



An Roinn Iompair
Department of Transport



***Intelligent Transport Systems:
Facilitating Safer, More Efficient and More
Sustainable Transport?***

**Development of Departmental Strategy
on
Intelligent Transport Systems
in Ireland:
A Consultation Paper**

February 2006



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Foreword

I am delighted to introduce this important consultation paper on the future development of Intelligent Transport Systems (ITS) in Ireland. It was drawn up by the Department's Technology Specialist and was informed by the work of two cross-cutting teams on ITS within the Department of Transport as well as engagement with the key stakeholders in the transport sector.

ITS has an important role in facilitating improved road safety as well as more economic, efficient and effective management of roads and public transport services. ITS is generally regarded as the integrated application of computer, sensor, electronics and communications technologies along with transport management strategies to provide an integrated, safer, more efficient and more sustainable surface transport system. In short, appropriate use of ITS can help save lives, time and money. Recognising this, one of the Department's objectives, as set out in our Statement of Strategy, is "*to use ITS to contribute to the development of the transport system*".

While there has been extensive comment on the need for Ireland to develop as a knowledge-based society, there has been limited investment to date in information and communications technologies in transport, in this State, relative to other countries. This consultation is intended to open up a much needed dialogue on the role ITS can play in delivering on transport policy. Such a dialogue is intended to inform the development of the Department's ITS strategy and to assist us in mainstreaming identified ITS initiatives into investment programmes under Transport 21.

There is a need for smart and innovative ideas, with lateral thinking cutting across institutional boundaries, if we are to address challenges in the transport sector. I see the development, promotion and ultimately implementation of an ITS strategy by the Department as an important contribution to ensuring that we get the best value for money from the Government's significant investment in physical transport infrastructure and as the transport sector's input to the Government's Information Society initiative.

I urge you to play your part in assisting the development of the ITS strategy by responding to this consultation. Make your views and your opinions count.

Secretary General
17 February 2006

Background

Ireland requires a modern safe, efficient and sustainable transport system. Technology is a key tool through which we aim to improve the movement of people and goods to meet the evolving needs of our economy and society. This paper is intended to open up a dialogue on the role Intelligent Transport Systems (ITS) can play in facilitating the saving of lives, of time and of money.

ITS is concerned with the application of modern computer and telecommunications technology to transport. As ITS is generally regarded as relating to surface transport i.e. roads, public transport and intermodality with maritime transport, this paper is confined to addressing ITS in the surface transport system.

ITS is a technology toolkit, involving a systems approach to transport, that facilitates effective infrastructure management encompassing improved road safety. There is provision in Transport 21 for significant investment in ITS.

What is ITS?: The Scope

ITS involves the applied use of various engineering disciplines, enabling technologies and management strategies to facilitate modern transport operations and policy development. At its core, ITS is about facilitating professional transport management based on information technology: there is no consensus on terminology. ITS is alternatively known as telematics, Information Communications Technology (ICT) in transport, e-transport and Information Society Technology (IST).

ITS involves the application of information communications technologies to transport infrastructure and operations in order to deliver increased efficiency, safety and informed mobility of people and goods. ITS has its origins in both the humble traffic light on the road and semaphore signals on the railway. The growth of electronics, computing and communications technologies, in recent years, has facilitated new applications in the surface transport sector, namely improved road safety, traffic management systems on road and rail, the provision of information to and from vehicles (i.e. geographic, navigational aids, goods condition, vehicle performance etc) and seamless and efficient financial transactions (e.g. tolls). It facilitates behavioural monitoring (i.e. speed cameras, corridor monitoring etc), effective policing and increased safety through various preventive (i.e. collision avoidance, speed limitation etc) and

responsive measures (incident management, eCall etc). It enables increased transparency of transport operations through asset (i.e. vehicle) tracking in fleet management systems. It realises increased mobility, efficiency and capacity in existing physical infrastructure. It allows for intelligent interactions between the infrastructure operators (i.e. road authority, railway undertaking) and the vehicle involving seamless and unobtrusive transactions for example, electronic fee collection, automatic fare collection, dynamic speed limits and alternative routing etc.

A technical insight into the scope of what ITS is can be gleaned from the international standardisation work being undertaken. e.g. CEN¹ Technical Committee 278 “Road Transport and Traffic Telematics”. It involves systems and architecture development to accommodate data processing along with human/machine interfaces for road transport payment, traffic and travel information, vehicle identification, asset tracking, public transport applications and access control. A listing of various CEN workgroups along with those of ISO² Technical Committee 204 “Intelligent Transport Systems” is provided in Annex 1.

In today’s society, it is specific applications of ITS, rather than ITS itself, that people identify with. This is reflected by the absence of advocacy from various interest groups for prioritisation of ITS rather than specific applications of ITS i.e. ‘speed cameras’, electronic road tolling, smartcard integrated ticketing, real time passenger/travel information etc.

Often the particular application is presented as a solution to or more appropriately a mitigation of a problem that exists or is perceived to exist. For example, real time passenger information from the perspective of the bus operator can have as objectives, increased bus fleet operational efficiencies such as reduced bus transit times, increased staff productivity, greater bus utilisation, data recording for evidence-based management reporting, increased revenue through increased patronage and developed customer relationship management. The nuances of different agendas and policies with real time information e.g. for fleet management, regulatory oversight, investment monitoring, transport planning, traffic management in addition to customer and public information are often not clearly understood.

¹ European Committee for Standardisation

² International Organisation for Standardisation

Sometimes specific ITS technologies are perceived as a panacea for ‘failures’ or rather shortcomings in current business processes and arrangements. This erroneous perception can lead to new ITS projects and initiatives being introduced without simultaneous or subsequent change in the business processes and structures in the relevant organisations. This can result in poor value for money and an unfair critique of the specific technology as opposed to the business systems and structures involved.

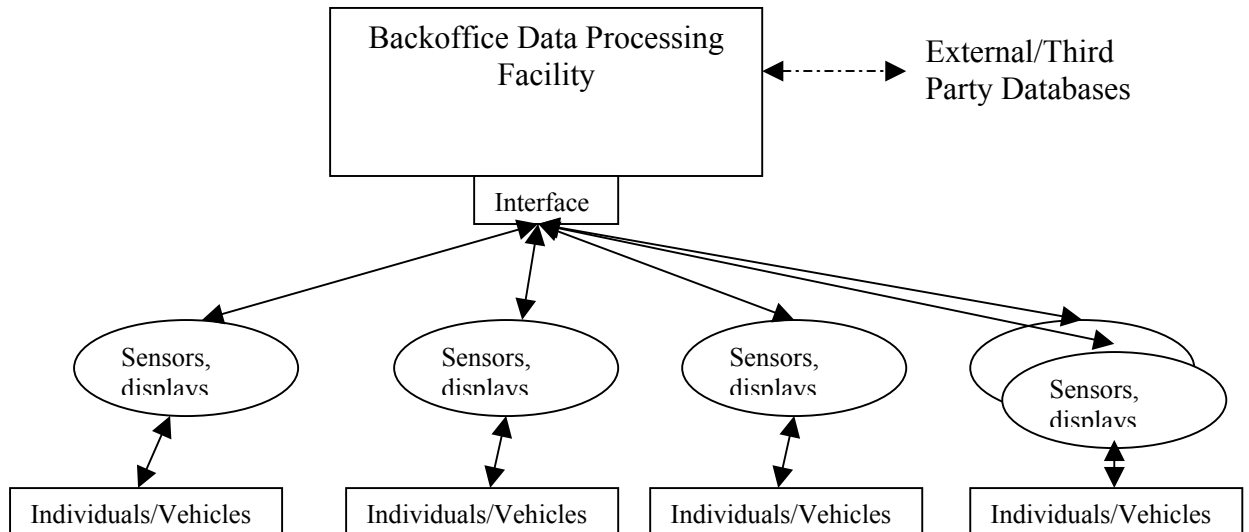
However, all ITS applications arise through use by:

1. Individuals, i.e. drivers and passengers, e.g. electronic tokens/smart card driver licences³, driver card for digital tachograph, or smartcards for public transport ticketing, parking or road use payment.
2. Vehicles, i.e. intelligent vehicles incorporating intelligent speed adaptation, automatic vehicle location, collision avoidance, asset tracking etc.
3. Road or rail infrastructure for monitoring, sensing, providing information, traffic management, regulation and enforcement e.g. through Variable Message Signs (VMS), inductive loops, microwave detectors, ANPR, DSRC etc

Historically ITS infrastructure was activated locally by roadside sensors e.g. microwave detectors or inductive loops linked to VMS. Increasingly most ITS applications have a requirement for a centralised back office data processing facility. Such facilities are essential for financial transaction processing, urban traffic management using Urban Traffic Control (UTC) (e.g. Dublin City Council’s SCATS⁴) and traffic enforcement, e.g. matching of speed camera data with national driver and vehicle database records. The block diagram overleaf describes the key attributes of most modern ITS systems.

³ Discussions ongoing at EU level that may result in a new ‘credit card’ style driver license. Some Member States wish to have the option on including an electronic chip on the proposed driver license card.

⁴ Sydney Co-ordinated Adaptive Traffic System



From an infrastructural perspective, ITS includes, but is not necessarily limited to, the following activities:

- **Payment Transactions**
 - Public transport fare payment
 - Motorway tolling,
 - Congestion charging
 - Parking and Park'n Ride

- **Safety**
 - Variable Speed Limits
 - Cameras for speed, red-traffic light enforcement
 - Incident Management i.e. eCall
 - Environmental Monitoring and Control
 - Cameras at Road or Rail Junctions /Automatic Level Crossings

- **Information Provision to Travellers**
 - Driver Information and Route Guidance
 - Real Time Passenger Information
 - Variable Message Signs, Kiosks⁵, text and email alerts
 - Internet based Journey Planning Services⁶

- **Traffic Management⁷**
 - Urban Traffic Control on roads i.e. SCATS, SCOOT⁸

⁵ Information booths involving computer screens in public places that allow the traveller to access information about transport services via a keyboard or touch screen.

⁶ e.g. Irish Rail's rail journey planner on its website, Dublin Transportation Office's walking journey planner etc

⁷ Encompasses technologies for ramp metering, hard shoulder running, tidal flow, dedicated lanes etc.

- Centralised Train Control
- On street priority at junctions involving bus and light rail⁹
- Motorway Management

- **Improving Efficiency**
 - Fleet Management
 - Asset Tracking
 - Automatic Vehicle Location.

From an intelligent vehicles perspective, technologies are generally focused on delivering enhanced road safety and efficiency i.e. electronic vehicle identification, collision-avoidance, navigational aids etc.

Question 1:

Does the previous description accord with your understanding of the scope of ITS?

Definition of ITS

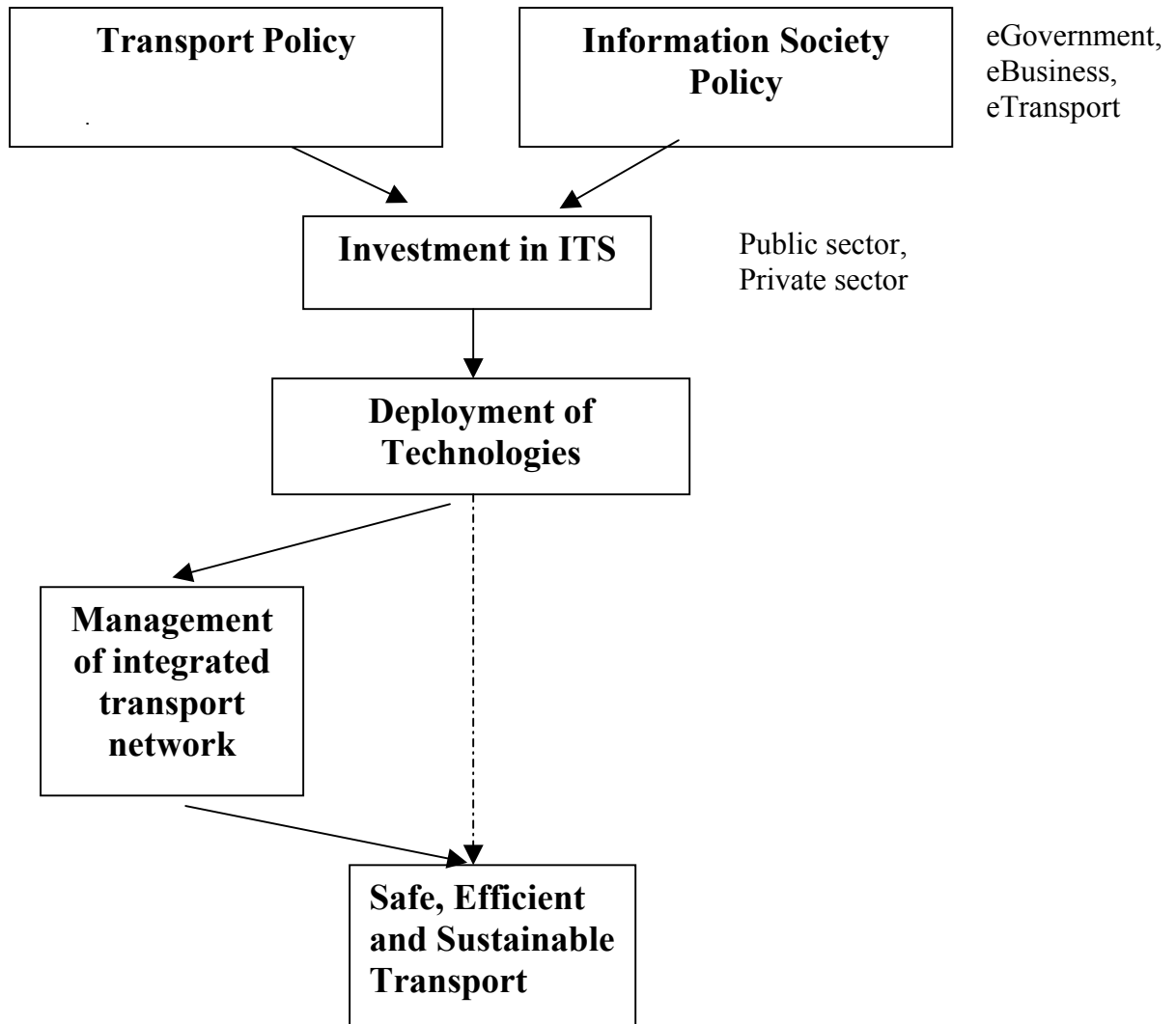
It is noteworthy that ITS is extremely difficult to define. There are a myriad of differing definitions of ITS proposed by various stakeholders. Annex 2 outlines some of these definitions. The following draft definition was developed by a working group within the Department of Transport.

Intelligent transport systems are part of the wider infrastructure of the information society policy and involve the deployment of technologies which can contribute to a safer, more efficient and sustainable use of transport and to the development and effective management of an integrated transport network.

⁸ Split-Cycle Offset Optimisation Technique: UTC system in use by Cork City Council.

⁹ It is a specific subset of urban traffic control focused on prioritisation of public transport at road junctions.

The following schematic depicts the policy context for ITS.



Transport policy also plays an important role in underpinning the rationale for ITS investment.

The benefits of deploying ITS technologies are presented as,

1. safer, more efficient, sustainable transport,
2. better (i.e. more effective) management of integrated transport network,
3. a contribution to the creation of an effective information society.

Safer transport can include accident prevention and security for passengers from crime

Management of integrated transport networks can include planning, monitoring, evaluation, sharing information between systems and organisations, traffic management, car parking information and passenger

information systems, and integration with international systems and networks.

Efficient transport can include a better use of time and money, greater choice for the passenger, quality, simplicity and transparency.

Sustainable transport can include economic sustainability, environmental sustainability, quality of life issues and social inclusion issues.

Technologies can include a range of information technologies currently developed or adapted for applications in the transport sector.

Question 2:

Does defining ITS matter? If so, is our definition adequate? If not how would you go about defining ITS and what would be your definition?

Developments in Europe: Impacts on Policy Development in Ireland

One could take the view that ITS is ultimately a trade and industry matter. The ITS component industry, along with in-vehicle applications, tends to be driven by the international industrial marketplace. For example vehicle suppliers are focused on ITS, or more particularly the subset of ITS that covers intelligent vehicles, if it enhances the driving experience and therefore sales e.g. in-car navigation systems. However other aspects of in-vehicle telematics that seek to promote a road safety remit such as speed limiting devices, electronic vehicle identification, automated emergency requests (i.e. eCall) are matters that require a public policy input. Such intervention is required where the needs of transport policy have to be balanced with industrial policy needs. As such aspects of transport policy tend to have significant implications for the Single Market, policy developments usually take place at European Union (EU) level.

The European Commission is active in promoting research, investment and deployment of ITS. The Commission's White Paper on Transport "European Transport Policy for 2010: time to decide", currently under review, calls for '*less concrete and more intelligence in the transport system*'. It goes on to articulate specific benefits¹⁰ arising from

¹⁰ European Commission White Paper, "European transport policy for 2010: time to decide": Annex 4, "Technological Developments and Intelligent Transport Systems", page 117.

deployment of ITS i.e. journey time savings of up to 20%, road safety improvements of 10-15% and increase in network capacity of 5-10%.

Within the Commission, the Information Society Directorate-General (DG-INFSO) has been responsible for promoting ITS from an industry oriented information society policy perspective. Initiatives such as eSafety have been promoted, mainly with vehicle manufacturers, through the 6th Framework Programme for Research, Technological Development and Demonstration. The Energy and Transport Directorate-General (DG-TREN) has promoted deployment of ITS infrastructure on road networks through the Trans-European Networks investment framework. This has resulted in greater awareness of and involvement in ITS deployment by roads administrations in Europe. The National Roads Authority (NRA), who collaborate with neighbouring roads administrations in the United Kingdom through the STREETWISE initiative, are direct beneficiaries of this Commission initiative. The Regional Policy Directorate-General (DG-REGIO), through the Structural Funds, is co-funding the cross-border ITS initiative INSTANT on the Dublin-Belfast road corridor.

At European Union level, both the Council and the European Parliament have been active in developing legislation that involves deployment of ITS. Examples include the regulations regarding the digital tachograph and the Electronic Fee Collection (EFC) Interoperability Directive on road use payment etc.

As ITS is a highly specialised area, Member State representatives on EU committees tend to be relevant national experts. In an Irish context, that usually means that the national representative is from a public body under the Department's remit rather than from the Department itself. This is usually sufficient and appropriate. However as ITS initiatives can have a very lateral/broad brief and since the remit of specific public bodies can be very focused, circumstances can arise where the specific and legitimate agenda of a public body can differ from that of a national representative. For example under the EFC Interoperability Directive, a representative of the NRA sits on the respective technical committee. Since the Directive is also binding in regard to road demand management measures, questions arise as to whether the national representative is able to take into account the Dublin Transportation Offices's (DTO) perspective. The key issues arising here are whether there is adequate networking and liaison between specialists in the various agencies and whether a support mechanism would help inform and resolve differences of emphasis. This challenge of effective networking and liaison can also arise at inter-Departmental level too.

Questions 3 and 4:

3: Is Ireland best positioned to take advantage of ITS policy developments and initiatives in Europe and internationally?

4: Are designated national representatives adequately supported and informed and thus able to act in the interests of all stakeholders?

ITS in Ireland: Impacts on Policy Development

It is the applications of ITS technology that have most impact on transport policy in Ireland. **It is important to emphasise that what is required is policy-led ITS development and not technology-led ITS development.** ITS applications are not ends in themselves but should only be deployed to meet policy needs.

Current applications of ITS in Ireland are focused on facilitating accessible (i.e. convenient from users perspective) and integrated transport, increased transport economy and efficiency through vehicle fleet management and congestion mitigation, road safety and increased transport efficiency. The following table is indicative of the scope of ITS applications in use in Ireland today.

Ref .	Organisation	Policy Objective	Application	Enabling Technology
1	National Roads Authority	Efficiency, accessibility	Interoperability of electronic tags on vehicles for road toll payment	Information Exchange System Backoffice between participating toll operators
2	Various Toll Operators	Efficiency, accessibility	Electronic payment in accordance with Directive ¹¹	Direct Short Range Communications (e.g. tags ¹² for M1, M4 and Westlink)
3	Railway Procurement Agency and various public transport operators (i.e. CIE, private operators etc)	Accessibility, integration	Integrated public transport ticketing	Smartcard based Automatic Fare Collection system incorporating backoffice and clearing facility for electronic money
4	Urban local authorities	Efficiency, safety	Optimising flow of road traffic in an urban roads environment	Urban Traffic Control systems based on SCATS and SCOOT technologies
5	Various road haulage and public transport operators	Economy, efficiency	Fleet and operations management	Automatic Vehicle Location technologies incorporating vehicle and asset tracking and management information reporting
6	An Garda Siochana	Safety	Road traffic enforcement	Speed cameras
7	National Roads Authority	Accessibility, Efficiency	Travel time information and electronic messaging	Journey time estimation system on N7 (i.e. pilot) under development on M1, comprises Variable Message Signs, road traffic sensors
8	Dublin City Council and Railway Procurement Agency	Efficiency, safety	Intelligent public transport priority for Luas at junctions	UTC (i.e. SCATS-AVL ¹³) system interface
9	Department of Transport, Road Haulage Division	Safety	Recording of commercial driver hours in accordance with EC Regulations	EU's Digital Tachograph system comprising of on-board units and backoffice data processing

The list is not exhaustive. In general it does not take account of the use of ITS by the private sector be it in car park management, asset tracking

¹¹ 2004/52/EC Interoperability Directive on Electronic Fee Collection

¹² i.e. Eurolink, see www.eirtag.ie and National Toll Roads, see www.easypass.ie for details.

¹³ Automatic Vehicle Location

and management or navigational assistance. More particularly, it excludes limited deployments by local authorities (e.g. temporary VMS, traffic controllers for individual junctions¹⁴, loops etc). Research and application development work is also undertaken by academics and industry e.g. in satellite positioning for road use payment, e-ticketing, VMS etc. Other applications include journey planning tools on various organisations' websites e.g. the DTO and AA Ireland, and insurance risk mitigation tools involving the deployment of on-board units to record driver activity.

Question 5:

Are there other applications of ITS in Ireland today that are significant from a transport policy development perspective? If so, what are they and why are they important?

Key features of ITS applications in Ireland

ITS applications are focused on management of transport infrastructure. The applications of ITS presupposes an agenda to actively manage the transport system.

ITS applications are about working with multiple stakeholders involving the exchange of data so as to provide the relevant services. Data exchange is about the transfer of information between two or more organisations so as to deliver the required service. Examples include data exchange between the web based European 'Tachonet' database and the digital tachograph back office of the relevant Member State and data exchange between public transport operators and the integrated ticketing system.

ITS applications are about the transfer of data (e.g. data on vehicle positions and data on card or token transactions) to a central database for processing. Smart cards for integrated ticketing will interact with various ticketing terminals that are unique entry points to the public transport network. It is possible to link the card to specific terminals. Likewise vehicles with on-board units are identified at various points on the road network e.g. toll plazas with DSRC. As it is technically possible to track the position of vehicles¹⁵ and individuals carrying smartcards¹⁶ through

¹⁴ Individual junctions optimised through Microprocessor Optimised Vehicle Actuation (MOVA) technology.

¹⁵ Via mobile phone networks, satellite positioning, ANPR, microwave detectors, CCTV, DSRC gantries etc

¹⁶ This is more acute where the smartcard is non-transferable and carries some form of identity.

road and public transport networks, data content has to be regulated. Often the needs of data protection, because it is deemed commercially sensitive or because it involves personal characteristics (i.e. name, address, biometric reference etc), has to be balanced with the requirements of regulatory oversight or transport safety and security. This requires a resolution of the potential conflict between the interests of personal or corporate privacy and the interests of the common good.

The deployment of ITS applications often calls for a multidisciplinary engineering approach to be taken involving systems engineering, telecommunications, electronics, civil, structural and mechanical engineering. Such complex IT projects also involve multiple stakeholders and require extensive project management skills.

The capital costs of ITS applications are not significant relative to infrastructure construction costs (i.e. hundreds of thousands to millions versus tens of millions to hundreds of millions €). However such projects often do have significant ongoing operating costs that go well beyond mere maintenance. Furthermore, the project lifecycle or investment period is usually defined in years rather than decades as is often the case with construction projects. It is unclear as to what extent project appraisal for transport infrastructure considers ITS as an option when examining alternative investment scenarios. On the other hand, some ITS initiatives are complex IT projects, involving a multiplicity of stakeholders, that require extensive appraisal and detailed planning before decisions can be made to go ahead with them.

While investment appraisal methodologies are applied to some ITS projects, in accordance with Department of Finance Capital Appraisal Guidelines, policy assessment using programme evaluation methodologies, before, during and after implementations is very rare.

Development of ITS projects is taking place in an ad hoc fashion without any consideration of such initiatives contributing to an overall strategy. Data collected in one application could be applied in another application, thereby meeting both sets of policy objectives and providing better value for money, but with some level of trade off on data protection. For example, the digital tachograph, introduced to facilitate enforcement of commercial driver rest periods, captures time and distance data that could be used to provide greater information about transport movements and to calculate average speeds.

Legislation is often developed without an adequate appreciation of the strategic potential of ITS as an enabling technology. While there are often justifiable reasons (such as privacy) for restricting the use of data collected for a particular purpose, there may very well be significant synergies in permitting its use for other purposes. We need to deliver an assessment methodology which permits a balanced consideration of all of the issues (societal, value for money and other synergies on the one hand and protection of personal rights and freedoms on the other).

The rate of deployment of ITS in Ireland relative to transport investment is very limited. With the exception of some local authority urban traffic control systems, notably Dublin City Council's SCATS, other projects are either just being developed or are at an early stage of implementation.

The benefits of ITS, relative to costs incurred in its provision and operation, are often not very transparent to transport users. For example, a key enabler of meeting the targeted journey time on the LUAS Red Line is the AVL-UTC (SCATS) interface providing intelligent transport priority for trams at junctions. It has been suggested that without such a facility, average end-to-end journey time on the Luas Red Line could be extended by an extra 10-20 minutes.

Questions 6 and 7:

6: Do you agree/disagree with the hypotheses expressed regarding features of ITS applications in Ireland? Why?

7: Are there other attributes of ITS implementation that are material to transport policy development or to other public policies?

Role of Department of Transport

On establishment of the Department of Transport in 2002, a Statement of Strategy was published for the years 2003-2005 in accordance with statutory requirements. Last year a new Statement of Strategy was drawn up for the period 2005-2007. It is useful to note the contents of both of these documents regarding ITS.

The 2003-2005 Statement of Strategy, contained the following ITS objective "*to contribute to the provision of safer, more sustainable and more efficient transport of people and goods using Intelligent Transport Systems*".

In the current Statement of Strategy, the ITS objective is “*to use ITS to contribute to development of the transport system*” with the key focus being the development of a Departmental ITS Strategy and the mainstreaming of ITS initiatives into investment programmes. It is envisaged that there will be increased use of ITS applications leading to improvements in the transport system.

The Department’s Road Safety Strategy 2004-2008 identified the following targeted actions that involve ITS. It should be noted that some of these actions could more closely described as more ‘standard’ IT projects, however they do have a transport application:

- *Provide for and introduce private operators of speed cameras*
- *Introduce “credit card” type driving licence*
- *Bring into operation the Garda Fixed Charge Processing System and integrate it with the Courts Service IT System and the National Driver File*
- *Investigate opportunities to exploit Intelligent Transport Systems and the emergence of electronic “birth” certificates for vehicles for road safety*

A key question to answer is the role of the Department itself in mainstreaming ITS in our surface transport system. It is noteworthy that while there has been extensive comment on the need for Ireland to migrate towards a knowledge-based society, there has been limited investment to date in Information Communication Technologies in transport infrastructure in this State relative to other countries. There also has been virtually no public comment on the need for such applications in transport by those agencies charged with promoting the digital economy and the information society.

One could argue that there is a need for active promotion by the Department of ITS initiatives with the objective of improving awareness amongst Government, public bodies and the private sector in Ireland. In this regard the Department has been involved in facilitating conferences and workshops on ITS over the past 3 years. However there is a view among industry practitioners that such promotion to date has not been adequate or sufficiently extensive to enable public bodies to expedite the deployment of ITS. Some have called for a more structured promotional programme similar to the UK’s “ITS ASSIST” initiative if we are to facilitate an informed understanding of ITS by public bodies who can then effectively prioritise implementation of ITS.

Aside from promotion, how can ITS initiatives be effectively mainstreamed in transport investment under Transport 21? Promoting awareness is one issue, being open to change to follow through with implementation is another. There is a view that the relative availability of public funds coupled with the relative conservatism¹⁷ of specialist public bodies militates against innovative and novel deployments (i.e. ITS) that may be outside the body's current area of competence and expertise. How do we ensure that our public bodies have the right set of multidisciplinary engineering competences (i.e. system, structural, mechanical, electronic, computer and civil engineering) to manage as well as provide our transport infrastructure? Is there a role for the Department to monitor the level of expenditure by public bodies on ITS deployments? Is there a need for an independent structure to both promote and openly challenge public bodies on the level of deployment of ITS? Would a published ITS strategy and implementation plan under the Transport 21 framework provide the necessary impetus to deployment of ITS solutions?

Questions 8 - 13:

8: What should be the role of the Department regarding ITS?

9: In the context of Transport 21, how can ITS investments be effectively prioritised and mainstreamed?

10: How can our public bodies, in deploying ITS, respond effectively to the challenges of transport management?

11: Is there a need for an independent structure to both promote and openly challenge public bodies on the level of deployment of ITS?

12: Would a published ITS strategy and implementation plan under the Transport 21 framework provide the necessary impetus to deployment of ITS solutions?

13: In the context of the development of an ITS strategy, please identify, in order of priority, the most important deployments of ITS, that, in your opinion, need to take place in Ireland over the next few years? In answering this question please give reasons for your choice and for your priorities from a national policy perspective.

¹⁷ Relative to private sector

ITS and the Transport User

ITS applications often involve direct interaction with transport users. A key benefit of integrated public transport ticketing is the convenience afforded to consumers. Similarly the provision of timely travel information in pseudo real time at the outset of a journey can lead to empowerment of the person making the journey.

On the other hand the data collected from ITS applications can make movements by individuals and vehicles, as well as the operation of transport system, very transparent. While such transparency may be welcomed from a transport planning and transport policy monitoring perspective there may be legitimate concern regarding the protection of such personal information.

ITS initiatives can be very attractive as they can often be delivered in a relatively short time frame, (e.g. months rather than years: the NRA's 'N7.ie' travel information site¹⁸ took approx 16 months, whereas the N7 upgrade is taking over 4/5 years from concept to completion) and can have an immediate impact on the travelling public. It is noteworthy that among the recommendations of the Consumer Strategy Group that reported to the Department of Enterprise, Trade and Employment was a request for a central public transport information system. The integrated ticketing initiative was also identified as desirable investment. The Group called for more 'soft' investment measures in transport that directly impact users. The UK's Department for Transport "TRANSPORT DIRECT" initiative seeks to provide to the travelling public, accessible, reliable, impartial and accurate real time information on road and public transport services. There is a view that informing transport users, empowers them to make the better decisions on travel.

There are also consumer issues arising in relation to the coherence of ITS initiatives. For example is there a need for a coherent transport electronic payment strategy that focuses on delivering convenience to the consumer? Will travellers need to carry multiple electronic black boxes (i.e. DSRC tags) in their vehicles for various toll payments or demand management measures, smartcards for public transport ticketing depending on who the service provider is? Should each public body be permitted to develop its 'own' system or systems in isolation without reference to parallel initiatives? If not, is there a risk that projects will

¹⁸ www.n7.ie provides travel information to road users travelling on the N7 towards Dublin from Rathcoole to the M50

become very complex or much needed developments delayed? Aside from electronic payment, similar issues arise with traveller information, traffic management, enforcement etc.

As successful ITS deployment will have a direct impact on the transport user, is there a direct role for ITS in facilitating the desired behavioural changes in line with current transport policy objectives? Is there any evidence to suggest that smartcard based public transport ticketing reduces barriers to public transport, thereby encouraging those to consider public transport alternatives to the private motor car? Would provision of real time information on parking space availability coupled with public transport service availability from that park and ride stop encourage use? Does the Department need to facilitate a support structure for ITS that involves ITS programme evaluation and transport user input?

Questions 14 - 16:

14: Would established structures that promote ITS also need to have direct transport user input? If so, how would this be achieved?

15: Does ITS have a role to play in facilitating behavioural change i.e. modal shift and intermodality (including Park and Ride) in urban transport and road safety?

16: Would a real time travel information service for road and public transport users deliver a safer and a more efficient transport system?

Value for Money: Assessment and Policy Evaluation

In a policy context value for money is concerned with the economy, efficiency and effectiveness of transport initiatives. Economy refers to inputs, efficiency to the ratios between inputs and outputs and effectiveness is concerned with the relationships between investment outputs and policy outcomes. Do ITS applications contribute to value for money objectives?

To what extent are economy objectives met by ITS? Does an ITS investment focus reduce the requirement for investment in a transport capital programme? Approximately € 2.6 billion of capital funding was allocated in 2005 on transport investment¹⁹ of which approximately € 2 billion was for national and non-national road improvement and maintenance. It is estimated that less than € 10 million was spent last year from the Exchequer on ITS capital investments.

¹⁹ Public Capital Programme 2005, Department of Finance, February 2005

Another key attribute of value for money is efficiency. To what extent are ITS investments delivering the required outputs for the investment made? Are there improvements in journey times for travellers impacted by the investment? Are commercial transport operators obtaining greater fleet utilisation from the investment? The EU White Paper²⁰ mentions that approximately a 5-10% improvement in capacity on road networks is possible with the deployment of ITS applications. Are road accident fatalities and injuries reduced through systemic deployment of ITS applications on both road infrastructure and on vehicles?

The third element of value for money is effectiveness. Can deployed ITS applications mitigate traffic congestion or do they merely displace traffic congestion to another section or area of the surface transport system? Are road safety improvements in general occurring as a result of the deployment of ITS applications or alternatively do they merely displace poor driver behaviour?

The UK National Audit Office, in its report *Tackling congestion by making better use of England's motorways and trunk roads*²¹, indicated that the Highways Agency was not investing enough in ITS deployments and needed to improve its management of existing ITS initiatives. It is worth noting that at a recent international conference on ITS in Dublin, the Chief Executive of the Highways Agency stated that it invested £ 200 million sterling in ITS in 2004 and expected to spend £ 300 million sterling on ITS in 2005. It is noteworthy that the investment emphasis in the UK and other Western European countries has been shifting from road infrastructure provision to operational management of existing infrastructure.

Another more robust question to ask is to what extent are ITS projects being evaluated from a policy perspective? What programme evaluation measures need to take place to assess the impact of ITS applications on transport policy? To what extent, if any, is there a direct causal relationship between the impact of the ITS project and the policy objective? Does ITS contribute to a more economic transport system? Is the task of facilitating safe, efficient and desirable travel reduced? Does ITS contribute to a more efficient transport system? Are barriers to mobility being removed? Does ITS contribute to a more sustainable transport system or is sustainability merely an indirect by-product of a more efficient transport system? Does ITS contribute to a more

²⁰ "European Transport Policy for 2010: time to decide"

²¹ National Audit Office, 26th November 2004, see www.nao.gov.uk

integrated transport system? Does ITS contribute to increased road safety?

Questions 17 and 18:

17: How important is ITS in delivering on transport policy?

18: Does ITS, relative to alternatives, deliver value for money? In responding, it would be useful to take into account the issue of 'optimism bias' by project promoter interests in undertaking investment appraisal and evaluation studies?

Delivery of ITS

How should ITS be best delivered in line with an emerging ITS strategy? The traditional approach would be to designate a public body as a delivery agent. However, ITS by its nature, involves multiple stakeholders. While current ITS applications are being championed by various public bodies, there is no one agency dominant.

Under the Roads Acts 1993-1998, the NRA has responsibility for the maintenance and management of national roads. This encompasses research such as the EU STREETWISE and INSTANT Projects. Under the Road Traffic Acts 1961-2004, local authorities have functions regarding traffic management and enforcement. Similarly under the Road Traffic Acts, An Garda Síochána have the primary traffic enforcement role. The DTO has an important role to play in developing surface transport strategy in the Greater Dublin Area. The current strategy "*A Platform for Change*" makes no explicit reference to ITS, though ITS applications are among its implementation programme measures. For example, "*develop a traffic management strategy for the Metropolitan Area and implement through an integrated traffic control system*", "*motorway management*", "*provide real time travel information system*", "*implement integrated ticketing*", etc. However the DTO is a co-ordinating rather than an implementing body and has a limited geographic remit. The Railway Procurement Agency has a mandate to deliver a multioperator system of integrated public transport ticketing. Its remit is limited by the Transport (Railway Infrastructure) Act 2001 to public transport services.

There are plans to establish a Road Safety Authority that will have a road safety remit encompassing driver testing, licensing and vehicle standards. In the context of Transport 21 there are also plans to develop a transport

authority for the Greater Dublin Area i.e. the proposed Dublin Transport Authority.

Assuming that there is no one body best placed to facilitate delivery of ITS projects, what structures need to be put in place to facilitate greater mutual awareness of initiatives and to promote delivery of cross cutting ITS applications involving more than one agency where data sharing needs to take place?

It is also important to note that there have been calls by ITS experts for a forum to facilitate greater mutual awareness of ITS initiatives.

Questions 19 and 20:

19: Are current structures suitable/unsuitable for rational and efficient deployment of ITS? Why?

20: Who should ensure delivery of any ITS strategy if multiple stakeholders are involved in implementation?

A National ITS Platform

Most developed countries²² have established ITS associations which appear to have transport policy as well as industrial policy and industry promotion remits.

The debate on the necessity for a national association to promote ITS, alternatively known as “ITS Ireland”, has been underway for over 4 years. A straw poll of academics, professional bodies, equipment suppliers, transport operators, local authorities, consultants, Government Departments and various public sector bodies, undertaken in late 2002, indicated overwhelming interest in such an initiative. Such a group could contribute to policy formulation on major ITS issues and also to the dissemination of information through effective outreach. Such a representative group would be well placed to advise on a suitable investment and regulatory framework for ITS developments and advise on the promotion and planning of new ITS projects and initiatives.

Any ITS group would need to address the needs for education, awareness, consensus building, standards implementation and policy input. It is unclear as to whether such a body would have a trade and industry remit:

²² United Kingdom, France, Belgium, Netherlands, Denmark, Sweden, Norway, Finland, Czech Republic, Hungary, Romania, Slovakia, Italy, Switzerland, Greece, Austria, Canada, United States, Australia, South Africa, Japan, Korea, Taiwan, China, Hong Kong, India, Singapore, Chile, Brazil.

such issues, if important, would need to be addressed to the Department of Enterprise, Trade and Employment and its agencies.

The following items are suggested, for discussion purposes, as Terms of Reference of a possible Irish platform on ITS:

- To promote, develop and agree a common and independent view of the benefits and functions of ITS emphasising:
 - the contribution that ITS can make to public authorities as transport and network operators with respect to efficiency and safety,
 - the partnerships involved in ITS.
- To advise Government on relevant technological, institutional, legal, societal and miscellaneous policy matters associated with ITS implementation.
- To advise on appropriate technical standards with the aim of ensuring interoperability and where possible harmonisation of systems on a national basis and, where desirable and necessary, interoperability with our neighbouring countries.
- To encourage participation and liaison with relevant technology fora in other European countries and internationally so as to effect a transfer, both to and from Ireland, of knowledge, skills and ideas.
- To promote research and educational activities.
- To advise and comment on national priorities on ITS and to promote an understanding of ITS issues and benefits.

Such a body could facilitate the development of a reference systems engineering approach to ITS in Ireland, thereby facilitating technical standards and technical interoperability between different organisations, i.e. architecture development for data exchange, communications protocols etc.

Question 21:

Is there a need for a formal Advisory Committee on ITS?

If yes, are the proposed terms of reference appropriate? How could they be amended?

Should such a body have an industrial policy and trade remit for Information Communications Technologies in transport?

Who should champion such an initiative?

Conclusion

The growing and strategic importance of ITS as a change agent in facilitating ongoing management of transport infrastructure does not appear to be widely understood in the transport sector in Ireland. It is difficult to reconcile the rhetoric of the need for a knowledge society and economy with the current poor state of knowledge on ITS. While construction will continue to play an important role in transport provision over the coming decade, it is entirely plausible that thereafter the focus on transport investment will move from infrastructure provision to smart or 'intelligent' management measures. However ITS is not the panacea for all transport problems and there are circumstances where ITS deployment will not manifestly achieve the required results that infrastructure provision could.

Question 22:

Are there any other views and comments that you wish to make about the development of ITS in Ireland?

The Department would be grateful if you would respond to this consultation on the development of ITS policy. It is important that there be an informed debate on the way forward in developing the Department's ITS strategy. It would be appreciated if you could respond in writing to:

Mr. Norman Elliott,
Department of Transport,
Transport House,
44 Kildare St.,
Dublin 2
email: normanelliott@transport.ie ,

by close of business on Friday, 21st July, 2006.

Annex 1: Subject Matter of Some ITS Standardisation Workgroups

European Committee for Standardisation (CEN) Technical Committee 278 “Road Transport and Traffic Telematics” Workgroups

Electronic Fee Collection and Access Control
Freight and Fleet Management Systems
Public transport
Traffic and Traveller Information
Geographic Road Data
Road Traffic Data
Dedicated Short Range Communications
Man-machine Interfaces
Automatic Vehicle Identification and Automatic Equipment Identification
Architecture and Terminology
After Theft Systems for the Recovery of Stolen vehicles

See www.cenorm.be for further information.

International Organisation for Standardisation (ISO) Technical Committee 204 “Intelligent Transport Systems” Workgroups

Architecture
Transport Information and Control Systems Database Technology
Automatic Vehicle and Equipment Identification
Fee and Toll Collection
General Fleet Management and Commercial/Freight
Public Transport/Emergency
Integrated Transport Information, Management and Control
Traveller Information Systems
Route Guidance and Navigation Systems
Vehicle/Roadway Warning and Control Systems
Dedicated Short Range Communications for Transport Information and Control Systems Applications
Wide Area Communications/Protocols and Interfaces

See www.iso.org for further information.

Annex 2: Some Definitions and Descriptions of ITS

As there is a lack of consensus on its scope and functionality, various bodies have differing interpretations on ITS. Below is just a sample of various definitions and descriptions of ITS in use. Definitions of ITS can be obtained from standardisation bodies, ITS national associations, Government ministries, road administrations, academics and various international professional bodies.

The Dublin City Council view is *"ITS involves the integrated application of a range of technologies – computer, sensor, electronics, communications – and management strategies to transport problems in order to increase the safety and efficiency of the surface transport system. Investment in ITS offers the potential of increasing the convenience, reliability and accessibility of all transport modes while also saving lives, time and money."* (Ref: ITS Conference and Exhibition 2002)

The **National Roads Authority** states that *"...ITS is commonly regarded as the application of modern computer and communications technologies in transportation systems, resulting in improved mobility, safety, air quality, productivity and information."* (Ref: The National Roads Authority Going Places ITS booklet)

The **United States** Federal Department of Transportation website includes the following statement on ITS: *"Intelligent transportation systems (ITS) encompass a broad range of wireless and wire line communications-based information and electronics technologies. When integrated into the transportation system's infrastructure, and in vehicles themselves, these technologies relieve congestion, improve safety and enhance American productivity."* See www.its.dot.gov/its_overview.htm

The New Zealand roads authority, Transit New Zealand describes ITS *"as the integrated application of advanced information, electronic, communications and other technologies to the management and operation of surface transport systems"*. (Ref: National State Highway ITS Strategy, May 2002)

Annex 3 List of Questions

1. Does the previous description accord with your understanding of the scope of ITS?
2. Does defining ITS matter? If so, is our definition adequate? If not, how would you go about defining ITS and what would be your definition?
3. Is Ireland best positioned to take advantage of ITS policy developments and initiatives in Europe and internationally?
4. Are designated national representatives adequately supported and informed and thus able to act in the interests of all stakeholders?
5. Are there other applications of ITS in Ireland today that are significant from a transport policy development perspective? If so, what are they and why are they important?
6. Do you agree/disagree with the hypotheses expressed regarding features of ITS applications in Ireland? Why?
7. Are there other attributes of ITS implementation that are material to transport policy development or to other public policies?
8. What should be the role of the Department regarding ITS?
9. In the context of Transport 21, how can ITS investments be effectively prioritised and mainstreamed?
10. How can our public bodies, in deploying ITS, respond effectively to the challenges of transport management?
11. Is there a need for an independent structure to both promote and openly challenge public bodies on the level of deployment of ITS?
12. Would a published ITS strategy and implementation plan under the Transport 21 framework provide the necessary impetus to deployment of ITS solutions?
13. In the context of the development of an ITS strategy, please identify, in order of priority, the most important deployments of ITS, that, in your opinion, need to take place in Ireland over the next few years? In answering this question please give reasons for your choice and for your priorities from a national policy perspective.
14. Would established structures that promote ITS also need to have direct transport user input? If so, how would this be achieved?
15. Does ITS have a role to play in facilitating behavioural change i.e. modal shift and intermodality (including Park and Ride) in urban transport and road safety?

16. Would a real time travel information service for road and public transport users deliver a safer and a more efficient transport system?
17. How important is ITS in delivering on transport policy?
18. Does ITS, relative to alternatives, deliver value for money? In responding, it would be useful to take into account the issue of 'optimism bias' by project promoter interests in undertaking investment appraisal and evaluation studies?
19. Are current structures suitable/unsuitable for rational and efficient deployment of ITS? Why?
20. Who should ensure delivery of any developed strategy if multiple stakeholders are involved in implementation?
21. Is there a need for a formal Advisory Committee on ITS? If yes, are the proposed terms of reference appropriate? How could they be amended? Should such a body have an industrial policy and trade remit for Information Communications Technologies in transport? Who should champion such an initiative?
22. Are there any other views and comments that you wish to make about the development of ITS in Ireland?

Annex 4: Glossary of Terms

ANPR:	Automatic Number Plate Recognition. It is a camera systems deploying ANPR capture vehicle registration plates for service provision (e.g. in car parks) or for regulation and enforcement purposes (e.g. speeding)
AVL:	Automatic Vehicle Location. AVL systems are used to identify the approximate geographic position of road and rail vehicles for fleet management purposes. Such systems use various positioning technologies such as satellite positioning, use of the vehicle odometer, inductive loops etc.
CEN:	European Committee for Standardisation. It is a standards body in Europe.
CTC:	Centralised Train Control.
DSRC:	Direct Short Range Communications. It is already in use in Ireland for electronic tolling. An on-board unit called a ‘tag’ in a motor vehicle communicates with roadside equipment using microwave or infra-red technology.
DTO:	Dublin Transportation Office. It is a public sector body under the ambit of the Department of Transport.
eCall:	Automatic emergency call technology. Upon collision, the vehicle automatically alerts the emergency services, it is being promoted by the European Commission and car manufacturers.
EFC:	Electronic Fee Collection. It is a charging mechanism for use of roads using electronics technology.
eSafety:	A joint initiative of the European Commission and vehicle manufacturing interests to deploy information communications technology in-vehicle so as to improve road safety.
EU:	European Union
ICT:	Information and Communications Technology.
INSTANT:	Information and Management System for Multimodal Transport. It is an ITS initiative focused on travel information on the Dublin-Belfast corridor involving both the National Roads Authority and the Northern Ireland Roads Service.
IST:	Information Society Technologies.
ISO:	International Organisation for Standardisation. It is a global standards body.

- ITS: Intelligent Transport Systems alternatively known as ‘Intelligent Transportation Systems’ or ‘Intelligent Transport Systems and Services’
- ITS ASSIST: It is a United Kingdom Department for Transport initiative to promote the use of ITS in local government in that country.
- NRA: National Roads Authority. It is a public sector body under the ambit of the Department of Transport.
- SCATS: Sydney Coordinated Adaptive Traffic System. Urban traffic control system in use by Dublin City Council and some other local authorities, it involves the use of adaptive computing to alter traffic signals at junctions so as to optimise traffic flow.
- SCOOT: Split Cycle Offset Optimization Technique. Urban traffic control system in use by Cork City Council, it involves the use of adaptive computing to alter traffic signals at junctions so as to optimise traffic flow.
- STREETWISE: Seamless Travel Environment for Efficient Transport in the Western Isles of Europe. It is a European Commission co-funded project, involving the National Roads Authority, aiming to provide seamless and effective travel information on major road networks (TEN-T) between the Republic of Ireland, Northern Ireland, Scotland, Wales and England.
- Tachonet: Telematics Network for the Exchange of Information Concerning the Issuing of Tachograph Cards. It acts as a central hub for the exchange of information between the national administrations responsible for issuing tachographs (in-vehicle recording equipment) in Europe to enforce rest periods and monitor the driving times of professional drivers.
- TRANSPORT DIRECT: It is an initiative of the United Kingdom Department for Transport to provide a comprehensive, easy-to-use multi-modal travel information and ticketing service in Great Britain. It covers walking, public transport, private car journeys and air travel.
- Transport 21: It is the Government’s transport capital investment framework for the next 10 years, launched on 1st November 2005.
- UTC: Urban Traffic Control: Such systems are in use by urban local authorities to improve traffic flow at road junctions.
- UK: United Kingdom

VMS: Variable Message Signs. These are electronic displays providing text and graphics based messages to passengers and drivers on roads and on public transport. They are intended to provide real time information to transport users.