forum (USF) work closely with the policy driven UDG Management Group. The UTMC Framework Technical Specification presents the core technical standards recommended for use by UK traffic managers in their systems.
Region	UK
Applicability	Transport Authorities, Travellers, Equipment Suppliers, Public Transport Operators

Organisation	Real Time Information Group (RTIG)
Contact	Real Time Information Group Secretariat Centaur Consulting Ltd Surrey Technology Centre Surrey Research Park Guildford Surrey Phone: 01483 688270 Fax: 01483 688271 E-mail: rtig@centaurconsulting.co.uk
URL	http://www.rtig.org.uk
Scope	To assist UK local authorities, PTEs, and public transport operators implement real time technology to deliver better public transport services and travel information
Description	RTIG brings together the requirements of local authorities and bus/light rail operators across the UK. Through various studies standards for the operation of real time equipment including data presentation will be developed. RITG is working at operational, functional, data exchange and communications layers, and working alongside other UK initiatives such as UTMC. Communications are expected to utilise IP protocol in a bearer independent manner. RTIG is about to sponsor a communications study, co-funded by a number of authorities, to review appropriate radiocommunications technologies.
Region	Primarily UK, with some limited international relevance
Applicability	Transport Operators, Transport Authorities, Systems Suppliers, VASPs, Travellers

Organisation	**Travel Information Highway (TIH) Community**
Contact	TIH helpdesk NTCC 3 Ridgeway Quinton Business Park Birmingham B32 1AF Phone: 0121 2454851 E-mail: helpdesk@tih.org.uk
URL	http://www.tih.org.uk/
Scope	The TIH aims to facilitate the exchange of real time travel information
Description	The TIH is an open and independent association of information publishers and receivers who have an interest in exchanging real-time travel information using an agreed set of TIH Principles. The TIH approach focuses on B2B travel information exchange and is based on the adoption of methods and techniques that are considered "common practice"; this means practices relevant to all members of the travel information community. Any common practices also embrace international standards by putting them in the context of the travel information industry. Common practices adopted as part of the TIH approach are collectively known as "TIH Principles". Membership gives access to the TIH Directory of Services, where information publishers, receivers and facilitators and their contacts are listed.
Region	GB
Take-up	An increasing number of trial and operational connections exist. The vision is to facilitate transport network operators and authorities across the UK and Europe to exchange information directly using TIH Principles, to provide comprehensive, European data sources and value-added services.

A.6   Other important UK bodies

Organisation	National Traffic Control Centre (NTCC)
Contact	NTCC 3 Ridgeway Quinton Business Park Birmingham B32 1AF Phone: 0121 2454851 Email: ha_info@highways.gsi.gov.uk
URL	http://www.highways.gov.uk/knowledge/1291.aspx
Scope	The NTCC aims to improve the network use through the management, operation and monitoring of the English national strategic road network and increasing the availability and provision of information.
Description	Based in the West Midlands, the NTCC has been designed to collect, analyse and communicate travel information for the Highways Agency network (http://www.highways.gov.uk/aboutus/139.aspx). To provide better information and more reliable journey times the NTCC gathers and disseminates real time data from across the network. Traffic monitoring equipment is installed around the network to gather traffic flow and traffic speed information. In addition, variable message signs, CCTV cameras, weather stations and traffic sensors are also used. As part of this information gathering and dissemination process the NTCC works in partnership with the Police, Highways Agency Traffic Officers, contractors, Local Traffic Authorities and maintaining agents.
Region	England.
Applicability	Road Users (private and commercial), Police, Media, Transport Authorities, Highways and other Agencies

Organisation	**Association of Transport Coordinating Officers (ATCO)**
Contact	Email: ianwhite@wiltshire.gov.uk
URL	http://www.atco.org.uk
Scope	UK public transport organization for local authorities
Description	ATCO was formed in 1974 to bring together local authority officers whose work involved what were then new county council responsibilities for passenger transport.
	ATCO members include senior staff directly concerned with strategic policy development and implementation for securing of passenger transport services for a wide range of public authorities. These include shire counties and unitary councils in England, Wales and Scotland, Passenger Transport Executives, London Regional Transport, the Isle of Man, the States of Jersey and Northern Ireland.
	Through exchanging information and views the Association helps formulate policies and standards (such as ATCO-CIF) and promotes transport initiatives aimed at achieving better passenger transport services for all. Members give advice to the Local Government Association and the Convention of Scottish Local Authorities. The Association cooperates closely with CSS, the Community Transport Association and the Passenger Transport Executive Group.
Region	UK
Applicability	Local authorities, public transport operators

Organisation	Transport for London – Oyster
Contact	TfL
URL	http://www.tfl.gov.uk/oyster
Scope	Smart payment card for use on London Underground, Buses, DLR and trams
Description	The Oyster card allows public transport users to travel on London's public transport network without the need for cash. At the moment the Oyster card can be used on the London Underground, Buses, Dockland Light Railway and Trams. The card always calculates the cheapest fare available for all journeys made in a single day.
Region	London
Applicability	Smartcard ticketing; potentially other micropayments

Organisation	**Royal National Institute for the Blind (RNIB)**
Contact	Royal National Institute of the Blind 105 Judd Street London WC1H 9NE Tel: 020 7388 1266 Fax: 020 7388 2034
URL	http://www.rnib.org.uk
Scope	UK charity and producer of accessibility standards, specifications and guidelines for disabled travellers.
Description	RNIB is a membership organization with offices across the UK. It works closely with technology developers to produce information systems for visually disabled travellers. RNIB offers practical support and advice to anyone with a sight problem. It also produces key accessibility guidelines, standards and reports on the provision of visual information for disabled travellers. RNIB also provides technology and consultancy advice to organisations. RNIB has also worked closely with the Real Time Information Group to produce a guide for disabled travellers using Real Time Information systems.
Region	UK
Applicability	Local authorities, information systems developers, travellers, information providers

Organisation	**Royal National Institute for the Deaf (RNID)**
Contact	RNID 19-23 Featherstone Street London EC1Y 8SL Tel: 020 7296 8000 Fax: 020 7296 8199 Email: informationline@rnid.org.uk
URL	http://www.rnid.org.uk
Scope	UK membership charity for the deaf and hard of hearing
Description	RNID offer a range of services for deaf and hard of hearing people and provide information and support on all aspects of deafness, hearing loss and tinnitus. As a membership charity, RNID aim to achieve a radically better quality of life for deaf and hard of hearing people. RNID's work involves campaigning and lobbying, providing services, training, products and equipment, and undertaking medical and technical research. RNID work throughout the UK.
Region	UK
Applicability	Local authorities, information systems developers, travellers, information providers

Organisation	The Association of Inland Navigation Authorities (AINA)
Contact	AINA Fearns Wharf Neptune Street Leeds LS9 8PB Tel. 0113 243 3125 Fax. 0113 245 8394 Email: info@aina.org.uk
URL	http://www.aina.org.uk
Scope	The AINA is the industry body that represents those organizations which operate and manage Britain's navigable inland waterways.
Description	AINA was formed in 1996 to provide a single voice on waterway management issues. The purpose of AINA is to facilitate the management and development of the inland waterways as an economic, environmental, recreational and social resource. AINA's Members are drawn from the public, private and voluntary/charitable sectors. They include the two large publicly-funded navigation authorities (British Waterways and the Environment Agency) in addition to local government authorities, national park authorities, private canal companies, internal drainage boards, and a variety of public and charitable trusts. AINA Members have statutory responsibility for the management and operation of some 5,000 km of navigable waterway, representing almost a complete UK coverage.
Region	Great Britain
Applicability	Local authorities, travellers

Organisation	British Waterways
Contact	British Waterways Willow Grange Church Road Watford Herts WD17 4QA Tel: 01923 201120 Fax: 01923 201400 Email: enquiries.hq@britishwaterways.co.uk
URL	http://www.britishwaterways.co.uk
Scope	Public corporation that manages Britain's Waterways and provides key stoppage information for travellers.
Description	British Waterways, as well as managing Britain's 2,200 miles of canals and rivers in England, Scotland and Wales, also produce stoppage and closure information for canals and towpaths. This information can be accessed and downloaded via the following URL: http://www.waterscape.com/boating/stoppages
Region	UK
Applicability	Travellers

Organisation	**Expert Panel on Air Quality Standards (EPAQS)**
Contact	EPAQS Secretariat Defra 7/F15, Ashdown House 123 Victoria Street London SW1E 6DE Tel: 020 7082 8421 Fax: 020 7082 8385 Email: air.quality@defra.gsi.gov.uk
URL	http://www.defra.gov.uk/environment/airquality/panels/aqs/index.htm
Scope	The Expert Panel on Air Quality Standards (EPAQS) was set up in 1991 to provide independent advice on air quality issues, in particular the levels of pollution at which no or minimal health effects are likely to occur.
Description	Members of the Panel are primarily drawn from those eminent in the fields of health research, practice and teaching. The Panel's recommendations were adopted as the benchmark standards in the National Air Quality Strategy. EPAQS gives advice on non-occupational ambient air quality standards, with particular reference to the levels of airborne pollutants at which no or minimal effects on human health are likely to occur, taking account of the best available evidence. This is done without reference to the practicality of abatement or mitigation measures, the economic costs and economic benefits of pollution control measures or other factors pertinent to the management rather than the assessment of risk. The Panel also identifies gaps in the knowledge needed for standard setting and suggests potential priority areas for future research; for the purpose of informing the development of policy on the improvement of air quality and increasing public knowledge and understanding of air quality issues. EPAQS does not give approval for products or equipment.
Region	UK only
Applicability	Local authorities

Organisation	Journey Solutions
Contact	Jonathan Radley – Commercial Director
	Telephone: 020 7240 1819; email: jonradley@journeysolutions.com
URL	http://www.journeysolutions.com *or* http://www.plusbus.info
Scope	Partnership of bus and train operating companies (mainly PLC Groups) aiming to develop and improve multi-modal integration and ease the travellers journey experience. Main customer facing product at present is PLUSBUS (an add-on to train tickets).
Description	**Journey Solutions** is an initiative of the Britain's six main bus and train operating Groups aimed at promoting and improving integration between these two transport modes. It is supported by the Association of Train Operating Companies (ATOC) and the Confederation of Passenger Transport (CPT). **PLUSBUS** sets minimum standards for train ticket add-ons, which gives train travellers unlimited bus travel on all participating bus operators around the urban area (one defined zone) of a town or city. PLUSBUS can be added to most types of train ticket (single, day return, period return and seasons tickets) at the start, the finish or both ends of the train journey specific periods: 1-day, 7-days, 1-month, 3-months or a whole year. New PLUSBUS schemes go through an accreditation process and have to meet a number of 'Fit for Purpose' tests. All the main bus and train operating Groups, ATOC and CPT have representation on the Journey Solutions Implementation Group (Board). PLUSBUS is now available to 195 towns and cities across Britain, for travellers to interchange between train and bus through over 270 train stations across Britain. There were 195 rail-served towns & cities available with PLUSBUS (as at January 2007).
Region	Great Britain (England, Scotland & Wales)
Applicability	Transport Operators (both bus and train), VASPs, Travel Authorities (including PTE's), Travellers

B   SDO Working Groups and formal standards

B.1   ISO/TC204

Working Groups

B.1.1   ISO Technical Committee 204 is responsible for "Transport Information and Control Systems". It has a number of standing Working Groups, which set up Subgroups from time to time.

B.1.2   For an up to date schedule of the remit of TC204, its current Working Groups and their points of contact please refer to:

http://www.iso.org/iso/en/stdsdevelopment/tc/tclist/TechnicalCommitteeDetailP age.TechnicalCommitteeDetail?COMMID=4559&scopelist=

Working Group	Work program	Secretariat
WG1	Architecture	UK
WG2	Quality and Reliability Requirements	Japan
WG3	TICS Database Technology	Japan
WG4	Automatic Vehicle Identification	Norway
WG5	Fee and Toll Collection	Holland
WG7	General Fleet Management and Commercial and Freight	Canada
WG8	Public Transport/Emergency	America
WG9	Integrated Transport Information, Management, and Control	Australia
WG10	Traveller Information Systems	UK
WG11	Route Guidance and Navigation Systems	Germany
WG14	Vehicle/Roadway Warning and Control Systems	Japan
WG15	Dedicated Short Range Communications for TICS Applications	Germany
WG16	Wide Area Communications/Protocols and Interfaces	America

Table B-1: List of ISO/TC204 Working Groups (as of March 2007)

Published ISO/TC204 Standards

B.1.3   For an up to date schedule of standards published by ISO TC204, please refer to:

http://www.iso.org/iso/en/CatalogueListPage.CatalogueList?ICS1=3&ICS2=220& ICS3=1&scopelist=

Document	Title	Status
ISO/TR 14813-1:2007	Transport information and control systems - Reference model architecture(s) for the TICS sector - Part 1: TICS fundamental services	Published
ISO/TR 14813-2:2000	Transport information and control systems - Reference model architecture(s) for the TICS sector - Part 2: Core TICS reference architecture	Published

Document	Title	Status
ISO/TR 14813-3:2000	Transport information and control systems - Reference model architecture(s) for the TICS sector - Part 3: Example elaboration	Published
ISO/TR 14813-4:2000	Transport information and control systems - Reference model architecture(s) for the TICS sector - Part 4: Reference model tutorial	Published
ISO/TR 14813-5:1999	Transport information and control systems - Reference model architecture(s) for the TICS sector - Part 5: Requirements for architecture description in TICS standards	Published
ISO/TR 14813-6:2000	Transport information and control systems - Reference model architecture(s) for the TICS sector - Part 6: Data presentation in ASN.1	Published
ISO 14814:2006	Road transport and traffic telematics – Automatic vehicle and equipment identification – Reference architecture and terminology	Published
ISO 14815:2005	Road transport and traffic telematics – Automatic vehicle and equipment identification – System specifications	Published
ISO 14816:2005	Road transport and traffic telematics – Automatic vehicle and equipment identification – Numbering and data structure	Published
ISO/TS 14817:2002	Transport information and control systems – Requirements for an ITS/TICS central Data Registry and ITS/TICS Data Dictionaries	Published
ISO 14819-1:2003	Traffic and Traveller Information (TTI) – TTI messages via traffic message coding – Part 1: Coding protocol for Radio Data System – Traffic Message Channel (RDS-TMC) using ALERT-C	Published
ISO 14819-2:2003	Traffic and Traveller Information (TTI) – TTI messages via traffic message coding – Part 2: Coding protocol for Radio Data System – Traffic Message Channel (RDS-TMC)	Published
ISO 14819-3:2003	Traffic and Traveller Information (TTI) – TTI messages via traffic message coding – Part 3: Location referencing for ALERT-C	Published
ISO 14819-6:2006	Traffic and Traveller Information (TTI) – TTI messages via traffic message coding – Part 6: Encryption and conditional access for the Radio Data System – Traffic Message Channel ALERT C coding	Published
ISO/TR 14822-1:2006	Traffic and Travel Information -- General specifications for medium-range pre-information via dedicated short-range communication -- Part 1: Downlink	Published
ISO/TS 14823:2007	Traffic and Travel Information - Messages via media-independent stationary dissemination systems - Graphic data dictionary for pre-trip and in-trip information dissemination system	Published
ISO 14825:2004	Intelligent transport systems -- Geographic Data Files (GDF) -- Overall data specification	Published
ISO 14827-1:2005	Transport Information and control systems -- Data interfaces between centres for transport information and control systems -- Part 1: Message definition requirements	Published

Document	Title	Status
ISO 14827-2:2005	Transport information and control systems – Data interfaces between centres for transport information and control systems – Part 2: DATEX- ASN	Published
ISO/TS 14904:2002	Road transport and traffic telematics -- Electronic fee collection (EFC) -- Interface specification for clearing between operators	Published
ISO 14906:2004	Road transport and traffic telematics -- Electronic fee collection -- Application interface definition for dedicated short-range communication	Published
ISO/TS 14907-1:2005	Road transport and traffic telematics -- Electronic fee collection -- Test procedures for user and fixed equipment -- Part 1: Description of test procedures	Published
ISO 15705:2003	Transport information and control systems – In-vehicle navigation systems – Communications message set requirements	Published
ISO 15622:2002	Transport information and control systems -- Adaptive Cruise Control Systems -- Performance requirements and test procedures	Published
ISO 15623:2002	Transport information and control systems -- Forward vehicle collision warning systems -- Performance requirements and test procedures	Published
ISO/TS 15624:2001	Transport information and control systems - Traffic Impediment Warning Systems (TIWS) - System requirements	Published
ISO 15628:2007	Road transport and traffic telematics – Dedicated short range communication (DSCR) – DSCR application layer	Published
ISO 15662:2006	Intelligent transport systems -- Wide area communication -- Protocol management information	Published
ISO 17572-3: 2007	Intelligent Transport Systems (ITS) – Location Referencing for Geographic Databases – Part 3: Dynamic Location References (Dynamic Profile)	Published
ISO/TS 17573:2003	Road Transport and Traffic Telematics -- Electronic Fee Collection (EFC) -- Systems architecture for vehicle related transport services	Published
ISO/PAS 17684:2003	Transport information and control systems -- In-vehicle navigation systems -- ITS message set translator to ASN.1 format definitions	Published
ISO/TS 18234-1:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 1: Introduction, numbering and versions	Published
ISO/TS 18234-2:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 2: Syntax, Semantics and Framing Structure (SSF)	Published
ISO/TS 18234-3:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 3: Service and Network Information (SNI) application	Published
ISO/TS 18234-4:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 4: Road Traffic Message (RTM) application	Published
ISO/TS 18234-6:2006	Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) data-streams -- Part 6: Location referencing applications	Published

Document	Title	Status
ISO 19133:2005	Location-based services – Tracking and navigation	Published
ISO 19134:2007	Location based services – Multimodal routing and navigation	Published
ISO 21214:2006	Intelligent transport systems -- Continuous air interface, long and medium range (CALM) -- Infra-red systems	Published
ISO 24104-1:2007	Public transport - Interoperable fare management system - Part 1: Architecture	Published
ISO/TS 24530-1:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 1: Introduction, common data types and tpegML	Published
ISO/TS 24530-2:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 2: tpeg-locML	Published
ISO/TS 24530-3:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 3: tpeg-rtmML	Published
ISO/TS 24530-4:2006	Traffic and Travel Information (TTI) -- TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) -- Part 4: tpeg-ptiML	Published
ISO/TR 24532:2006	Intelligent transport systems -- Systems architecture, taxonomy and terminology -- Using CORBA (Common Object Request Broker Architecture) in ITS standards, data registries and data dictionaries	Published

Table B-2: List of published ISO/TC204 standards (as of March 2007)

Future ISO standardisation activities

B.1.4   For an up to date schedule of standards in current development by ISO TC204, please refer to:

http://www.iso.org/iso/en/CatalogueListPage.CatalogueList?ICS1=3&ICS2=220& ICS3=1&scopelist=PROGRAMME

Document	Title
ISO/PRF TS 20452	Requirements and Logical Data Model for a Physical Storage Format (PSF) and an Application Program Interface (API) and Logical Data Organization for PSF used in Intelligent Transport Systems (ITS) Database Technology
ISO/CD 21210-1	CALM (Communication Air-interface Long and Medium range) Networking Protocols -- Part 1: CALM Networking for Internet Connectivity
ISO/CD 21210-2	CALM (Communication Air-interface Long and Medium range) Networking Protocols -- Part 2: CALM Networking for Direct Mode Connectivity
ISO/DIS 21212	Intelligent transport systems -- Communications, air-interface, long and medium range (CALM) -- 2G Cellular systems
ISO/DIS 21213	Intelligent transport systems -- Communications, air-interface, long and medium range (CALM) -- 3G Cellular systems

Document	Title
ISO/WD 21216	CALM-MM: Medium and long range, high speed, air interface parameeres and protocols for boradcast, point-point, vehicle-vehicle, and vehicle-point communications in the ITS Sector using MILLIMETRE WAVE MOCROWAVE COMMUNICATIONS, including specifications for Master/Slave and Peer to Peer Communications
ISO/CD 21217	Communications, Air Interface, Long and Medium Range (CALM) -- Architecture
ISO/CD 21218	CALM Common Station Manager (Lower Level SAPs)
ISO/NP 22837	Configuration of vehicle probe data for wide area communications
ISO/WD 24100	Privacy - the basic principles for probe personal data protection
ISO/DIS 24101	Intelligent transport systems -- Communications, air interface, long and medium range (CALM) -- Application management
ISO/CD 24102	Interface management
ISO/CD 24978	Emergency crash notification using any available wireless media
ISO/WD TR 25100	User Guide for Harmonisation of Data Concepts
ISO/NP TS 25110	Interface definition for on-board account using integrated circuit card
ISO/NP 25114	Probe Data Reporting Management
ISO/NP TR 26682	Crash and Emergency Notification Reference Architecture
ISO/CD TR 28682	A joint APEC-ISO study of progress to develop and deploy ITS Standards
ISO/NP TS 28701	Public transport – Identifications of Fixed Objects in Public Transport (IFOPT)

Table B-3: Current ISO Work package (as of March 2007)

B.2   CEN/TC278

Working Groups

B.2.1   CEN Technical Committee 278 is responsible for "Road Transport and Traffic Telematics". It has a number of standing Working Groups, which set up Subgroups from time to time.

B.2.2   CEN TC278 works in close cooperation with ISO TC204, and to avoid duplication of effort, there is an agreement between them as to whether leadership in any given context is taken by the relevant ISO or CEN Working Group. The list below indicates how this works:

CEN Working Group	Work program	Leader
WG1	Automatic Fee Collection and Access Control	CEN
WG2	Freight and Fleet Management System	ISO
WG3	Public Transport	ISO
WG4	TTI – Traffic and Traveller Information	ISO
WG5	TC - Traffic Control	ISO
WG6	Parking Management	n/a
WG7/8	Geographic Road Data Base: Road Traffic Data	ISO
WG9	Dedicated Short Range Communications	CEN

CEN Working Group	Work program	Leader
WG10	Man-machine Interface	n/a
WG11	Subsystem- Intersystem Interfaces	ISO
WG12	Automatic Vehicle and Equipment Identification	CEN
WG13	System Architecture and Terminology	ISO

Table B-4: List of CEN/TC278 Working Groups and their CEN mirrors (as of March 2007)

B.2.3   For an up to date schedule of the remit of TC278, its current Working Groups and their points of contact please refer to **http://www.nen.nl/cen278/**

Published CEN/TC278 standards

Document	Title	Status/Info
EN 12253:2004	Dedicated Short-Range Communication – Physical layer using microwave at 5.8 Ghz	Replaces ENV 12253:1997
ENV 12313-4:1999	Traffic and Travel Information (TTI) - TTI Messages via traffic message coding - Part 4: Coding protocol for Radio Data System - Traffic Message Channel (RDS-TMC) - RDS-TMC using ALERT-Plus with ALERT-C	Published
ENV 12314-1:1996	Automatic vehicle and equipment identification - Part 1: Reference architectures and terminology	Withdrawn
ENV 12315-1:1996	Traffic and Travel Information (TTI) - TTI Messages via Dedicated Short-Range Communication - Part 1: Data specification - Downlink (roadside to vehicle)	Published, lifetime extended
ENV 12315-2:1996	Traffic and Travel Information (TTI) - TTI Messages via Dedicated Short-Range Communication - Part 2: Data specification - Uplink (vehicle to roadside)	Published, lifetime extended
ENV 12694:1997	Public transport - Road vehicles - Dimensional requirements for variable electronic external signs	Published, lifetime extended
EN 12795:2002	Dedicated Short-Range Communication (DSRC) - DSRC Data link layer: Medium Access and Logical Link Control (review)	Replaces ENV 12795:1997
EN 12834:2002	Dedicated Short-Range Communication - Application layer (review)	Published
ENV 12896:1997	Public transport - Reference data model (Transmodel)	Published
ENV 13093:1998	Public transport - Road vehicles - Driver's console mechanical interface requirements - Minimum display and keypad parameters	Published
ENV 13106:2000	DATEX traffic and travel data dictionary (version 3.1.a)	Published, under review
ENV 13149-1:2004	Public transport - Road vehicle scheduling and control systems - Part 1: WORLDFIP definition and application rules for onboard data transmission	Replaces ENV 13149-1:1999
ENV 13149-2:2004	Public transport - Road vehicle scheduling and control systems - Part 2: WORLDFIP cabling specifications	Replaces ENV 13149-2:2000
CEN TS 13149-3:2006	Public transport - Road vehicle scheduling and control systems - Part 3: WORLDFIP message content	Adopted, ready for publication

Document	Title	Status/Info
CEN TS 15504:2006	Intelligent transport systems — Automatic vehicle and equipment identification — Intermodal goods transport architecture and terminology	Published since 2001
ENV 13149-4:2004	Public transport - Road vehicle scheduling and control systems - Part 4: General application rules for CANopen transmission busses (review)	Replaces ENV 13149-4
EN 13149-5:2005	Public transport - Road vehicle scheduling and control systems - Part 5: CANopen cabling specifications (review)	Replaces ENV 13149-5:2002
TS 13149-6:2004	Public transport - Road vehicle scheduling and control systems - Part 6: CAN message content	Published since 2001
EN 13372:2004	Dedicated Short-Range Communication (DSRC) - DSRC profiles for RTTT applications (review)	Replaces ENV 13372:1999
ENV 13777:2000	DATEX specifications for data exchange between traffic and travel information centres (version 1.2.a)	Published, lifetime extended
ENV 13998:2001	Public transport - Non interactive dynamic passenger information on ground	Published
EN 15509:2007	Electronic fee collection – Interoperable application profile for dedicated short range communication	Published

Table B-5: List of published CEN/TC278 standards (as of March 2007)

Future CEN standardisation activities

Work Item	Title	Present Status	Document
00278193	Electronic fee collection - System architecture for vehicle related transport services (review)	Under development	prEN ISO 17573
00278207	Public transport - Identification of Fixed Objects in Public Transport (IFOPT)	No TC comments received	prCEN TS 00278207
00278218	Public transport - Service interface for real-time information relating to public transport operations - Part 4: Real-time status monitoring information of facilities	Preliminary	
00278219	Public transport - Service interface for real-time information relating to public transport operations - Part 5: Traffic incident monitoring service	Preliminary	
00278178	Traffic and Travel Information - Medium-range pre-information via DSRC - General specification - Part 2: uplink	TC comments received	prCEN ISO/TS 14822-2
00278211	Traffic and Travel Information (TTI) – TTI via Transport Protocol Expert Group (TPEG) data-streams – Part 10: Weather information (WEA) application (TPEG-WEA)	Under development	prCEN ISO/TS 18234-10
00278208	Traffic and Travel Information (TTI) – TTI via Transport Protocol Expert Group (TPEG) data-streams – Part 7: Parking Information (PKI) application (TPEG-PKI)	Under development	prCEN ISO/TS 18234-7

Work Item	Title	Present Status	Document
00278197	Traffic and Travel Information (TTI) – TTI via Transport Protocol Expert Group (TPEG) data-streams – Part 8: Congestion and Travel Time information (CTT) application (TPEG-CTT)	Under development	prCEN ISO/TS 18234-8
00278210	Traffic and Travel Information (TTI) – TTI via Transport Protocol Expert Group (TPEG) data-streams – Part 9: Traffic Event Compact (TEC) application (TPEG-TEC)	Under development	prCEN ISO/TS 18234-9
00278198	Traffic and Travel Information (TTI) - TTI via Transport Protocol expert Group (TPEG) Extensible Markup Language (XML) – Part 5: tpeg-pkiML	Ready for Parallel Formal Vote	N1741
00278199	Traffic and Travel Information (TTI) - TTI via Transport Protocol expert Group (TPEG) Extensible Markup Language (XML) – Part 6: tpeg-cttML	Preliminary	prCEN ISO/TS 18234--8
00278212	Traffic and Travel Information (TTI) - TTI via Transport Protocol expert Group (TPEG) Extensible Markup Language (XML) – Part 7: tpeg-weaML	Under development	prCEN ISO/TS 24530-7
00278213	Traffic management systems - Detection on motorways for traffic information and traffic management applications	Preliminary	
00278182	Automatic vehicle and equipment identification – Electronic Registration Identification (ERI) for vehicles - Part 1: Architecture	Adopted in CEN, not published	CEN ISO/TS 24534-1:2006
00278183	Automatic vehicle and equipment identification – Electronic Registration Identification (ERI) for vehicles - Part 2: Operational requirements	Adopted in CEN, not published	CEN ISO/TS 24534-2:2006
00278184	Automatic vehicle and equipment identification – Electronic Registration Identification (ERI) for vehicles - Part 3: Vehicle data	Adopted in CEN, not published	CEN ISO/TS 24534-3:2006
00278185	Automatic vehicle and equipment identification – Electronic Registration Identification (ERI) for vehicles - Part 4: Secure communications using asymmetrical techniques	Adopted in CEN, not published	CEN ISO/TS 24534-4:2006
00278201	Automatic vehicle and equipment identification - Interfaces	Adopted in CEN, not published	CEN ISO/TS 17264
00278206	Intelligent transport systems - Automatic emergency call crash notification	Under development	prCEN ISO/TS 24978
00278205	Intelligent transport systems - Wireless communications - Emergency call using cellular networks	Under development	prCEN ISO/TS 24977

Table B-6: Future CEN standardisation activities (as of March 2007)

C   Projects

C.1   Introduction

C.1.1   This section provides catalogue information on the following:

– European and international standards projects;

– UK standards projects.

C.1.2   All entries are accurate as of March 2007 but are subject to change.

C.2   European and international Standards Projects

Project	European projects: Sixth Framework
Contact	The Cordis website (URL below) includes links and contacts for each of the Fifth Framework projects
URL	http://www.cordis.lu/fp6
Scope	To improve Europe
Description	Group of projects which aim to test innovative policies, systems and technologies at the local level. Projects relevant to Transport Direct include the following:
INTRO	The INTRO project aims to improve road safety and capacity by providing rapid feedback of emerging problems to maintenance authorities and road users.
IM@GINE IT	This project aims to develop a single access point for location-based, intermodal transport information, mapping and routing, navigation and other related services across Europe. Personal traveller preferences will be taken into account in order to target the facilitation of seamless travel in Europe.
INTEGRAIL	This project aims to integrate the major railway sub-systems and deliver a higher level of coordination and cooperation between the key railway processes. The objective is to achieve higher levels of performance of the railway system in terms of capacity, average speed and punctuality, safety and the optimized use of resources
REACT	The REACT project presents a long-term vision of reducing traffic deaths and improving transport infrastructure. By using mobile sensors, REACT will transmit sensed real-time data to a central server and will generate safety alerts, speed and route recommendations to specific vehicle drivers and road and law enforcement authorities.
ANEMONE	Addresses the challenges of accommodating future user needs for mobile Internet based information and providing it in a reliable and secure fashion.
HIGHWAY	This real-time map-based e-safety project will provide an integrated approach to providing drivers with location-based value added in-vehicle services, including speed limit data, traffic information and weather information.
DANAE	DANAE proposes to address the dynamic and distributed adaptation of scalable multimedia content in a context-aware environment.
GST (Global System for Telematics)	An intiative mobilizing more than 50 stakeholders in the European telematics industry. It will provide building blocks to carry out the transition from closed to open systems.

Project	European projects: Sixth Framework
Related Standards	JourneyWeb, DATEX 2, TRIDENT, European TAP for Transport projects
Current Status	Some projects have been started while others are still in development
Future Development	Seventh Framework projects are likely to occur
Region	Europe
Applicability	Transport Authorities, Transport Operators, Travellers

Project	European projects: TAP for Transport
Contact	The Cordis website (URL below) includes links and contacts for each of the projects
URL	http://cordis.europa.eu/telematics/tap_transport/home.html
Scope	To encourage the Transport sector to use Telematics Applications Programme (TAP) (funded by the European Commission through Fourth Framework of DG XIII)
Description	Group of projects which aim to develop and validate telematics applications to provide enhanced services to transport users through improved efficiency, safety and environmental quality. From the x projects the most relevant to Transport Direct include:
AUSIAS	AUSIAS' main objective has been to demonstrate, on a large scale and under real conditions, how ATT can help European cities to reduce congestion, improve traffic management, and support sustainable socio-economic improvement, while also protecting the environment
ENTERPRICE	ENTERPRICE concerns the development of a Mobility and Traffic Information Centre, which takes on the function of generating multimodal traffic information from raw data in various traffic systems, combining the information, and presenting it for use by various private and public information services.
ICARE	ICARE concerns a new contactless payment and ticketing system for multi-modal and multi-operator Public Transport, and the extension of the technology to multi-service purposes such as the electronic purse.
INFOTEN	INFOTEN has introduced language-independent systems for traffic information exchange, multi-modal traveller information services and advanced driver warning systems in the Alpine area and Central Europe.
PROMISE	The aim of PROMISE is to provide travellers with a direct and easy access to multimodal traveller and traffic information during their whole journey, through mobile phones and hand-held PCs with wireless data communications (e.g. GSM).
SAMPLUS	Following on from the successful SAMPO project, SAMPLUS demonstrated and evaluated Demand Responsive Transport (DRT) services using telematics technologies. SAMPLUS involved undertaking major demonstrations of telematics-based DRT services at five sites in four different EU member states (Belgium, Finland, Italy, Sweden).
TITAN1	The project Titan concerned validation and further development of the European Reference data model for Public Transport operations (Transmodel).
CALYPSO	CALYPSO develops and implements a system based on a single smart card for multiple uses, for transportation, banking and other services. Using the same microprocessor card, the system provides contact and contactless operations in a multi-service, multi-operator environment for payment, ticketing, identification, location, reservation, information and security functions
INFOPOLIS2	Infopolis 2 improves travellers' ability to access electronic sources of information on all modes of transport, by offering transport operators guidelines for good presentation of information.
EURO-SPIRIT	The EU-Spirit project develops and demonstrates a customer-friendly, Internet-based system offering information on door-to-door public transport across Europe. Project completed in 2002.

Project	**European ITS Framework Architecture (EITSFA) – also known as FRAME**
Contact	Jan Willem Tierolf FRAME Forum Chairman Rijkwaterstaat AVV Phone: +31 10 2825879 Fax: +31 10 2825644 E-mail: j.w.tierolf@avv.rws.minvenw.nl
URL	http://www.frame-online.net/
Scope	The European ITS Framework Architecture provides a framework for the development and deployment of working and workable ITS solutions within the European Union.
Description	The EITSFA (also called "FRAME" or the "Framework Architecture") was developed with funding from the EC through the KAREN and FRAME Projects to become the main European ITS Architecture. Since its first release in November 2000, the Framework Architecture has been supported and updated through the EC funded FRAME Project, and since the beginning of 2005 by its users through the FRAME Forum. The Forum is continuing to fund development work to keep the Framework Architecture "alive" and to provide support for its use. Tools are available with the Architecture to assist Member States to develop national, regional and local architectures; and for Projects or other specific ITS related activities to develop their own system architectures. In order to accommodate this wide range of uses, the Architecture is designed to be adaptable and can be used in part, and with or without additions to suit particular requirements for the provision of ITS services. The Architecture has been used in France and Italy as the starting points for the development of their national ITS Architectures, plus in Scotland and the UK County of Kent for the development of their regional ITS Architectures. It is also being used in Austria, Slovenia, Hungary and Poland to support their national ITS deployments. The Architecture can be downloaded from the FRAME Web Site, together with its Tools and supporting documentation that provides help and guidance on its use to develop particular ITS architectures.
Related Standards	The Framework Architecture has been used to support the development of the UTMC standards, and the CEN/ISO TICS Fundamental Services (ISO TS 14813-1).
Current Status	Currently explicitly deployed in several European countries and Projects
Future Development	The FRAME Forum is responsible for adapting the Framework Architecture to accommodate new developments in ITS deployments and the services that they provide.
Region	Europe
Take-up	Widespread throughout European ITS deployment
Applicability	Transport Authorities, Network Managers, ITS related projects and other activities

C.3   UK Standards Projects

Project	**National Transport Data Framework**
Contact	Michael Simmons
	Centre for Mathematical Sciences Cambridge
	Tel: 01223 337990
	Email: m.p.simmons@dpmms.cam.ac.uk
URL	http://www.ntdf.org.uk/
Scope	Improving access to a variety of transport and other relevant data for users.
Description	The aim of the National Transport Data Framework project, a bid by the Cambridge-MIT Institute on behalf of Imperial College and the University of Cambridge, in close partnership with leading UK universities, is to provide an effective solution to derive useful information in real time and to analyse archival data from disparate sources.
	This will help transport users and operators make better decisions and government departments formulate strategy. The data to be handled will be very varied and will range from information from sensors on highways and from CCTV to demographic or pollution data.
	The project is developing the middleware at the core of the Framework. An architecture is being prepared to combine information from a variety of sources, allowing for uncertainities in the provenance of the data. A prototype implementation of the framework software is being developed to include the following areas - authentication framework identifying the users of the data: an authorisation framework, defining access rights to data: a core database system for the hub metadata: modules for ingesting new information: metadata handling for processes that create new secondary data, including the tracking of data quality and the propagation of uncertainties: a user interface.
Related Standards	-
Current Status	In development
Future Development	Ongoing
Region	UK
Take-up	In development
Applicability	Travellers, transport operators, governments

Project	Roads Information Framework (RIF)
Contact	Mary Gosden Highways Agency
URL	http://www.highways.gov.uk
Scope	Strategic roads information framework
Description	The Roads Information Framework (RIF) programme is focused on drawing data from disparate sources so that it can be shared across the Department for Transport, Highways Agency and Local Highways Authorities to support operational management, performance management, and strategic planning. Limited information is available on the web, via the HA, with current sources dated 2005.
Current Status	Ongoing
Future Development	Ongoing
Region	UK
Take-up	-
Applicability	Local authorities, highways agency, travel information providers

Project	**Travel Technology Initiative (TTI)**
Contact	Mick Mott Rowden Farm, Brentor, Tavistock, PL19 0NG, UK Telephone: +44 (0) 870 904 1521 Fax: +44 (0) 870 904 1521 E-mail: mick.mott@tti.org
URL	http://www.tti.org
Scope	Travel retailer organisation.
Description	TTI undertakes projects in the leisure and tourism sector of the travel industry. This includes projects that encompass intermediary activities (travel agents, tour operators), leisure travel - including package holidays, ferries, flights (primarily chartered) and cruises, as well as tourism ground products such as accommodation, tours and attractions. TTI is based within the United Kingdom, drawing its membership primarily from UK based organisations. It takes an interest in activities within mainland Europe and elsewhere (if particularly relevant) and may become involved in these if it is to members' benefit. However, it does not seek to coordinate or unduly influence these. TTI is active within the Open Travel Alliance. TTI has three primary objectives: • To engage in and/or coordinate technology and business process projects that are of benefit to TTI members and the travel industry as a whole within the scope set out above. This includes standards work. • To organise events such as conferences, workshops and forums as well as operate a Web site and publish a newsletter, in order to provide members with the opportunity to learn about technology related subjects and to allow members the opportunity to network with each other. • To coordinate its activities with other relevant bodies (eg. the Open Travel Alliance). TTI maintains and publishes the Unicorn EDI messages, of which there are now over 130 in use by over 100 organisations world-wide throughout the travel industry. It has developed a message called REScon to transfer booking information from a tour operator videotext system to a travel agent's local system and has also developed a standard format for availability information (TOPAS). TORIX is an XML message set which has been developed for the booking of package holidays. TTI also developed the Ferry XML standard, created by providing an XML structured alternative to the existing Unicorn EDI standard for booking ferry reservations.
Related Standards	OTA
Current Status	Currently active, with 150 members cover 10 countries
Region	Europe and USA
Take-up	Europe and USA
Applicability	Travel industry, ticketing and booking

D   Generic Standards

D.1   Data exchange services

Standard	Internet protocol suite: data exchange services
Contact	not applicable
URL	http://www.ietf.org/rfc.html
Scope	Group of standards common to IT interconnectivity and interfaces
Description	
Web page exchange	HTTP v1.1 (Hyper Text Transfer Protocol) (RFC 2616),
E-mail	SMTP/MIME (Simple Message Transfer Protocol) (this includes RFC (Request for Comments) 821; RFC 822; RFC 2045; RFC 2046; RFC 2047; RFC 2048; RFC 2049)
File transfer protocols	FTP (File Transfer Protocol) (RFC 959) and HTTP (RFC 2616)
Message exchange	SOAP (Simple Object Access Protocol) and SOAP+XML (RFC £902). XHR (XMLHttpRequest)
Instant Messaging	XMPP (Extensible Messaging and Presence Protocol) MPP (Messaging Presence Processing) (RCF 3921)
Web Services	WS* Ws-Addressing, WS-Notification, WS-Policy, WS-Eventing, etc
Queuing	AMPQ (Advanced Message Queuing Protocol) JMS (Java Message Service) JSR 914
Syndication	ATOM (RFC 4287) RSS (Really Simple Syndication).

D.2   Data structures and access

Standard	Data structures and access
Contact name	not applicable
URL	http://www.w3.org/TR (for XML,RDF) http://www.omg.org/technology/documents/formal/omg_modeling_specifi cations_avai http://www.opengis.org/techno.specs.htm (for GML) http://www.uml.org
Scope	Group of standards common to data integration in IT systems
Description	
Metadata/meta language	XML (Extensible Markup Language), RelaxNG
Metadata definition	XML-Schema
Data transformation	XSLT (Extensible Stylesheet Transformation Language)
Web service definition	WSDL (Web services Description Language) UDDI (Universal Description, Discovery and Integration)
Ontology meta language	RDF Resource Description Framework OWL Web Ontology Language
Geospatial data	GML (Geospatial Markup Language) including metastructures for GML Web Map Service (WMS) WGC Web Coverage Service (WGC)
Data modelling and description language	UML (Unified Modelling Language) RDF (Resource Description Framework)
Database access	SQL (Structured Query Language), ODBC, JDBC
Data object exchange	CORBA (Common Object Request Broker Architecture)
Exchange patterns	REST (Representational State Transfer)
Current status	Continuously evolving internet standards set
Future	Likely to evolve following advances in the IT industry
Region	Global

D.3   Digital broadcasting standards

Standard	Digital Audio Broadcasting (DAB)/Digital Video Broadcasting (DVB)
Contact	Julie Ackerman DAB Project Manager Phone: +44 20 7288 4642 E-mail: ackerman@worlddab.org DVB Project Office 17a Ancienne Route CH-1218 Grand Saconnex Geneva Switzerland Phone: + 41 22 717 27 19 Fax: + 41 22 717 27 27 E-mail: anthony.smith@dvb.org
URL	http://www.worlddab.org/ and http://www.dvb.org/
Scope	Standards for the broadcast of digital content (i.e. audio, data, text, pictures, and videos)
Description	Sets of standards for digital broadcasting; including audio, conditional access, interactivity, interfacing, measurement, MHP, multiplexing, sub-titling and transmission are being developed. Some standards have ISO/CEN force, for example; (i) MPEG-2 audio is specified in ISO/IEC 13818-3, TR 101 154 specifies the minimum requirements for the interoperability of baseline receivers; (ii) Dolby AC-3 audio for surround sound described in TR 101 154, TR 101 211, EN 300 468.
Current Status	Continuously evolving industry standards
Future Development	Likely to evolve following advances in the consumer electronic industry
Region	Global but strongly European
Take-up	In Europe, the definitive set of core standards for digital broadcasting
Applicability	Transport authorities, VASPs

D.4   XML Best Practice eGovernment Information Framework

Standard	eGIF (eGovernment Information Framework)
Contact	Office of the e-Envoy Stockley House 130 Wilton Road London SW1V 1LQ E-mail: ukgovtalk.gov.uk@e-envoy.gsi.gov.uk
URL	http://www.govtalk.gov.uk/egif/home.html
Scope	Guidance on common XML best practices to be applied to all. Catalogue library of approved reusable XML data definitions for specific domain areas.
Description	The eGIF framework documents the technical standards and policies that will act as the foundation for the e-government strategy. It includes a catalogue of registered schemas. The Transport section includes NaPTAN, NPTG, TransXChange and SIRI.
Current Status	Evolving – sections currently undergoing public review
Future Development	Version 3.1 of the e-Government Schema Guidelines for XML was published in June 2004.
	Version 3.1 of the Government Metadata standards was published July 2006.
	Govtalk XML schema catalogue
Region	UK (government)
Take-up	Widespread throughout UK government, as a result of Cabinet Office standardization initiatives
Applicability	UK Transport Authorities, Travellers

D.5   Geospatial Location Referencing Standards

Standard	Geospatial Location Referencing Standards
Contact	Not applicable
URL	http://www.alertc.com http://www.dnf.org http://www.tpeg.org http://ww.opengeospatial.org http://www.oasis-open.org
Scope	Standards for location of objects such as vehicles, bus/train stops etc
Description	
WGS84	Coordinate system used by GPS
Geolocation	GPS, Galileo, OGC Web Coverage Service, OGC Web Feature Service, OGC Web Map Service, OGC Web Map Service with Styled Layer Descriptor, OASIS Web Services Notification.
ALERT-C and ALERT-PLUS	Location referencing Used in DATEX and RDS-TMC and TPEG and outlined in various ISO and CEN standards.
ATCO-CIF	Contains location Referencing for bus information
ILOC	European location referencing system for ITS developed through projects such as EVIDENCE. Used in TPEG
Ordnance Survey	The British national mapping agency who have developed OSCAR that covers the British road network. ITN is the transport network Layer.
DNF	Digital National Framework. UK OS framework to provide an overall framework in which to integrate GIS (Geographical Information Systems) and GIS feature related data sets.
XGDF	Update to GDF that includes transport XML for transport features of maps and location based services
UIC	UIC have developed a set of location codes for international railways
POINTX	UK proprietary data set for points of interest

D.6   Networking standards

Standard	Internet protocol suite: networking standards
Contact	Not applicable
URL	http://www.ietf.org/rfc.html
Scope	Core standards for internet based communications, directory services, domain name services, e-mail, LAN/WAN internetworking, transport.
Description	
LAN/WAN internetworking	IPv4 (Internet Protocol) (RFC 791) IPV6 (RCF2497)
Transport	TCP (Transport Control Protocol) (RFC 793)/UDP (User Datagram Protocol) (RFC 768)
Domain name services	DNS (Directory Network Service) (RFC 1035)
E-mail	SMTP/MIME (this includes RFC 821; RFC 822; RFC 2045; RFC 2046; RFC 2047; RFC 2048; RFC 2049)
Directory services	X.500 (defined in GNC Technical Notice 1/2001), LDAP (Lightweight Directory Access Protocol)
SNMP	Simple Network Monitoring Protocol (RFC 1157)
Current status	Continuously evolving industry standards
Future development	Likely to evolve following advances in the IT industry
Region	Global
Take-up	The fundamentals of the internet. Some are pervasive (e.g. IPv4 & IPv6 are the network standards at the heart of the internet), others more localised but still almost universal within their area (eg the DNS for networking)

D.7   Screens, browsers and viewers

Standard	Presentation, browsers & viewers
Contact	Not applicable
URL	http://www.ietf.org/rfc.html http://www.ecma-international.org http://www.json.org
Scope	Group of standards used to define renderings, markups for browsers and viewers in IT systems
Description	
Hypertext interchange formats	HTML (Hyper Text Markup Language) and XHTML (Extensible Hypertext Markup Language)
Document file types	Adobe Acrobat (.pdf) Rich text format (.rtf) Plain/formatted text (.txt)
Spreadsheet file types	Comma separated variable (.csv)
Proprietary viewer file types	Hypertext interchange format (.htm)
Extended document types	Lotus Notes Web Access (.nsf) Microsoft Word Viewer (.doc)
Character sets and alphabets	UNICODE (ISO/IEC 10646-1:2000)
Graphical/still image interchange formats	Joint Photographic Experts Group/ISO 10918 (.jpg) Graphical Interchange Format (.gif) Portable Network Graphics (.png) Tag Image File Format (.tif) Simple Vector Graphics (.svg), Tiny SVG.
Moving Image and audio/visual information	Moving Image Experts Group (.mpg) MPEG-1/ISO 11172
Audio/video streaming data and animation	Real Audio, Real Video, Shockwave, Macromedia Flash (.swf), Dynamic html (.dhtml)
Scripting	ECMA (European Computer Manufacturer's Association) 262 Script, JavaScript, JSON (Java SCript Object Notation) AJAX (Asynchronous JavaScript and XML) "Web 2.0"
Voice	VoiceXML
Retrieval of information held on local servers	CGI (Common Gateway Interface) scripts, JavaEE Servlets, .NET
Current status	Continuously evolving industry standards set
Future development	Likely to evolve following advances in the IT industry There is a significant move towards the use of Web 2.0" style services which use scripting technologies (e.g. AJAX (Asynchronous Javascript and XML) to combine multiple content services using pre-emptive strategies)
Region	Global
Take-up	Extremely widespread. MS and Firefox browsers support these standards.

D.8   Security

Standard	Internet protocol suite: security
Contact	Not applicable
URL	http://www.ietf.org/rfc.html http://www.vpn.org http://www.pki.org
Scope	Core standards for internet based security and encryption used to build secure applications.
Description	
IP security	IP-SEC (RFC 2402/2404)
IP encapsulation security	ESP (Encapsulating Security Payload) (RFC2406)
E-mail security	S/MIME V3 (this includes RFC 2630; RFC 2631; RFC 2632; RFC 2633)
Transport security	SSL v3/TLS (Secure Socket Layer) (RFC 2246) https
Digital	PKI (Public Key Identification)
Web services	WS-Security
Identity Federation	SAML (Security Assertion Markup Language)
Current status	Continuously evolving internet standards set
Future development	Likely to evolve following advances in the IT industry

D.9   Mobile and wireless standards

Standard	Mobile Applications
Named contact	Not applicable
URL	http://www.openmobilealliance.org/ http://smsforum.net http://www.irda.org http://www.nxp.com
Scope	Standards used to define mobile applications and common to mobile device data services
Description	
Mobile data	GPRS (General Packet Radio Service), HSCSD (High speed circuit Switched data , 3G Edge (Enhanced Data GSM Enhancement)
Wireless LAN	Wifi (IEEE 802.11*), WiMax (IEEE 802.16)
Wireless PAN	Bluetooth (IEEE 802.15)
Infrared PAN	IrDA, IrSMP InfraRed Data Association
Radiotag	RFID (Radio Frequency Identification) (ISO/iEC 18000)
Nearfield	NFC (Near Field Communications) (ETSO EN 302 208, ISO/IEC10892)
Mobile data	WAP (Wireless Access Protocol) 2.0 (xHTML Mobile profile) is a subset of XHTML for mobile phones. iMode.(cHTML) is a major variant.
Texting	SMS (Short Message Service): Text messaging MMS (Mobile Message Service): Multimedia messaging SMPP (Short Message Peer to Peer Protocol) MMAP (Mobile Message Access Protocol)
Current status	GSM texting and GPRS/3G packet based data services, WiFi are uniquitous backbone standards. Most phones support WAP 2.0, and or xHTML and text messaging
Future development	WAP is used as a delivery mechanism for information over mobile phones. SMS and MMS are used to provide
Portable device	J2ME Java Mobile profile is used for portable client apps.
Region	Worldwide
Take-up	WiFi, Bluetooth are now widely used. RFID and NFC growing fast. SMS is widely used for text query (Mobile Originated MO) services and for alerts (Mobile terminated MT) .WAP 2.0 xHTML is available on most handsets and is used for data services. J2ME is the most potable smart device platforms but still requires some work to package for between different devices
Applicability	Any user wishing to deliver or receive information over WAP

D.10   Data structures and Definition and Access

Standard	Data structures and access
Contact name	not applicable
URL	http://www.w3.org/TR (for XML,RDF) http://www.omg.org/technology/documents/formal/omg_modeling_specifi cations_avai http://www.opengis.org/techno.specs.htm (for GML) http://www.uml.org
Scope	Group of standards specifying mainstream technologies used to design, define and build data services and to manage data.
Description	
Metadata/meta language	XML (Extensible Markup Language), RelaxNG
Metadata definition	XML-Schema
Data transformation	XSLT (Extensible Stylesheet Transformation Language)
Web service definition	WSDL (Web services Description Language) UDDI (Universal Description, Discovery and Integration)
Ontology meta language	RDF Resource Description Framework OWL Web Ontology Language
Geospatial data	GML (Geospatial Markup Language) including metastructures for GML Web Map Service (WMS) WGC Web Coverage Service (WGC)
Data modelling and description language	UML (Unified Modelling Language) RDF (Resource Description Framework)
Database access	SQL (Structured Query Language), ODBC, JDBC
Data object exchange	CORBA (Common Object Request Broker Architecture)
Exchange patterns	REST (Representational State Transfer)
Current status	Continuously evolving internet standards set
Future	Likely to evolve following advances in the IT industry
Region	Global
Take-up	XML the de facto internet standard for internet data exchange; it can be used in conjunction with a number of different transports such as SOAP, http, TCIP/Sockets etc and has extensive tool support. SQL is almost universal for database access and query. UML, now in version 2.0 is the mainstream design notation, with tool support for transforming into XML and SQL. CORBA is in widespread use for high performance distributed ORBS. Advanced semantic web technologies such as OWL are likely to become more important for integrating complex data sets. GML is a specialized language for GIS markup and is used in many GIS and mapping schemas. Application building with complex technology requires frameworks with ready made components and binding tools. JavaEE and .Net are the two main platforms with support for the above.
Applicability	Complex data exchange over IP networks

E Specific Standards

E.1 Introduction

E.1.1 This section lists specific standards, guidelines and technical reports under the following headings:

- Key formal standards;
- De facto "standards":
    - Current core ;
    - Current non-core;
    - Legacy;
- Guidelines;
- Projects.

E.1.2 **This is not intended to be a definitive list –** it highlights only key specifications which are likely to be relevant to a wide range of project managers. Annex B provides a complete current list of formal standards of relevance to the area, and pointers to where updates may be obtained. Annex A lists a range of organisations covering specific sectors, whose advice may be sought on specifications and guidelines relevant to local sector issues.

E.1.3 All entries are accurate as of March 2007 but are subject to change.

E.2 Formal standards

Standard	TRANSMODEL
Contact	Roger Slevin, Standards Manager, Transport Direct Team, Department for Transport
	Phone: 020 7944 2668 E-mail: roger.slevin@dft.gsi.gov.uk
	Kasia Bourée Kasia Bourée-Ingénieur Conseil (KB-IC)
	91, rue Escudier 92100 Boulogne France phone/fax: 33 1 41 31 12 21 E-mail: kbouree@orange.fr
URL	http://www.transmodel.org
Scope	Transmodel addresses the requirements of public transport companies and authorities as regards data structures for constructing integrated information systems. It describes the data structures as a conceptual data model accompanied by a data dictionary. It refers to the domains: Scheduling/Rostering, Passenger Information, Fare Collection, Personnel Disposition, Management Information/Statistics, Operations Monitoring and Control.
Description	Transmodel is an open architectural framework that can be used in information system design to define data used by and/or exchanged between different application programs. As a conceptual data model, it describes elementary data structures dedicated primarily for database design. It has been developed independently from any project linked to the definition of messages, but the Transmodel objects contain information to be used when defining messages linked to public transport

applications.

Transmodel has been developed through several EC research and development programmes. In particular, Cassiope (1989-1991), EuroBus (1992-1994), Harpist and Cartridge (1994-1995) and TITAN (1996-1998). Version 5.1 was voted in 2005 and accepted as a European standard EN 12896.

Related Standards	SIRI, VDV, TRIDENT, IFOPT, TransXchange
Current Status	Covers modes such as bus, tram, trolleybus, light-rail and metro systems in urban areas.
	Transmodel v4.1 voted in '97 as ENV 12896 has been extended to become Transmodel v5 (additions: real-time control domain, multi-modality, multiple operators environment, extended versions management, generic network modelling) presented to CEN as the revised proposal for European standard.
	An amended version 5.1 has been accepted as the European standard EN 12896.
	Currently being considered as a candidate International Standard by ISO TC204 WG8 (Public Transport).
Future Development	Possible extensions refer to the detailed modelling of concepts related to static or dynamic Passenger Information (e.g. complex stops, events) suggested by the developments undertaken in Fare Management, SIRI and IFOPT.
Region	Europe (with international potential)
Take-up	Widespread throughout the transport development sector
	Applied under the control of the Transmodel development team in Lyon (France), Hanover (Germany), Salzburg (Austria).
	Parts applied in the UK (TransXChange and related national standards) and in Scandinavia (PubTrans).
Applicability	Transport Operators, Transport Agencies, software designers for Public Transport

Standard	Service Interface for Real-time Information (SIRI)
Contact	Real Time Information Group Surrey Technology Centre Surrey Research Park Guildford Surrey GU4 8JJ
	Tel: 01483 688270
	Fax: 01483 688271
	Email: secretaritat@rtig.org.uk
URL	http://www.siri.org.uk
Scope	XML protocol for Real Time Information Systems
Description	SIRI is an XML protocol to allow distributed computers to exchange real-time information about public transport services and vehicles.
	The protocol is a CEN standard, developed with initial participation by France, Germany (VDV), Scandinavia, and the UK (RTIG).
	SIRI is based on the Transmodel abstract model for public transport information, a general purpose model, and XML schema for public transport information.
	The SIRI protocol uses open system technologies and is platform independent. The SIRI publish/subscribe architecture and terminology is based on the WS-Pubsub draft standard for publish subscribe web services.
Related Standards	Trident, VDV, Transmodel
Current Status	Formerly adopted as a European standard in October 2006
Future Development	As and when required
Region	Europe
Take-up	UK RTI systems
Applicability	Local authorities, RTI systems suppliers, transport operators

Standard	Transport Protocol Experts Group (TPEG) specifications
Contact	European Broadcasting Union
	TPEG Forum Office L'Ancienne-Route 17A Case postale 45 CH-1218 Grand-Saconnex GE Switzerland
	Phone: +41 22 717 27 23 Fax: +41 22 747 47 23 E-mail: ecoffey@ebu.ch
URL	http://www.tpeg.org/ (limited information at present) http://www.ebu.ch/en/technical/projects/b_tpeg.php (information on standards access and the TPEG Forum)
Scope	To provide multi-modal TTI dissemination over digital broadcast systems through use of a bearer independent TTI protocol.
Description	TPEG was initiated in 1997 by the European Broadcasting Union to develop a new ISO/CEN standard for the transmission of traffic and travel information via digital broadcast systems such as DAB, DVB and the Internet using XML
	TPEG technology has been developed to facilitate the delivery of information messages within the multimedia broadcasting environment from service providers to end-users.
	The underlying principles of TPEG technology require that hierarchically structured messages may be delivered in such a way that client devices are able to decode and filter the content to provide language independent presentation either directly for human use, or for agent systems.
	The initial TPEG work was completed in 2002. Latterly, in parallel for three years with the EBU work, the "TPEG Project" undertook validation of the technology and completed its work in 2003, including on-air testing.
	The EBU is sponsoring continued work in the TPEG Forum and Task Forces have been established to ensure continuity of expert involvement in TPEG technology, as it is gradually introduced in the broadcasting service and consumer electronics markets.
Related Standards	DAB/DMB, DVB (bearer channels for TPEG content) DATEX 2 (content segment using TPEG-Loc) RDS-TMC (related Road Traffic Message content)
Current Status	Work ongoing
Future Development	Many new applications now in ISO/CEN Workplan
Region	Worldwide
Take-up	Strongly supported by broadcasters – already in use for EBU TTI Message Exchange System GST Integrated Project Safety Channel and mobile.info Project adoption of various TPEG Toolkit applications TTI services within Korean DMB service delivery
Applicability	All end-users (RTM and PTI applications), TTI Service Providers (public and private), Client Device Designers, Transmission Network Operators (broadcast and telecomm)

Standard	National Public Transport Gazetteer (NPTG)
Contact	Roger Slevin, Standards Manager, Transport Direct Team, Department for Transport
	Phone: 020 7944 2668 E-mail:roger.slevin@dft.gsi.gov.uk
URL	http://www.nptg.org.uk
Scope	The NPTG provides a topographic database of towns and settlements in the UK; it provides a common frame of reference for the NaPTAN schema and other UK Public Transport Information schemas such as JourneyWeb.
Description	The appropriate naming of towns and places is vital for providing effective place and stop finding in all modern on-line journey planners and other Passenger Information Systems.
	The NPTG XML schema is used to distribute topographic data from the NPTG database to users. An ancillary schema, the NPTG Discovery XML schema, is used to exchange data that relates topographical localities with the available computer information services. The NPTG Discovery schema can be used for the automatic provisioning and system configuration of systems, for example to find the server that covers particular stops for journey planning or real time services.
	The NPTG database and schema are maintained under contract by the UK DfT.
Related Standards	NaPTAN, JourneyWeb, TransXChange, IFOPT
Current Status	Version 2.1 of NPTG XML Schema is currently available and includes a comprehensive harmonization with GovTalk XML standards and NaPTAN 2.1. This became the mandatory version from January 2007
Future Development	No planned schema developments; data to be improved progressively within existing schema
Region	UK only
Take-up	nationwide
Applicability	Local authorities, transport operators, travel information systems operators

E.3   De facto standards: core

Specification	National Public Transport Access Nodes (NaPTAN)
Contact	Roger Slevin, Standards Manager, Transport Direct Team, Department for Transport
	Phone: 020 7944 2668 E-mail:roger.slevin@dtlr.gsi.gov.uk
URL	http://www.naptan.org.uk
Scope	The NaPTAN schema and database provide a UK nationwide system for uniquely identifying all the points of access to public transport in the UK.
Description	NaPTAN is the core component of the UK national transport information infrastructure and is used by a number of other UK standards and information systems.
	Every UK station, coach terminus, airport, ferry terminal, bus stop, etc is allocated at least one unique NaPTAN identifier.
	The NaPTAN schema is a UK National de facto standard sponsored by the UK DfT and supports both the public registration of bus timetables by the Vehicle and Operator Services Agency (VOSA), and data exchange between the Transport Direct Portal and traveline regional systems using the JourneyWeb protocol
	The NaPTAN database and schema are maintained under contract by the UK DfT.
Related Standards	National Public Transport Gazetteer (NPTG), JourneyWeb, TransXChange, IFOPT
Current Status	Version 2.1 of NaPTAN XML Schema is currently available and includes a comprehensive harmonization with GovTalk XML standards and NPTG 2.1. This became the mandatory version from January 2007.
Future Development	Schema enhancements to allow change-only updating of data
Region	UK only
Take-up	Nationwide
Applicability	Local authorities, transport operators, travel information systems, fare management systems

Specification	TransXChange
Contact	Roger Slevin, Standards Manager, Transport Direct Team, Department for Transport
	Phone : 020 7944 2668
	Email: roger.slevin@dft.gsi.gov.uk
URL	http://www.transxchange.org.uk
Scope	To facilitate interchange of electronic bus route, timetable and Bus Service Registration information
Description	TransXChange is a national XML based data standard for the interchange of bus route and timetable information between Bus Operators, VOSA, Local Authorities and Passenger Transport Executives, and others involved in the provision of Public Transport Information.
	Its purpose clearly overlaps with that of ATCO-CIF and it is envisaged that TransXChange will replace ATCO-CIF. TransXChange is substantially compliant with Transmodel and JourneyWeb, and makes reference to NaPTAN and NPTG standards.
Related Standards	ATCO-CIF, RJIS-CIF, Transmodel, JourneyWeb, NaPTAN, NPTG
Current Status	Version 2.1 now adopted as baseline standard for Electronic Bus Service Registration, and as the general standard to which all related developments are expected to comply
Future Development	Extension envisaged to cover Ticketing and Fares through the proposed FareXChange standard. Scope can also be extended to other modes of transport - already used for Metro and Tram systems route and timetable data.
Region	UK
Take-up	Likely to be broad across the UK bus sector
Applicability	Bus Operators, Bus Users, Transport Authorities, Travel Information Systems operators

Specification	UTMC
Contact	Ken Laughlin UDG Chair Monument House 5 Upper High Street Winchester Hampshire SO23 8UT Tel: 01962 846893 Email: ken.laughlin@hants.gov.uk
URL	http://www.utmc.uk.com
Scope	To develop and promote modular and open traffic management systems for the ITS market
Description	UTMC has helped local authorities achieve their traffic management goals by adopting an appropriate, but not over constraining, set of standards to allow users, suppliers and integrators of UTMC systems to plan and supply systems cost-effectively in an open market. Today UTMC is the preferred ITS platform for UK towns and cities. The UTMC Development Group (UDG) of stakeholders facilitates the development and implementation of UTMC systems. The UTMC Suppliers Forum (USF) work closely with the policy driven UDG Management Group. The UTMC Framework Technical Specification presents the core technical standards recommended for use by UK traffic managers in their systems.
Related Standards	CORBA, NTCIP,TIH, Internet standards
Current Status	TS003:2005 – UTMC Framework Technical Specification is currently available and takes into account ongoing feedback and consultation
Future Development	To continue to promote and develop UTMC as a key traffic management initiative in the UK
Region	UK
Take-up	A number of UK cities are using the UTMC framework as part of their Intelligent Transport Systems.
Applicability	Transport Authorities, Travellers, Equipment Suppliers, Public Transport Operators

Specification	Integrated Transport Network layer (ITN)
Contact	Ordnance Survey Romsey Road Southampton SO16 4GU
URL	http://www.ordnancesurvey.co.uk/oswebsite/products/osmastermap/layers/itn/
Scope	Digital map for Britain's roads
Description	The Integrated Transport Layer (ITN) is a geographic reference layer for Great Britain's road infrastructure.
	The ITN Layer consists of two themes; the Roads Network and Road Routing Information (RRI). The Roads Network represents all navigable roads across Great Britain for those who require increasingly sophisticated geographical data to support their services and applications. The data includes road categories from motorways to alleyways, providing Department for Transport (DfT) road classifications, including trunk roads and primary routes, as well as named and unnamed minor roads and local streets. Each road link is supplied with a unique topographic identifier or TOID® – a 16-digit reference number that can be shared with other users across different applications and systems.
Related Standards	Geographic Markup Language (GML)
Current Status	Available
Future Development	Ongoing
Region	Great Britain
Take-up	Country-wide
Applicability	Transport operators, satellite navigation, traffic control, route planning

Specification	JourneyWeb
Contact	Roger Slevin, Standards Manager, Transport Direct Team, Department for Transport Phone: 020 7944 2668; E-mail: roger.slevin@dft.gsi.gov.uk
URL	http://www.journeyweb.org.uk/
Scope	JourneyWeb is an extensible protocol for dynamic data exchange over the internet between multimodal public transport journey planners
Description	JourneyWeb is an open XML-schema designed for use over the internet to link multi-modal journey planning systems. The protocol enables any one journey planner to send questions to another, and to receive answers back, so that journeys can be planned beyond the boundary of the first journey planning system. The protocol can be used with journey planners used in telephone call centres, on the internet or at kiosks.
Related Standards	European TAP for Transport Projects, Delfi, EU-Spirit
Current Status	Version 2.1 used extensively within UK.
Future Development	Further developments for mapping and navigation data partially drafted but not yet formalised
Region	UK
Take-up	Underpins distributed journey planning, SMS text information and other services in UK, particularly within Transport Direct and traveline
Applicability	VASPs, Travellers, Transport Agencies

Specification	ITSO Specifications
Contact	ITSO Limited Room 122 Centro House 16 Summer Lane Birmingham B19 3SD 0121 233 2598
URL	http://www.itso.org.uk
Scope	Open national smart card
Description	ITSO produces the ITSO Specification (currently v.2.1.1) for the implementation of interoperable contactless smart customer media public transport ticketing and related services in the UK. The specification defines the key technical terms and interfaces that are required to deliver interoperability and is fully downloadable from the ITSO website.
Related Standards	RSP, ECBS, ADEPT II, ISO 14443, ISO 15408, ISO 24014, EN 1545, EN 15320
Current Status	Operational across UK
Future Development	Remote loading of tickets and other applications over internet and mobile phone
Region	UK; under consideration in a number of other countries
Take-up	National; mandated by DfT for all public transport smartcard applications
Applicability	Transport Operators, Travel Authorities, Retailers, Travellers, Suppliers

Specification	Airport and Airline Standards (IATA)
Contact	IATA Head Office
	Tel: +1 (514) 874 0202
	Email: corpcomms@iata.org
URL	http://www.iata.org/standards http://www.iata.org/ps/publications/9179.htm http://www.iata.org/workgroups/airport-invoice-standards.htm
Scope	To improve the exchange of airline information
Description	IATA provide a number of standards that are applicable to the travel vendor and information markets. Including:
	• DISH – Billing and Settlement Plans Data Interchange Standards
	• PADIS – Passenger and Airport Interchange Standards
	• SSIM – Standard Schedules Information Manual
	• AIS – Airport Invoice Standard
Related Standards	-
Current Status	Active standards
Future Development	Continued
Region	Worldwide
Take-up	International travel agencies, airlines and airports
Applicability	Airports, airlines and travel agencies

E.4   De facto standards: non-core

E.4.1   The specification in this section are likely to be of less relevance than those in section E.3 generally, for various reasons:

−   TCIP is American rather than European;
−   RDS-TMC is focussed on a very specific application which is now largely delivered – successors may well use TPEG;
−   UIC standards are also largely relevant to specific functional context within railways and may have little external relevance.

Specification	Transit Communications Interface Profiles (TCIP)
Contact	American Public Transport Association 1666 K Street, N.W. Suite 1100 Washington, DC 20006 Telephone (202) 496-4804 Fax (202)-496-4335
URL	http://www.aptastandards.com/TCIPProgram/tabid/113/Default.aspx
Scope	To facilitate data exchange in the US transit industry
Description	TCIP is an APTA Standard that provides a library of information exchange building blocks, to allow transit agencies and transit suppliers to create standardized tailored interfaces. APTA TCIP is based on the earlier TCIP work performed by ITE, AASHTO, and NEMA and published as the NTCIP 1400-series standards. APTA TCIP extended the NTCIP Standards to include a Concept of Operations, Model Architecture, Dialog Definitions, and a rigorous, modular approach to conformance. Both the APTA TCIP development and the earlier NTCIP development were sponsored by the US DOT Intelligent Transportation Systems Joint Program Office.
Related Standards	NTCIP
Current Status	Ongoing
Future Development	Ongoing
Region	USA
Take-up	-
Applicability	Network Operators

Specification	Radio Data System-Traffic Message Channel (RDS-TMC)
Contact	James Burgess ERTICO - ITS Europe 326, Avenue Louise B-1050 Brussels Phone: +32 2 400 07 43 Fax : +32 2 400 07 01 tmcforum@mail.ertico.com
URL	TMC Forum: http://www.tmcforum.com/
Scope	To provide a system for the collection and broadcasting of TTI according to a global standard.
Description	The Traffic Message Channel (TMC) is a specific application of the FM Radio Data System (RDS) used for broadcasting real-time traffic and weather information. Data messages are received silently and decoded by a TMC-equipped car radio or navigation system, and delivered to the driver in a variety of ways. The most common of these is a TMC-enabled navigation system that can offer dynamic route guidance - alerting the driver of a problem on the planned route and calculating an alternative route to avoid the incident. The ISO standardised protocol to deliver RDS-TMC is ALERT-C as defined in ISO/CEN standards series 14819 parts 1, 2, 3 and 6. ALERT-C was developed concurrently with DATEX and therefore has a degree of compatibility to enable TMC information to be distributed between traffic information centres using DATEX.
Related Standards	TPEG, DATEX 2, ISO/CEN
Current Status	Services in normal operation. Standards stable, with periodic updates through ISO/CEN.
Future Development	Work in TMC Forum to identify development requirements, implemented as periodic minor updates through ISO/CEN. TPEG (Transport Protocol Expert Group) is a protocol and set of applications, under development and undergoing ISO/CEN standardisation, to provide TTI taking advantage of digital broadcasts such as DAB and the greater bandwidth thus potentially available. TMC Forum, TPEG Forum and other stakeholders are working together to ensure coordinated development of future TTI.
Region	Global – Services are in place across Europe (with some exceptions), America and in Australia, have been demonstrated in China and are under development for a number of other countries.
Take-up	Deployment is widespread around Europe, USA, Australia and beyond.
Applicability	Travellers, Telecommunications Industry, Automotive Industry, Public Authorities

Specification	Rail Data Transmission and Data Processing (UIC)
Contact	Editions Techniques Ferroviaires
	+33 (0) 1 44 49 21 81 +33 (0) 1 44 49 21 83
	E-mail: ETFpublic@uic.asso.fr
URL	http://www.uic.asso.fr/etf/codex/codex-resultat.php?sschapitre=91
Scope	Remote data transmission and data processing for the international rail industry
Description	The UIC/ETF website holds a number of standards 'leaflets' including the following which are of relevance to Transport Direct: • 914 – Technical Security Standards for Electronic Sales and Distribution Systems • 918/0 – Electronic Seat/Berth Registration and Electronic Production of Travel Documents – General Regulations and Standards • 918/1 - Electronic Seat/Berth Registration and Electronic Production of Travel Documents – Exchange of Messages • 918/2 - Electronic Seat/Berth Registration and Electronic Production of Travel Documents – Transport Documents (RCT2 Standard)
Related Standards	RJIS, RSP
Current Status	Currently available for download from ETF website
Future Development	Leaflets are regularly updated or replaced
Region	International
Take-up	International railway industry
Applicability	Railway operators, transport authorities, travel vendors

E.5   De facto standards: legacy

Specification	Association of Transport Coordinating Officers-Common Interface File (ATCO-CIF)
Contact	Atkins Transport Systems Woodcote Grove Ashley Road Epsom Surrey KT18 5BW Phone : E-mail : paul.everson@atkinsglobal.com
URL	http://www.atco.org.uk/
Scope	A data exchange standard for bus timetable information operating in the information level.
Description	ATCO-CIF is a general-purpose interchange format for common elements of bus timetable information e.g. stop locations etc. ATCO-CIF operates at the information level and is a simple, clearly understandable and well-documented standard that has been widely taken up by the UK public road transport community. ATCO-CIF continues to be widely used though will, in time, be superseded by TransXchange. ATCO-CIF provides extension points for suppliers and this feature is widely used creating several variants to the core format. To ensure back compatibility with ATCO-CIF is maintained, ATCO-CIF will continue to provide a necessary sub-set for the TransXchange Logical Reference Model. In addition, TransXchange will be capable of generating ATCO-CIF records from TransXchange records.
Related Standards	TransXchange, RJIS-CIF
Current Status	Beginning to age
Future Development	Being replaced by TransXchange
Region	UK
Take-up	Widely adopted in the road public transport and related local authority sectors
Applicability	Transport Operators, Transport Authorities, Network managers

Specification	Rail Journey Information System-Common Interface File (RJIS-CIF)
Contact	Melvin Mayes ATOC Ltd 3rd Floor 40 Bernard Street London WC1N 1BY
URL	http://www.atoc.org
Scope	To improve the coordination of rail information systems on a nation scale
Description	RJIS is the national rail journey information system for distributing data about timetables, fares, reservations etc. RJIS comprises three parts, the Data Factory (for acquiring, checking and storing data), the Integration Layer (a facility for computer systems to enquire about journeys, which uses the data factory and links to the reservations service) and the Presentation.
Related Standards	RSP
Current Status	In delivery
Future Development	-
Region	UK
Take-up	Will be the rail industry standard
Applicability	Rail Operators, VASPs, Rail Users

Specification	RTIG Bus Management Standards
Contact	Real Time Information Group Secretariat Centaur Consulting Ltd Surrey Technology Centre Surrey Research Park Guildford Surrey Phone: 01483 688270 Fax: 01483 688271 E-mail: rtig@centaurconsulting.co.uk
URL	http://www.rtig.org.uk
Scope	To assist UK local authorities, PTEs, and public transport operators implement real time technology to deliver better public transport services and travel information.
Description	RTIG T021 – Common TransXchange profile for input into RTI systems
	RTIG T022 – ETM Interface Specification
Related Standards	UTMC, VDV
Current Status	Final specifications
Future Development	Further specifications are being developed
Region	UK
Take-up	RTIG currently has 80 members
Applicability	Local authorities, PTEs and bus operators

E.6   Guidelines

Guidelines	Code of Practice for Traffic Control and Information Systems – MCH1869
Contact	Highways Agency Room 624 Tollgate House Houston Street Bristol BS2 9DJ
URL	http://www.highways.gov.uk/
Scope	Code of practice that applies to roadside systems that convey instructions or information to road users by signal control, variable signs/symbols
Description	Code of practice covering: (i) manufacture and supply; (ii) installation, testing and commissioning; and (iii) operation and maintenance of traffic control and information systems. Includes procedures for statutory type approval and safety review.
Related Standards	None
Current Status	Published code of practice
Future Development	None planned
Region	UK
Take-up	Widespread
Applicability	Transport Operators, Transport Authorities

Guidelines	UK National Air Quality Standards/Strategy
Contact	DEFRA Nobel House 17 Smith Square London SW1P 3JR Tel: 08459 33 55 77 email: helpline@defra.gsi.gov.uk
URL	http://www.airquality.co.uk/archive/standards.php#std http://www.defra.gov.uk/environment/airquality/strategy/strategy.htm
Scope	To provide UK national air quality standards
Description	Standards for air pollution are concentrations over a given time period that are considered to be acceptable in the light of what is known about the effects of each pollutant on health and on the environment. They can also be used as a benchmark to see if air pollution is getting better or worse. An exceedence of a standard is a period of time (which is defined in each standard) where the concentration is higher than that set down by the standard. In order to make useful comparisons between pollutants, for which the standards may be expressed in terms of different averaging times, the number of days on which an exceedence has been recorded is often reported. An objective is the target date on which exceedences of a standard must not exceed a specified number. The objectives adopted in the UK are based on the Air Quality (Wales) Regulations 2000 and (Amendment) (Wales) Regulations 2002 for the purpose of Local Air Quality Management. These Air Quality Regulations have adopted into UK law the limit values required by EU Daughter Directives on Air Quality.
Related Standards	-
Current Status	Current standards and strategy available online
Future Development	Levels and standards will be monitored
Region	UK
Take-up	All UK local authorities
Applicability	Local authorities

Guidelines	Safety Standards for In-Vehicle Information Systems
Contact	Dr Tim Horberry Transport Research Laboratory Old Wokingham Road Crowthorne Berkshire RG45 6AU Phone: 01344 770804 Fax: 01344 770356 E-mail: thorberry@trl.co.uk
URL	www.trl.co.uk
Scope	To minimise driver distraction whilst using In-Vehicle Information Systems
Description	The publication, Development of Safety Principles for In-vehicle Information and Communications Systems, provides a detailed account of UK and European standardisation within this area. In particular it highlights relevant BSI and EC standards documentation.
Related Standards	TPEG, RDS-TMC
Current Status	An area where little progress has been made due to the difficulties of performing research but is recognised to have increasing importance
Future Development	EC is expected to sponsor further research under the 7th framework programme
Region	UK/Europe
Take-up	Individual standards are strongly supported and enforced because of the safety implications
Applicability	Transport Industry, VASPs

Guidelines	**TIH Principles – Publishing and receiving travel information**
Contact	NTCC 3 Ridgeway Quinton Business Park Birmingham B32 1AF Phone: 0121 2454851 E-mail: helpdesk@tih.org.uk
URL	http://www.tih.org.uk/
Scope	The TIH aims to facilitate the exchange of real time travel information
Description	The TIH Principles document aims to make data available in a common format, for ease of exchange. The document is freely available. The TIH Principles are developed and recommended by independent members within a series of Working Groups. Each group is led by a recognized expert in that area. The Priniciples are available to download from the TIH website.
Current Status	Freely available to the ITS community
Future Development	Ongoing
Region	UK
Take-up	UK
Applicability	Travel information providers, local authorities, highways agencies

Guidelines	Best Practice Guide – Public Transport Information Web Sites
Contact	The Transport Research Group School of Civil Engineering and the Environment University of Southampton Highfield Southampton SO17 1BJ Phone: 023 8059 2192 Fax: 023 8059 3152 E-mail: TBC
URL	http://www.trg.soton.ac.uk/bpg/index.htm
Scope	To improve the design of PTI websites
Description	Best practices guidelines for websites encompassing all aspects of PTI; eg user requirements, interface design and journey planning
Related Standards	European TAP for Transport projects
Current Status	Published best practice guide
Future Development	None planned
Region	UK
Take-up	Unknown
Applicability	VASPs, Travellers, Transport Operators, Transport Authorities

Guidelines	**Public Service Terminals Usability Guidelines**
Contact	Cityspace Ltd. Astley House 33 Notting Hill Gate London W11 3JQ Phone: 020 7313 8400 Fax: 020 7313 8401
URL	http://www.cityspace.co.uk
Scope	To provide guidance on usability issues for designers of Public Transport Terminals
Description	Public Service Terminals (PSTs) are likely to become as much an every day facility as bus timetables, street maps, displays, billboards and Local Authority notices are today. Their installation inside public buildings, or as free standing structures on the street or as part of existing architectural features eg bus stop shelters, must allow easy access by the general public. The guidance is based on comprehensive ergonomics research and testing and is an attempt to reflect the most up to date knowledge and experiences in the field of human computer interface design and in access design. It sets out the minimum requirements for access and use of PSTs by all sections of the population as a basic resource for designers.
Related Standards	RNIB, RTIG, WAI
Current Status	Currently available
Future Development	Extensions to incorporate payment, ticketing and other digital transactional services
Region	UK
Take-up	-
Applicability	VASPs, Local Authorities, Infrastructure Manufacturers, Transport Operators, Transport Authorities

Guidelines	Printed Information at Bus Stops – Interim Good Practice Guidelines
Contact	Peter Warman
URL	http://atco.org.uk/publications/images/ATCO%20Roadside%20Public%20Transport%20Information%20-%20GPG%20-%20v04.01.pdf
Scope	Design guidelines for at-stop printed bus information
Description	The Transport Act requires each local transport authority to develop a bus information strategy. The purpose of these Interim Good Practice Guidelines is to assist local authorities in discharging this duty and to provide advice on how a high standard of public transport information at bus stops might be secured. It is attempting to address requirements for the majority of printed displays in the UK, instead of focusing on local cases only.

The guidelines give succinct information on the following:

- General layout
- Layout of timings
- Print and paper
- Display maintenance and frequency of timetable revisions

It also contains an annex of useful documents, such as: DDA guidelines, RNIB information, case studies and codes of practice.

Related Standards	-
Current Status	Interim document produced by ATCO
Future Development	To be developed into a Design Manual
Region	UK
Take-up	-
Applicability	Local authorities, bus operators, travellers

Guidelines	Web Accessibility Initiative
Contact	Judy Brewer
	Tel: +1 617 258 9741 email: jbrewer@w3.org
URL	http://www.w3.org/wai
Scope	Initiative offering key accessibility information and guidelines for the Web
Description	The Web Accessibility Initiative (WAI) develops its work through W3C's consensus-based process, involving different stakeholders in Web accessibility. These include industry, disability organizations, government and accessibility research organizations.
	The WAI develops strategies, guidelines, and resources to help make the Web more accessible to people with disabilities.
	One of the roles of the Web Accessibility Initiative (WAI) is to develop guidelines and techniques that describe accessibility solutions for Web software and Web developers. These WAI guidelines are considered the international standard for Web accessibility.
Related Standards	RNIB, RTIG
Current Status	Ongoing work
Future Development	Ongoing
Region	Worldwide
Take-up	Worldwide
Applicability	Web developers, local authorities, transport operators, information providers

E.7   Projects: specifications

E.7.1   This section covers projects established to deliver specifications. In some cases these are still at the feasibility stage and might generate more definitive specifications or even formal standards (eg DATEX2, IFOPT), while in other cases they are not likely to do so (eg TRIDENT, which completed its project phase several years ago but continues in wide operational use in France in particular.)

Project	FareXChange
Contact	Roger Slevin, Standards Manager, Transport Direct Team, Department for Transport
	Phone : 020 7944 2668
	E-mail : roger.slevin@dft.gsi.gov.uk
Scope	UK standard for the general exchange of fares and ticketing information
Description	In 2006 Transport Direct commissioned a Scoping Study to examine the need for such a standard and its potential feasibility - and has coined the name FareXChange for such a standard, if it is developed.
	The results of that study are the subject of further consultation with interested parties before any decision will be reached about the development going forward.
Related Standards	TransXchange, JourneyWeb, NaPTAN, NPTG
Current Status	In development
Region	UK only
Applicability	Transport operators, local authorities

Project	**DATEX 2**
Contact	CETE Méditerranée PO Box 37000 Avenue Albert Einstein, Pôle d'activités des Milles Aix-en-Provence FR-13791 CEDEX 3 France Phone: +33 4 42 24 77 04 Fax: +33 4 42 24 71 41
URL	http://www.datex2.eu
Scope	A standard for data exchange, primarily for information relating to road networks (both urban and inter-urban), travel information and traffic information.
Description	The DATEX standard was developed for information exchange between traffic management centres and constitutes the reference for applications that have been developed in the last 10 years. DATEX was designed and developed as a traffic and travel data exchange mechanism by a European task force set up to standardise the interface between traffic control and information centres. It has been the reference for applications that have been developed and implemented in Europe. With DATEX II the DG TREN now also pushes the door wide open for actors of the traffic and travel information sector.
Related Standards	SIRI, RDS-TMC, ISO/CEN, TPEG
Current Status	A first release (DATEX 2 v1.0) was issued on 22 December 2006 and is available via the Datex 2 website.
Future Development	Will be maintained by a supporting organization as part of the EasyWay programme for ITS deployment coordination in Europe. Standardisation in CEN is being considered, but no work items have been launched yet.
Region	European/International
Take-up	Initial demonstrators and proof of concept in 2006 (demonstration at i2tern Barcelona conference and ITS World Congress 2006) with feeds from France, Germany and the UK (plus relayed data from Belgium, Italy, Luxembourg, Spain and The Netherlands). Scheduled 2007 pilot implementations in France, Germany, Ireland, Italy, Portugal, Spain, Sweden and UK (all co-funded by the EC). Nation large scale deployment in 2007 in France and The Netherlands.
Applicability	Transport Operators, Network managers, Content Providers

Project	Continuous Air-interface or Long and Medium range communications (CALM)
Contact	Nigel Wall Communications Research Network Email: n.wall@communicationsresearch.net
URL	http://www.communicationsresearch.net
Scope	Protocol standards for ITS and RTI systems.
Description	CALM offers a set of protocol standards that will allow a host ITS system to route necessary communications over the most suitable telecommunications system that is available at that time, based upon knowledge of the quality of service requirements for that application and the real-time performance of the available communications media. New communications media which are designed from the outset to work with CALM will include Management Service Access Points (SAPs) that allow detailed information on the capability and instantaneous performance of the comms system to be passed to the intelligent routing management software. Existing communications media can be adapted to work with CALM, using a protocol adaptor. The set of CALM standards is being developed within the Technical Committee 204 of the International Standards Organisation, Working Group 16 (ISO TC204, WG16).
Current Status	In development
Future Development	Ongoing
Region	EU
Take-up	Ongoing project
Applicability	ITS system suppliers, local authorities, communications specialists

Project	IFOPT
Contact	schemer@kizoom.com
URL	http://www.naptan.org.uk/ifopt/index.htm
Scope	Model for the identification of fixed objects
Description	IFOPT is a prCEN standard in development. IFOPT defines a model and identification principles for the main fixed objects related to public access to Public Transport (e.g. stop points, stop areas, stations, connection links, entrances, etc.) in particular: • Stop Place Model: Describes the detailed structure of a STOP PLACE (that is station, airport, etc) including physical points of access to vehicles and the paths between the points, including mobility hazards. • Point of Interest Model: Describes the structure of a POINT OF INTEREST including physical points of access, i.e. ENTRANCEs. • Gazetteer Topographical Model: Provides a topographical representation of the settlements (cities, towns, villages etc) between which people travel. It is used to associate Stop and Station elements with the appropriate topographic names and concepts to support the functions of journey planning, stop finding, etc. • Administrative Model. Provides an organisational model for assigning responsibility to create and maintain data as a collaborative process involving distributed stakeholders. Includes namespace management to manage the decentralised issuing of unique identifiers. Full documentation is available via the IFOPT URL.
Related Standards	NaPTAN
Current Status	Consultation draft
Future Development	Ongoing
Region	UK
Take-up	UK
Applicability	Local authorities, bus operators

Project	**RailML (Rail Mark-up Language)**
Contact	Vasco Paul Kolmorgen
	Email: coordination@railml.org
URL	http://www.railml.org
Scope	Railway application communication standard
Description	The railML Initiative was founded in early 2001 to develop solutions to connect different railway IT applications. Its main objective is to enable heterogeneous railway applications to communicate with one another. In order to achieve this goal, the railML initiative finds, discusses and presents systematic XML-based solutions for simplified data exchange between railway applications.
	The result has been the development of the Railway Markup Language – railML which delivers a universally applicable data exchange format.
	RailML is an initiative made up of railway companies, software and consulting firms, and academic institutions located across the world. Together they have helped to develop the railML standard.
Related Standards	RJIS, RSP
Current Status	railML is available to download
Future Development	Ongoing
Region	EU
Take-up	EU
Applicability	Railway operators, systems suppliers

Project	TRansport Intermodality Data sharing and Exchange NeTwork (TRIDENT)
Contact	ERTICO - ITS Europe 326, Avenue Louise B-1050 Brussels Phone: +32 2 400 07 32 Fax : +32 2 400 07 01 E-mail : info@mail.ertico.com
URL	http://www.ertico.com/en/activities/activities/trident_website.htm
Scope	To extend DATEX to enhance the exchange of public transport, road traffic and multimodal information; trial object oriented approaches and technologies.
Description	Trident's intention has been to develop specifications and software modules, which would enable the sharing and exchange of real time multimodal traffic and traveller information through the whole TTI content chain. Intentionally, two different paths to achieve this goal were selected: one based on the "messaging approach" (EDI, DATEX) and the other one based on the use of more modern object-orientated technologies. In summary Trident has achieved all the goals it set out to achieve. First specifications for multimodal information have been produced, tested, trialled and modified according to the results from four test sites (West Yorkshire, Rome, Paris and Flanders). Specifications have been submitted to the CEN TC 278 working groups WP3, 4, and 8. It has been recognized that the TRIDENT specifications will end up being a key European standard on multimodal information exchange.
Related Standards	DATEX 2, CORBA, TRANSMODEL, TRANSXCHANGE, ISO/CEN
Current Status	Completed in 2002
Future Development	Specifications have been submitted to CEN TC 278 working groups
Region	Europe
Take-up	-
Applicability	Transport Operators, Network managers

E.8   Projects: productised

E.8.1   The items in this annex are projects which have resulted in specifications which are close to de facto standards, and which – while openly specified – have been maintained through product lines.

Project	PubTrans
Contact	Hogia Public Transport Systems AB SE-444 28 Stenungsund Sweden Tel: +46 (0)303-667 90 Fax: +46 (0)303-691 27
URL	http://www.hogia.com
Scope	Central system for data harmonization, increased accuracy and automated data flows for ITS and public information systems.
Description	In order to ensure delivery of disruption- and real-time information to hundreds of thousands of travellers, the information in the database must to be managed correctly right from the start. PubTrans is a central platform for integrated management of data about multimodal public transportation. The database covers planned operation, deviations, disruptions and real-time information. PubTrans Public Interfaces offers a great flexibility to collect data both off line and in real-time from a variety of data sources; scheduling systems, operation control system, automatic vehicle location systems etc, and to provide this data in a uniform and harmonized way to passenger information system, operation control systems and so on in real-time. PubTrans offers a superior data structure and features for integrated data management with increased accuracy and a higher degree of automated information flows. The seamless integration of real-time information and information about of deviations and disruptions ensures that data at any time is coherent in the all information systems connected through the interfaces. PubTrans uses a unique model for working with realistic timetables that match the passengers' perception of the offered service, for instance travel time guarantees. The timetable model is designed for both bus- and rail operation and is used throughout in the system. PubTrans is used by the major public transport authorities in Scandinavia. They have also made the PubTrans Public Interfaces to a de facto standard (NOPTIS). A large number of the suppliers on the Scandinavian market have adopted this standard.
Related Standards	TRANSMODEL, SIRI, VDV
Current Status	Available
Future Development	PubTrans 5 is now shipping to existing customers.
Region	Sweden, Denmark
Take-up	Stockholm Transport, Västtrafik (west Sweden), Skånetrafiken (south Sweden), Movia (Copenhagen transport), North Jutland Transport plus others. The users represent over 60 % of the operation in Sweden and Denmark.

Applicability	Local, regional and national authorities, Value added service providers, Traveller information, Bus, train and ferry operators, Vehicle manufacturers, and System integrators.

Specification	DELFI
Contact	Thomas Müller DB Personenverkehr P.VMK 2 Email: Thomas.Mueller@bahn.de
URL	http://www.delfi.de
Scope	German travel information system
Description	In 1994, the Federal Ministry of Transport (BMV) set up a project in the frame of a research program (FOPS) which will indicate the technical feasibility of nationwide electronic time table information. The official start for the productive DELFI information system was announced on 28 June 2004. Ever since, all federal states of Germany now provide information via their Internet portals based on the DELFI technology. Partners are the transport associations and information systems of the federal states which integrated the DELFI-Technology into their regional system. Hereby, the traveller receives complete itinerary information which can be developed in two ways: 1. If start and destination is covered by the regional system the customer receives his information only via the regional system in a well known form. 2. If the active system discovers (using the town information of the meta data table MetaCity), a requested location that does not lie within the area covered, the DELFI technology will be used to request this location via other responsible local systems and the partial connection information will be computed. The active system combines the partial trip information to the complete itinerary. This form of computation can realise real time information in an easier way compared to an integrated system (also called pooled system) that allows nationwide high standard information. The over all possibilities are dependent on the abilities of the single systems and can be different for start and destination (i.e. addresses are not in every system available). The customer receives an itinerary in any case.
Related Standards	JourneyWeb, Traveline, RJIS-CIF
Current Status	Operational since July 2004
Future Development	Ongoing
Region	Germany
Take-up	German Federal states only
Applicability	Transport Information providers, local authorities