



Research/cooperation needs for urban and regional network management and ITS

Position statement

What is this document?

This document provides an overview of the needs of local authorities (cities and regions) for research, cooperation and knowledge transfer in the area of transport network management and ITS. Network management, enabled by ITS, is an important task for local authorities and has spawned a large market for ITS systems and services, which is evolving rapidly. The purpose of this document is to promote understanding and awareness of the directions that local authorities would like to see ITS developments take to ensure they respond to their real and pressing network management needs.

The document comes in two parts: this first part describes the rationale, the approach and the main findings of the exercise; the second part (annexed) shows the many topics, in the form of a matrix, identified by Polis members (city and regional authorities). The document was compiled by the members of the Polis Traffic Efficiency and Mobility Working Group between June and November 2011.

Why was it compiled?

The European Union offers many opportunities for funding projects in the area of ITS. However, much of the funding goes to European projects which do not address the priorities of local authorities. The technology projects have tended to focus on cooperative systems, which will undoubtedly bring a revolution to traffic management in the future. However, the role of local authorities in many of these projects has remained limited. Outside of the cooperative systems projects, there is a great need for projects in the area of urban and regional network management and ITS, especially for non-technological projects which are particularly lacking even if it is widely acknowledged that the main ITS deployment challenges are of a non-technological nature.

The need for research and development in this area, to help local authorities manage their roads and wider transport network more efficiently and sustainably and to make better use of the supporting (ITS) systems, involve both technological development, eg, transport payment systems, real-time multi-modal information, more efficient use of existing ITS, and 'softer' matters, such as ITS impacts assessment, open ITS systems, integration, decision support, financing and legacy, among others.

Who are the target groups?

This document aims to provide an insight to the needs and expectations of local authorities for the development and deployment of ITS and the wider, more complex area of managing

multimodal transport networks. It should therefore appeal to a wide audience; however, it is particularly targeted at:

- European institutions, especially those bodies responsible for defining the priorities of the programmes offering funding opportunities for research, cooperation and knowledge transfer in the area of ITS and network management, notably FP7/FP8 Transport and ICT programmes, Competitiveness and Innovation Programme (ICT PSP and Steer programmes) and Interreg, among others.
- Traffic systems suppliers and ITS providers, with the expectation that future traffic systems and ITS developments will meet the evolving needs of local authorities.
- Local authorities (city and regional) to encourage them to be more vocal about their needs and priorities.

Why network management and ITS?

Network management is a concept far broader than traffic management in that it addresses the management of the full transport network and hence all modes, whereas traffic management is concerned mainly with the management of the (motorised) road network.

The shift from traffic management to wider network management is happening progressively in line with the greater emphasis given to sustainable modes and the environment in urban and regional transport policy. This policy shift has various consequences in terms of traffic management and ITS. Traffic management is no longer solely guided by the principles of maximum throughput at junctions and minimum travel delay. Priority for public transport and measures to protect and facilitate pedestrian and cycling traffic are being built into the traffic control systems. Faced with deteriorating air quality and increasing traffic-generated noise, there is also a growing interest in environment-responsive traffic control.

ITS is a widely-used term often employed and interpreted in a parochial way depending on the user/client group. For the motorway operator/authority, it is a tool to manage traffic, mainly through road-side information services (incident warning, speed limits, weather warnings, etc); for the car manufacturer, it covers on-board systems for the driver (mainly advanced driver assistance systems); and, for the ITS service providers, it often means information services (eg, satellite navigation). The reasonably new concept of cooperative vehicle-infrastructure systems is bringing all these components (infrastructure, on-board unit and nomadic device) together. In most of the above cases, ITS is developed primarily for car drivers and to a lesser extent for freight vehicles. Most action on ITS at European level, be it in terms of innovation, research or policy, tends to address this type of ITS.

For the local authority, however, ITS has a wider reach. It is of course an important tool for managing road traffic, but it also plays a crucial role in delivering multi-modal information services, transport payment systems and other mobility services, often with the aim of contributing towards seamless mobility and sustainable travel. For local authorities, therefore, ITS is a tool to support all transport modes (private car, freight vehicles, public transport, cyclists, pedestrians and new mobility services). A further distinguishing feature is the policy-driven nature of ITS deployment. Indeed, the priority given to sustainable modes in urban and regional transport policies in recent years has meant that most investment has likewise been directed towards ITS-enabled services such as public transport priority at traffic lights, real-time bus/tram departure information, multi-modal journey planners and electronic ticketing.



Why research and cooperation?

Technology development is far outpacing deployment, meaning that the gap between research and implementation is widening and local authorities are left wondering how to manage legacy systems, which solutions (technological and otherwise) are best suited to their needs and how to future proof the investments they do make. Research is needed to answer these questions and many others. In some cases, research in its strictest sense is not needed to address these issues. Learning from existing good (and bad) practice through structured knowledge transfer can also be effective. As they share common goals, are not competing with each other and do not have vested interests, local authorities tend to value opportunities to share experience in a peer-to-peer setting. There is clearly a strong need for projects on a wide-range of non-technological matters and these projects could play a role in bridging the gap between research and deployment.

While technology is not the main problem, this does not mean that local authorities do not have needs in the area of technological development. Indeed, there are many areas where development is needed in the transport sector and in other sectors which can be tapped into for the benefit of transport (eg, social media). In the current economic and financial climate, it is clear that cost-effective solutions or solutions making clear inroads towards policy goals are a prerequisite. In many cases, this means better utilisation and development of existing systems, as will be explained later.

Compilation of document

This position statement was produced between June and November 2011 by the Polis Traffic Efficiency & Mobility working Group, which is made up of representatives of city and regional authorities across Europe primarily, as well as some transport experts/researchers.

The topics presented in the matrix (in annex) have all been proposed by Polis members. A questionnaire was used as a basis for gathering the input. Polis members were invited to provide topics according to the categories proposed along the vertical axis.

The vertical axis is divided into the three tiers of network management: strategy is self-explanatory; the tactical level is the level at which choices are made on the measures to deliver the strategy (eg, bus priority at traffic lights, real-time passenger information, etc) and operations is concerned with the implementation of measures (through the traffic control centre for instance). The three tiers have been sub-divided into further categories, which broadly reflect the main tasks of each tier.

The headings in the horizontal axis emerged from an analysis of the submitted topics; they reflect the overarching themes guiding the (desired) future development of ITS and network management from the local authority perspective, namely, user devices, interfaces and applications (including mobile phones); increased value and further development of existing assets; integrated network management; and, open systems and data. It should be noted that some topics may fit under more than one heading.

The matrix enables the research and cooperation needs to be read by management task (eg, decision support) or by thematic heading (eg, integrated network management).

Interpreting the matrix

On the basis of density and spread of topics, the heading 'increased value and further development of existing assets' can be read as being the most popular. The substantial cuts

in public spending, induced by the dire economic and financial situation in Europe, is undoubtedly forcing local authorities to look at how to get more out of their existing systems. Today's public finance pressures have reinforced and accelerated a trend which had in fact already started some years ago. Even in times of growth, local authorities had started to look at how to use their existing systems more effectively.

Regarding the network management task, 'multimodality', 'decision support' and 'planning, legal and organisational aspects' are unsurprisingly the most populated with topics for research and cooperation.

- Transport networks are multi-modal by nature and multi-modal travel is an important aspiration of most public authorities. Indeed, multi-modality is central to the need for improved decision support.
- The concept of decision support has been gaining ground for many years, reflecting the shift in transport policy and the growing complexity of urban and regional transport networks. Decision support tools do exist, mostly in the form of transport and traffic models and simulation software. However, these are mostly offline tools and were developed primarily for motorised transport. Cities and regions today are interested in understanding more about other modes (pedestrians, public transport users and cyclists) and the interaction between them and motorised transport. Decision-support tools are also needed to improve traffic control in real-time, especially in the event of an incident.
- The third task 'planning, legal and organisational aspects' essentially reflects the changing role in service provision whereby commercial services are taking a stronger role and the public sector is becoming a data provider rather than a service provider.

The ITS Action Plan and Directive

The ITS Action Plan and Directive will impact on local and regional authorities, mainly in terms of publishing data about roads, regulations and traffic. One part of the Directive is concerned with creating a legal framework for publishing data in order to accelerate the development and deployment of commercial information services. This legal framework provides an opportunity for local authorities to review and streamline the systems and processes they have in place. However, it is important that the framework makes a distinction between data for information services and strategic data related to network priorities. Research leading to the development of guidelines and tools is needed to help local authorities fulfil the obligations emerging from the Directive, including:

- Cost-effective (IT) tools for the publication of new/amended road regulations and similar updates.
- Define set of minimum information (in relation to ITS Directive) that should not be required to be shared, eg, related to network priorities
- Certification (or guaranteed quality level) of data from external sources (GSM, navigation systems) for use in traffic management
- Development of European standards for traffic communications, building on UTMC and OCIT among other existing traffic protocols and user communities as well as accepted industrial protocols. Benefits would be to expand the supplier base for all member states and avoid single supplier lock-in.



Some selected projects

The matrix shows many topics for research and cooperation. In addition to these topics, several Polis members submitted concrete ideas for research projects, which are listed below.

1. ITS development for the application of mobile phone tracking for real-time situational awareness delivering improved knowledge of network performance and demand and allowing for intelligent interventions (including RTTI delivery – personalised / location base push technology – use of social media too). This would also have a positive impact on low cost detection technologies and applications for the future.
2. ITS technologies and trials in controlled urban areas based on technologies and applications that use wireless communications to provide connectivity (among vehicles of all types, between vehicles and roadway infrastructure, among vehicles, infrastructure and wireless consumer devices) with a possible link to the public transport operator on the same platform. The outcomes would be in improved safety, mobility and environment.
3. Demonstration of pollution-responsive dynamic traffic control system whereby multiple pollution monitoring sensors are linked with the adaptive control system and generate smooth traffic control strategies automatically.
4. Development of tools to model goods movement: Build up a model for movements of goods (as opposed to goods vehicles); this would include (i) data collection to generate typical demand for goods from specific land use types (schools, retail, pubs, housing etc.) so that the totality of goods can be quantified (ii) baseline monitoring of goods movements (for development types, or central city areas etc..) to understand how goods are shifted in year 1, year 2 etc. as well as the patterns across day, month, season etc. (iii) modelling for various scenarios (intensification of land use, new goods management initiatives etc.) to understand what needs to be done to maintain goods flows.
5. Study, development and deployment of Near Field Communication (NFC) solutions, to improve the passengers' multimodal experience, to make mobile payments possible and to enable enhanced real-time information through the combination of multimodal information.
6. Experimentation of a multimodal traveller information platform centralising public transport/road/bicycle data in a system providing various services: journey planner, traffic and travel information (including real-time) and cartographic representations (accessible through a mobile device).
7. Study, development and deployment of innovative services related to the design of efficient transport interchanges to enhance user accessibility: (i) integration of mobility services at Park & Ride (bike sharing, car sharing, carpooling, bicycles parking); (ii) optimisation of passenger mobility and simplification of trips at Park & Ride sites, improving accessibility and increasing travel information and signage (for disabled people) – notably through new technologies.
8. Experiment/pilot of energy re-use at the metro stops, notably for metro functioning and lighting, to lower CO2 emissions.

Further information

Please contact:

Suzanne Hoadley, Polis: shoadley@polisnetwork.eu