ITS United Kingdom

Better transport through technology

LOCAL AUTHORITY INTELLIGENT TRANSPORT SYSTEMS: THE ITS (UK) GUIDE TO DEPLOYMENT, BUSINESS CASES AND FUNDING

...or, as *The Hitchhikers Guide to the Galaxy* says on its cover, 'Don't Panic'

www.**its-uk**.org.uk

INTRODUCTION FROM DARREN CAPES OF CITY OF YORK COUNCIL

I am delighted that ITS (UK) and DfT have produced this guide to help practitioners in local authorities in deploying Intelligent Transport Systems (ITS). Authorities are facing similar pressures to manage and reduce car use and promote sustainable transport, whilst demonstrating increased efficiency. ITS can help meet these aims, but procurement and implementation can at first appear daunting.

This guide would have been very useful to us in York ten years ago when we started down the road to ITS deployment, so I am very pleased it is now available to newcomers to this field. It has been written to help overcome the first barriers and shows where more help is available. It also contains ways to reduce risk and also highlights best practice.

ITS makes a real difference to residents and visitors in York – and I hope it will for your authority.

ABOVE Minstergate, York

1 ABOUT THIS GUIDE

ITS (UK) have already developed a high level overview for elected officials about the benefits of ITS . This more detailed document aims to give officers direct help in understanding more about deploying ITS in local authorities. We aim to help you deliver the benefits from ITS in practice, by:

- Giving more information about ITS (section 2)
- Highlighting benefits it might bring (section 3)
- Showing how ITS systems are being deployed (section 4)
- Outlining how to build a business case (section 5)
- Identifying sources of funding (section 6)
- Promoting places where more help is available (section 7)
- Golden rules for ITS funding (section 8).

We have aimed this guide at people who know little or nothing about ITS, but may have transport, highways or IT knowledge. We also want to help those who wish to extend existing ITS investments. We welcome feedback to ITS (UK) on how well we are hitting these targets.

ITS (UK) formally would like to acknowledge the many authority staff, suppliers, consultants and other helpful individuals who have contributed to this guide or reviewed its draft stage. Thank you.

2 ABOUT ITS

2.1 What is ITS?

ITS is wide in scope, from passenger transport ticketing, traffic and travel information, car park guidance through to traditional traffic control. ITS offers a basket of services and tools that bring together existing transport technologies, as well as novel leading edge services to tackle a range of transport and environment challenges. Here new technology and best practice from the mainstream IT industry allows use of much less expensive communications. So ITS is not just about new technology, but also about making traditional techniques work better, faster or with less cost. ITS also allows integration and interoperability of existing technology, to improve and join up transport.

Over the last few years, more and more authorities have invested in ITS to deliver policy objectives and

ABOVE LEFT ITS technology plays a big part in the operation of tram projects such as the Manchester Metrolink **ABOVE RIGHT** ITS used for red light enforcement

improve local travel. Traditional divisions between traffic control, network management and public transport are disappearing, as authorities see they are totally interconnected. The term ITS refers both to systems for smarter travel and also increasingly services that are provided to traffic managers and travellers.

ITS is becoming a key tool in removing seams in transport, by weaving technology like the Internet with existing transport infrastructure and services, for example to help authorities:

- better co-ordinate traffic signals for **reliable journeys** or to **improve air quality**
- **improve road safety** for all users
- enable **pedestrian and cycle friendly zones** to co-exist with busy roads
- deliver the **network management duty** required by the Traffic Management Act
- not just tell people **when the next bus will arrive** but **give it priority** over other vehicles
- **inform people about parking spaces** and make it easy for them to pay on mobile phones
- **improve people's security** through latest CCTV monitoring
- help **manage networks** when things go wrong (floods, adverse weather or major incidents)
- provide interoperable **smart cards for easy use of public transport** and other travel.

ITS in an urban authority might be designed for network management. Rural areas might use ITS to improve public transport information and services, deploy intelligent speed signs or give better safety at isolated signals. **One size and one solution doesn't fit all authorities.**

2.2 Today and tomorrow

There are many examples of ITS in day-to-day use in the UK. It is now part of mainstream urban transport and is no longer a specialism – ITS has moved from pilot projects to being everyday transport tools. ITS is also key towards encouraging smarter travelling in the near future, by:

- **Delivering the information** local people and visitors expect in their increasingly connected lives – if they can surf the internet and watch TV on their mobile phone, why can't they find out when their next bus will arrive?
- **Helping people to change travel behaviour** in response to climate change by providing timely and appropriate information before they choose to travel and during their journey
- **Linking to new services** like in-vehicle systems and payment for integrated travel.

3 DEMONSTRATING LOCAL BENEFITS FROM ITS

3.1 Outcomes, not systems

Building a business case for ITS is not easy, as the potential benefits are not often clear. As an industry, we have regularly experimented with technology to prove concepts and demonstrate technical capabilities without always having a problem to solve. But we now have many examples of systems with proven, outcome related benefits, such as:

- **Improving travel experience** – halving time looking for car park spaces in Southampton, improving journey time reliability in Essex
- **Delivering a policy** – bus patronage in Bristol increased by 10%
- **Demonstrating best value** – revenue saving in York using existing City Council IT networks
- **Reducing accidents** – KSI down 70% in Norfolk by using intelligent road markings
- **Disaster management** – reducing the impact of Worcester's floods by warning of closed roads
- **Improved accessibility** – minimising impacts of a new city centre store (IKEA, Coventry), SMS journey information service for the visually impaired in Brighton

ABOVE The Essex Traffic Control Centre is a key tool in meeting Traffic Management Act objectives

- **Compliance with legislation** – allowing monitoring and exchange of information across borders, in line with the Traffic Management Act

ITS is unlikely to yield significant benefits if it is planned without thinking of the local policy context and designed without regard to specific local transport problems and your LTP objectives. These need to be linked to clear targets such as 'reduce unreliable journeys by 10%'.

3.2 Answers, not problems

Your LTP will help identify these objectives and problem areas, and also measures of success (journey time reliability, car parking, bus priority, safety, etc). The ITS toolkit developed by DfT (www.itstoolkit.org) then helps to:

- Select the right tools (eg a car park management system). In an urban area this will often involve using the Urban Traffic Management and Control (UTMC) Framework as detailed in section 4
- Look at where such systems have already been installed and evaluated
- See typical benefits from such systems. Clearly, each deployment is subject to location variations but this should give a steer on the type of solutions to address your problems.

When you have seen the type of solutions needed, procurement and deployment need addressing. The governance of the project becomes important too – who is the 'user' and 'responsible officer' in your organisation? This could often be the Traffic Manager.

You do not have to do everything in one go. ITS is designed to start small and evolve – the flagship ITS authorities in the UK have built their systems up from modest investment. However, determining your future strategy will ensure that early investments are value for money.

4 HOW ITS IS BEING DEPLOYED

4.1 UTMC

As ITS developed in local areas there was, rightly, concern about the need for standards and economies of scale. During the mid-1990s the DfT funded the Urban Traffic Management and Control (UTMC) programme. In partnership with industry this has resulted in an expandable ITS approach based on mainstream system standards such as the

use of Internet Protocols (IP) for communications. From the outset, the focus of UTMC has been on practical implementation and meeting real needs to allow local authorities to purchase systems that share information with each other. UTMC compliant systems allow informed decision making when deciding on a strategy to tackle traffic problems.

UTMC uses best practice IT industry approaches to prevent purchasers being locked to a single supplier. It is open and interoperable, and so reduces risk as UTMC components can be mixed and best solutions built up from separate suppliers of roadside equipment, communications and software etc. UTMC is now very much a mainstream approach to ITS solutions used in local authorities but a similar approach is also used in other areas, for example the ITSO standards for smartcards.

4.2 UTMC features

Key features of UTMC systems are:

- **A common database (CDB)** to store data often needed by several systems – eg car park count data might be needed by a variable message sign, a website and a map display. Having a CDB ensures consistency of data and ease of access for publishing data
- **Communications to link roadside equipment, like traffic signals or Variable Message Signs (VMS) to a Traffic Management Centre.** This is often IP based and adaptors are available to allow connection to older 'non-IP' equipment. This means not having to throw away relatively recent equipment to adopt UTMC. Increasingly, communications may be wireless, use an existing corporate network or a mix of technologies, rather than as previously used expensive dial up land lines
- **Strategy Supervisor** – this can monitor information in the CDB and take pre-defined actions, for example, implementing a plan that includes direction information on VMS, modification of signal timings and car park guidance and information during a major event such as a football match
- **Data exchange** uses a set of commonly agreed data 'objects'. Hence, it is easy for example to export data to other traffic systems across boundaries. Work is also underway linking UTMC with next generation sat nav, for example.
- The CDB can be accessed remotely. This means **one service provider can run several authorities' systems in a managed facility miles from each authority**, so reducing the need for a 'computer room' and costs of maintenance and disaster recovery.

4.3 Evolution and future-proofing

An ITS system built up from UTMC can also evolve with your needs. An authority could start with simply a car park, a central database and a few variable message signs to reduce car park congestion, or it could group with other authorities and purchase region-wide services that include many different systems with a single contractor. Commonly added facilities then include:

- Automatic Number Plate Recognition (ANPR) – measuring journey times for congestion and reliability
- VMS for information, event management
- Vehicle-activated signs for speed warning and enforcement
- Parking information and guidance
- Map displays for congestion monitoring
- CCTV – linking cameras and maps and also websites for 'traffic cams'
- Emissions monitoring for improving air quality
- Traffic signal control and fault monitoring
- Pedestrian/cyclist detection – to give them as much network access as vehicles
- Real Time Passenger Information for 'next bus' information and performance monitoring.

The best ITS deployments have a clear strategic vision of how ITS helps deliver the local authority's LTP objectives, now and those likely in the future. This has been developed in phases, to:

- **Reduce perceived risk** and gain elected member support and confidence
- **Spread expenditure** over budget years, whilst achieving set goals and tangible deliverables
- **Let someone else be the first user** of a new technology
- **Allow evaluation of the benefits delivered** against those predicted.

4.4 Why is ITS through UTMC now popular?

Many people think ITS needs special skills, rather than off the shelf products. But between 2002 and 2008 over 40 UK local authorities[1] invested in UTMC due to:

- **New policies requiring more sophisticated traffic management tools.** For example the duty for monitoring and safe and expeditious travel under the Traffic Management Act, or a shift towards public transport or more signal time devoted to pedestrians
- **Lack of infrastructure alternatives** to reducing congestion or improving journey time reliability
- **Customer pressure** – drivers and public transport customers expect a higher level of service on increasingly congested networks. They now expect information as part of everyday travel, not a special service and expect websites, up to date travel times and information on bus arrivals.
- **Obtaining better value** – UTMC for example may allow remote access/control of systems from a duty officer's home or shared centre, rather than 24/7 staffing of a local control centre
- **Flexibility and expandability** – UTMC allows changes in road networks to be managed easily
- **Replacing time expired kit** – many authorities have adopted UTMC to move away from expensive and unreliable analogue communications, or to replace old systems with better performing products.

UTMC also deals with the important details - for example:

- **Data security and safety of data transfer.** Proven solutions are in place to prevent attack on your UTMC network impacting on traffic
- **Making information available** to third parties
- Adding in new roads, car parks and equipment, **accommodating network change**
- Adopting **new traffic control techniques**

4.5 ITS is more than UTMC

UTMC is a way urban authorities can deploy ITS but it is not the only flavour of ITS. A key area has been, and remains, public transport – including:

- **Better information** about planning and using existing services
- **Demand responsive provision** in rural areas
- **Real time passenger information** on screens, internet and mobile phones
- **Integrated ticketing** via smart cards, for both concessions and all travel
- Fleet management and **monitoring of subsidised bus services**
- **Genuine modal shift** from the car to public transport on Quality Bus Corridors.

Integrated ticketing and smart cards offers a way of encouraging modal shift, managing concessionary fares and joining up with paying for other local authority services, from libraries to car parking as well as rail and other modes of transport. Many authorities have adopted the Integrated Transport Smartcard Organisation (ITSO) standard, as this is the key to both DfT funding and making one card work across many different operators. All smart cards issued under Concessionary Travel Schemes are ITSO-compliant so authorities already have a head start in this area.

Linking public transport ITS and network management allows for example priority to be given to the busiest, latest buses, not just every bus. This means working with bus operators to access ticket machines and timetables, but can help squeeze another level of network improvement.

ITS is increasingly used in rural areas to increase safety and accessibility. Dial-a-ride schemes like 'Wigglybus' in Wiltshire and car sharing all help policy objectives. Users of irregular buses in rural areas can both plan journeys and be confident the bus is *en route* before they leave for the stop.

1 Aberdeen City Council, Avon (Bristol City Council, South Gloucestershire, North Somerset), Bath and North East Somerset Council, Belfast, Brighton & Hove, Cardiff, Cornwall, Coventry City Council, Derby, Devon, Dorset, City of Edinburgh, Essex, Glasgow CC, Gloucester, Greater Manchester UTC, Hampshire, Harrogate MBC, Hull, Kent County Council, Lancashire CC, Leeds CC, Leicester, Liverpool, Northampton, Nottingham, Norfolk CC, Plymouth City Council, Portsmouth, Reading, Romford, Scarborough, Sefton, Sheffield City Council (with Barnsley, Doncaster Rotherham and SYPTE as part of the SYITS regional system), Southampton, Stoke, Suffolk County Council, Surrey, Warrington MBC, Warwick, West Midlands (inc. Birmingham CC, Wolverhampton MBC, Coventry CC, Solihull MBC, Sandwell MBC, Walsall MBC, Dudley MBC), West Sussex CC, Wirral , Worcestershire County Council, City of York Council

5 BUILDING A BUSINESS CASE AND PROCURING YOUR SYSTEM

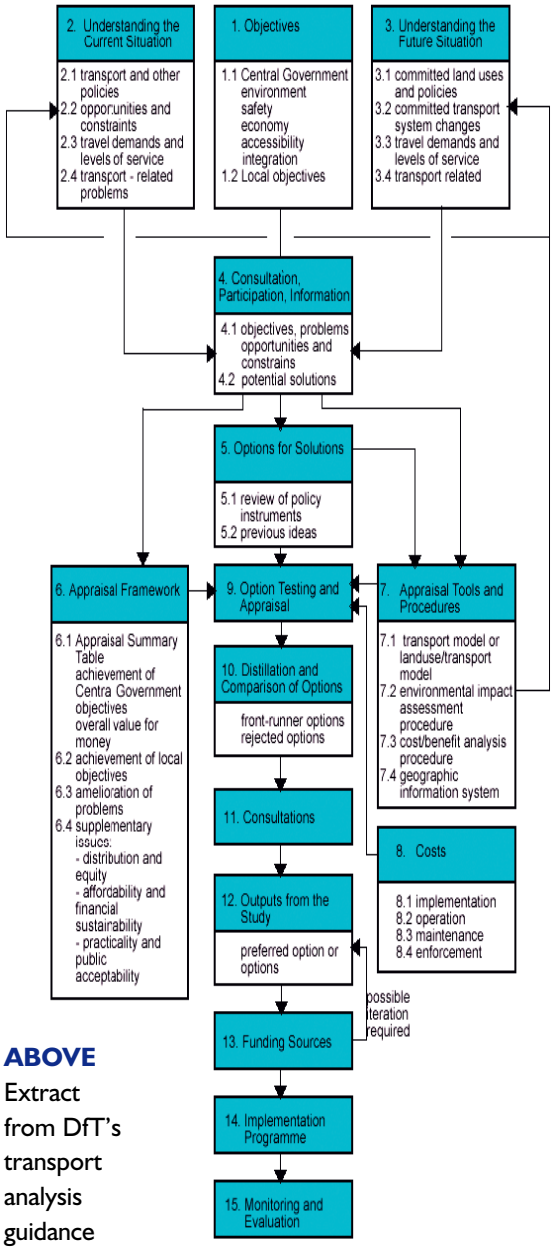
5.1 Local policy – not just local transport

The ITS toolkit in section 3.2 contains guidance based on the DfT's Webtag approach on how to quantify benefits for a local area. Typically the highest economic benefits will come from reductions in travel time and improvements in journey reliability, plus safety gains. Key areas include benefits of linking signals via Split Cycle Offset Optimisation Technique (SCOOT), reduced lost time looking for parking spaces, better bus journey times, etc.

The business case can also take other local factors on board. One system was justified by better emergency vehicle priority. Others have been justified on reducing the cost of cleaning buildings due to pollution. There are always issues worth including such as retaining retail trade, customer service, ability to demonstrate PSA targets and assistance for visiting tourists.

5.2 Financial savings

Financial savings can often be more acceptable and understandable within an authority, eg savings from reducing revenue costs for communications can be extensive. ITS may reduce maintenance costs, allow better use of existing resources or reduced risk allowances for procurement from off the shelf products. Procurement and funding must go hand in hand with the business case as they impact on the overall costs and particularly the capital/ revenue split, for example buying wireless communications may be more expensive than leased lines overall but offers longer term advantages.



ABOVE
Extract from DfT's transport analysis guidance

5.3 Procurement

Ways to procure a system include:

- **Procure everything separately**, eg common database, signs and detectors. All will talk to one another if you specify UTMC compliant equipment or ITSO smartcards, but you may need assistance integrating them together
- **Procure a whole system by appointing a lead supplier**, who then provides all the equipment and software. This reduces effort but can lead to reduced flexibility. It is essential to make sure that what is built for you follows open standards so you are not 'locked in' to the makers of the initial purchases.
- **Join up with other authorities**, to make a bigger project and share costs of procurement. These need not be neighbouring authorities.

In any procurement, you will need to remember:

- EU procurement rules mean you will need to advertise for expenditure over set values. This takes far longer than people expect and can delay projects that have funding and a business case in place. **Your procurement team should be able to help with these rules and standing orders.**

- **Corporate IT people** can help to get all the various approvals you need to connect your ITS system to their network and in procuring systems. Various authorities already have **framework contracts for IT supply**, you may be able to lever from these to procure equipment
- You will reduce risk with a **clear functional specification** with performance targets, some idea of the final scope of system size allowing for future components and avoiding any 'input related' design. The more you tailor how a system is built, the less 'off the shelf' it becomes. A better way is to let those that supply it configure proven products to your local area.
- **People in ITS are more than willing to help – not just suppliers but users too.** The ITS (UK) Interest groups represent a large body of expertise and experience that is available to you.

6 SOURCES OF FUNDING

The most common source of ITS funding for authorities is the **LTP Integrated Transport Funding**. Some authorities have even received up to 25% of their settlement for specific ITS projects, such as new control centres, with a good target being 10%.

To gain LTP support, the business case must show how the ITS deployment will impact on LTP objectives and give measures of success. DfT will not fund systems for systems' sake. LTP guidance on ITS is available at **www.dft.gov.uk/pgr/regional/ltp/guidance/fltp/fullguidanceonlocaltransport3657?page=5#a1010**

Other sources of funding include:

- **Transport Innovation Fund (TIF)** – here matched funding is available for improvements linked to congestion charging. Whilst charging is not directly part of ITS the technologies used (ANPR, enforcement, etc) are closely associated and there is an opportunity to share some costs, for example installation
- **Developers' funds** – ITS is attractive to developers compared to paying for physical infrastructure as it is cheaper, quicker to implement and often helps add value to their development. VMS in Coventry were used to manage traffic on the opening of a new IKEA. In Kent for example, a developer installed bus information screens in the lobby of each house. Commercial and Business Parks with public transport designed into them as an integral part of journey planning are looking at ITS as a way of reducing their footprint. When development restarts funds for hard infrastructure are likely to be less easily found.

7 WAYS IN WHICH WE CAN HELP YOU

Help to make the task easier is available from many existing information sources:

- **The ITS (UK) Local Authority Interest Group**, a forum for developing good practice for all aspects of ITS in local transport and advising how a business case can be developed. ITS (UK) is a not-for-profit public/private sector association promoting all ITS across all forms of transport. **http://www.its-uk.org.uk/groups/group.aspx?id=6**
- **The UTMC Development Group (UDG)**, a representative group led by local authority purchasers with active participation of suppliers and national and regional governments. They ensure the UTMC Technical Specifications are maintained and managed, and organise outreach activities such as an annual UTMC conference, workshops and seminars. **http://utmc.uk.com/**
- **The Traffic Systems Group** is open to all those interested in traffic control who work for, or on behalf of, highway authorities. **http://www.ihie.org.uk**
- **The Real Time Information Group** provides a focus for all those involved in bus related ITS. They have a wide membership from local authorities, bus operators and system suppliers, with representatives from Government and industry. **http://www.rtig.org.uk/**

Get involved in the ITS arenas. There are free ITS (UK) seminars and workshops and the UDG. Use these to talk to other authorities (experienced and new), suppliers, consultants and potential partners.

Communicate your plans to your authority, stakeholders and the public. Get your procurement and IT people on your side. Tell local people what benefits they can expect in clear words.

Manage expectations. ITS will make a difference but it is not the 'traffic super brain' that journalists sometimes make it out to be! You need to work with your elected members and media to explain what ITS means for them.

8 AND FINALLY...

Many UK ITS experts recently joined forces to prepare advice for teams bidding for funds. It is reproduced here, as you may find it helpful when looking at competing demands for your own budgets:

The ten golden rules for successful ITS public funding

1 Are you applying technology to address a policy issue influencing mobility or a real customer need, or is it just **technology looking for a problem to solve**? What's the added value over what exists now? How does it integrate with what is there already?

2 ITS doesn't exist on its own and is **not a solution in itself** – it must link to our life and business as an everyday service we use and adapt our travel as a result. Think about the people, the businesses and their operations that need your idea and how it can be integrated with other services, to make it easy to use.

3 Be careful if you think you an opportunity that everyone else has missed – they may be ignoring it because they see problems that you can't, so **do your homework**. Also, make sure it isn't already being offered by someone outside transport as part of another package like Google. Read the current literature to see what others are doing already. But remember, 92.6 % of transport facts are made up on the spot or actually just an opinion – choose the evidence in your business case carefully and verify that it is true.

4 Look at the many transport services already in the market and make sure you're not **reinventing the wheel**. As examples:

- Sat navs are already available with real time data and historic journey patterns, and are becoming available for HGVs
- e-mail and SMS alerts of rail and road problems are already widely available
- GPS data from fleet management systems is already routinely used for journey times and in sat navs
- Transport Direct already provides a door to door UK journey planner and a link to ticket sales
- A large proportion of the UK bus fleet already has real time information.

And check your new idea does not already **have a patent** – many ideas have been registered but not deployed.

5 There is already a great deal of knowledge in **data exchange between transport systems** (the TIH). The TIH community has much knowledge to share and has five basic principles for interoperability– so follow them! Use existing emerging international standards for data exchange (DATEX, TPEG, SIRI) to source data from machines directly, not skim websites. And think about who you will get data from and why they would give or sell it to you – they own it after all. Remember, institutions are often key here, not technology.

6 There is already a great deal of knowledge about **what travellers want** from ITS and will use and how much they are (un) willing to pay for it. You may need specific research on how your idea might be used in practice to tailor it to users' actual behaviour.

7 The UK has a **nationally agreed specification** for smartcards for travel – ITSO. Do not expect your idea for payment for travel to have interoperability everywhere if you don't follow this.

8 The UK has developed a modular approach to urban traffic control and monitoring systems, UTMC, which about 50 local authorities already use. Using these specifications offer **immediate access to markets and to local authority data.**

9 **Think about safety, about legislation, about data privacy and about accessibility**. Follow the DfT's Human Machine Interface Guidance and do not promote anything associated with receiving mobile phone calls or data while moving (eg on-call tracking, texting of information to drivers, etc). And think about social inclusion – does your idea apply to all roads and all people, or just a specific high value market that does not need public support?

10 Many ITS ideas are easy to invent and to prototype, but their viability depends not on technology but on achieving a big enough scale. **Think about the risks**– will enough data be available, will enough of the market want it – and how these risks are mitigated. How will the changing cost and availability of technology impact your idea? Those that are prohibitive now may become feasible in a couple of years but others patently will not.

If you can 'tick the above boxes' then you needn't panic!

Picture credits

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Page 5 Essex County Council
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