



Publishing and Receiving Traffic and Travel Information

The TIH Executive Group

***To support the travel information marketplace... from
spotting an opportunity... to exchanging information***

**Version 7.0
December 2009**

FOREWORD

Most travellers neither know nor care who runs the road, bus or train they are travelling on; they just want to know which service or route to take and how long the journey will take, and feel informed if things go wrong.

This lack of distinction is crucial for travel information providers, because the way we divide up our networks into operator-sized chunks is largely meaningless in the minds of the people we are trying to reach.

The solution, of course, is to pool travel information and make it available in ways that blur the boundaries between providers to give a joined-up view of the transport network and support information provision that the traveller believes is relevant to their journey.

This is not a new issue and traveller information services have a long history and so we are not starting from a clean sheet of paper.

Countless organisations, from local authorities and government agencies; to train and bus operators; and public-sector and commercial information providers, have invested in systems to manage their own information on urban traffic, motorway incidents, journey times, public transport timetables, parking, and more; in fact practically every conceivable type of data and information for every mode of transport. As many of these systems developed locally and at different times, lots of diversity exists and few of these systems share a common core or terminology so exchanging information can be a significant challenge.

The benefits of sharing data are clear - both for informing travellers and improving how we manage events across local boundaries – but we can see how complex this might be. Thankfully, help is at hand...

**Stephen George
TIH Executive**



EXECUTIVE SUMMARY

The TIH Principles have been set up by a group of organisations and individuals with a common interest in exchanging traffic and travel data and exchanging best practice to support the efficient management of transport networks, and to provide information services to users of these networks. They define some common “rules” for exchanging data that can be reused by other organisations to set up data exchanges.

Why TIH Principles?

Transport and network operators recognise that the users of their services often undertake journeys that take the traveller from one network to another or from one operator to another, or both. A lack of integrated operation, dislocated or unavailable information frustrates users, reduces efficient travel and can reduce the standing of the operators in the eyes of the public. The public's perception is that information sharing, in the internet age, is trivial.

The benefits of sharing data are clear - both for informing travellers and improving how we manage events across local boundaries – but we can see how complex this might be. Thankfully, help is at hand... this is where the TIH approach and the Principles for data exchanged are focused, and where they can bring benefit.

We have come together to form the TIH Principles; to share our experiences and the “best practice” and lessons that we have learnt from setting up exchanges between our organisations. We aim to support to you in developing your exchange rules and in deciding what type of exchange to set up.

Many organisations and travellers have already benefitted from using TIH principles and shared practice. Can we help you?

1. ARE YOU A LOCAL AUTHORITY?

The Traffic Management Act 2004 has placed a clear onus on Local Authorities to manage activities on their road networks and a part of this duty is coordination with others. Information exchange and knowledge of activities on the network and about the state of the network are vital components to achieving this aim. In a wider context, corporate business plans allied to customer, operational partner, citizen and member needs promote the expectation that in a networked information society information should be available, accessible, accurate, complete, timely and shared. This can clearly be seen initiatives such as Transformation Government, and legislation such as the Freedom of Information Act 2000, the Re-use of Public Sector Information Regulations 2005, and the EU INSPIRE Directive.

Furthermore, many authorities plan improved information services and traffic management and network operations to support more informed travellers, smoother efficient network operations, optimisation of throughput, safety improvements and promotion of sustainable communities and commerce. However, most travellers neither know nor care who runs the road, bus or train they are travelling on; they just want to know which service or route to take, if the way ahead is clear, that the journey time is reliable, and feel informed when things go wrong.

This lack of distinction is crucial for travel information providers, because the way we divide up our networks into operator-sized chunks is largely meaningless in the minds of the people we are trying to reach. The solution, of course, is to pool travel information and make it available in ways that blur the boundaries between providers to give a joined-up view of the transport network. Some services seek to provide information relevant to the individual traveller.

Countless organisations, from local authorities and government agencies to train and bus operators, have invested in systems to manage their own information on urban traffic, journey times, motorway incidents, timetables and parking; in fact practically every conceivable type of data for every mode of transport. What's more, due to developing standards, local needs and a long history of deployment, few of these systems share a common core or terminology so they can't readily “talk” to each other.

Street Works are a fact of life for a Local Highway Authority – some have introduced self-noticing and internet based publishing to improve overall awareness of all activities on the road network.

Some wish to go further still including other information that might affect your travel (incidents, events, predictions of travel times, etc).



The benefits of sharing data are clear - both for informing travellers and improving how we manage events across local boundaries – but we can see how complex this might be. Thankfully, help is at hand... this is where the TIH Community and the TIH Principles are focused, and where they can bring benefit.

Local authorities vary considerably in scale and capabilities, with a diversity of transport networks to manage. A number of authorities have procured Urban Traffic Management and Control (UTMC) systems, real-time bus information systems have a wide geographical coverage, a number of authorities publish information on street works via shared services such as ELGIN (www.elgin.gov.uk). Much exists, but there is much more that can be done, and the TIH Community seeks to promote good practice to reduce duplicated effort, improve interoperability and the commercial conditions to support improved information sharing; whilst recognising that there is no single solution, but a range of similar approaches in relevant domains.

1.1 Devon County Council Case Study:

Devon County Council have an *operational Datex II link, which follows the TIH Principles*, and are able to integrate VMS, traffic counters, journey-time information, road works and incidents from the NTCC into their Envitia CUTLAS UTMC system so that motorway and trunk road data can be viewed seamlessly with information from their own network.

Devon County Council also have their own 115 camera ANPR journey-time system, car park guidance system, real-time traffic counters, Urban Traffic Control, over 25 strategic message signs all integrated within their Envitia CUTLAS UTMC system and are starting to develop strategies to maximise the potential of UTMC for Devon including:

- Journey-times on sign
- Management of Taw Bridge in windy conditions
- Warning of ice in freezing conditions
- advising of delays on the network
- developing real-time travel information on its web-site

<http://www.devon.gov.uk>

Contact	Tel	Email
Chris Cranston	01392 385038	Chris.cranston@devon.gov.uk

1.2 Sheffield City Council (South Yorkshire UTMC) Case Study

Sheffield CC have completed the second phase of sylITS, thanks to £11.6m of European funding, and are moving onto the third phase which makes use of the infrastructure created by the first two to deliver all the things promised in the second.

The first South Yorkshire Local Transport Plan (LTP) recognised the need to implement coordinated ITS in South Yorkshire, and proposed the development of a strategy to take this forward. With the help of funding from Yorkshire Forward an ITS strategy for South Yorkshire was prepared. Implementation of the strategy to provide a South Yorkshire Intelligent Transport System forms an integral part of the second LTP, covering the period 2006-2011, will be taken forward in the third LTP.

The first phase of the South Yorkshire ITS (sylITS) Project included work begun under the first LTP, particularly the bus priority work already carried out to improve public transport routes and the traffic management and calming work undertaken to improve network operation and minimise adverse traffic impacts.

The second phase of sylITS has used ERDF Objective 1 funding to establish an ITS Control Centre for the South Yorkshire sub-region, based on development of the existing Sheffield Urban Traffic Control (UTC) Centre; introduced ANPR journey time monitoring of the operation of the strategic highway network in South Yorkshire; improved the capacity of major junctions to assist economic regeneration; provided improved priority for public transport at major intersections; and provided improved information about traffic conditions for travellers throughout South Yorkshire.

The next phase of sylITS is using LTP funding to extend the geographical coverage of the ITS facilities. Sheffield County Council will make use of the greatly expanded monitoring information to recognise abnormal conditions in real time, introduce control strategies to mitigate the effects, and inform travellers so that they can make intelligent decisions about the route, time and mode of their journeys. This monitoring will make use of information from the wider area around South Yorkshire, and will provide information about conditions in the sub-region to neighbouring authorities. *This exchange of data will make use of TIH principles and equipment following the UTMC specifications.*

<http://www.sheffield.gov.uk/roads-and-transport/travel-information>

Contact	Tel	Email
Peter Bull	0114 273 6174	peter.bull@sheffield.gov.uk



2. NOT JUST FOR LOCAL AUTHORITIES?

The TIH Community is not only a community of local authorities. Many people in the street would not think of turning to those who operate the roads for traffic or travel information, but would turn to commercial traffic and travel information providers via their radio or “sat-nav” device to find out about road and transport conditions.

The TIH Principles are helping traffic and travel information providers access the information that roads authorities increasingly have about conditions on their road networks. If an “information publisher” can make their data available in standard formats and with clear commercial terms and conditions and acceptable use policies, it becomes easier for “information receivers” to take this data and collate it to provide the seamless information services that the public really want.

For example, Google and TomTom use the TIH Principles to receive data from both the Highways Agency in England and Traffic Scotland in a standard data format that is common to both, DATEX II. The data is combined with other data sources by the receiving organisations for presentation to their customers via websites and in-car devices.

The Highways Agency, in particular, have set up agreements with partner organisations who make use of information about the strategic road network within England as part of their businesses. These organisations include over 120 local transport authorities and 30 major traffic generators such as shopping centres, airports and football stadia. Many of these are taking information using the TIH principles, or are working towards doing this.

3. THE TIH PRINCIPLES – Adopting Good Practice

Organisations across industry sectors share and reuse each other's information – this is not an issue specific to traffic and travel information. Across industries successful information exchange is not simply based on a choice of appropriate technologies but it is also based on use of common standards and specifications, unambiguous and clear rules for exchanging and using data which include factors such as protection of intellectual property, charging and security. The TIH Principles encapsulate good practice that can aid users establishing, using and benefitting from information exchange.

By sharing the experience of members and reviewing good practice elsewhere, the TIH Community has distilled its knowledge into a framework of guidelines known as the TIH Principles, which is a set of simple rules to define a common approach based on proven techniques and good practice. Appendix A of this document is a “checklist” of the Principles.

TIH Principles have been used for some ten years and form the basis of the information exchange and information services of a number of organisations including, the Association of Greater Manchester Authorities (AGMA), Devon County Council (www.devon.gov.uk), Reading Borough Council (www.reading.gov.uk), Sheffield City Council (www.sheffield.gov.uk/roads-and-transport/travel-information), and the Highways Agency. Further information on these and other member organisations can be found at www.tih.org.uk/index.php/Directory.

These users use shared principles including:

- Agreed formats for data publishing that generally conform to agreed standards and specifications, using published data models.
- Use of common methods for location referencing (such as TPEG-Loc or ETRS89).
- Agreement on the Authentication Level to match the value of the data.
- A description of the cost (if any) of the data

The main specifications describing the format, semantics and relationship of information in a standardised way include:



UTMC
UK DfT sponsored
specification for
exchange between
applications within
urban traffic
management
systems

DATEX II
European
specification for all
traffic data
including VMS
settings, flow and
journey times

TPEG
Broadcasters'
favoured format
for all types of
travel events

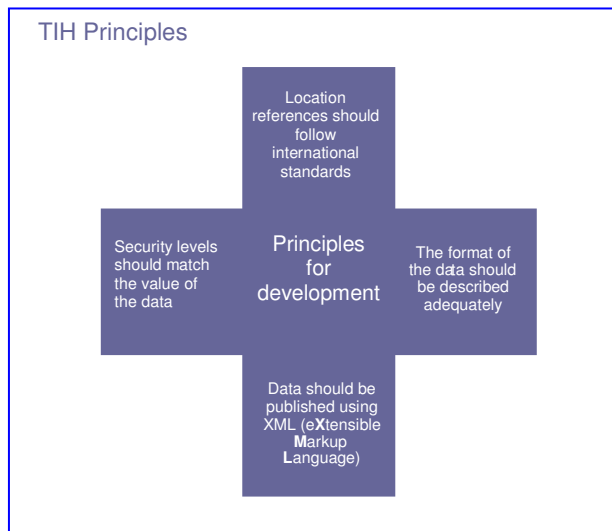


Many of the TIH recommendations share the TPEG Loc location referencing that adds road name, direction of travel and other details to the ETRS89 international latitude/longitude reference standard.

The simplest way to explain how these standards work is to think of them like a simple, standard electricity plug and socket where well-considered standards and specifications for use have created wide-scale interoperability. The Principles recommend language independent look-up codes with descriptions substituted by whatever system reads the file. This means that data can be consistently decoded in a known and repeatable manner.

For example, with the DATEX II specifications, if your traffic data is packaged by your own system and made available on a web-server, then everyone who you give permission to can see it and use it. As the data is published against an agreed standard, it is in an information model and format that users will expect and their systems can be configured to use such collaborative data.

Full descriptions of each specification can be found on the ITS data registry website (www.itsregistry.org.uk). The Registry is linked to the TIH website, and is a repository of data definitions and data models, with an associated supporting process for improving quality and for harmonising data definitions across different systems. The registry aims to cut across work in isolated "silos" and avoid re-invention and duplication of effort. If you have a data type that you want to exchange, the changes are that there is a data model already available and defined for you to use.



The TIH Principles do not compromise your data ownership, nor do they imply a data warehouse. TIH is not a system in itself, just the agreed framework for joining many systems together over the Internet and this framework sets out the "rules" for these key areas of data exchange:

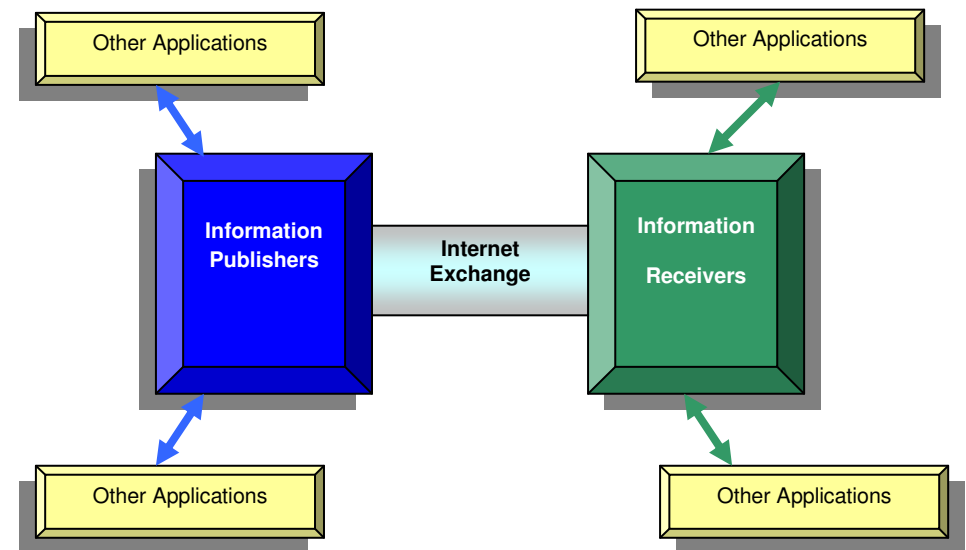
As you can see, there's no mystique or complexity to the Principles – just some common-sense standards that we can all work with.

The basis of the TIH model is the exchange of information between:

- an **Information Publisher**, wanting to make information available and
- an **Information Receiver**, seeking to obtain information.

In most cases Organisations will have both Information Publishers and Information Receivers but the distinction helps to separate the two sides in any exchange.

This generic model is illustrated in the figure below.



TIH Principles generic model

4. What do I do Next?

The TIH Community are here to help you to “get started” or to share and adopt best practice.

We are a group of organisations and individuals with a common interest in exchanging traffic and travel data to support the efficient management of transport networks, and to provide information services to users of these networks.

We have come together to form the TIH Community to share our experiences and the “best practice” and lessons that we have learnt from setting up exchanges between our organisations. We aim to support to you in developing your exchange rules and in deciding what type of exchange to set up.

To join the TIH Community, all you need to do is register on our website: www.tih.org.uk.

Membership is free, and we will only use your details to contact you about the TIH Community.

On the website you can find:

- details of the organisations that make data services available, the types of data, the terms and conditions of their use, and the formats that they use;
- useful business documentation – for example standard terms and conditions that you can reuse;
- details of the common standards, from high level overviews, to detailed schema, and when to use them;
- discussion papers and case studies; and
- contact details for further help and support from members of the TIH Community, who have experience in setting up data exchanges between their own organisations.

If you wish, via the website you can also join the TIH mailing list, run for us by ITS UK¹.

We can put you in touch with people and organisations that have already set up exchanges and who can help and advise you through the process.

¹ ITS United Kingdom (ITS UK for short) is the UK association for all who work in the field of ITS (Intelligent Transport Systems, all aspects of using information technology and telecommunications for transport applications). Its aims are to work to increase the deployment of ITS solutions in the UK, and to promote UK ITS expertise abroad.



APPENDIX A: THE TIH PRINCIPLES CHECKLIST

The TIH Principles are easy to understand, setting out common practice in five areas of data exchange. These are detailed in the checklist below.

- 1. The Charging Mechanism and acceptable usage terms should be clearly described.**
 - Each Information Publisher must clearly:
 - identify whether or not there is a charge for receiving their data.
 - indicate acceptable terms of usage for the data supplied.
- 2. The Authentication Level should match the value of the data.**
 - It is recommended that authentication should be used for protecting commercially valuable data services.
 - Services which generally make data available free of charge may require only minimal or no authentication.
 - Where authentication is used, the use of SSL/TLS is recommended for protecting HTTP data services and authentication over IIOPS for protecting CORBA data services.
- 3. Data and Publication Models should be described adequately.**
 - Information Publishers should:
 - publish their data using industry or formal standards, if possible.
 - supply an appropriate description of the data provided and its quality attributes.
 - supply an appropriate description of the data concepts used and the way they are assembled.
 - Data models should be fully described using UML, if these are not to agreed standards already. (Models already exist for many specifications and standards, including DATEX II, TPEG and UTMC).
 - New publication models should be registered through the Highways Agency ITS Metadata Registry, which is available on the Internet at <http://www.itsregistry.org.uk/>.
- 4. Data should be published using XML with compression.**
 - Information Publishers should support HTTP GET of XML using compression where applicable. The use of web services using /GET, XML send via HTTP/POST, SOAP via HTTP/POST may also be applicable.



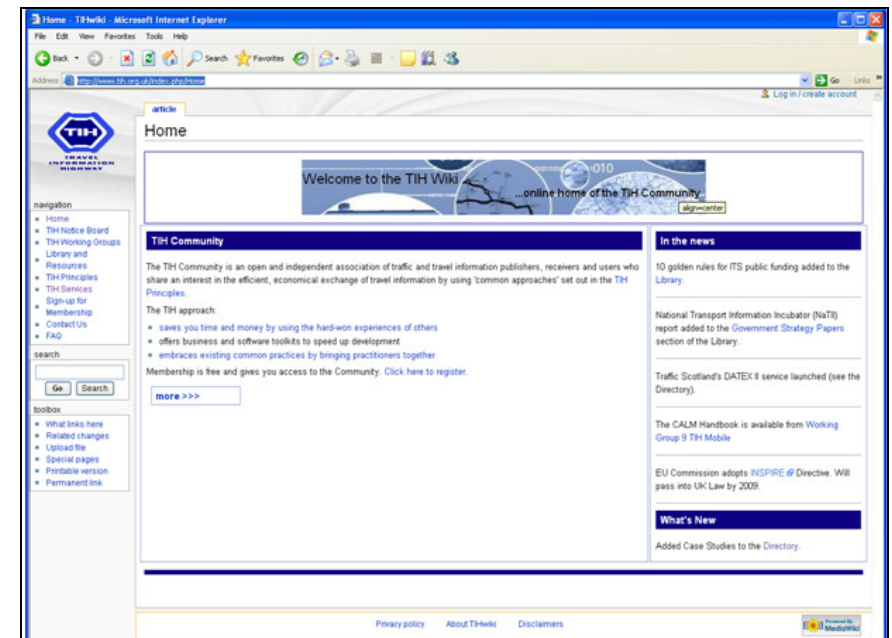
5. For location referencing use TPEG-Loc or at least ETRS89.

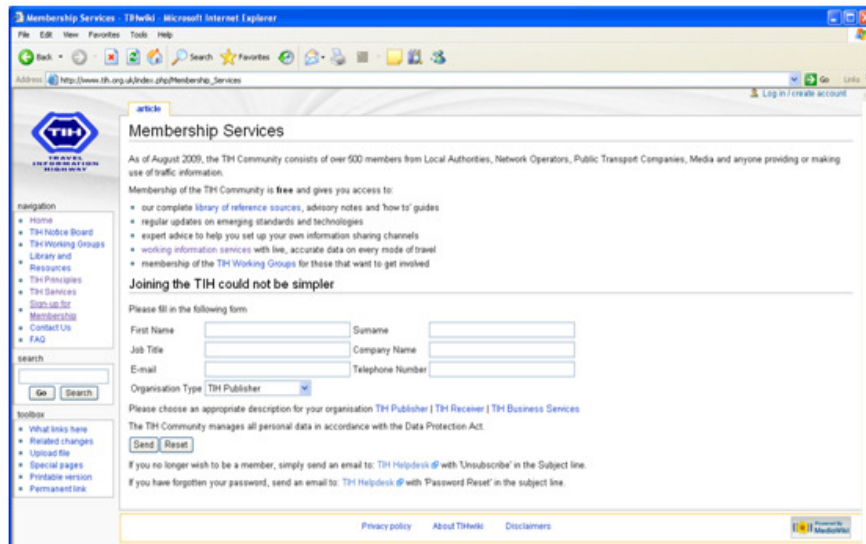
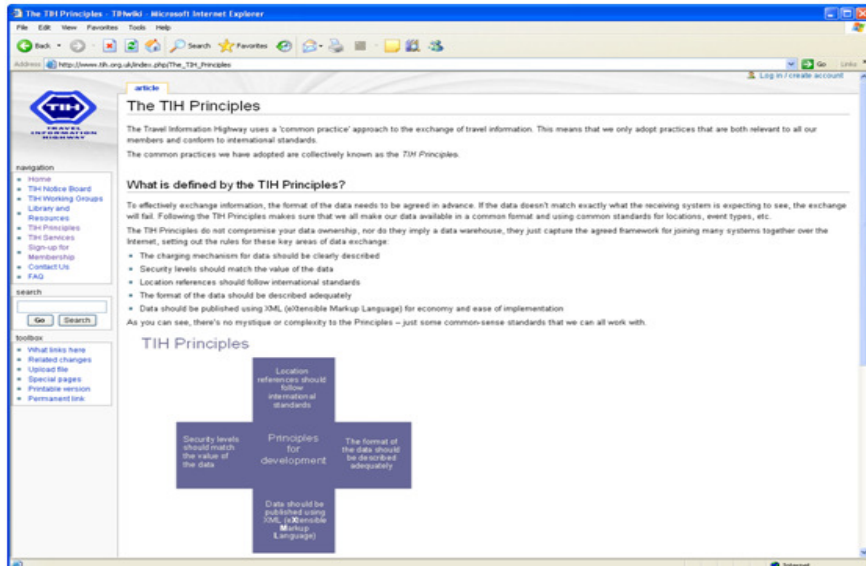
- Use TPEG-Loc (DD CEN ISO/TS 24530-2:2006) in most cases and for multi-modal information.
- Use ETRS89 coordinates when using limited bandwidth carriers.
- As an alternative option, that is not currently preferred, the bilateral use of other location referencing approaches may be considered, where these approaches are supported by International or European Standards.

APPENDIX B: THE TIH WEB SITE

<http://www.tih.org.uk>

The TIH website is the principal tool available to the TIH Community for information about the TIH Principles and how to use them. Traffic and travel industry personnel can register (for free) on the website to become members of the TIH Community allowing them access to a catalogue of TIH compliant services; TIH documentation; email archives of working groups and a bulletin board showing news and events of interest.









APPENDIX C: THE JOINT CHAIRS GROUP (JCG)

The UK's technical framework for Intelligent Transport Systems

The Joint Chairs Group, and its component groups, use their communities to build specifications and provide guidance on a market neutral basis. The notes below summarise in brief the scope of specifications available through each group and which, collectively, form part of the UK's *de facto* technical framework for ITS. Coordination activities to ensure compatibility between the components of the framework are in place, though we recognise that this is a long term project:

- RTIG-INFORM provides a strategy and architecture for public transport technology, on and off the vehicle. Its interface specifications cover on-vehicle, vehicle-to-centre, and centre to centre data exchange, linked to European standards where available. Guidance is provided on areas as diverse as DDA compliance, use of CCTV and data sharing. 
- The TIH Community provides a common practice approach to the exchange of travel information. These are embodied in the "TIH Principles", covering charging for information; authentication; use of XML; use of data models; and location referencing. The TIH Community also provides the UK focus for issues relating to the European DATEX II project. 
- UTMC provides a Technical Specification for road network management, in two parts. The first part (the Framework) defines a general architecture and protocols, while the second (the Objects Register) is an evolving library of modules for different UTMC functions, ranging from ANPR to car parks and air quality to incidents. 
- ITSO provides a platform and tool-box for the implementation of interoperable contactless smart customer media, public transport ticketing and related services. Specifications cover consumer media, media readers and back end facilities; in addition ITSO provides the national security management system. 

Over the past decade or so, with a combination of community energy and Government encouragement, the organisations that form the JCG have been established to guide UK practitioners on the practicalities of implementing technology. UTMC leads on road traffic management,



while RTIG (now RTIG-INFORM) leads on local public transport; ITSO specialises in smart media ticketing and the TIH Community focuses on the information marketplace between organisations.

Each group works as a partnership between central and local government, ITS users and private sector suppliers. Each is delivery oriented: aiming for practical solutions based on achievable systems engineering, open specifications and integrated systems. The Joint Chairs Group as a coordination body dates from 2004.

We recognise that we are working on behalf of the UK at large, and aim to be as representative as possible. If you have a question, or something to offer, please do not hesitate to contact us.



working in collaboration with...

Department for
Transport

HIGHWAYS
AGENCY

innovITS

ITS United Kingdom
The association promoting
Intelligent Transport Systems

TIH
TRAVEL
INFORMATION
HIGHWAY