



# Standards and Guidance Documents

Document Title	Integrated Systems A Generic Approach
Reference	ITS 3/03

Date	2003
Publisher	Department for Transport (DfT)
Category	Guidance
Search terms	ITS; introduction; local authorities

## Information:

This document has been downloaded from the **ITSnow.org** website, which aims to encourage the promotion of best practice and continued professional development, by developing an improved understanding of current standards, advice and issues relating to Intelligent Transport Systems and Traffic Control.

## The small print:

### Conditions

Please read these conditions before you use this document. Although all efforts are made to host current versions of documents on the **ITSnow.org** web-site, we cannot offer an absolute guarantee that they have not been superseded. Information is provided 'as is' and excludes all representations, warranties, obligations and liabilities in relation to the information. We do not accept responsibility or liability for any errors or omissions in the information we supply and shall not be liable for any loss, injury or damage of any kind caused by its use. We do not guarantee the continued supply of information. Any information used is at your own risk.

### Copyright

© **ITSnow.org** copyright - You may re-use this document (not including logos) free of charge in any format or medium. You must re-use it accurately and not in a misleading context. The material must be acknowledged as ITSnow.org copyright and you must give the title of the source document. Where we have identified any third-party copyright material you will need to obtain permission from the copyright holders concerned. This document may be the subject of third-party copyright, with one or more of the following:

- **OGL** Contains public sector information licensed under the Open Government License.
- Crown copyright material is reproduced under the terms of the Click-Use license; PSI licence number C2011000278.
- Parliamentary material is reproduced with permission of the Controller of HMSO on behalf of Parliament; Parliamentary license number P2011000120.
- Other material is reproduced with permission of the relevant author or publisher.

This document is also available on our website at [www.itsnow.org](http://www.itsnow.org)



Any enquiries regarding this document should be sent to us at [info@itsnow.org](mailto:info@itsnow.org).

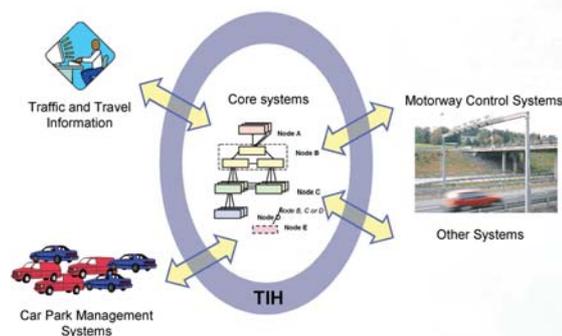


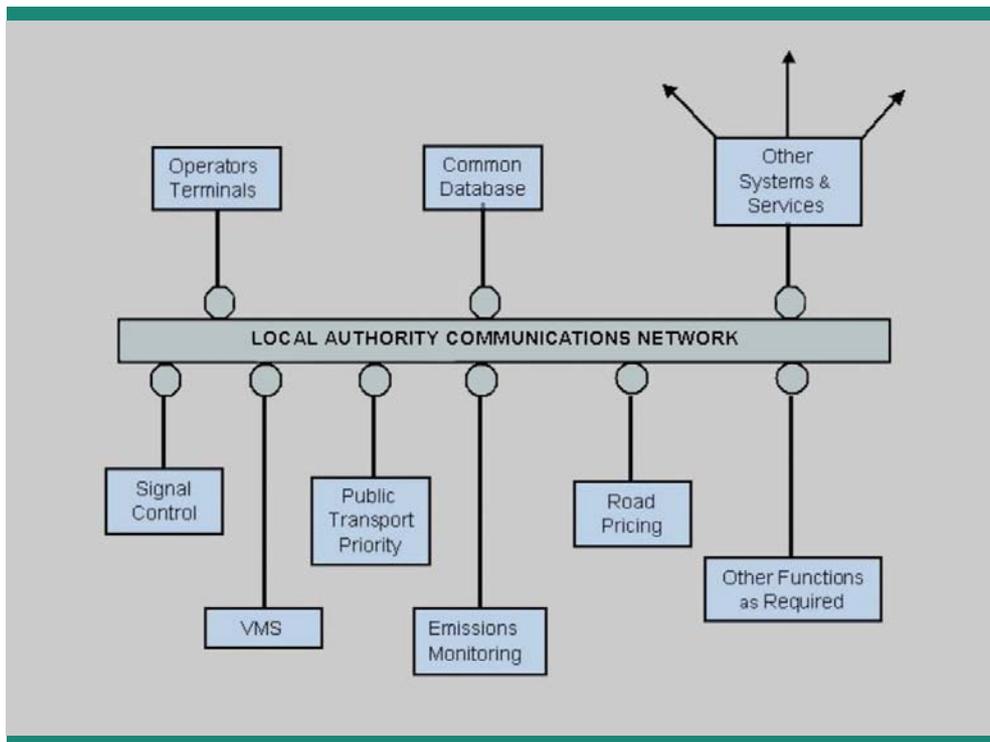
# TRAFFIC ADVISORY LEAFLET ITS 3/03

## Integrated systems – a generic approach

This leaflet is one of a series of documents from the ITS Assist Project. ITS Assist is a Department for Transport (DfT) initiative that aims to encourage and promote across the UK the use of Intelligent Transport Systems (ITS) as tools to implement local transport policy objectives.

The leaflet provides an overview of the likely benefits associated with the adoption of integrated systems for traffic management and control in the urban environment. It also outlines the approach and relevant standards that will be required as well as the likely migration paths available to local authorities.





AN INTEGRATED SYSTEMS APPROACH USING A COMMON COMMUNICATIONS NETWORK

- Car park management
- Variable message signage
- CCTV
- Traffic information systems

Procurement of new systems has invariably occurred on case-by-case basis in line with the development of local policy objectives. The ability to pass data between such systems has rarely been a priority and as a result it has therefore proven difficult to evolve or functionally extend such systems. At worst, local authorities may have a legacy of isolated bespoke systems that are unable to communicate with other

### BACKGROUND

Traditionally local Authorities have invested in traffic signals as the primary means to manage the traffic network. Over the past two decades substantial improvements have occurred to improve the efficacy of signals including remotely controlled signals, linked signals and adaptive control - Split Cycle and Offset Optimisation Technique (SCOOT). Concurrently local transport policy makers have been charged with trying to meet an increasingly wide range of demanding objectives, each requiring better traffic management. Policies currently being supported include:

- Giving priority to public transport and other selected vehicles;
- Improving the conditions for pedestrians, the disabled, cyclists and other vulnerable road users;
- Reducing the impact of traffic on air quality;
- Improving safety;
- Reducing traffic in sensitive areas;

- Providing improved congestion and demand management.

Adoption of such wide-ranging objectives has led to the procurement of additional systems by local authorities that supplement the existing network of traffic signals. Accordingly many local authorities now have a solid baseline of applications that commonly include:

- Fixed time and adaptive signal control
- Remote fault monitoring
- Selected vehicle priority
- Real-time information systems for buses

applications. Consequently the joined-up management of the traffic network in its entirety, rather than simply controlling traffic flow on a citywide scale, has not proven easy to implement.





Traffic Control Centre – Belfast

## BENEFITS

Migration to integrated systems will help to solve many of the transport issues faced by local authorities – although it is not always easy to quantify the value of integration. Among the benefits that may be achieved are:

- The ability to meet a more complex set of traffic policies relatively simply, cheaply and quickly – for example, linking air quality and car park information can help improve both signal control and travel information services;

Provided the integration is done well, and architecture design and migration paths are carefully planned, it can also:

- Reduce the cost of implementing a particular set of applications and policies – for example, by sharing telecommunications links between cameras and signal controllers;
- Improve flexibility for the future, by providing a ‘baseline’ onto which additional components can readily be attached.

## SYSTEM DESIGN

Local authorities seeking to integrate their traffic management systems face a number of critical decisions regarding the future system design and available migration paths. Typically local authorities will need to be mindful of the following issues:

### System architecture

- How will interfaces be created and maintained between systems?
- Is there a common communications infrastructure available to link systems?

### Data management framework

- What data will need to be exchanged?
- How will the data be shared and stored?

### Communications

- What bearers will be used?
- What protocols will be used to transport data?

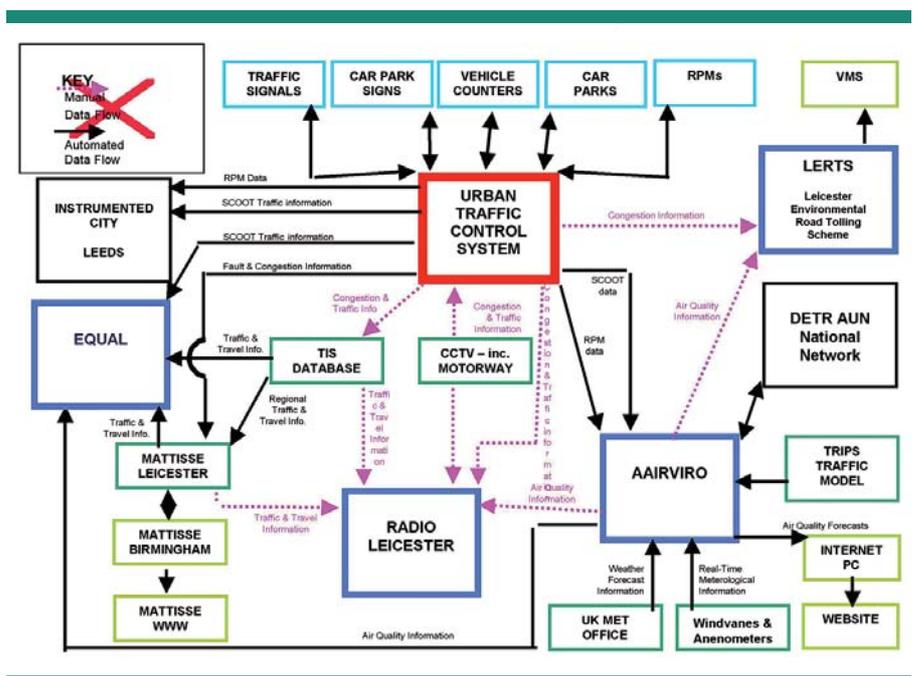
### Systems acquisition plan

- How does the current systems portfolio fit with political objectives?

- How will future procurements enhance the current offering?

Whilst substantial benefits are offered by more integrated systems, most local authorities have a substantial quantity of legacy systems that continue to provide significant benefits. In considering the migration path the following questions will need to be addressed:

- What timescale is envisaged for improvements in integration, and what budget is available to achieve this?
- In what order should systems be integrated – for instance, should new systems be integrated at procurement and others connected in, or should priority go to integrating existing systems?



- How will the migration occur – is it most sensible to adopt a gradual migration path as part of existing procurement cycle or is initial investment in infrastructure followed by connection of integrated systems preferred?

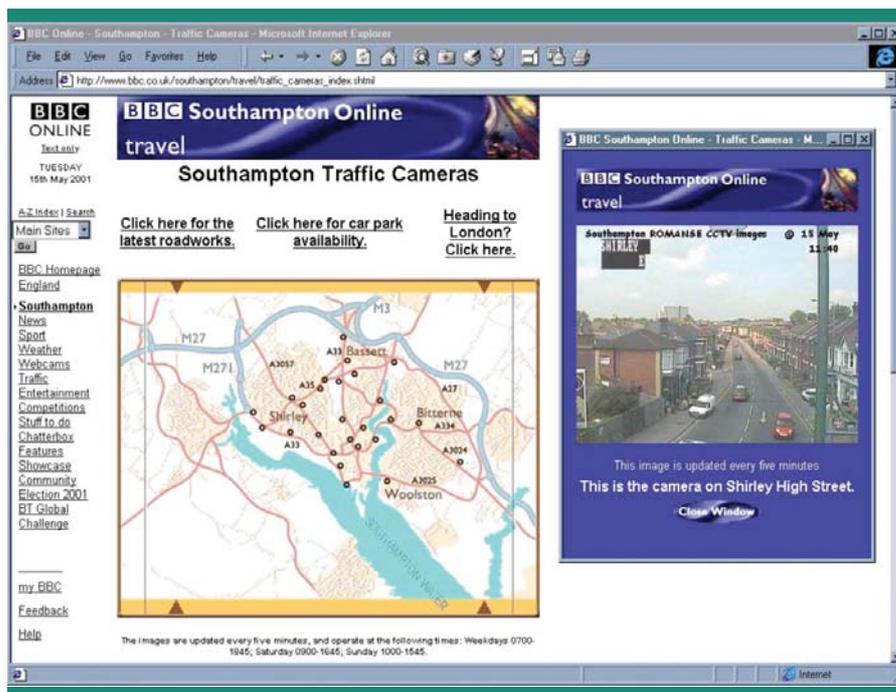
Designing an integrated system architecture and a suitable implementation/migration strategy is a specific skill, to be treated separately from the implementation of individual systems.

### AVAILABLE TECHNOLOGIES

There are different ways of achieving integrated systems, but these broadly fall into two types:

- **Infrastructure based** integration, where different systems are developed for connection to a 'generic' integration framework (eg a communications network); and
- **Direct integration**, where systems are connected on a machine to machine basis, via an adapter if necessary.

Historically much integration has followed the second path, which has the benefit of minimising disruption



WEB PAGE FROM ROMANCE SHOWING CCTV PICTURES OF REAL TIME TRAFFIC CONDITIONS IN SOUTHAMPTON. COURTESY OF HAMPSHIRE COUNTY COUNCIL AND SOUTHAMPTON CITY COUNCIL

to existing systems. However as the number and type of systems to be integrated grows larger, it becomes more appropriate to develop an infrastructure. Ideally, the infrastructure will offer 'standard' connections, and systems will be available to connect to them.

At the lowest level, this means the establishment of a suitable communications network. There is a

wide range of wireline and wireless technologies that have potential use here; fortunately, there is a general move in mainstream systems to adopt the **Internet Protocol (IP)** as a mechanism that can ride over almost all communications links, and serious consideration must therefore be given to adopting IP as an 'infrastructure protocol' for any integrated systems.

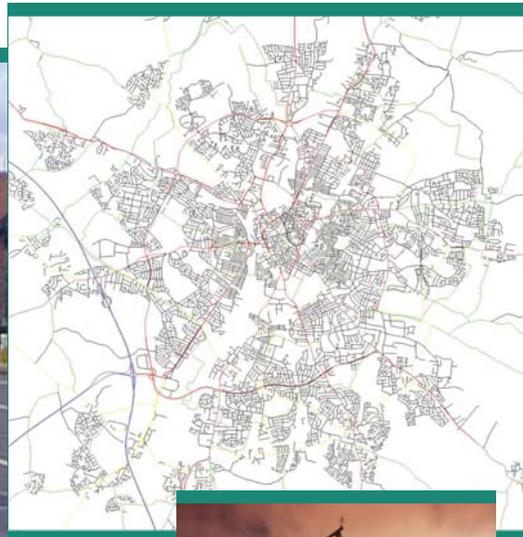
At a higher level, the applications used to exchange information are important. Here the situation is less clear cut, and it is more a case of 'horses for courses' – typical applicable technologies would include HTML for websites, SNMP for remote monitoring, CORBA for inter-organisational exchange where 'push' and 'pull' connection is required, and so on.



## REPORTED BENEFITS

Due to the relative youth of the integrated systems approach it is often difficult to appraise the empirical benefits of integrated systems. Initial anecdotal evidence suggests that the linkage of car park management and VMS signage systems reduces the time taken by motorists to locate parking spaces and may lead to lower levels of congestion and associated pollution. Likewise, the linkages of air quality monitoring to selective access measures can lead to local reductions in key pollutants.

Some changes to the organisational approach brought about the integration of systems are subtler. For example York City Council have found that adoption of IP networking has enabled many of their communication problems have been solved by teaming up with the council's "in-house" broadband roll out.



*Air-quality monitoring, Leicester*



## EVALUATION

Evaluation of integrated systems should be continuous. Local authorities will need to appraise how well their system meets policy objectives on a regular basis, to determine whether additional integration would be beneficial (or, less likely, whether reducing the level of integration would be helpful).

There is no mechanistic way of doing this, but good practice in other industries suggests that a 'lightweight' annual review should be combined with a full 5-year architecture and strategy refresh project. This fits the LTP timetable process well.

## STANDARDS

There are few formal standards for integration, in the transport area or outside it, but a number of frameworks are emerging that may be of use.

- For **traffic management systems** such as signalling, VMS, car park management, etc, the Urban Traffic Management and Control (UTMC) programme has developed a coherent and evolving framework.
- For **interurban and police systems** the Highways Agency's Traffic Control Centre project, and the Travel Information Highway service, provide de facto standards for centre-to-centre integration.
- For **public transport systems** the 'umbrella' initiative Transport Direct is beginning to develop a series of best practice documents, and a framework of standards is likely to emerge from this in due course.

- For **bus information systems** specifically, there is a framework under development by the industry's Real Time Information Group. This is at an earlier stage than UTMC.
- Finally, for **road user charging systems** the DfT is in the process of developing an 'open preliminary minimum interoperability specification suite' (OPMISS) which could be embedded in LA procurement specifications to enable interoperability between charging systems.

All these initiatives propose a set of consistent standards, based on mainstream approaches and technologies, and all of them acknowledge the need for integration both within and outside their own areas.

## FURTHER INFORMATION

The following references provide further information about some of the topics discussed in the text.

### Urban Traffic Management and Control (UTMC) programme

UTMC Programme Office  
Mouchel Consulting Limited  
St John's House  
Queen Street  
Manchester, M2 5JB  
Email: [utmc@mouchel.com](mailto:utmc@mouchel.com)  
<http://www.utmc.dft.gov.uk>

### Traffic Control Centre

The TCC Project Manager  
5 Broadway  
Birmingham, B15 1BL  
E-mail: [tcc@highways.gsi.gov.uk](mailto:tcc@highways.gsi.gov.uk)  
<http://www.highways.gov.uk/roads/projects/tcc/index.htm>

## Travel Information Highway

Highways Agency  
Room 705  
Tollgate House  
Houston Street  
Bristol, BS2 9DJ  
Email: [helpdesk@tih.org.uk](mailto:helpdesk@tih.org.uk)  
<http://www.tih.org.uk>

## Transport Direct

Transport Direct  
Department for Transport,  
Great Minster House  
Marsham Street  
London, SW1P 4DR  
Email: [transportdirect@dft.gov.uk](mailto:transportdirect@dft.gov.uk)  
<http://www.dft.gov.uk/itup/transdirect/index.htm>

## Real-time Information Group

Real Time Information Group  
Secretariat  
Suite 412  
Channelsea House  
Canning Road  
London E15 3ND  
Email: [realtime@its-focus.org.uk](mailto:realtime@its-focus.org.uk)  
<http://www.dft.gov.uk/research/rti/summary.htm>

## CONTACTS

Department for Transport  
Traffic Management Division  
3/19 Great Minster House  
76 Marsham Street  
London SW1P 4DR  
Tel: 0207 944 2599  
Fax: 0207 944 2211

e-mail: [assist-info@dft.gsi.gov.uk](mailto:assist-info@dft.gsi.gov.uk)

To find out more about the wide range of ITS-related initiatives and projects supported by DfT, and the development of ITS policies to encourage and promote greater deployment of ITS, please contact Transport Technology and Telematics division of the Department for Transport at: [its@dft.gsi.gov.uk](mailto:its@dft.gsi.gov.uk)

### DfT WEBSITE [www.dft.gov.uk](http://www.dft.gov.uk)

Details of Traffic Advisory Leaflets available on the DfT website can be accessed as follows:

From the DfT homepage, click on the Local Transport icon and then on Traffic Advisory Leaflets. Lastly, click on one of the themes to view material.

The Department for Transport sponsors a wide range of research into traffic management issues. The results published in Traffic Advisory Leaflets are applicable to England, Wales and Scotland. Attention is drawn to variations in statutory provisions or administrative practices between the countries.

The Traffic Advisory Unit (TAU) is a multi-disciplinary group working within the Department for Transport. The TAU seeks to promote the most effective traffic management and parking techniques for the benefit, safety and convenience of all road users.

### Department for Transport

Requests for unpriced TAU publications to:  
Charging and Local Transport Division,  
Zone 3/23, Great Minster House  
76 Marsham Street, London, SW1P 4DR.  
Telephone 020 7944 2478  
e-mail: [tal@dft.gsi.gov.uk](mailto:tal@dft.gsi.gov.uk)

### Scottish Executive

Within Scotland enquiries should be made to:  
Neil Weston, Scottish Executive, Development  
Department, Transport Division 3, Zone 2-F,  
Victoria Quay, Edinburgh, EH6 6QQ,  
Telephone 0131 244 0847  
e-mail: [neil.weston@scotland.gsi.gov.uk](mailto:neil.weston@scotland.gsi.gov.uk)

### Llywodrath Cynulliad Cymru Welsh Assembly Government

Within Wales, enquiries should be made to:  
Welsh Assembly Government,  
Transport Directorate, 2nd Floor, Cathays Park,  
Cardiff, CF10 3NQ  
Telephone 029 2082 5111  
e-mail: [cone@wales.gsi.gov.uk](mailto:cone@wales.gsi.gov.uk)



Cycling



Traffic  
Management



Walking



Bus Priority  
Systems



Parking



Signs and  
Signals



Intelligent  
Transport Systems