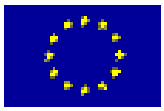

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CAPE Project
(TR 4101/ IN 4101)

SURVEY ON THE REQUIREMENTS AND FRAMEWORK FOR ENVIRONMENT AND TRANSPORT TELEMATICS IN CEEC (COUNTRY REPORTS)

DELIVERABLE D 2.2
(SUMMARY)

March 1999

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(SUMMARY)

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1 INTRODUCTION

CAPE (Co-ordinated Action for Pan-European Transport and Environment Telematics Implementation Support) is a European Union (EU) funded project that aims to encourage the greater use of telematics technologies in Western, Central and Eastern Europe.

One key objective of CAPE is to survey the needs and priorities among CEE and EU local and regional authorities for transport and environment telematics solutions.

Within Work Package 2 of the CAPE project a qualitative examination of the organisational, technical and legal frameworks for transport and environment telematics among local authorities and related policies and priorities has been realised for each of the EU accession countries (Country Reports), i.e. this document.

Additionally three quantitative (questionnaire) surveys of the status and priorities for telematics solutions in CEE and the EU were prepared[1]:

- Survey on Transport Telematics Applications in CEEC
- Survey on Environment Telematics Applications in CEEC
- Survey on Environment Telematics Applications in EU

The objective of this deliverable is to analyse the requirements and implementation framework of Environment and Transport Telematics in Central and East European Countries (CEEC). For each of the ten countries, national experts prepared a Country Report, including the following items:

- The structure of local government and responsibilities for transport and environmental policy
- Environment and transport problems and policy priorities
- Status of application of telematics (e.g. measures and obstacles to uptake)
- Possible framework for future solutions
- Recommendations

For each of the Country reports different national experts for the environment and the transport part were engaged.

These experts were selected by the Central European CAPE partners. While the experts on environment where chosen by the Regional Environmental Office (Sztendre/Hungary), the transport experts were selected by PPU/Babtie (Prague/Czech Republic) and GSF (Bucharest/Romania). All national experts were selected on the basis of the following criteria and in a competitive selection process:

- Local government experience
- Knowledge of Telematics/ IT issues
- Strong knowledge of the environment/ transport field

The Steering Group has confirmed their selection.

[1] Outside the CAPE project, two comparable surveys on general and transport telematics use are available from the European Digital Cities (EDC) project, another support action of the Telematics Application Programme of the EU.

The Country Reports were written in English in the period between October and December 1998. In order to ensure a high degree of comparability of the Country Reports, National Experts were given a very detailed outline structure for the Country Reports.

First drafts of the Country Reports were quality-controlled by the CAPE partners and sent back to the national experts for further revision. From January to March 1999 the final revision and editing of the Country reports was done by CAPE partners.

However, it was not always possible to get information on all the aspects requested in the outline. Due to the significant differences in economic and political development in the ten Central and East European Countries, the framework for the use of information and communication technologies varies considerably from one country to another. The editing of the Country reports was also dependent on the authors' specific expertise and on the information sources available. As a result some country reports focus on crucial aspects for each country/ area of the given outline.

As the transport parts were considered to be too heterogeneous, it was decided to provide additional information in table format, including multiple-choice questions on the importance of various transport problems, the status of technology implementation and the preparedness for telematics uptake. These tables are provided in Annex I.

2 OVERVIEW OF THE COUNTRY REPORTS

This overview describes the key findings of the Country Reports concerning environment and transport telematics. For both, the environment and transport side, this overview gives some general trends of most important problems and policy strategies. Moreover, it tries to summarise the status of telematics use and priorities, without giving detailed information on the development of telematics use in specific countries.

Additionally to this general overview, two tables for each country were provided, which give a short summary of the key findings of the environment and transport parts of the Country reports (Annex II).

2.1 ENVIRONMENT TELEMATICS IN CEE COUNTRIES

2.1.1 ASSESSEMENT OF THE STATE OF THE ENVIRONMENT

Natural Habitats, Biodiversity, Urban Environment

Most Central and East European countries have the benefit of large tracts of relatively unspoiled forests and other natural habitats. However, these are under pressure from economic change and development. The overall threat on biodiversity from human activities has generally increased

Driving forces are uniform and large-scale management of agriculture and forestry, fragmentation of the landscape, loading by chemicals, water extraction, disturbance, and influx of alien species. The development of urban areas is characterised by a continuous increase of the urban population. Mainly larger cities increasingly show signs of environmental stress like poor air quality, excessive noise, traffic congestion and the loss of green space. Many factors, especially from transport, are increasingly leading to a deterioration in the quality of life and human health.

Atmospheric Issues, Climate Change, Tropospheric Ozone and Summer Smog

Some reductions in emissions of sulphur dioxide, lead, ozone-depleting substances and greenhouse gases have been achieved, many of these reductions have resulted from the recent economic changes in the CEE countries, such as the closure of some heavy industries and the switch from coal or heavy oil to cleaner fuels. The energy supply sector is still the largest contributor to carbon dioxide emissions, but the contribution from the transport sector is increasing. In spite of the economic restructuring rising traffic levels are the main reason for a significant increase in emissions of ozone precursors which was observed during the last years throughout the ten reported countries. These circumstances frequently resulted in summer smog periods, caused by high tropospheric ozone concentrations. Especially the Southern countries where the solar radiation is higher - are facing problems which are posing a threat to human health and to vegetation. The country studies showed that the large potential for growth in private transport in CEE and in the NIS is likely to exacerbate the problem. For NO_x emissions from transport, environmental policy has not kept up with growth in transport use. Most cars, mainly imported from EU countries, are operated without catalystic converters. In combination with the use of low quality fuel the transport sector has become the dominant contributor to emissions of nitrogen oxides.

Water

In most of the CEE countries potential drinking water shortages persist, particularly around urban areas. Leakages from distribution systems in some countries and inefficient water use continues to be a problem. Concentrations of pesticides in groundwater commonly exceed EU admissible maximum concentrations and many countries report groundwater pollution by heavy metals, hydrocarbons and chlorinated hydrocarbons. Groundwater quality – and consequently human health – are often threatened by high concentrations of nitrate from agriculture and bacteriological pollution which are caused by the lack of sewage systems as well as by partly insufficient waste management or illegal dumping. Measures for improvements in groundwater qual-

ity will take many years to show results because of the time pollutants take to enter and move through groundwater. The problem of eutrophication of rivers, lakes, reservoirs and coastal and marine waters remains due to excessive nutrient levels. Water pollution is closely related to the lack or malfunction of sewage systems and waste management. The sewage of most of the smaller cities in CEE is discharged untreated and even some large cities treat only about 20 % of their sewage.

Waste

Waste management in most CEE countries continues to be dominated by using landfills as the cheapest available option. Priorities in CEE have shown generally improvement in municipal waste management through better separation of wastes and an improvement of landfill management. Introducing recycling initiatives at local level will be as necessary as closing and remediating illegal waste dumping sites.

Soil Degradation, Acidification, Man-Made and Natural Hazards

Salinisation and soil erosion by wind and water remain serious problems in many areas of the CEE and NIS countries. A large number of contaminated sites are in need of remediation, particularly sites of former military areas and sites with heavy industry. Better information about the large number of contaminated sites is needed to ascertain the extent of the problem. Some progress has been made in bringing the problem of acidification under control, mainly as a result of the continuous reduction of sulphur dioxide emissions.

The environment of the CEE countries and the NIS is also affected by infrequent damages from disasters with a climatological background such as floods, storm floods, forest fires and heavy snow storms or other extreme weather events. Industrial accidents caused by the use of insufficient technology and the danger of nuclear power plants - especially when they are located in seismically sensitive areas - can be seen as the main man-made hazards.

General Public Awareness

Bearing in mind the critical environmental situation in all countries it can be said that public awareness for environmental issues has increased in the last years but is still quite low compared to Western European countries. Some funds are made available for financing environmental education, for training programmes, and for the dissemination of basic environmental information to the public. Considerable gaps exist between the generally shared concern about the environment and between the willingness to act. Often local subdivisions of NGOs effectively are the only representation of public awareness in the field of environment.

2.1.2 STRATEGIES FOR ENVIRONMENTAL IMPROVEMENT

Law Enforcement and Policies on a National Level

The responsibility for law enforcement at the national level is mainly covered by a national government authority and/or an associated institution. In general, national regulations for environmental issues are heterogeneous and often do not seem to be harmonized. As a common problem some countries report, that the control of violence against the environment is poor due to the lack of personnel and insufficient monitoring capacities. Environmental pollution often has no high priority for legal action. It also turns out as a problem that national regulations have sometimes been approved under different political and economical conditions. This causes the legislative basis of some countries to include unrelated clauses - including the obstacles for executing the law.

Institutional Frameworks

New institutional and legislative frameworks for environmental protection have been created on regional level in most of the countries within the last years. This was often done in accordance with the radical changes necessary to meet the needs of the market economy. Apart from that, the co-operation within the administration is sometime less efficient and there are lacks of understanding potential benefits of cooperation between

municipalities. The newly built-up institutions are mainly reported as well organised and effective. There is a tendency to increase local autonomy through a co-operation between local environmental agencies, local authorities, and the private sector. The aim of institutional changes often is to have the protection of the environment in accordance with the standards of the European Union.

2.1.3 DATA AVAILABILITY AND PUBLIC ACCESS

Most environmental data is stored in different media-specific databases (e.g. air pollution sources, ambient air quality, sources of water pollution, water quality, data concerning landscape and general nature protection). In many cases this data is available only in paper form or in standalone non-state-of-the-art computers of different types, as it is reported from Bulgaria and Romania. On the other side e.g. Hungary has established an integrated GIS based IT system as the basis for a national environmental database. Some countries also provide a digital map for the spatial coverage of distributed data.

Public access to this data mainly depends on how the collected data is stored. In some cases, national institutions like Ministries of Environment already give access to environmental information via Internet which has become a widely used information tool in CEEC. Only a few countries report essential problems due to the lack of technical infrastructure. Other countries like Hungary are now relying on e-mail networks, e.g. Green Spider which is regularly used by more than 200 environmental protection NGOs for the dissemination of environmental information to the public. In Estonia for example about 50 telecottages have been established to link the most remote villages and towns, to provide local information, and assist municipalities in elaborating sustainable development plans.

2.1.4 TELEMATICS SYSTEMS AND TECHNOLOGIES

Air monitoring systems seem the most advanced telematics application in the CEEC. Most of these systems are used for observing urban air quality. Only a few air monitoring networks are observing the situation in so-called fresh-air areas or are integrated into a transboundary observation network. A similar situation exists in water monitoring systems. Some countries have even established a high density groundwater monitoring network. The observation of surface water is mainly done near big polluters or close to national borders. Most of the countries mention that transboundary water pollution is a main problem. However, there is only one multinational transboundary water monitoring network within the CEEC by now, the Transnational Monitoring Network (TNMN) within the Danube Pollution Reduction Programme.

Most of the gathered environmental data is stored in different and partly incompatible data bases, some of them in a specialised national format. Water quality data is partly stored in GIS compatible databases. GIS are also mainly used in the field of landscape and nature protection, for the documentation of contaminated sites. Remote sensing methods like the usage of satellite- and aero-photography are only used for specific areas and within projects of a special status (e.g. for forest monitoring or the Danube Delta Biosphere Reserve).

2.1.5 OBSTACLES TO TELEMATICS UPTAKE

As major obstacles for the uptake of telematics applications almost every country mentioned the lack of standardised technologies, the incompatibility of the collected and stored data and the lack of qualified staff. These obstacles are often closely linked to the problem of limited financial resources. Some countries pointed out that the only limited financial resources do not allow to keep experts in the administration and prevents the organisation from supplying regular training sessions for the staff.

2.1.6 GENERAL FRAMEWORK FOR FUTURE TELEMATICS SOLUTIONS

General Framework

The existing framework for future telematics solutions related to the environment sector is very heterogeneous within the ten countries covered by this survey. While some countries reported a relatively advanced and increasing use of telematics applications, others claimed telematics has no priority at the moment. In most of the countries the foundations for basic technologies for surveying the environmental conditions, for information and communication systems and for the collection and the presentation of data have been laid.

Generally speaking, it seems obvious that the principles for the development of telematics technologies have not been widely discussed. As a result, existing systems have been developed independently of each other and levels of technology use are very different. For the further implementation of telematics solutions a detailed analysis and discussion at the level of central and local governments about different systems and their usability will be necessary. Additionally, it is of paramount importance to ensure the compatibility of gathered data. This will help to save costs and will reduce the possibilities of mistakes and inefficient solutions.

2.1.7 FUTURE PRIORITIES OF TELEMATICS USE

Almost as homogeneous as the reported obstacles are the priorities named by the surveyed countries. GIS - based integrated IT systems, the completion of Local Area Networks and Intranet systems are considered to have a high priority. Beside this the optimisation of existing networks and monitoring systems and the extension of access to and use of the Internet also have a high priority. An appropriate infrastructure for collection and dissemination of environmental data with an approved and certified monitoring and modelling system, applications for emergency systems and decision support systems are also reported as future priorities. With regard to one of the main obstacles better skilled managers and qualified staff will be necessary for local and for governmental authorities to meet the future challenges of the implementation of telematics applications.

2.1.8 RECOMMENDATIONS

Up to now it seems that the use of telematics applications is often limited to a few specialised institutions. Therefore there is an obvious need to promote much more the potentials and advantages of telematics solutions. An appropriate approach would be to start with relevant activities applicable at local level involving competent institutes and local users of environmental information. These activities should include specific demonstration of meaningful applications with participation of one or more pilot municipalities as a means to see the actual results and benefits of telematics applications. Such projects could focus on any of the following issues:

- building community information systems to meet the needs of municipalities within a region;
- application of a telematics system for resource management (e.g. of the water supply);
- building local emergency support systems (for floods and industrial accidents);
- elaborating a Web based technology to provide a public accessible meta information system on environmental information.

Apart from the development of demonstrations there will also be a need to strengthen the organisational structure for environmental enforcement. Telematics can then be implemented as a fundamental tool for environmental management. There is also a definite need for modern monitoring, as often old and obsolete technologies are still relied upon in some countries. Also the standardisation of the format and procedures for data exchange has to be enforced. To ensure the development of compatible information systems it will be essential to include CEEC partners in international telematics projects including the Fifth Framework Programme of the European Union. In order to improve the quality and reliability of environmental data, it

would be helpful to establish an action program based on Good Practice experiences in the field of environmental telematics applications and data quality assurance systems.

There is a real need for public presentation of environmental data most cost-effectively by means of the Internet. The first steps have already been done and first web sites have been created. It is an important issue to enable free access to public data. If environmental data is not freely available, clear and simple procedures for obtaining the data have to be established. Public access to environmental information is also important to support environmental awareness and is able to promote broadly environmentally and socially friendly lifestyles and values. Telematics is known to play a key role in this domain.

For all surveyed countries an important driving force for future development of environmental policies is the objective to join the EU. Approximation of environment and communication legislation according to the EU requirements should stimulate development of environment telematics. An increased implementation of environmental telematics applications by local and regional authorities should be the result.

2.2 TRANSPORT TELEMATICS IN CEE COUNTRIES

2.2.1 TRANSPORT RELATED PROBLEMS AND DRIVING FORCES

The process of democratisation and economic reforms from 1989 onwards led to a considerable change of transport flows, since trade patterns in CEE countries were oriented more and more towards countries of the European Union.

Road transport has increased dramatically. The rising level of car ownership and traffic congestion have exceeded all earlier forecasts. Although the level of car use and traffic congestion has not yet reached Western levels, the negative effects of increased car traffic on the quality of life through time losses, accidents and environmental damage, are already realised. In cities, the growth of car traffic has been accelerated by the development of out of town retailers, such as hyper-markets. More and more commerce and housing areas are located at the periphery of towns, which are not always easily accessible by public transport. Car ownership is increasingly seen as a status symbol. As a consequence of growing car ownership, the use of public transport services will decline further. Additionally most of the large cities experience increasing freight transport, due to growing commercial activities. However rail still plays a far more important role in freight transport in Central and Eastern Europe than in the EU.

In all Central and East European Countries, the transport infrastructure reflects the effects of over 40 years of central planning, and the lack of investment. The density of the national public road networks and their quality are in general lagging far behind road network standards of EU countries. As many roads cannot stand the high volumes of traffic and the heavy weight of modern lorries, road networks are generally in a poor state.

Another major problem of CEE Countries is traffic safety. The rate of traffic accidents is generally much higher than that of EU countries. Cities in Central and Eastern Europe have considerably higher rates of fatal road accidents than cities in Western Europe.

The standard of public transport in the CEE region is often still at a high level. The scope, frequency, and punctuality are often superior to West European towns. However, the quality of vehicles is much poorer as is cleanliness and information provision. The public transport fleet tends to be old and inefficient. The old public transport vehicles (mainly buses) are characterised by high emission levels, overcrowding and deteriorating interiors.

The importance of railways is decreasing in all CEE countries and especially the future of many rural lines is uncertain. Not surprisingly, the frequency of services and therefore the overall attractiveness of public transport to users has declined. In addition, many public transport operators have increased fares.

2.2.2 TRANSPORT STRATEGIES

All CEE countries have supported the process of privatisation of transport companies. Not only bus companies have been privatised, but also on national railways the access of some new private operators has been facilitated. On the national road networks the number of Concession Companies that are operating toll highways is increasing.

A key objective of national transport policies of CEE countries is to increase the competitiveness and accessibility of their economies to the European Union. National transport policies of CEE countries mainly focus on the new construction of motorways for international corridors and the upgrading of national routes between larger cities. The aim is to improve the integration in the Trans-European Road networks. Large sums of money have been devoted to motorway programmes.

As regards rail transport national transport authorities are aiming at improving European Transport Corridors. The development of the rail network focuses on increasing line speeds on main connections.

At national level there is in general a lack of transportation policies for cities and urban agglomerations.

Regional and local level transportation policies however are often non-existent with the exception of large cities who have defined local transportation plans. In the past, local transport policy mainly consisted in maintaining the local road network and operating public transport services.

In the early nineties cities had to face new transport problems. As a consequence of the increase of car ownership, traffic congestion and pollution appeared more often and public transport use was declining rapidly. Public transport companies had to adjust their services to lower demand. Cities have started to realise, that the extension of road infrastructure is not a viable option to solve urban transport problems. In many urban areas now future strategies aim at slowing down the increase of individual traffic and reversing the existing trends of declining public transport demand. Measures for public transport priority, renewal of the public transport rolling stock and track rehabilitation or modernising ticketing systems are becoming more and more appreciated. Along with the promotion of public transport systems, cities are increasingly aware of the importance of restrictive physical, fiscal and legal measures to constrain road traffic (traffic calming, parking management, etc.). The implementation level of these measures however is still very low.

2.2.3 BASIC TECHNOLOGIES AND DATA AVAILABILITY

All CEE countries have experienced a fast development of basic information and communication technologies, such as computer networks. Computer equipment, e-mail and Internet are available, but not yet widely used in business and administration. The availability of computers in households is still extremely limited.

The collection of data on road and traffic parameters or on meteorological conditions linked with centres of traffic control are mostly realised at the national level only. Data collection at national level mainly includes data on transport infrastructure and volumes and flows of all transport modes, fuel consumption and environmental effects. Traffic volumes on national motorways is already often measured electronically by induction loops. Especially for road traffic accidents data availability is in general very good. Police departments or road traffic safety directorates have often created vehicle, driver and accident data bases for the national road network.

The level of transport-related data availability in CEEC authorities is largely dependent on city size. The largest cities, mainly capitals often already have a good standard of data bases using modern technology. The situation of data availability is very low in small and medium sized towns, where staff is not as well trained as in larger cities. Data on road and public transport, or traffic pollution are available in some bigger cities, but are not common.

A number of large cities generate data from passenger surveys, traffic counts or map network data for modelling the transport situation. In most CEE countries data monitoring and evaluation of traffic volumes is

achieved through manual counting. Telematics-based traffic counting for modelling purposes is rarely used. Only in Lithuania, Slovenia and in Czech Republic (in large cities) electronic traffic counting is commonly used. Computer technology is mainly applied to store and process data mostly for static modelling based on one-off sampling. Advanced modelling (e.g. simulations, real-time data) is not common. Again in Lithuania and Slovenia advanced modelling already seems to be more advanced than in other CEE countries.

2.2.4 TELEMATICS SYSTEMS AND TECHNOLOGIES

In many, especially larger, cities, integrated traffic control and management systems are under study. Only very few cities have reached the level of implementation, where strategies for integrated traffic control, public transport priorities and incident and emergency management are already in operation.

Larger cities in Central and Eastern Europe generally are modelling their transport network and are practising centralised traffic signal control (green wave co-ordination on fixed traffic light plans). Dynamic signal control is only used in a few, mainly large cities.

VMS are already in use on some state roads, mainly to indicate permitted speed and weather conditions (Czech Republic, Slovenia, Hungary), but not in urban contexts with very few exceptions (e.g. Prague).

In general, modern incident and emergency management solutions are almost non-existent. Some countries have installed telephone posts, situated along the motorways.

There is only little done for parking management, although parking is a main issue in almost every city, particularly in large ones. In general no real-time occupancy data is available.

There is generally no use of information technologies for access control and fee collection. In cities, where traffic flows in certain areas are controlled by charging fees, these fees are collected manually (e.g. Tallinn). Slovenia however was the first Central European country which decided to stop manual toll collection and establish a Electronic Toll Collection (ETC) System.

In recent years the quality of traveller and driver information has increased. The radio is generally recognised as a very effective mode of driver information. In most CEE countries, National Traffic Control Centres are transferring information on traffic jams, weather and road conditions and sometimes on air pollution to radio stations. A growing number of public transport operators present (fixed) timetables and a scheme of routes at stops and terminals. Some operators already provide information on public transport on the Internet (Czech Republic). Real-time information at stops is very rare.

With regard to public transport, the use of telematics applications is very low. Automatic Vehicle Monitoring Systems and priority measures are only rarely implemented. In addition to this, most public transport providers are missing basic data on public transport use. Sometimes control checks are made on vehicles, but usually in the form of individual vehicle estimates. In general telephone or Internet ticket booking and payment technology are not existent for any type of public transport. Tickets must be booked and purchased in person at station or ticket agencies. However static public transport time table information mostly exists. Travellers can often get substantial information on the whole trip in advance (e.g. time table information). Only in a few places (e.g. Prague) the real time situation of public transport vehicles can be read on electronic signboards (VMS).

The basic conditions for using GPS technology are often missing, because the digitalisation of city maps is not existing or is incomplete. For a number of cities maps are available, but real usage is exceptional. However, to a certain extend, mainly private companies are working on advanced modelling and simulation techniques (GPS) to forecast public transport and traffic flows. The level of implementation of such projects however, is low.

2.2.5 OBSTACLES TO TELEMATICS UPTAKE

Obstacles to telematics uptake are quite similar in all CEE countries. The major obstacle to a more widespread use of telematics applications is the lack of funding. The limited funds for transport infrastructure in Central and East European States are mainly needed for the reconstruction, improvement and maintenance of basic transport infrastructure (roads and railways), for new vehicles or for subsidies to cover operating costs. Awareness of the advantages of advanced information and communication technologies for the transport field is limited due to the fact, that the effects and benefits of telematics use is difficult to measure in short term. Technological solutions are often considered to be expensive and ineffective. As a result, investments in telematics applications are mostly not seen as a first priority.

Other important obstacles are the lack of qualified staff and institutional problems. The low incomes in public administrations has led to a "brain drain" of young and qualified staff to the private sector. As a consequence there is a lower level of expertise at technical and management executive level in public institutions. The implementation of modern information technologies is often hindered by inefficient co-ordination of the institutions involved.

2.2.6 GENERAL FRAMEWORK FOR FUTURE TELEMATICS SOLUTIONS

The general level of telematics implementation is low, especially in Latvia and Estonia. In terms of basic technical infrastructure (level of communication and computerisation) for telematics uptake, only countries like Czech Republic, Slovenia and Lithuania have a sufficient standard. The existence of local private sector suppliers, support and services has improved. Slovakia, Czech Republic, Slovenia, Lithuania and Estonia are those countries with a satisfactory standard in this respect. The technical expertise on telematics applications needs improvement in almost all countries. Training sessions on telematics applications are either not existing or are organised only very rarely.

A key condition for better transport telematics uptake is seen in the improvement of the overall management and co-operation between the transport authorities. In order to ensure well-managed and effective investments in transport infrastructure, the responsibilities of the institutions involved must be regulated and all strategic and financial decisions must be better co-ordinated. Many countries see the demand to develop a national programme for telematics.

Moreover, it is considered essential to provide and institutionalise education and training in telematics and technology management and to encourage information sharing and know-how transfer between all levels of transport organisations.

Another very important task authorities have to face is to provide for appropriate technical, commercial and legal frameworks for public-private partnerships (PPP).

When strategies for a better transport telematics uptake are developed, pilot projects should be implemented so that the cost and benefits of different telematics applications can be clearly demonstrated. Partners from locally managing organisations should be involved in the early stages and during the implementation of the projects and information dissemination.

Central and East European authorities are becoming more and more aware of the need for an integrated transport policy and its importance for ensuring a better quality of life, including environmental improvements. In order to find the appropriate solutions of traffic management, CEE authorities are starting to realise, that they have to consider the behaviour of transport network users and the multi-facetted sources of urban traffic problems.

2.2.7 FUTURE PRIORITIES OF TELEMATICS USE

CEE authorities however conceive the growing importance of modern technologies in all fields of transport planning and management. Telematics is increasingly seen as a useful tool to support the analysis of actual conditions of road and public transport networks and to develop scenarios of how to improve these networks in the most effective way. Telematics is considered to be a key factor for better control and management of traffic flows. However, clear ideas on the major future priorities for telematics use usually do not formally exist.

A number of cities would like to improve their data collection systems. A key element for collective and individual traffic control systems is the implementation of traffic data collection systems and centralised data bases. These systems shall include records from road inspectors, information about ongoing and expected road works, police accident records, traffic signal and sign inventory data. Furthermore they should comprise information on traffic intensity, speed, congestion and pollution as well as data on public transport vehicles in traffic streams and actual vs. scheduled position. A modern traffic data collection system should also provide for better traffic management and control and for transport and urban planning.

Additionally, cities often have the intention to provide real-time information on car traffic and public transport flow.

The wider implementation of GIS technology for traffic monitoring often is a high priority.

The highest demand of transport telematics systems in the next years might arise for some basic applications of traffic management. For many cities there seems to be a clear demand for centralised and flexible traffic signal control systems, which allow the introduction of "green-wave sequences" or "priorities for public transportation modes". For reasons of road safety and in order to reduce congestion, a number of cities is interested in using VMS which can provide real-time information on traffic incidents and speed limits. With respect to the increasing parking problems in cities, the interest for telematics systems for managing parking spaces is very likely to increase in future. In a few cities a discussion about the implementation of electronic fee collection systems for entering or parking in a limited zone has started.

Moreover many cities seem to have a high demand for applications in the area of public transport vehicle control and monitoring. The benefit of telematics arising from improvement of public transport scheduling and provision of real-time information at stops and stations is considered to be very high.

The use of modern technologies for electronic ticketing and fare collection is seen to be very effective, but the implementation of smart cards is not of high priority, due to perceived high costs.

ANNEXES

I SUMMARY OF KEY RESULTS

Part A: Transport

Part B: Environment

II OVERVIEW (TRANSPORT) OF

- Problems
- Technologies implemented so far
- Preparedness for telematics uptake

ANNEX I – SUMMARY OF KEY RESULTS

PART A: TRANSPORT

	Major local transport problems and driving forces	Transport related data availability	Network and traffic management	Traveller and driver information	Framework for future telematics solutions	Future priority systems
Bulgaria	▪ High volumes of car traffic especially in large cities ▪ Bad road network conditions ▪ Substantial parking problems, especially in Sofia ▪ Low quality of rolling stock of public transport	▪ Manual traffic counting is commonly practised at local level, whereas electronic traffic counting is only used on national motorways ▪ Static traffic modelling can only be found in larger cities ▪ In larger cities several stations for air pollution monitoring can be found	▪ Systems for real-time traffic monitoring and control (green wave systems) have been partly implemented in Sofia and other large cities ▪ Automated tolling for parking is used in some bigger cities ▪ Incident and emergency management on motorways by means of telephone posts ▪ A radio-relay system for the positioning of buses has been developed in Sofia ▪ GPS is used by SOMAT, the largest Bulgarian freight carrier	▪ National information system of the Automobile Transport Control Office and the General Road Administration transfers information on road conditions to the national radio station and other stations	▪ Lack of funds ▪ Bad co-ordination of the institutions involved ▪ Low awareness and knowledge of telematics use	▪ Specialised national radio information systems ▪ Modern information systems in railway stations and airports ▪ Modernisation of existing and introduction of new systems for transport positioning in railway and automobile transport ▪ Automated toll collection on highways and parking lots

	Major local transport problems and driving forces	Transport related data availability	Network and traffic management	Traveller and driver information	Framework for future telematics solutions	Future priority systems
Czech Republic	▪ Heavy traffic congestion in larger cities ▪ Quality of bus and tram services is deteriorating ▪ Bad condition of road surfaces ▪ High accident rates (especially in Prague) ▪	▪ For data monitoring and evaluation of traffic volumes, mainly manual traffic counting is used ▪ Electronic traffic counting is only rarely used ▪ Vehicle detectors are mainly used on motorways and at some main traffic light junctions ▪ Static modelling is often in practice ▪	▪ Traffic management with real-time information is not used with the exception of the Prague City Control centre: manual central control of some city traffic lights on the basis of camera information ▪ Green-wave co-ordination of fixed traffic light plans is commonly used, but no dynamic light control ▪ VMS use only in connection with speed control or information on weather conditions ▪ Traffic pollution monitoring exists, but not followed in real-time ▪ Public transport priority at intersections is only rarely used in Prague (only for certain tram lines)	▪ Traffic Information (congestion, road works, accidents) is provided by state broadcast on the traffic situation in the state network ▪ In the city of Zlin there is and advanced system of electronic public transport information at stops ▪ In newer Prague trams and buses, digital information on the next stop is provided on screens ▪ National railway and bus timetable searching is possible via Internet ▪ The first on-line time table systems of public transport were installed recently ▪ No telephone or internet ticket booking and payment technology	▪ Technical requirements for telematics uptake are basically in place ▪ Too little basic public and political awareness of the need for integrated solutions ▪ Lack of public funding ▪ Low level of expertise in applying telematics	▪ More basic electronic data collection infrastructure ▪ Monitoring of transport volume in real time ▪ Dynamic traffic light control and public transport priority ▪ Real-time information for passengers of public transport both at stops and in-vehicle ▪ Information on parking places occupation in real time ▪ Real-time monitoring of vehicle pollution ▪ Electronic time tables ▪ Radar and speed cameras on busy and sensitive sections ▪

	Major local transport problems and driving forces	Transport related data availability	Network and traffic management	Traveller and driver information	Framework for future telematics solutions	Future priority systems
Estonia	▪ Public transport supply and demand has decreased and private transport increased ▪ High pollution and congestion in larger cities ▪ Poor road quality ▪ High traffic accident rates ▪	▪ Local authorities generally collect transport related data by manual data counting ▪ Only the city of Tallinn partly is gathering data by electronic data counting Advanced modelling of traffic data can only be found in Tallinn ▪ Traffic pollution is monitored in real-time in the centre of Tallinn ▪	▪ In some places in Tallinn green wave traffic light control is implemented ▪ Apart from "green waves" telematics systems for network and traffic management and public transport monitoring are not is use, but are planned ▪ Traffic pollution monitoring is used in Tallinn	▪ Traffic information centres (reported by radio stations) ▪ For public transport travellers there are timetables in bus stops and at the Internet homepage of Tallinn, Tartu and other cities ▪ No real time information on public transport is available	▪ Low awareness concerning benefits of telematics: new vehicles and subsidies to cover operating costs seem to be more important than telematics use ▪ Public-private-partnership is weak ▪ Low co-operation between local and regional authorities	▪ Traffic control centre in Tallinn ▪ In Tallinn the use of telematics for public transport management is planned ▪ Parking management ▪ In Tallinn it is planned to collect parking fees by smart card ▪ Traffic pollution monitoring ▪ Traffic safety monitoring

	Major local transport problems and driving forces	Transport related data availability	Network and traffic management	Traveller and driver information	Framework for future telematics solutions	Future priority systems
Hungary	▪ High increase of traffic volume ▪ Low quality of road network and railway infrastructure ▪ Rolling stock of public transport is very old ▪ Low quality of public transport services ▪ High annual rate of road accidents, although it has been declining over the last years	▪ Electronic traffic counting can be found in major cities and on national motorways ▪ Transport information databases are in function in larger cities ▪ Data on traffic volumes of the trunk road network is recorded; count stations are located at the densest cross sections of the main roads ▪ Most developed systems are located in Budapest: Traffic data is collected in real time by inductive loops; there is a central database storing the data of the most important locations ▪ Central database for the national road network (TUTORG) ▪ Regional and local Police Department register personal injury accident records in local database	▪ In major cities signal-controlled junctions are connected to Control Centres ▪ Green wave traffic light systems are commonly used ▪ Little done for parking management; Park and Ride facilities are not controlled electronically ▪ Budapest public transport system: Vehicles running on the most frequent lines are monitored by Automatic Vehicle Monitoring System ▪ Freight transport management is supported by GPS	▪ Traffic control centre gives information for drivers on highway ring road (MARABU) via VMS ▪ Information on public transport timetable is available on Internet	▪ Significant backlog in the information infrastructure ▪ Little knowledge about the advantages of advanced telematics solutions	▪ Centralised traffic data collection systems ▪ Electronic fee collection ▪ Parking management and driver Information via VMS ▪ Travel information systems and real-time information at stops and stations ▪ Electronic ticket validation and fare collection ▪ Better use of GIS technology

	Major local transport problems and driving forces	Transport related data availability	Network and traffic management	Traveller and driver information	Framework for future telematics solutions	Future priority systems
Latvia	▪ Serious congestion and parking problems in Riga and other large cities ▪ High road traffic accident rates ▪	▪ Local authorities are commonly practising manual traffic counting (rolling stock and time tables of public transport) ▪ Automatic data collection is used on national motorways; today traffic data collection is carried out by modern pressure detectors ▪ Road Traffic Safety directorate has created vehicle, drivers and accidents databases for the national road network ▪ Real time data is only available at "Latvian Railways"	▪ Riga has a special Traffic control centre, which offers some "green wave" sequences and dynamic traffic lights on some central streets in Riga ▪ Public transport priority at intersections does not exist, except for trams ▪ Parking management exists; ideas on P&R have not yet been implemented ▪ Toll ring in Riga, where money is collected manually	▪ In rural areas information on weather conditions is sent to local road maintenance units ▪ Time table of Riga Central railway station is shown on electronic signboards via VMS ▪ Collective roadside information for drivers does not exist ▪ Traffic pollution monitoring/ forcecasting and information service in Riga; information is broadcast on radio and TV	▪ Reconstruction, improvement and maintenance of infrastructure is considered to be much more important than telematics use ▪ Lack of financing for a better telematics uptake	▪ Centralised traffic control in Riga ▪ Bus priority system and advanced vehicle scheduling and control ▪ Emergency management ▪ Commercial freight and fleet management ▪

	Major local transport problems and driving forces	Transport related data availability	Network and traffic management	Traveller and driver information	Framework for future telematics solutions	Future priority systems
Lithuania	▪ Rapid growth of motorised traffic ▪ Low quality of rolling stock ▪ Parking problems and congestion only in larger cities ▪ Heavy through traffic and high emissions in Vilnius ▪	▪ Data collection at local level is mainly done by manual traffic counting ▪ Municipalities and public transport companies are organising their own traffic and passenger flow surveys ▪ Ministry of Transport has created a transport database: data is available on transport volumes, transport costs, accidents, fuel consumption, environmental effects ▪ Until now there is no integrated transport data collection system	▪ In Vilnius there are some isolated applications of green waves and some dynamic management of traffic lights ▪ In some large cities (Kaunas, Vilnius, Klaipeda) some basic incident and emergency management can be found ▪ VMS are in use at state roads ▪ Advanced modelling and simulation techniques to forecast traffic flows, noise and air pollution are partly used in large cities	▪ Automatic traffic data collection system on motorways provides information on road conditions, which is accessible on teletext pages ▪ In future information on road conditions will be available on Internet	▪ Telematics use has only low political priority ▪ Lack of funding	▪ Creation of transport control and information centres that collect and process transport related data ▪ Public transport vehicle scheduling, control and information systems ▪ Parking management systems ▪ Real-time information on traffic pollution

	Major local transport problems and driving forces	Transport related data availability	Network and traffic management	Traveller and driver information	Framework for future telematics solutions	Future priority systems
Poland	▪ High increase in traffic volume, especially in large cities ▪ Low parking space availability in large cities ▪ Poor road quality ▪ Level of public transport service has diminished ▪ Very high accident rate and high number of fatalities	▪ Traffic data at local level is commonly collected by manual traffic counting ▪ Electronic traffic counting is only rarely used ▪ Traffic information databases are basically in place	▪ Only a few towns have developed traffic and road networks management (Poznan, Warsaw) ▪ Dynamic response traffic lights and "green wave" systems can be found in many places ▪ Public transport priorities exists only in a few cities (Czestochowa) ▪ There is only little done for parking management; advanced parking management solutions are rare ▪ Incident and emergency management solutions are very limited ▪ In some cities dynamic vehicle information systems are installed in modern buses and tramways ▪ GPS is commonly used for goods transport management ▪ Real-time pollution and forecasting exists in some larger cities	▪ Practically all public transport operators present fixed time tables and schemes of routes in stops and terminals ▪ Road user information for drivers is transferred via radio, TV ▪ VMS are used, but not very often ▪ Real-time transportation information at stops will soon be announced in Warsaw	▪ General lack of funds ▪ Low level of awareness ▪ Poor development of telecommunication networks ▪ Services should be low cost and simple ▪ High demand for information on how to apply telematics systems	▪ Realisation of studies on the development of road and public transport networks and cost-benefit analysis of investment in transport infrastructure ▪ Traffic control and parking management systems in big agglomerations ▪ Public transport priority at intersections ▪ Dispatcher control systems on public transport routes ▪ GPS in public transport management ▪ Passenger and traffic information systems ▪

	Major local transport problems and driving forces	Transport related data availability	Network and traffic management	Traveller and driver information	Framework for future telematics solutions	Future priority systems
Romania	▪ Traffic congestion and parking problems in Bucharest and other large cities ▪ Very poor conditions of the rolling stock ▪ High road accident rates	▪ Transport information databases are generally available for all main operators and transport authorities; these refer to the infrastructure, transport volumes and flows ▪ Traffic data is mainly collected by periodically performed manual traffic counting ▪ Electronic traffic counting is only at the beginning	▪ Traffic control can be found in a few large cities ▪ Public transport traffic light priority is used in large cities ▪ No telematics tools for parking management are available ▪ Pollution monitoring is only performed in a few cities ▪ For railways and underground public transport, traffic control is carried out through dispatcher facilities, equipped with old technology ▪ Systems only exist in air and sea transport	▪ Information systems for passengers and drivers do not exists, but are planned ▪ Some information on traffic conditions, etc. is disseminated via radio/TV ▪ Timetables are available on internet	▪ Low awareness of benefits of telematics applications ▪ Lack of qualified staff ▪ Lack of funding ▪ Lack of public-private-partnership ▪ New organisation for the implementation of Intelligent Transport Systems was founded; it focuses on supporting the research and development of telematics applications, raising awareness on the benefits of ITS	▪ Information systems for travellers and drivers are under study ▪ Public transport vehicle scheduling and control ▪ Real-time information on traffic pollution ▪ Parking management

	Major local transport problems and driving forces	Transport related data availability	Network and traffic management	Traveller and driver information	Framework for future telematics solutions	Future priority systems
Slovak Republic	▪ Congestion and high emission rates, especially in large cities, like Bratislava and Kosice ▪ Low standard of rolling stock ▪ Low traffic safety	▪ Manual traffic counting is commonly used at local level ▪ Electronic traffic counting can be found in large cities ▪ Slovak road administration measures electronically traffic volumes on motorways and main roads (in real-time)	▪ Integrated traffic control system are used in some larger cities: ▪ Each important junction is equipped either with traffic lights or any other automatic electronic controlling equipment ▪ Green wave traffic light systems exist in large cities ▪ Incident and emergency management is functioning well, but does not use telematics ▪ Parking management and P&R is not used frequently and has no telematics use ▪ Traffic pollution is only monitored in large cities ▪ Electronic system of fee collection on motorways is in preparation ▪ Measures of access control and traffic calming have been implemented (pedestrian zones, use of humps) ▪ Public transport priority does not exist, except for trams	▪ For road transport the so called "Stella service" provides information on traffic conditions in case of either traffic accidents, modifications or congestion; this information is provided by radio or TV ▪ Slovak road administration is developing a unified information system ▪ Only in some places VMS offer real-time information ▪ ▪	▪ Basic framework, skills and infrastructure are in place ▪ Lack of financial resources ▪ Inefficient institutions ▪ There is no immediate need for advanced telematics application ▪ There is a need to analyse the cost-effectiveness and operational impact of existing telematics solutions	▪ Development of data measuring technology on the road network and corresponding information systems ▪ Public transport management systems, including public transport priority and electronic provision of time schedules ▪

	Major local transport problems and driving forces	Transport related data availability	Network and traffic management	Traveller and driver information	Framework for future telematics solutions	Future priority systems
Slovenia	▪ Transport network overburdened ▪ Air and noise pollution and congestion in large cities ▪ Maintenance of existing magistral and regional roads is rather poor. ▪ Bad parking conditions in larger cities ▪ High accident rates	▪ Transport information databases are commonly available ▪ Data collection includes data on freight and passenger transport, transport volumes, accidents, fuel consumption, environmental effects, etc. ▪ Manual and electronic traffic countring as well as passenger movement surveys are commonly used ▪ Advanced modelling and simulation techniques have already been used	▪ Network and traffic management is implemented in bigger cities (Ljubljana, Maribor, Celje, Koper) ▪ This includes: integrated traffic control, public transport priority, traffic information centres, incident and emergency management ▪ Automated detection, control of incidents and parking management solutions exist, but are not so far implemented ▪ There is no real-time monitoring and forecasting of traffic pollution ▪ Automatic Toll collection system has been implemented on the motorways. Slovenia was the first Central European country which decided to establish a Electronic Toll Collection System ▪ GPS for public transport vehicle location is used in large cities	▪ Traveller and driver information is available at national motorway association (AMZS), but not yet in electronic form ▪ For public transport there is an overall vehicle schedule available, but not in electronic form	▪ Technical requirements for telematics uptake are basically in place ▪ At present not yet a high need for an immense telematics uptake, but in future ITS will be needed ▪ Low qualification of staff ▪ Weak instituional framework and low capacity of management and administration ▪ European standards for basic technology systems might cause some difficulties ▪ Already tried systems and system elements of software must be coordinated	▪ Public transport vehicle scheduling and control ▪ Real-time information on traffic pollution ▪ Electronic signboards ▪ Parking management systems

PART B: ENVIRONMENT TELEMATICS

	State of the Environment	Environment related data availability	Public access	Status of technology use	Requirements, general framework	Obstacles	Priority systems and applications
Bulgaria	▪ Natural Habitats Outstanding diversity flora and fauna; some old woods, rare flora and fauna habitat places are endangered by human increasing human activities and mining. ▪ Air Some places with permanent or periodical vitiation of the air quality are mainly the regions with developed industry but decreasing levels SO_2, CO_2, NO_X ▪ Water Particularly critical situation for some rivers Black-Sea region is generally in a better condition compared to the rivers, decreasing pollution by untreated sewage ▪ Soil Acidification near to heavy industry, chemical plants, and mining places; humus layer wash-out, wind erosion; pesticides. Soil pollution mainly by lead and phenols caused by the dangerous waste of industry. Domestic waste causes also soil problems in case of landfills. Better situation in remote areas	▪ Data of air emission are collected through mainly manually operated monitoring stations. ▪ Information is sent via telex to the National Centre of Sustainable Development. Water quantity monitoring network combines rainfall and hydrological stations. ▪ Data collection is mainly used for meteorological forecast an not available for public or local government administration. ▪ No national or local databases on waste	▪ The access to databases of MoEW for the general public is difficult, their completeness is not warranted enough. Some offices have installed GIS, but its environmental use is absent. ▪ No system for electronic exchange of professional issues, except limited access to Internet.	▪ Field-monitoring stations and laboratory measuring and analytical devices are in use. ▪ Aero-photographic and other distant measuring methods are practically not in use.	▪ At the national government level does exist an understanding of the necessity for building advanced information systems based on new technologies. Environmental issues as well as the information technology issues are therefore of high priority. ▪ Bulgaria was specialised in electronics within the former COMECON Union for Economic Assistance, there are many specialists within the field well-qualified to work with telematics systems. ▪ The existing telecommunications infrastructure, although rapidly developing, is still hindered by poor telecommunications links a result of obsolete equipment and systems.	▪ There are no data exchange networks between many of the above institutions and administrations. Where information is needed it must ALSO be requested by an official letter. ▪ Most probably, however, the lack of regular information exchange is due to insufficient financial resources and also limited knowledge and a lack of understanding as to the advantages of modern information systems.	▪ extend access and use of Internet within the institutions of public administration, and to the public on the other; ▪ optimisation of the existing network of measuring points and automatic stations on air quality; building local networks for data processing and dissemination; ▪ structuring and integration of databases on water management (particularly that information collected and stored by many different institutions); ▪ use of GIS applications for managing the environment (at the national level).

	State of the Environment	Environment related data availability	Public access	Status of technology use	Requirements, general framework	Obstacles	Priority systems and applications
Czech Republic	▪ Natural Habitats National parks, landscape protected areas and small scale protected areas cover about 15 % of the country. Forests cover 33.3 %, more than half of it is damaged by air pollution; Situation is getting slowly better. ▪ Air Reduced but still increased rate of sulphur dioxide emissions, moderate increase of nitrogen due to traffic (causes 50 % of NOx). "Hard" freons reduced to zero. ▪ Water One third of the length of watercourses is still classified as "highly" or "extremely highly" polluted. 16% of the individual wells do not comply with drinking water standards. ▪ Soil 72.2% is used for agriculture, nearly half of it is endangered by water erosion. The ability of the landscape to absorb and retain water is insufficient due to man made changes.	Areas covered by specialised information systems: • Large and medium air pollution sources; • Ambient air quality; • Hydrology; • Water quality; • Point sources of waterpollution; • Geology; • Landscape and nature protection. The information is stored in tabular but also in GIS form. The data is also available in printed and in digital form	▪ The Internet is becoming a standard tool for communication. The Ministry of Environment has been gradually building its web pages at http://www.env.cz	▪ GIS technology is also becoming widely used. All GIS environmental data produced within the authority of Ministry of Environment is maintained in ARCINFO/ARCVIEW format within a specialised Czech format (S-JTSK Krovak).	▪ Foundations for key information systems have been laid and basic technologies for communication and the presentation of data now in use.	▪ Existing information and communication systems are developed independently of each other, different levels of technology are used, far from state-of-the-art. Software and hardware cost of GIS rises beyond budgetary limits and salary regulations do not attract specialists	▪ The Ministry of Environment does not rely on any two-way information and communication system. That is why it is difficult to give any priority areas and systems, since the development of a decision making support system would be the obvious recommendation.

	State of the Environment	Environment related data availability	Public access	Status of technology use	Requirements, general framework	Obstacles	Priority systems and applications
Estonia	▪ Natural Habitats Low number of endangered species Baltic Sea is a commercial fish resource and partly overfished. ▪ Air Sulphur dioxide is not an air quality problem, high nitrogen oxide concentration in the centres of the capital caused by traffic. ▪ Water Surface water of good quality, some problems with transboundary pollutants. Problems with drinking water: nitrate pollution, bacteriological pollution and leakage of drinking water systems.	▪ Environmental data is kept in more that 40 databases, divided into Waste Water, Air Pollution and Solid Waste Management.	▪ The Estonian Environmental Home Page (http://www.envir.ee/ehp/) provides information on air, water, coastal sea, land use, forestry, mineral resources, fishery, biodiversity, and waste radiation, with basic indicators, institutions involved etc	▪ The Estonian Telecottages network is a grass-roots initiative working among small communities and regions. Some 50 telecottages have been established to link the most remote villages and towns and to provide local information. In terms of environmental information, telecottages have assisted local municipalities in elaborating sustainable development plans, raising awareness to proposed environmental investments, and assisting in studies concerning local needs.	▪ The framework for the increase of usage of telematics is relatively advanced.	▪ The limited State Budget does not allow any coverage of IT costs for local self-governments. no real allocations for either hard- and software, nor training and maintenance costs. The compatibility of the data gathered and presented by local governments with central information systems is not guaranteed.	▪ The priority areas are considered to be promotion of public awareness and introduction of environmentally sound technologies, as these are definite preconditions for solving most of the existing problems. ▪ The selection of applications and systems has here secondary importance, although the information must be readable naturally by widespread packages. Further Cooperation with Telecottages would help to provide a stronger base for local level colleciton and dissem. of environmental informaiton.

	State of the Environment	Environment related data availability	Public access	Status of technology use	Requirements, general framework	Obstacles	Priority systems and applications
Hungary	▪ Natural Habitats 8.64% of the territory is a protected area, 48% is covered by woods. The bio-diversity is still high but some species are endangered because of habitat damages. ▪ Air Quality of air has been improved, CO emission is declining; Growth of road traffic causes degradation of air quality in the major cities. ▪ Water Water pollution is biggest problem. Half of the country's sewage is discharged untreated. The city of Budapest treats only 20% of its waste water, the rest goes into the Danube. ▪ Soil 80% of the total area is cultivated by agriculture, industrial dump sites and former Soviet army barracks are contaminated areas, more than 2000 illegal dump sites.	▪ An integrated GIS based IT system is the basis for national environmental databases.	▪ Public information is provided by the Green Spider, an e-mail network that is regularly used by more than 200 environmental protection NGOs and numerous other related organisations.	▪ A regional subsystem has been set up for the Office of the Central Danube Region's Environmental Protection Supervisor. This system is suitable for analysis of aerial and space photographs. ▪ The national system of Civil Defence includes a radioactivity monitoring system	▪ The most important local telematics application area is surveying the local general environmental conditions. Basic communication networks have to be developed.	▪ The problem is that the systems developed are heterogeneous and that a digital base map of Hungary is not available yet.	▪ GIS based integrated IT systems for local governments. ▪ Development of intelligent city halls and regions to provide electronic access for the public to communal services ▪ Local telematics application surveying the local general environmental conditions.

	State of the Environment	Environment related data availability	Public access	Status of technology use	Requirements, general framework	Obstacles	Priority systems and applications
Latvia	▪ Natural Habitats Biodiversity in natural habitats is above average. Certain exploitation will endanger the biodiversity especially along the coastal areas. ▪ Air CO, SOx, and NOx is below average, sources are increasing road traffic (more than 75%), energy and industry; transboundary air pollution. ▪ Water Surface waters in good condition; A major problem is the eutrophication, rich reserves of groundwater. Seawater is moderately polluted. ▪ Soil Soils are relatively clean. Compaction, natural acidification and erosion of arable land soils are the main problem.	▪ Most environment data is stored in paper form or in standalone low quality computers of different types, using different database management systems. ▪ The Integrated Coastal Zone Management project develops a database which including digital maps based on satellite images. ▪ From 1996, annual data on hazardous waste from the industrial sector (the levels of emissions, the possible methods of utilisation, chemical properties, etc.) have been processed in a FoxPro DBMS.	▪ Public access to some environmental databases by internet.	▪ The urban air quality observation network is partly automated and information is stored in special databases. ▪ The water quality monitoring data and emission data are stored in a special database (from 1991-1997 using DBMS FoxPro, and in the future within DBMS Oracle). ▪ The data exchange within the HELCOM Programme occurs electronically by special software provided by HELCOM.	▪ A Unified Environment Data and Information System is envisaged to serve as part of a distributed information system. Two parts are envisaged: - public access via internet - governmental institutions and authorities via the Governmental Data Communication Network.	▪ Main obstacles are limited financial and the availability and qualification of staff, as well as changes in the priorities of future new governments.	▪ to complete development of LAN-s in institutions ▪ to develop an intranet system for the Min. of Env. Prot. and Reg. Develop. ▪ the development of GIS databases and the implementation of GIS in the decisionmaking process ▪ to develop Topic Centres in Latvia and provide on-line access to databases managed by those Centres.

	State of the Environment	Environment related data availability	Public access	Status of technology use	Requirements, general framework	Obstacles	Priority systems and applications
Lithuania	▪ Air Road traffic contributes about 63% of pollution. Large amounts of SO2. caused by the use of heavy oil fuel. Transboundary air pollution from other countries. ▪ Water Excessive nitrate pollution; Major rivers are relatively polluted. Part of the pollution is transboundary. The Curonian Lagoon is mostly very shallow and rather polluted. ▪ Soil Soil contamination by industry, energy sector, transport and agriculture. Use of mineral fertilisers and pesticides has decreased. Upper ground layers are contaminated by heavy metals and oil.	▪ Environmental monitoring data (qualitative and quantitative data on emission exhausts and wastewater discharged by industries) is available at the Joint Research Centre of Ministry of Environment. Cartographic background for spatially distributed data is available in the form of 1:200 000 and 1:50 000 scale maps. ▪ Aerial photographs and satellite images to major extend are used only in forestry inventories.	▪ Data exchange via Internet is limited. ▪ Vilnius air quality monitoring data is available in the Internet under: http://www.vilnair.gamta.lt.	▪ Surface water quality is monitored in 47 rivers, 9 lakes, in Curonian Lagoon and in the Baltic Sea. Including groundwater monitoring there are some 200 points for water quality monitoring. ▪ The air pollution measurement network consists of 23 air quality control stations located in biggest towns and industrial centres. ▪ In forestry sector as well as in geology GIS and data bases are widely in use.	▪ Present monitoring system has no scientific background for selection of measurement points in the monitoring network.	▪ Obstacles are weak PCs and the unfamiliarity of older people and the lack of finance when introducing new information technologies. A stiff organisation like a ministry is more willing to keep old procedures than to develop new approaches.	▪ Setting up an infrastructure for collection and dissemination of environmental data with an approved and certified monitoring and modelling system

	State of the Environment	Environment related data availability	Public access	Status of technology use	Requirements, general framework	Obstacles	Priority systems and applications
Poland	▪ Natural Habitats Biological diversity is fairly high, 568 legally protected species of animals. ▪ Air Some critical situations regarding air pollution. the worst situation is in the Katowice voivodship. ▪ Water Groundwater is used on a very large scale to supply inhabitants. ▪ Soil Full inventory of soil values and detailed maps of soil-nature and soil-agriculture. Average quality of soil is fairly low, about 39% of the territory is threatened by water erosion and about 28% by wind erosion.	▪ Environmental Protection Inspection collects the measurement data and process them statistically.	▪ The register of environmental emergency accidents is available via WWW. ▪ Internet daily reports (Krakow, managed by Environmental Inspectorate) Ministry of Environmental Protection (MOSZNiL) and the office of Head Inspector of Environmental Protection have the web sites (www.mos.gov.pl, www.pios.gov.pl)	▪ Air monitoring and surface waters monitoring are the best developed in all levels. ▪ Two examples of specific local monitoring systems are the Black Triangle international monitoring system and the BASKI industrial monitoring system	▪ There is no direct legislation setting up information technology as the mean of information transfer in environmental protection.	▪ The obstacles in use of information technology for environmental purposes are the lack of standardisation,. limited finances, and the lack of qualified staff	▪ General issue is the development of a uniform information system.

	State of the Environment	Environment related data availability	Public access	Status of technology use	Requirements, general framework	Obstacles	Priority systems and applications
Romania	▪ Natural Habitats47% of territory is covered by natural or semi-natural ecosystems. Biggest surface area covered by natural forests in Europe. 80% of the Danube Delta (the biggest European wetland) are in Romania. Highest priority is given to the Danube Delta and Razim-Sinoe lagoon system. ▪ Air Air problems due to polluting industries and increasingly heavy traffic, insufficient technical equipment, incomplete combustion in industry in energy sector. ▪ Water Water Quality has slightly improved. Rivers: 54% „1st quality", 12-13% of the total length is still lifeless. Special case: Danube river, with important polluters in upstream countries Drinking water and groundwater pollution is also extensive. ▪ Soil 75% of this soil has been damaged by one or more pollutants such as: pesticides, improperly used chemical fertilisers, heavy metals, petroleum, etc; Only one third of soil meets standards for an environmentally sustainable agriculture.	▪ A very small quantity of data is produced in electronic format and only selected information in this format is available to the public.	▪ The public has limited access to information. A very small quantity of data is produced in electronic format and only selected information in this format is available to the public. The Danube Delta Institute is one good example (both on the regional and national level) of the use and exchange of electronic data within the Danube basin and other institutions in Romania such as the Delta Biosphere Reserve Authority, and abroad.	▪ Air quality monitoring is arranged to perform high altitude measurements from four sampling points located above 1000 m altitude and low altitude measurements from 750 sampling points. ▪ Surface water monitoring stations collect data from 276 sampling sites. There are 12,000 sampling points for groundwater, located near potential pollution sources and sources of drinking water supply. Almost 1000 sampling sites are used to measure soil contamination. ▪ Aerial photographs, satellite images and GIS are used only for areas with special status (e.g. the Danube Delta Biosphere Reserve.	▪ The integration of telematics is currently limited in part by the insufficient level of co-operation between local authorities, relevant institutions, organisations and ministries. ▪ State and local authority representatives are not open to accepting the new technologies, authorities do not have equipment for environment related measurements, the national integrated monitoring network hardly operates.	▪ Most stringent problems is that they do not have suitable equipment, both in terms of quality and number, to be able to ever adapt it to state-of the-art mechanisms, access to Internet is hindered because of a poor telecommunications network.	▪ GIS does have a role to play; since some causes of our environmental problems stems from a lack of useful, up-to-date and accurate information. ▪ Besides better skilled managers, improved expertise and qualified staff are necessary for local government authorities. Extensive training is required for existing staff.

	State of the Environment	Environment related data availability	Public access	Status of technology use	Requirements, general framework	Obstacles	Priority systems and applications
Slovak Republic	▪ Natural Habitats Seven internationally important wetlands (Ramsar Convention), four Biosphere Reserves (UNESCO). 384 species of individually protected animals, and 252 species of protected higher plants. 58 species are protected according to CITES. ▪ Air Located in the area of the greatest atmospheric pollution and acid rainfall in Europe, selected emissions shows a degreasing trend. The most significant air polluters are energy and metallurgy, 12 regions requiring special air protection. Energy and traffic are the main air polluters. ▪ Water Groundwater quality is mainly affected by high concentration of iron, manganese and active carbon dioxide, caused by natural conditions and economic activities. Surface water quality is affected waste water discharged into water courses. 53% of population are connected to public sewerage systems. Public water supplies regularly 79,8% of the population. ▪ Soil The most of the municipal waste is landfill disposed (89.14%).	▪ National environment monitoring is divided into 12 component systems: air, water, soil, forests, geological factors, radiation and other physical factors, waste, human settlements, land use, foodstuff and animal feed contaminants, impact of environmental factors on population, biota, meteorology and climatology.	▪ Direct access to information about actual local environmental situation via digital automatic information boards in several towns. ▪ Annually Report on State of the Environment is available in electronically form on Slovak Environmental Agency homepage (http://www.sazp.sk).	▪ The information systems of many towns are based on GIS technology. ▪ These systems provide data such as real estate records, local roads and green areas, technical infrastructure (water supply, sewerage, electricity, gas lines), real estate tax, territorial and building management.	▪ The Slovak Association of Towns and Communities conducted a survey in 1998 on the quality of hardware and software available at the municipal level. Questionnaires have been filled in by 1612 municipalities and survey results showed that only 386 have no access to computers (mainly very small municipalities). On the other hand, all towns (136) benefit from good quality computer equipm. mostly with data exchange networks. ▪ The Centre for Economic Development within the framework of the Support to Local Democracy project currently offers via the Internet financial and techn. support to municipalities in the field of Internet technology. A webserver for territorial self-govt. was developed within this project.	▪ Problems are caused by different availability of environmental data. ▪ Availability of qualified staff is influenced by financial and professional conditions. ▪ Environmental issues are not a priority in execution and financing. ▪ Environmental information are often partial, problems arising from different data sources.	▪ Applications for emergency systems and air control would be appropriate to the regions requiring specific air protection.

	State of the Environment	Environment related data availability	Public access	Status of technology use	Requirements, general framework	Obstacles	Priority systems and applications
Slovenia	▪ Natural Habitats Virgin forests have been preserved since the mid-19th century. Several protected endangered species. ▪ Air Traffic became an important source of NOx pollution. High concentrations in urban areas. Troposph. ozone in summer; Significant reduction of SO2 pollution in the past ▪ Water Poor sewage systems; Pig farms are major sources of water pollution. Coasts are densely populated, excessive concentrations of bacteria occur several times per year. Groundwater is the main source of drinking water, its quality is worsening. ▪ Soil General soil quality is good, some heavy metal content around industrial plants and high pesticide content on farming land.	▪ Basic topographical maps of the whole country (1:5000 or 1:100009 digital and printed map formats. ▪ Digital orthophotographs exist for parts of the country, new maps are under development. Available to everybody, for a fixed fee. ▪ Air and water quality monitoring results are collected in electronic form and are publicly accessible. ▪ An illegal dumpsite inventory was made within several municipalities. The data exists in an electronic form and is available to the public free of charge.	▪ The Ministry of Environment and Physical Planning also has a meta-catalogue of data available electronically on the Internet accessible under http://www.sigov.si:81/GISborza/MPB/index.html, while data acquisition must be through the individual data providers.	▪ Air pollution monitoring is one of the best developed systems, supported by a network of stations that regularly report data. ▪ Groundwater and river water quality monitoring is performed.	Two groups of users: • Professionals and other advanced users; • General users, including the public with less sophisticated equipment.	▪ Some organisations have financial benefits from the data or simply feel that having the data is power.	▪ Expert systems, or decision support systems would be useful tools. ▪ Trained employees could help to further uptake. ▪ High officials in administration should be encouraged to get involved in telematics projects. ▪ Special attention should be given to presenting the benefits of the projects. ▪ Relevant software would be required to access and use the data, and to make it accessible via the Internet. The information shall not only be given on demand, but also regularly through public electronic information sources.

ANNEX 2: OVERVIEW (TRANSPORT)

Transport problems today	Poland	Hungary	Slovakia	Czech	Slovenia	Latvia	Lithuania	Estonia	Roma-nia	Bulgaria
overall road accident rate	++	++	+	+	++	+	+	+	+++	+
serious road injury and death rates	+++	++	++	+++	+++	+++	+++	+++	++	++
parking space availability	+++ / C	++/ C	++ / C	++ / C	+++	++ / C	++ / C	++ / C	++	+++/ C
traffic emissions	++	++	+++ / C	++	+++	++ / C	++ / C	++ / C	++/ C	+++/ C
traffic congestion	++ / C	++/ C	++ / C	++ / C	+ / C	++ / C	+ / C	+ / C	++	+
high volume of through traffic in towns and cities	++	++	+++	++	NO	++	++	++ / C	++/ C	+++
high speed driving in urban areas	+++	+	+	++	+	++	+	+	++	++
public transport infrastructure and vehicle fleet	++	+++	+++	++	+	+	++	+++	++	+++
public transport customer service quality (punctuality, overcrowding, cleanliness, information)	+	+++	++	+	+	+	+	++	++	++
public transport service scope and frequency	NO	+	++ / C	NO	+	NO	NO	+	+	+
slow and uncoordinated incident response	+	++	++	++	+	++	++	+	++	++
poor road quality - inadequate grade and capacity	+++	++	++	++	+	+++	+++	++	+++	+
poor road quality - inadequate maintenance	+++	++	++	+++	++	+++	+	+++	+++	+++

LEGEND :

+++	very serious problem
++	serious problem
+	mild problem
NO	not a problem
and / **C**	specific only to larger cities (>200,000 inhabitants.)

Technologies implemented so far:	Poland	Hungary	Slovakia	Czech	Slovenia	Latvia	Lithuania	Estonia	Romania	Bulgaria
Technologies for Transport Planning										
Manual traffic counting	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
Electronic traffic counting	+	+++	++ / N	+	++ /C	+	+	+	+++	++/ N
Passenger movement surveys	+++	+++	+	++/ C	+++	+	+++	+ / C	++/ N	+++
Static traffic modelling	+++	++/ C	+++	+++	+++	+++	+++	+++	NO	++/ C
Advanced modelling (simulation, real-time etc.)	+	+ /N	+	+	++/ C	+	+++	+ / C	+	+
Road maintenance planning software	+++	+	+	+	+++	+	NO	NO	+	+
Digital maps	+++	+++	+	+++	+++	+	+++	+	+	+
GIS databases	+++	+++	+	++ /C	+++	NO	++	+ / C	+	+
Transport information databases	+++	++/ C	+++	+	+++	+	+++	++ / C	+++	+
Technologies for Public Transport Management										
GPS in public transport	++ / C	+	NO	NO	++ / C	NO	NO	NO	+	NO
Real-time public transport scheduling	NO	NO	NO	NO	+ /C	NO	NO	NO	+	+
Public transport traffic light priority	+ /C	++/ C	+ / C	+ /C	NO	+ /C	NO	NO	++/ C	+

LEGEND

+++	**commonly found** in a **range of places**
++/ C	**commonly found** in **larger cities** (>200,000 inhabitants)
++/ N	**commonly found** on **national road network(s)**
+	**rarely found** and only in isolated case(s)
NO	**not found** anywhere

Technologies implemented so far	Poland	Hungary	Slovakia	Czech Rep	Slovenia	Latvia	Lithuania	Estonia	Romania	Bulgaria
Technologies for Network and Traffic Management										
Central traffic control centre	+ / C	++/ C	++ / C	+ / C	+++	+ /C	NO	NO	++/ C	+
Dynamic response traffic lights	+++	++/ C	++ / C	+ /C	+++	+ /C	+ /C	NO	+	+
Green wave traffic light systems	+++	+++	++ /C	++ /C	+++	+ /C	+/ C	+ / C	++/ C	+
Automated incident detection and centralised management	+	+	NO	NO	+	NO	NO	NO	NO	NO
Automated toll collection	+	NO	NO	NO	+ / N	NO	NO	NO	NO	NO
Automated and co-ordinated parking management	+	NO	NO	NO	+	NO	NO	NO	NO	+ /C
Real-time pollution monitoring / forecasting	++ / C	+	++ / N	++ / C	NO	NO	NO	+ / C	+	+ /C
GPS in freight transport	+	+++	NO	+	+++	+	NO	NO	++/ N	+
Technologies Passenger / Driver Information										
VMS systems (variable message signs)	+ / N	+	+ / N	+	N	NO	+ / N	NO	++/ N	NO
Classical radio / TV broadcast of detailed traffic information	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
Internet provision of detailed traffic information	++ / C	+	NO	NO	++ / C	NO	NO	NO	NO	+
Digital transmission of traffic information received in-vehicle	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Real-time public transport information at stops	NO	+	NO	+	NO	NO	NO	NO	+	+
Internet provision of timetables	++ / C	+++	NO	++ / N	NO	+	NO	+++	+++	+
Telephone and internet booking of buses and trains	NO	+++	NO	NO	NO	NO	NO	NO	+	NO

LEGEND

+++	**commonly found** in a **range of places**	**++/ C**	**commonly found** in **larger cities** (>200,000 inhabitants)
++/ N	**commonly found** on **national road network(s)**	**+**	**rarely found** and only in isolated case(s)
NO	**not found** anywhere		

Preparedness for telematics uptake	Poland	Hungary	Slovakia	Czech	Slovenia	Latvia	Lithuania	Estonia	Romania	Bulgaria
level of implementations to date	++	++	++	++	++	+	+	+	++	++
level of technical readiness - basic technical infrastructure of communications and computerisation	+++	+++	++	+++	+++	++	++	++	+++	++
level of technical readiness - private sector suppliers, support and services	+++	+++	+++	+++	+++	++	+++	+++	+++	+++
level of telematics qualification and "know-how" in public administration	++	++	++	++	++	++	++	++	++	+++
level of training and education programs with telematic content in public administration	++	+	**NO**	+	++	**NO**	**NO**	**NO**	+	++
level of demonstration of benefits and cost-effectiveness of telematics applications	**NO**	+	+	**NO**	++	**NO**	++	**NO**	+	+
level of financial resources available for telematics in public administration	+	++	+	++	++	+	+	+	+	**NO**
level of priority for telematics in public administration	++	++	++	++	+++	+	++	++	++	++
level of local and regional policy referring to telematics solutions	++	++	**NO**	++	**NO**	**NO**	**NO**	+++	++	++
level of public - private co-operation	++	++	**NO**	++	++	++	+	+	+++	++
level of integrated transport policies	++	+++	**NO**	+	++	++	**NO**	++	+++	++

LEGEND

+++	satisfactory
++	low
+	very low
NO	does not exist