Deliverable D3.2: Mapping of European best practices in ITS

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PROJECT INFORMATION

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Duration: 24 months
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PROJECT PARTNERS

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<th>Name</th>
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<td>CERTH-HIT</td>
<td>Greece</td>
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<tr>
<td>ERDF PP1</td>
<td>Patras Municipal Enterprise for Planning and Development S.A.</td>
<td>ADEP S.A.</td>
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<td>AustriaTech - Federal Agency for Technological Measures Ltd</td>
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<td>ERDF PP3</td>
<td>Hungarian Transport Administration</td>
<td>HTA</td>
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<td>ITS Bulgaria</td>
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<td>ERDF PP5</td>
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<td>ERDF PP7</td>
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<td>EU ASP1</td>
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<td>Albanian Association of Urban Transport</td>
<td>SHKTQ</td>
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<td>FPZ</td>
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**Abstract**: This final report is the result of a best practice collection amongst all SEE-partners in order to identify the optimal services’ combinations with respect to the needs and the characteristics of the areas examined in the framework of the project.
EXECUTIVE SUMMARY

The objectives of WP 3 are to critically compare the applied (in SEE) practice for ITS deployment with the European best practices and policy initiatives for achieving interoperable ITS implementation. The gap of regional/national ITS architectures with the EU ITS framework will be documented and communicated to stakeholders of the domain with the main emphasis on the added value of the integrated traffic management.

This report is the output of WP3 Action 3.2. “Mapping of European best practices in ITS” and should give an overview of the collected best practices.

The goals of this activity have been:

- Scientific and literature review concerning best practices on ITS applications across Europe
- Detailed recording of the state-of-the-art tools
- Identification of the best practices on ITS services and as a result different transport needs and users profiles from different countries

In a first step, a definition of “best practices” for a common understanding between all partners has been defined.

As a second step, a template for the collection of best practices on ITS applications across Europe has been designed and distributed among all WP3 partners. The requirement was to report as many ITS activities as could be found that could be of importance for this project. The emphasis was on the collection of projects/implementations in order to learn from success as well as from failures of previous projects.
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## Abbreviations and Terminology

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<td>CBM</td>
<td>Cross Border Management</td>
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<tr>
<td>CC</td>
<td>Cyber Cars</td>
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<td>CCTV</td>
<td>Closed Circuit Television</td>
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<td>DMV</td>
<td>Dual Mode Vehicles</td>
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<td>EFC</td>
<td>Electronic Fee Collection</td>
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<td>FCD</td>
<td>Floating Car Data</td>
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<tr>
<td>GPS</td>
<td>Global Positioning System</td>
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<td>HGV</td>
<td>Heavy Goods Vehicle</td>
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<td>HTB</td>
<td>High Tech Buses</td>
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<tr>
<td>ITS</td>
<td>Intelligent Transport Systems</td>
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<tr>
<td>OBU</td>
<td>On-board Unit</td>
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<td>POI</td>
<td>Point of Interest</td>
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<td>PRT</td>
<td>Personal Rapid Transit</td>
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<td>RUC</td>
<td>Road User Charging</td>
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<td>TCC</td>
<td>Traffic Control Centre</td>
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<td>TIC</td>
<td>Traffic Information Centre</td>
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<tr>
<td>TMC</td>
<td>Traffic Message Channel</td>
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<td>VIH</td>
<td>Video Information Highway</td>
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<td>VMS</td>
<td>Variable Message Sign</td>
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1. **INTRODUCTION**

Transport integration in South East Europe is a fundamental pre-requisite for regional cohesion and development. Intelligent Transport Systems applications (ITS) are key tools that can support efficient transport infrastructure management and traveller information provision throughout the SEE area. In order to maximise benefits out of ITS deployment, the SEE-ITS project aims at stimulating cooperation, harmonization and interoperability between isolated ITS applications, so as mobility is seamlessly supported throughout the SEE transport network, including motorways, secondary and urban/periurban road networks, as well as with their interfaces to other modes, such as surface public transport, ports and inland waterways.

The main objective of the project is to enhance the interoperable use of ITS technologies for monitoring and controlling traffic along road transport networks at transnational, regional and local (urban/periurban) levels. More precisely, the main areas to be covered within the SEE-ITS project, in line with the ITS Directive 2010/40/EC, are:

- Optimal use of road, traffic and travel data
- Continuity of traffic and freight management ITS services
- ITS road safety and security applications
- Linking the vehicle with the transport infrastructure

The main task of action 3.2 is to identify and collect best practices on ITS services across Europe. As a result different transport needs and users’ profiles from different countries with provided ITS services could be correlated. This task was accomplished in 2 steps:

- First step: definition of the term „best practice“
- Second step: design and distribution of a template for the collection of best practices

Altogether, 122 best practices which could be of importance for the SEE-Region were found. The following figure illustrates the projects/implementations collected per country. From the 122 collected reports, 7 reports had minimal to no significant impact regarding safety, efficiency or environment.
The majority of the projects address the ITS services Traffic Management and Operations Services and Traveller Information Services while the most addressed mode of transport is the road.

The majority of the collected evaluation reports concerns measures for road transport (80%), while 15% of the projects have a multimodal scope. The fewest activities are on the public transport sector (4%) and activities concerning bicycles (1%).
2. **RESULTS OF BEST PRACTICE COLLECTION**

2.1. **Austria**

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<th>Mode of Transport</th>
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<tr>
<td>Interaction and Conflicts between Cyclists and Public Transport in narrow Urban Space</td>
<td>• Public transport • Bicycles</td>
<td>• Road transport related personal safety</td>
</tr>
<tr>
<td>ITS Vienna Region / AnachB.at</td>
<td>• Public transport • Rail • Road • Pedestrians</td>
<td>• Traveller Information Services</td>
</tr>
<tr>
<td>TMC plus service implementation in Austria</td>
<td>• Road</td>
<td>• Traffic Management and Operations Services • Traveller Information Services</td>
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**Table 1**: Overview of Austrian projects

2.1.1. *Interaction and Conflicts between Cyclists and Public Transport in narrow Urban Space*

**Description of the ITS project**

The parts of the study, which are presented here, deal with safety and comfort aspects for cyclists and trams on lanes with rails and at tram stops. They focus on traffic flow, comfort, behaviour, interactions and conflicts between cyclists, trams, pedestrians and cars on tram lanes and stops. The main questions of this study are:

- How to make cycling safe, comfortable and flowing when sharing narrow urban space with public transport?
- What criteria are influencing safety, comfort and traffic flow of cyclists when sharing narrow urban space with public transport?

After a literature research and a good practice research, interviews were conducted with experts of cycling, public transport and urban planning, and interviews with focus groups of cyclists and tramway drivers. An accident analysis, interviews on location with cyclists and video-based behavioural observations were conducted in order to collect data on the influence of decisive criteria on safety, comfort and traffic-flow of cyclists.
Results:

- Bicycles and tramways are not enemies in urban space.
- Decisive criteria to allow cyclists on lanes with rails are space and cars concerning safety and comfort and space, cars and trams concerning traffic flow.
- Cycling in front of a tram-stop-cape depends primarily on cars’ density and speed.
- Cycling behind a tram-stop-cape is difficult to put into practice due to lack of urban space.
- Cycling across a tram-stop-cape would be a good compromise and deserves further research.

Furthermore, it is of importance to increase the presence of bicycles in urban space. Suggestive lanes for bicycles should be implemented even on lanes with rails.

Contact data of main author:
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Document link:
http://www.nationaler-radverkehrsplan.de/eu-bund-laender/eu/velocity/presentations/velocity2007_tu4g1_long.pdf

2.1.2. ITS Vienna Region / AnachB.at

Description of the ITS project
ITS Vienna Region has created a new common network (GIP – Graph Integration Platform) which serves as a reference in the Vienna Region. Currently, the experts of ITS Vienna Region and other Regions of CENTROPE are in negotiation to define procedures for combining the data systems at the borders with the vision to create a common network for the total CENTROPE Region.

Since 18th June 2009, ITS Vienna Region provides complete dynamic information about traffic conditions and an intermodal routing service for all three federal states of the Vienna Region, including a routing service for cyclists and park-and-ride information.

These services are publicly available for all travellers in the Vienna Region on the new traffic service homepage, online at www.AnachB.at.

In the long term, AnachB.at should also be adapted for mobile phone use (pilot project for iPhone till the end of 2009) and expanded throughout Austria and the total CENTROPE Region.

Results:
The major objective of ITS Vienna Region is to establish a complete image of the traffic situation as a basis for regional, intermodal and dynamic traffic information and routing service. The results are an intermodal network representation for all traffic modes and an
integrated cooperative traffic management combining information, monitoring, controlling and regulation as well as the optimisation of the traffic system. In the medium term, this integrated cooperative traffic management should be extended nationally as well as transnationally throughout the CENTROPE Region.

The main intentions are:

- Free online traffic information and services
- Dynamic and intermodal routing combining all modes of traffic
- Shift towards environmentally friendly transport modes (public transport, cycling, walking)
- Optimised traffic management by infrastructure providers based on a common traffic data pool
- Enhanced road safety as a result of dynamic information and regulation
- Intelligent solutions for public transport in rural areas
- Comprehensive data for e-government, traffic policy and planning
- Transnational interoperability, transfer of traffic data and know-how

Contact data of main author:
VOR (Verkehrsverbund Ost-Region), http://www.vor.at

Document link:

2.1.3. **TMCplus service implementation in Austria**

Description of the ITS project

The project “tmcplus” can be seen as a huge upgrade of the existing TMC service adding new features and functions to set a new standard of on-trip traveller information services. Improvements have also been made in order to provide better traffic information. Usually, it took several minutes for all traffic messages to be transmitted to and displayed on the navigation device. Therefore, ASFINAG and ORF decided to make an upgrade in order to increase the speed of transmitting the messages and improve the service quality. Real-time on-trip traffic information is one instrument to have a better influence on the traffic flow and prevent higher traffic problems. Spoken traffic information is provided by ORF every 30 minutes. In the past, it took up to ten minutes, until the messages could be displayed at the navigation device. Now, the actual messages can be received by the customer’s end device within about 2 minutes. For this improvement, a regionalisation of TMC messages has been decided. That means that traffic events are broadcasted only in that region, where the event is referenced to and not in whole Austria. Important messages on motorways (like motorway closures) are still transmitted Austrian-wide.

Results:

According to Austria’s climate research, at least 25% of the greenhouse gases are caused by traffic emissions. In the next phase, TMCplus will also contain traffic information from public transport modes. Being informed in-time helps traffic users choose their route or mode of
transport. The user can also decide to take an alternative mode of transport – like public transport or bicycle. Therefore, TMCplus is also a measure to reduce carbon dioxide. TMCplus is the only traffic information service that informs the user on-trip in the car. The TMCplus-messages are provided nearly in real-time and therefore can warn the driver immediately in case of danger or delays on the individual route. By providing in-time traffic information and options for alternative routes, traffic flow can be harmonised immediately. Reducing congestion also means a more effective guidance of the traffic flow.

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**Document link:**
http://www.easyway-its.eu/download/487/4912/
2.2. **Belgium**

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Table 2: Overview of Belgian projects

2.2.1. **Average speed calculation and display on the A602 (E25) in Liège**

**Description of the ITS project**
From the beginning of the project in 2000, control devices have been installed along the A602 in Liège. Their efficiency is real but over the months, effective speeds tend to increase. Very high speeds have been registered during the night and during week-ends or holidays. Drivers know where the points of control are situated and obey the speed limits only when they pass by before accelerating. ITS application aims at a better and continuous obedience of speed limits by the drivers and elimination of excessive speeds.

The control of average speed aims at improving the observance of speed limits on the A602. Indeed, speed regulation is considered as a major factor in order to avoid accidents on this section, which is crucial for safety but also for uninterrupted traffic flow, as any accident has major consequences. Moreover, the suggested speed limit contributes to a functional occupancy rate, which is very important regarding high traffic density, while reduction of congestion is also in favour of less CO₂ emissions.

The advantage of controlling average speed is to guarantee the observance of the suggested speed limits on a complete section and not only at the point of control.

**Results:**
The display of average speed calculation on VMS has been started mid-April 2009. The analysis of average speeds registered during the period 16/04/2009 to 31/10/2009 shows an immediate and strong influence on drivers’ behaviour. Before the launching of the system, 8 to 9% of the drivers were above the speed limit (80 km/h). This rate decreased to 1.5% on 16/04/2009. Since May, there is slow and steady increase of 2% - 3% during the weekends at the end of October.

Document link: www.easyway-its.eu/download/415/893/

2.2.2. Météoroutes

Description of the ITS project
Ten years ago, Wallonia launched Météoroutes in order to improve the efficiency of winter maintenance. This project aimed at collecting data of weather stations specifically equipped for roads. This was a first step in the direction of taking into account weather conditions in road surfaces. New developments made recently have improved the amount and the way of accessing data but have also integrated a new type of data concerning the progress of operations on the network. This leads to a better integration of local winter maintenance operations with the actions taken by the traffic centre. Météoroutes has become a tool of reference, giving the different actors a real consciousness of participating to a whole process aiming at a better service to the road user.

Results:
New developments made recently have improved the amount and the way of accessing data:

- The consultation occurs through the internet. This means that it is possible to access the application program from every computer connected to the network, even with a low flow connection.
- New generation sensors have been installed.
- Work has also been done on the presentation of the data, which are available on graphs and tables per station but also for several stations, with customizable facilities offered to the user.
- Another improvement is the increase of general weather information with the introduction of images taken by radar every 5 minutes in order to follow the precipitation and of images taken by satellite to see the evolution of the cloud cover. Medium-term forecasting data have also been added.
- A special version has been designed to be available on GSM through GPRS. All data are available for each weather station as well as the last radar and satellite image.

All this information has also been available free of charge for local public authorities (municipalities) responsible for their own road network. This is in favour of greater consistency in winter maintenance actions on all roads.

Document link:
2.2.3. **Reyers Tunnel, Brussels**

**Description of the ITS project**
At the entrance of tunnels, a special building is equipped as a local control room with a local server redundant to the main distance servers and control room installed at the Brussels traffic centre MOBIRIS.

The main objectives of this project are the following:

- Place a real dynamic signalisation system to send real-time information on directions to users
- Have the possibility to change users' information depending on the traffic situation, either manually for dispatching operators or automatically with computer algorithms
- Propose a real-time supervision system for the traffic centre thanks to the traffic measurement and the CCTV network
- Prevention of incidents or accidents with immediate action to achieve a high level of safety and avoid dangerous situations
- Send specific information to users in case of a special event in Brussels (for instance, European summit or smog alert) to prevent traffic jams or in some cases non adequate user behaviour
- Collect and record a lot of traffic measurements for analysis and statistics

**Results:**
The system has been entirely used for some years now and fully fits more or less all requirements. It is used every day by operators from Mobiris. Data measurements are recorded continuously and sent to other departments for statistic aspects. Road indicators are all active. The safety of drivers should be guaranteed as much as possible.

**Document link:**

2.2.4. **The European PROSPER-project: Final results of the trial on Intelligent Speed Adaption (ISA) in Belgium**

**Description of the ITS project**
In October 2002, a first ISA-trial in Belgium was held in Ghent. Until January 2004, 34 cars and 3 buses were equipped with the "active accelerator pedal (AAP)". This means that when the driver attempted to exceed the speed limit, a resistance in the accelerator was activated. If necessary, the driver could overrule the system. To study the effect of the ISA-system both surveys and analyses of driving data were held.
In total, 37 vehicles participated in the ISA-trial. Twenty vehicles were owned by private test drivers, 17 vehicles were owned by companies: six cars of the City of Ghent (one of the Social Services), five vehicles of the Ghent University, three buses of the regional public transport company, two vehicles of the Province of East-Flanders and one of Volvo cars Ghent.

**Results:**
Data logging shows a clear effect of the ISA-system on speeding behaviour. Speeding reduces significantly. There is however still a large remaining percentage of distance speeding, especially in low speed zones. Differences between drivers are large. For some drivers speeding increases despite activation of the system. For less frequent speeders, average driving speed almost always increases and for more frequent speeders average speed tends to decrease. Less frequent speeders tend to accelerate faster towards the speed limit and drive exactly at the speed limit instead of safely below, which causes average speeds to go up.

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**Document link:**

### 2.2.5. Traffic Management Plan Brussels-Beaune

**Description of the ITS project**
This traffic management plan is developed in order to cope with traffic disruptions that call for coordinated actions from several services responsible for road / traffic management on a given road or network. The main objective of this plan, in the event of a crisis situation on the motorway corridor between Brussels (Belgium) and Beaune (France), via Luxembourg (Luxembourg) is to:

- facilitate cross-border road traffic management
- facilitate information given to drivers, prior to and during their trip

The traffic management plan was developed in order to cope with road traffic disruptions that call for coordinated actions from the authorities and the different services responsible for road / traffic management on a given road or network.

**Results:**
- The interest of the evaluation lies in the verification of the aptitude of the CC during a crisis
- Very good participation of the services
- The moderators are too involved, no synchronization of the clocks
- Operators not enough trained Staff means are too low
• Technical means are not always suitable
• The organizational part of the TMP is not always followed:
• Communication:
  • Significant difference in time between transmission and reception of the faxes
  • Duration of the transmission too long
  • Faxes in the corner of the room (not visible)
  • Difficulties in understanding (translation)

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Document link:
http://www.easyway-its.eu/download/480/332/
2.3. **Czech Republic**

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**Table 3: Overview of Czech projects**

2.3.1. *Ex-post evaluation of ITS applications implemented on highway D8 in Czech Republic*

**Description of the ITS project**

The project of implementation of ITS applications on highway D8 (TKRS D8) was an integral part for the creation of a unified system of traffic information. It was a pilot project in which the part of highway D8 was equipped with automatic traffic detectors, equipment for traffic information (VMS – display of travel times and other traffic information) and also software for collection, process and dissemination of travel times. The extension of existing control software of Monitoring and information system on highway D1 in Central data storage of National traffic information centre for traffic data collection, process and dissemination was also necessary. The system was drawn up as a testing with a possibility of further results and practise use for all highways in Czech Republic.

**Results:**

The ITS system implemented on highway D8 was expected to reach the goals as: improve the traffic monitoring (structure of traffic flow, density, intensity, speed of traffic flow) and better monitoring of communication quality.

According to the questionnaire survey: The most frequent way, in which drivers gather information is radio broadcasting, the second most frequent way is internet information portals, while the walkie-talkie was mostly mentioned as alternative source. The same results were reached also in analysis of specific groups: only women up to 50 years old gather information more frequently from TV than from internet. Also, truck drivers prefer radio, walkie-talkie or information from satellite navigation. Paucity (only 1%) of all drivers does not gather traffic information either.

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**Document link:**

2.4. Denmark

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<td>TRIM Travel Time Funen, Denmark</td>
<td>• Road</td>
<td>• Traveller Information Services</td>
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Table 4: Overview of Danish projects

2.4.1. Evaluation of Bilrejseplanen.dk

Description of the ITS project
Bilrejseplanen.dk (Car route planner) is a co-modal planner comparing travel between origins and destinations (A to B), where the origins and destinations normally are entered as addresses, but can be also entered as Points of Interests (POI).

The co-modal planner includes the following travel mode possibilities:
- Walk/cycle from origin to bus/train, use a number of busses and trains, walk/cycle to destination
- Use car from origin to destination
- Use car from origin to P/R location, use a number of busses and trains, walk/cycle to destination
Results:
The system has been running very stable in the whole operational period. Down time has been very limited (few hours) and the response time of the system is very high. The usage of the system has been less than expected. Rejseplanen.dk had 17,000 users per month doing co-modal search out of 3-4 mil users in total Bilrejseplanen.dk had 45,000 users per month. The relatively low number of users reduces the traffic impact of the Bilrejseplanen as the impact is expected to be proportional with the number of users.

Document link:
http://www.easyway-its.eu/download/489/5642/

2.4.2. Evaluation of variable speed limits at Holbaekmotorvejen

Description of the ITS project
During construction along the east/west between Copenhagen and Roskilde, the Danish Road Directorate (DRD) has implemented a system of variable speed limits to prevent a decrease in the motorway's traffic handling capability during construction, as well as to protect contractor personnel working along the motorway.

The variable speed limits have been introduced in an attempt to keep traffic flowing safely at a reasonable speed while also protecting contractor personnel while construction takes place. The objectives of this project are: To keep traffic flowing safely at an acceptable speed while also protecting contractor personnel during the construction phase.

Results:
The evaluation indicates that the ITS project has caused the average speed to drop by approximately 10-20 km/h during daytime (at times with no congestion) depending on the (variable) speed limit. When the speed limit is lowered from 110 to 100 km/h, the average speed drops from between 90 to 100 km/h to somewhere between 80 and 90 km/h. When the speed limit is reduced further, to 80 km/h, the average speed drops to approximately 80 km/h.

When it comes to user acceptance, the questionnaire survey carried out among motorists shows that the variable speed limits are widely accepted (and appreciated). 75% of the approximately 850 respondents believe that traffic flow has improved as a consequence of the IST project. Furthermore, 80% believe that the project has led to an improvement of the traffic safety conditions. However, more variation in the speed limits is requested (demanding on the traffic conditions).

2.4.3. Multi-modal Traveller Information Service
Trafikken.dk/Hovedstaden, Denmark

Description of the ITS project
The objective is to provide travellers with a complete overview of the status of the transport system, i.e. all relevant information on current situation for all transport modes. Furthermore, the objective is to improve the mobility by shifting journeys from private car to public transport.
transport or bikes, and to increase the number of combined trips where private car and public transport are combined (Park and Ride).

Results:
The results are overwhelmingly positive with respect to the success criteria for behavioural changes. The users are willing to change their behaviour and they do so to a much larger degree than expected.

All success criteria, except number of visits, have been fulfilled. Although the number of visits is considerably lower than the target, the information provided on the site is widely disseminated through other channels than the Internet, e.g. radio stations use the web site for traffic announcements. Furthermore the site is used by the TV-station TV2 News etc.

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2.4.4. The road pricing Experiment in Denmark – User Reactions

Description of the ITS project
In the EFC trial (Electronic Fee Collection) of Greater Copenhagen, 500 test drivers had an OBU (On Board Unit) installed in their own cars, thus testing three different systems of Road User Charging (RUC) namely cordon charging, high distance based kilometre charging and low distance based kilometre charging. For 100 of the test drivers, the trial involved real money. With a total of 500 cars driving in average of four month, the data collected can be compared to one car driving for 2000 months or approximately 160 years.

Results:
Conclusions are made on the behavioural impacts of the different pricing schemes and road users' attitudes. It appears that pricing level shall be high if road users are to change behaviour (between 1 – 5 Dkr./km in the peak hours and half price in none peak hours. 1 Euro equals about 7,5 Dkr. ). The main changes in driving pattern during the trials seem to be new routes, and for “occasional" trips new destinations, shifting time of day (to non-peak) and to some extent making fewer trips. Commuting trips can be hardly – or not at all –changed.

Document link:
http://www.easyway-its.eu/download/474/358/

2.4.5. Traffic management applications on the Koge Bugt Motorway

Description of the ITS project
During the process of widening the motorway, the Danish Road Directorate decided to install traffic management applications in order to ensure traffic safety and prevent traffic from breaking down during the construction period in 2002/2003. The overall application consists
of an application of variable speed limits and an application of dynamic route information (and manually operated surveillance cameras).

The issues addressed by this project are:

- Impacts on speed and traffic flow due to variable speed limits
- Technical performance of the variable speed limit application
- Impacts on route choice due to dynamic route information
- Forecasting delays to be used by the dynamic route information application

Results:
Since drivers do not change route during normal conditions (minor delays), the application cannot be concluded to have led to general reductions in travel times. However, the evaluation has shown that the application also has the potential to improve travel times in situations of minor delays, if only the drivers would use the information more actively. It should be added, that a success criteria was not defined except for trying to distribute traffic in the best possible way.

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Document link:

2.4.6. TRIM Queue, Vejle N

Description of the ITS project
TRIM Queue was an automatic queue warning system, which served to warn motorists of possible queue further up the road to avoid rear end collisions etc. in the widest possible way.

The reasons for establishing the system was a very high frequency of rear end collisions in the area around Vejle Fjord Bridge and the bridge across Lillebælt. These two bridges together had a frequency of 1,7-1,8 rear end collisions pr. Km. pr. year (1999-2003).

Results:
The data used were accident data from 2001-2005 and 2007-2008. Data from 2006 was excluded to eliminate effects of the construction work on the site. Data was retrieved for km 109,5 – 112,5 (covering TRIM Queue), and reference data was retrieved for km 99-105 and 115-125.

For the period before TRIM Queue was initiated (2001-2005) there was a total of 9,8 accidents per year from km 109,5-112,5 and 28,8 accidents per year for the reference stretch.
For the period After TRIM Queue was initiated (2007-2008) there was a total of 10.5 accidents per year from km 109.5-112.5 and 31.5 accidents per year for the reference stretch. Looking at the absolute numbers, the improvement of traffic safety for the stretch covered by TRIM Queue would therefore appear to have worsened by 7.1%, but if one were to expect the same development in the number of accident for km 109.5-112.5 as for the reference stretch covering km 99-105 and 115-125, a total of 10.7 accidents pr. year could have been expected, which leads to a calculated improvement on 2%.

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Document link:

2.4.7. TRIM Travel Time Funen, Denmark

Description of the ITS project
Due to increasing traffic loads on the motorway across Funen (E20), the telematics application TRIM Travel Time was established in 2003/2004 by the Danish Road Directorate. The application provides online information regarding mean speeds, travel times, delays and overall traffic conditions along 40 kilometres of the motorway.

The objectives of TRIM Travel Time are to help motorists use the road network in the best possible way, as well as provide traffic information regarding mean speeds, travel times, delays and overall traffic conditions. The application includes the E20 motorway across western Funen. The information is expected to lead part of the traffic from the motorway to the parallel road, Route 161, in case of slow traffic on the motorway.

Results:
It has not been possible to determine the impact of TRIM Travel Time on traffic distribution, mainly because of lack of data.

Analyses show that delays rarely occur unless there has been an accident etc. During the data collection period (1 month), the T.I.C. reported delays in 3 cases, based on information from the application, and in neither case was it possible to determine any effects on traffic distribution.

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Document link:
2.5. European Union

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<td>• Road</td>
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</tr>
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</table>

Table 5: Overview of European projects

2.5.1. Call-a-bus-Services

Description of the ITS project
Call-a-bus Services are:
- demand responsive transport (DRT) schemes in public transport that adapt their itinerary and timetable to suit a particular transport demand;
- reserved by the users in advance via phone, offering pickup at home (or close to it);
- particularly suitable for medium to low density areas and times of weak demand;
- already existing in a wide range of service designs.

Results:
- improves accessibility to the public transport system in areas or times where conventional services cannot do this in a satisfactory way;
- tackles social exclusion of people that do not have access to a car;
- offers potential for cost reductions when replacing conventional services in areas or times of low demand.

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2.5.2. CityMobil Towards advanced transport for the urban environment

Description of the ITS project
The global objective of the CityMobil project is to achieve a more effective organisation of urban transport, resulting in a more rational use of motorised traffic with less congestion and pollution, safer driving, a higher quality of living and an enhanced integration with spatial development. For this aim, four different technologies will be tested and evaluated in the project: Personal Rapid Transit (PRT), CyberCars (CC), High Tech Buses (HTB), and Dual-mode Vehicles (DMV).

Results:
The users were generally satisfied with the new system, considering the service as useful, easy to use, reliable and well integrated with the other systems. Users also perceived a high quality of service, the information to use the system was available and comprehensible, the system was perceived as comfortable, safe, secure and with a high level of privacy, and the ticketing was quite good. The cleanliness of the system was also perceived as satisfactory. The system resulted to be safe for the drivers too and required the same workload required for a conventional system.

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Document link:
http://www.citymobil-project.eu/downloadables/Deliverables/D5.2.2-PU-CityMobil-Field%20trial%20first%20year%20evaluation%20report.pdf

2.5.3. Long-Distance Corridor Demonstration Project

Description of the ITS project
On the technical side, so-called strategy brokers have been installed at the participating traffic centres. They are prototype systems for cross competence definition and activation of traffic management strategies, enabling a co-ordinated decision process between the involved partners for the activation of re-routing measures along the pilot corridors. In addition, mechanisms were implemented in participating traffic control centres to exchange, activate and de-activate on-line strategies in relation to real-time events happening on the various corridors.

Results:
Tests have shown that the reduction of driving time is the main benefit of the re-routing measures. It amounts to more than 80 % of the total benefit. A further important aspect of the field trial was the organisational level. It was analysed by means of interviews with the operators and questionnaires. The co-operation between different road authorities was a very important element and was improved as a result of the initiative. All road authorities involved in the pilots stressed the importance of continuing on implementing and increasing the scope of the 3 pilots as an effective way of countering traffic problems that go beyond their borders and to streamline their operational capabilities in co-ordination with neighbouring regions.

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Document link:

2.5.4. Public Bicycles

Description of the ITS project
Characteristics of the project: Public Bicycles
- are innovative schemes of rental or free bicycles in urban areas;
- can be used for daily mobility as one-way-use is possible and they can be seen as part of the public transport system;
- differ from traditional, mostly leisure-oriented bicycle rental services as they provide fast and easy access;
- have diversified in organisational layout, the business models and the applied technology towards “smart bikes” (rental process via smart card or mobile phone).

Results:
- Promoting urban cycling and increasing its modal share. A Public Bicycle scheme can be an effective measure to promote urban cycling as a “normal” daily transport mode when introduced in an integrated strategy and combined with other measures that make cycling safe and convenient. In cities without an existing “bicycle culture”, Public Bicycles have a potential to act as “door opener”. In cities where cycling is already well accepted, the idea can add a further valuable element to the promotion and use of the bicycle.
- Fast, convenient and flexible inner urban transport option that meets the needs of many users and increases mobility choices.
- Encouraging inter-modality through the integration of Public Bicycle schemes in the public transport system.
- Wise use of inner urban space, as Public Bicycles are space-efficient. In Lyon, for example, 5 Public Bicycle racks (average: 15 users/day) can substitute 1 car parking lot (average: 6 users/day).
- Proven positive health effects of cycling.
- Increase of sustainable non-polluting mobility choices for inner urban transport.
- Increase of traffic safety for cyclists through critical mass of users on the roads.
- Strengthened local identity, as Public Bicycle schemes may become a well-accepted part of the local cityscape and provide a sense of identity.

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Document link:

2.5.5. Silence: Noise Reduction in Urban Areas from Traffic and Driver Management

Description of the ITS project
Traffic management measures and driver assistance systems may reduce noise through:
- reductions in traffic volume,
- changes in composition and diurnal distribution of traffic,
- speed reductions and
- changes in driving patterns.

Many of the traffic flow measures and the driver assistance systems presented in this toolkit have not been subject to surveys aimed at assessing their effects on noise emissions. Therefore, the possible effects of these measures presented in this context are based on the effects of traffic volume, traffic composition, speed and driving pattern on noise emissions.

The traffic-noise relations can also be used to assess the effects of various traffic management measures for which the effects on traffic flow, and thereby on noise, are so dependent on local conditions that they must be assessed individually from case to case.

Results:
Traffic flow measures and driver support systems for low noise driving may affect both propulsion and rolling noise emissions from the individual vehicles as well as the types of vehicles emitting the noise. If such measures are combined with measures such as noise reducing pavements, noise barriers or façade insulation, the total effect can usually – but not always – be found through simply adding the effects of the individual measures.

Although conclusions should be drawn with caution, there are some results regarding noise emissions from traffic on various types of pavements, which indicate that the speed dependency of the noise emissions may vary from one type of pavement to another (Ögren et al. 2008 22–24). Differences in noise emissions between various types of pavements seem – for most types of pavements – to be quite uniform across speed levels, but results indicate that this may not always be the case. Thus, it may be necessary to take the type of pavement...
into consideration when assessing the difference in noise emissions from before to after reducing driving speed.

Contact data of main author:
Rolf Annecke, City of Munich

Document link:
http://www.silence-ip.org/site/fileadmin/SP_H/SILENCE_H.D2_20080816_DRI.pdf

2.5.6.  [website] Rules and Regulations of abnormal transports in northern Europe (Viking Region)

Description of the ITS project
This is an Internet information service system concerning the different rules and regulations for permission, which are treated differently in the European countries. Hauliers, which carry out transports crossing several countries, can check whether their transports are classified as abnormal transports in the specific countries and directly find the authorities and responsible persons to be contacted.

The haulier is also informed about any additional requirements that may apply (e.g., vehicle length restrictions, type of suspension). Furthermore, the hauliers can download the respective application forms. The Web service also includes a Forum Platform for the exchange of information between and within the user and operator groups. The web service is multilingual, i.e. available in Danish, Finnish, German, Norwegian, Swedish and English.

Results:
Factors of success and failure are the communication network and the willingness of all participants to improve the service constantly every day. Recommendations for other implementations are an absolutely faultless working system as well as the willingness of all participants to deliver creative input. By implementing a Content Management System the national executives get more involved in the project and more responsible for their country specific content at the same time.

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Document link:
www.easyway-its.eu/download/411/927/
2.6. Finland

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Table 6: Overview of Finnish projects

2.6.1. Evaluation of regional traffic information service

Description of the ITS project
The main problem is the accessibility of the various transport related information in Oulu region. Before the service was launched, the data was scattered – and not so easy to find. The current version of the service includes information for all modes, including private cars (parking info, traffic info), public transportation and pedestrian/bicycle traffic. In addition, weather information is also included.

In addition, the accidents due to incidents and adverse weather conditions are major concerns in the area. The service aims at offering people in the Oulu region a wide selection of traffic information from ‘one-stop-shop’ and to guide people to safe and operable routes and sustainable travel choices.

The main objective of OLLI-service is to provide all the needed pieces of traffic information in the same portal - to enhance the travellers’ possibilities to choose the mode and departure time (before trip).

Results:
Despite the low usage count, those who used the service found it useful (85% of the respondents in the survey). Real-time information related to driving: incidents, accidents, road works and fluency of traffic, were seen as most important.

Based on the survey, stakeholder interviews and expert evaluation the continuation and further development of the service were recommended. The service is seen beneficial for the
users (they can find all the needed information in one place). In addition, the service is seen as a tool to quite travellers and drivers to safer, more fluent, and more sustainable routes and modes.

**Contact data of main author:**
Risto Kulmala, VTT

**Document link:**
http://www.easyway-its.eu/download/489/4265/

### 2.6.2. **Evaluation of Renewal of Road Weather Information System and Finnish Road ITS Action Plan**

#### Description of the ITS project

The main user needs and requirements were identified to be the following:

- **Main roads, metropolitan and urban areas and special sites:**
  - the performance and safety of travel and transport chains between regions and inside urban areas: providers of goods transport and passenger traffic services, foreign trade, commuter traffic
- **Basic network in rural areas**
  - the basic safety and transport needs of the forest industry’s timber acquisition
- **Basic network in rural areas and urban areas**
  - the basic transport and safety needs of school children
- In addition, the following effects were sought for in all parts of the road transport system:
  - Road users get on all sections of the road network
    - information about the allowed speed
    - guidance to different locations
    - warnings of local problems
  - Curbing climate change
  - Constraining traffic demand
  - Minimising traffic congestion caused by traffic accidents and disruptions

On the basis of the user requirements, problems identified and the effects sought for, the Finnish Road Administration developed the Road ITS Action Plan, with the help of its regional offices.

#### Results:

Based on the Finnish and EasyWay results, good quality real-time road weather information will reduce injury accidents by 11% in adverse conditions. In Finland, 25% of injury accidents occur in adverse conditions, i.e. good quality information would reduce 2.75% of injury accidents. The sub-projects were estimated to account for 1/3 of this improvement, i.e. 0.9% reduction of injury accidents. This would mean an annual expected reduction of 12.8 injury accidents (year 2010 situation).
The CO2 emissions on the network amount to almost exactly 4 million tonnes/year. The measure is estimated to have a negligible impact on the emissions.

On the whole, the Road ITS Action Plan is expected to provide the impacts sought for, and would annually save more than 220 injury accidents, reduce congestion costs by more than 9 M€ annually (20% of the annual total congestion costs), and reduce CO2 emissions by more than 500 000 tonnes (4% of the annual total road transport related emissions).

Contact data of main author:
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Document link:
http://www.easyway-its.eu/download/489/4339/

2.6.3. Impacts of an automatic emergency call system on accident consequences

Description of the ITS project
The aim of the study was to estimate the impacts of an automatic emergency call system (eCall) on accident consequences in whole Finland. The estimated number of fatalities that could be avoided using the eCall system is based on the case reports of Road Accident Investigation Teams covering the period 2001–2003. The benefit-cost ratio of the eCall system examined in this study was 0.5–2.3. The benefit-cost ratio would have been higher if the indirect benefits of the eCall system could have been taken into consideration.

Results:
The eCall system could have prevented 4.7% of the fatalities in accidents involving motor-vehicle occupants. In the accidents involving fatal unprotected road user, however, the system could have prevented no fatality. In all, eCall system was estimated to be able to reduce 5–10% of motor vehicle fatalities and 4–8% of all road fatalities in Finland.

The results showed that, in most accidents involving motor-vehicle occupants (82%), the emergency call had been made within five minutes of the accident. However, in 14% of the cases the emergency call had been made 5–30 minutes after the accident and in approximately 4% of the cases more than 30 minutes after the accident. In the accidents involving fatal unprotected road user, the delays were slightly shorter.

Based on the main findings of this study, the eCall system is recommended for immediate and widespread implementation in Finland. The study also indicated a need for developing statistics on severely injured accident casualties.

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Document link:
2.6.4. **Variable speed limits at T-junction of highways 6 and 13 in Selkäharja, Finland**

**Description of the ITS project**

The test site is located on the T-junction of main roads 6 and 13 at Selkäharju in Southeast Finland. The junction that is located in a hollow had relatively large traffic volumes with high proportion of heavy vehicles (23.9%) during the commuter traffic and summer weekends. Consequently, merging from the minor road is difficult. In addition to the traffic volume on the main road, the right turn exit lane on the main road impedes merging to the left. Vehicles on the exit lane block the sight. Consequently, lot of accidents had occurred in the junction. An interchange was planned to solve the traffic related problems in that junction, but due to its high costs it seems to be impossible to begin the construction in the near future. That is why the Kaakkois-Suomi Region of the Finnish Road Administration (FinnRA) decided to look for new ideas to improve traffic flow and safety of that junction before the construction of the interchange.

The objective of the telematics application is to lower the speed limits of the priority road during heavy traffic and make it easier to access the priority road.

**Results:**

It can be assessed that the critical gap did not increase as the speed limit on the main road was decreased. If the headway distribution on the main road was shifted in a way that the proportion of long headways increased, it could be argued that the merging was relieved. However, if the headway distribution did not change, one should know, whether the critical gap decreased as the mean speed decreased on the main road in order to verify if the target of the system was met or not.

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**Document link:**

http://www.easyway-its.eu/download/485/298/
### 2.7. France

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Table 7: Overview of French projects

2.7.1. Alert in tunnels

Description of the ITS project
In order to improve safety on its network and in particularly in tunnel, ATMB has installed new equipment in the tunnel of Vuache. Consequently to these installations, a tunnel evacuation exercise has been performed in the tunnel of Vuache on the 17th of May 2009 from 7am to 1pm. The scale of this experiment makes it one of the first performed in France.

Results:
All the efforts and energy deployed contributed to the success of this tunnel evacuation experiment, whose scale makes it one of the first performed in France.

Tunnel evacuation exercises proved that behaviour of tunnel users was in line with the safety plan using current equipment. However, it also enabled to identify technical renovation to bring into the tunnel and additional information to provide tunnel user to improve safety in case of tunnel evacuation situation.
Deliverable D3.2: Final Report: Mapping of European best practices in ITS

Deep analysis of efficiency of information messages and signalisation equipment concluded that, up to now, audio message seemed to be the more efficient way to relay alert in the tunnel of the Vuache: it keeps users’ attention and encourage application of safety instructions.

Contact data of main author:
ATMB, France

Document link:
http://www.easyway-its.eu/download/487/4272/

2.7.2. Automatic Incident Detection and Fast Alert Evaluation

Description of the ITS project
In order to ensure that drivers receive traffic or event information as quickly as possible, the SAPN has developed an automatic link between the detection system, the expert system of operation support, and the subsystem that controls VMS signs. The TCC operator can later verify the actual traffic condition, and eventually corrects the VMS messages.

Results:
Thanks to this project, the average interval of time between the posting of a message on the VMS and the moment the AID detects an incident is less than 5 seconds.

The first results showed that the rate of false alarms remained low (10%). Since its implementation, alert VMS messages have been typically activated more than once a day in both directions.

The operating feedback is positive and the system is well accepted by TCC operators in Les Essarts.

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Document link:
http://www.easyway-its.eu/download/446/463/

2.7.3. Ban on truck overtaking

Description of the ITS project
On-site implementation involves a series of permanent or folding police signs (on the shoulder or on the central median) to define the overtaking ban zone. Advance signalling can also be installed several hundred meters upstream of the zone. Overtaking can be banned separately for caravans and heavy goods vehicles. The ban can be permanent or activated
temporarily. The objectives for this project were to test the cost-effectiveness and performance of the measure.

**Results:**
The 2008 ban on truck overtaking measure in the Grand Boeuf pass (South / North direction) shows impacts and a compliance rate of the same nature as those observed in 2007 in North / South direction: the impacts seem favourable in terms of congestion and accident black spots despite a reduction of the distances between Lorries.

**Document link:**

2.7.4. *Dedicated Lane for taxis and buses*

**Description of the ITS project**
The main aim is to make travel times more reliable for some categories of users: buses and taxis.

The dedicated lane (DL) is also supposed to address the lack of taxis in downtown Paris during early morning, because due to the heavy congestion, it is more beneficial for them to stay in Roissy.

The most objectives of this experimentation on A1 are:
- Ease the access of taxis (even empty) to the centre of Paris on early morning.
- Enhance the travel times for the following users: taxis, buses and eventually carpooling, without deteriorating too much the security or the traffic conditions for other users.

**Results:**
The functioning of the DL depends on the overall flow of the traffic. Actually, it can be deactivated in case of accidents or exceptional traffic (for example during a strike of train personal). Some incidents have caused a suspension, but rarely for more than one hour. We observe 5 closures between April 27 and May 14. Since then, the closures have been less frequent.

The efficiency of the DL, in relation to its objectives, also strongly depends on the respect of the traffic rules by all users. As the control/sanction device has been introduced late after the opening of the DL, the rate of offenders has remained high, this could affect the movement of authorised users.

**Document link:**
http://www.easyway-its.eu/download/489/4264/
2.7.5. **Dynamic motorway lane management in France**

**Description of the ITS project**
The activity regards the dynamic management of motorway lanes in the common urban motorway section A4-A86 of the Paris region, through the use of an auxiliary lane (hard shoulder) in periods of high demand. The key objective of the project is to optimize the motorway’s capacity, reduce the negative impacts of bottlenecks (traffic congestion, reduced safety, negative environmental impacts) and speed up the restoration of normal traffic conditions.

**Results:**
The lane opens in case of high demand, disruptive event or work. In 2006, the additional lane was open daily for an average of 5 hours, for the direction towards Paris, and 4 hours for the opposite direction (during working days). On Saturday it was open for 4 and 3 ¾ hours respectively. On Sundays it was open for 3 hours and 20 minutes for both directions respectively.

**Contact data of main author:**
Simon Cohen, National Research Institute for Transportation and Safety (INRETS)

**Document link:**
http://intranet.imet.gr/Portals/0/UsefulDocuments/documents/01103.pdf

2.7.6. **ERATO traffic management system – Real time information services through VMS on urban fast lanes of Toulouse**

**Description of the ITS project**
The initial objective is to define a new exploitation strategy taking into account the evolution of the traffic conditions of Toulouse. This strategy aims to create new orientations in terms of common equipment usage and proper equipment. ERATO aims to coordinate the traffic control actions of the two operators DIRSO and ASF and to reinforce the coherence and the global efficiency of the network. The following effects are planned:

- Improvement of the traffic safety for users;
- A non-congested situation for a better network utilization;
- A bigger comfort thanks to updated traffic information towards users and media.

**Results:**
Information on traffic conditions on urban fast lanes around Toulouse diffused on Internet or thanks to Smartphones’ applications is not very much used by the users for the time being. On the other hand, information provided in real time on VMS or through radio channels are predominantly considered as useful and with a good quality even if most of the users have expressed the following desire: information on jams should be displayed on VMS located...
upstream from the urban fast lanes entries. However, road information will not solve alone the increasing difficulties of saturation of the Toulouse network.

**Document link:**
http://www.easyway-its.eu/download/489/6038/

### 2.7.7. French-Spanish Cross Border Traffic Management and Information Interoperability of Services

**Description of the ITS project**
This cooperation helps operators to sharply monitor the whole network without any geographical limitation and to enhance reactivity and efficiency. From an end-user perspective, the harmonisation of web-based TIS on long distance corridors is a powerful tool to prepare their trip and ensure a maximum understanding of information among foreign populations. The impact of the project on congestion has been estimated at 1500 hkm/year saved and the contribution to greenhouse gases emissions reduction represents about 1000 tonnes of CO₂ saved per year.

**Results:**
Enhanced reactivity and efficiency of the road operators by the monitoring of the whole network without any geographical limitation. High level of service provided to drivers by harmonised traffic information services and an optimum usage of the motorway infrastructure both sides, leading to enhanced safety on the network.

Very good feedback from stakeholders and local authorities (consultation meetings, approval of the Cataluña and Languedoc-Roussillon regions). Dissemination of this best practice among the EW community, production of one EW Highlight. Success of the cooperation leads to deploy new interoperable services (EFC interoperability, HGV secured parks, cross-border travel times).

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**Document link:**

### 2.7.8. Geolocation of service vehicles

**Description of the ITS project**
The challenge is to geolocate 300 vehicles over the entire ESCOTA network (about 460 km of motorways). Tracking data for the vehicles will use the data transmission channel for the TETRA digital radio network and ESCOTA's general high speed network.
Results:
62% of service vehicle arrive on the scene of an incident in less than 16 minutes.

Document link:

2.7.9. Grand Lyon Urban Traffic Management System

Description of the ITS project
CRITER is the multimodal traffic management centre of Lyon, which enables real-time management of traffic, through the management of green waves and the provision of traffic light intersection priority to public transport. The monitoring of the road network is achieved through cameras and sensors. CRITER links together certain traffic light intersections. This allows the prompt detection, through sensors, of even the smallest breakdown and its prompt repair. Traffic lights are being coordinated based on the actual automobile traffic. Furthermore, the system informs (in real time) drivers and travellers on the traffic status and events, weather forecast, parking placed, bike road network, free bike service (places and bikes free in real time), car sharing and carpooling. The system also contributes to truck prioritized traffic management within the FREILOT European project.

Results:
CRITER manages traffic on a 2400 km road network of Lyon. 1096 traffic lights are connected together to the central system, 209 video cameras on the main road axes of Lyon, 477 measuring stations for real time traffic detection and 42 VMSs are installed (including 22 assigned to bicycles).

Document link:

2.7.10. Gutemberg traffic management system – Real time information on VMS on urban fast lane

Description of the ITS project
The main issue addressed is the management of a network with heavy traffic, both local and transit, but with no possible rerouting. In that constraint context, the main questions are:
- How to limit the impacts of events, predictable or not?
- How to improve the level of service in case of congestion, with travel time information?
- Is it possible to reduce the demand on the road network, via dissemination of information on public transport?

The reduction of traffic environmental emission during pollution crisis is also addressed as a secondary issue.
Results:
Impacts related to the system are hardly measurable. Traffic is still high: stable in the most urban part of the network, but highly increased in its North and South parts. For daily congestion: small improvement of time spent in congestion.

Document link:

2.7.11. Secure parking places for trucks

Description of the ITS project
The main objective of the project is to respond to imperatives of security of property and persons, in order to avoid incidents such as theft (fuel or cargo), assault or injury. The second major objective is to provide quality services reserved for truck drivers (food, showers, laundry ...) to improve the comfort level of their breaks. Choice of locations has been done to make parking access easy to trucks, especially those engaged in long journeys, even throughout Europe. They are placed on strategic European motorways.

Results:
At the end of 2009, it is still early to take stock. Indeed, the introduction of these truck parks has been longer than expected, and was concluded only a few weeks ago with the installation of permanent signing. For this reason, communication targeting potential customers has not been fully developed.

In addition, the commissioning of these secure parking was carried out in economic crisis, in an unfavourable environment to the transport companies.

Document link:

2.7.12. Speed Control Evaluation on the A13 Motorway (France)

Description of the ITS project
The ITS project consists of several topics:
- The development of a variable speed limit algorithm
- The development of the entire chain from field data measurements to VMS indicating updated speed limits on the motorway
- Field deployment of several VMS for speed display
- End User Information

Results:
The VSL system calculates on its own, through its internal algorithm, the speeds to be displayed on the VMS signs along the VSL section. Initially, the transmission of new speeds to the VMS had to be validated by the traffic control centre operator (whether speeds were decreased or increased). The operator had to verify the consistency of the proposed speed in
regard of the current traffic situation. The VSL algorithm has proved to be so stable in its proposal for new speeds that it was decided to fully rely on its calculation and remove the operator validation.

Since then, the system is fully automated and the system changes speeds up and down automatically depending on traffic flow. No human action is required. Another technical performance of this system is its ability in decreasing congestions during traffic peak of week days. The results below show this excellent capacity in reducing congestions, accidents, increasing mean speed and travel time.

**Document link:**

### 2.7.13. TIBUS, a Demand Responsive Transport (DRT) System in Cote d’Armor

**Description of the ITS project**

With the TIBUS project, the County Council of Côtes d’Armor started the creation of several bus lines served by a demand-responsive bus system and created a mobility call centre where all users can ask for travel plans in the County Council and outside (nationally and internationally). For interurban transport the cost of a ticket on TIBUS is 2€ for any destination (1.6€ for users benefiting of social aids). TIBUS was launched in September 2005 and first assessed in December 2005.

**Results:**

The first result prove that the demand was existing as on several lines the patronage increased in average with up to 40% in 4 months. The quality of the service was well perceived by the users. On one specific line the patronage increase up to 65% more customers. The mobility call centre receives up to 300 calls a day. This result is very significant for a rural area, where modal shift is normally very difficult to achieve.

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**Document link:**

### 2.7.14. Totem Evaluation Report

**Description of the ITS project**

Sanef aims at creating awareness by conveying information to the drivers relating to their speeding. The excessive speed issue is tackled by planning the deployment of the system, which automates the posting of licence numbers and speeds, in real time, through licence plate recognition coupled with radar measurement of speed.
The key objectives are:

- A smooth integration in a work zone,
- An optimal reliability of the system’s performance, in order to gain credibility and make it a perennial solution,
- A formal recognition and identification of preventive aspects of the system by drivers.

Results:

- Speed reduction by 20% at the entrance of the work zone.
- No more drivers exceeding 130km/h.

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Document link:
http://www.easyway-its.eu/download/484/303/

2.7.15. Travel time service on the ASF network

Description of the ITS project

The project aims to realize two main operations:

- Change operating processes to make a full time use for travel time dissemination and not only in incidents or crisis,
- Use of VMS also to inform customers when the level of service is good (smooth traffic: normal travel time displayed)

The project consists in:

- creation of fusion algorithms allowing to feed the processing engine with several data sources: traffic counting stations, toll data
- the setting up of cross-border systems allowing to process and disseminate cross-border travel time to Barcelona,
- the setting up of systems allowing to process and disseminate permanent (24/7) dissemination all over the ASF network, deployment of access VMS in order to inform incoming customers and mainline VMS in order to ensure a 30-minute customer information frequency

Results:

The technical results of the project can be considered as the capability of the system to display travel times on the motorway’s VMS, when no more important information have to be displayed. Several measurements have been made and it could be concluded that in 99,3% of the cases, where the travel time has to be displayed, it is effectively displayed. A customer’s satisfaction survey has been realized during fall 2010 on 600 drivers and on the whole network:

- The reconnaissance rate of the travel times on the VMS is 86%
86 % says these information are useful to manage their travel times

Document link:
http://www.easyway-its.eu/download/489/6042/

2.7.16. Travel Times on the ASF network

Description of the ITS project
This is also for ASF as a motorway operator a relevant indicator for real-time level of service that can possibly lead to real-time triggering of suitable operational measures. ASF thus decided to recast its dissemination policy by extending the travel time information coverage to the whole network and over 2 main cross-border areas (Montpellier – Barcelona, Biarritz - Saint-Sebastian) and ensuring a permanent dissemination.

Dissemination is based on a multi-channel strategy covering VMS (access and mainline), 107.7FM radio and the Internet. This combination of media ensures pre-trip and on-trip reliable information. The usage of a homogeneous traffic information web service and multilingual traffic bulletins on the radio during the peak periods ensure a maximum understanding of information among foreign populations.

Results:
Travel time information brings driving comfort to customers: true picture of traffic conditions with delay information, ability to define a driving strategy: A real impact on driving behaviour and a real contribution to a safer road network.

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Document link:

2.7.17. Travel Times perception on Variable Message Signs

Description of the ITS project
Issues Addressed:
- Know the understanding of customers regarding the dissemination of Travel Times on several information medias
- Understand their representation of Travel Times
- Determine their needs, regarding Travel Time information (double display, short distance travel times, SMS…)

The evaluation aims at assessing the efficiency of the methods used to convey information related to Travel Times to users. The ITS project evaluated is thus the display and dissemination of information regarding Travel Times to users on-trip or pre-trip. The media through which Travel Times are sent are either VMS, Internet, radio or telephone.
Results:
Out of the representative group of motorway users, 90% of them are satisfied by the dissemination of Travel Times on various medias. Dissatisfactions originate mainly from the reliability of Travel Times, from the information given on the 107.7FM radio, from the display of Travel Times on VMS or from the lack of multiplicity of routes covered by Travel Times.

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Document link:
http://www.easyway-its.eu/download/482/320/

2.7.18. Truck traffic management experimentation on Nice conurbation

Description of the ITS project
The study focuses on the Antibes-Nice section of the A8 motorway and on experiments for traffic regulation measures to decrease congestion.

Step 1: the first step of the study was to analyse behaviour vehicle drivers (both light vehicles and HGVs), the inventory of peak traffic and rush hours on the Trans-European Road Network.

Step 2: the study of HGV impact on congestion is divided in 2 steps: quantification of HGV traffic (estimated by counting the video recordings) and characterization of the HGVs’ behaviour.

Results:
Congestion zones have been highlighted as shown hereafter in the « Pont du Var » (a daily congestion area): at rush hours they are represented in red slowed traffic areas and green arrows point lanes changes.

Several solutions were proposed in the study, the selected one combines speed regulation and overtaking prohibition for HGVs. Static signs have been deployed on the experimental section: they are allocation signs on yellow background.

Document link:
2.8. Germany

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<tr>
<td>Design, setting up and installation of ramp metering on motorways intersections</td>
<td>Road</td>
<td>Traffic Management and Operations Services</td>
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<td>Dynamic HGV Information at A5 in Baden Wuerttemberg</td>
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<td>Freight Transport Management</td>
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<td>Evaluation of the cross-border Re-routing System Mosel-Saar Network</td>
<td>Road</td>
<td>Traffic Management and Operations Services</td>
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<td>Hazardous Goods in the Alpine Region – Preparatory Activity</td>
<td>Road</td>
<td>Freight Transport Management</td>
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<td>HGV On-site Parking Information at the Motorway A61 Service and Rest Area “Brohltal-Ost”</td>
<td>Road</td>
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<td>Investigating on the effects of the line control system on motorway A61 Meckenheim - Mending</td>
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<td>Line control system A6 Kaiserslautern</td>
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<td>Mobility Portal Rheinland-Pfalz</td>
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<td>Munich Tram and bus prioritization</td>
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<td>Realization of online-centres for super-heavy and dangerous goods vehicles</td>
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Table 8: Overview of German projects

2.8.1. Analysis of the red light driving on ramp metering systems on the motorway A40

Description of the ITS project
Ramp metering proved to be one of the most efficient measures to improve traffic flow on heavily charged motorways and to reduce the risk of congestion. Ramp metering is aiming to avoid vehicles entering the motorways in platoons and to control the access of single vehicles in dependency on the traffic quality on the motorway.

The motorway A 40 is the major arterial road in the conurbation “Ruhrgebiet”. It is the connection between large settlement areas in the conurbation as well as an important east-west axis for long distance transportation. The average daily traffic amounts to 132,000 vehicles.

Results:
- One main reason of red light violation is a long inter-green phase (5s). Many drivers were surprised by the breakdown of the green-phase and had (with only 1s amber-phase) no possibility to stop on time. On the other hand, in many cases a vehicle running ahead caused the breakdown of the green-phase and the following vehicle could not stop on time. This case was registered especially in Bochum Hamme very often. The roadbed (direct and with incline) and the low traffic volume cause this situation there.
- Switching-on the ramp-metering system does not cause red light driving.
• Passenger vehicles and lorries do not behave significantly different.
• A copyist-effect could not be established.
• With a longer duration of the RED phase, the possibility of red light driving is increasing. It is assumed that the drivers are accustomed to an equal red light duration (95% of the cases 2s). Only 1s longer red light leads to a notable higher number of red light violation.
• The traffic volume on the slip road has an effect on the number of red light violations only in Essen Frillendorf. The reason for it is the special situation in Essen Frillendorf: Vehicles (especially motor cycles) from two access roads come together in front of the signal and often pass the stop line parallel or staggered, which in turn leads to a higher traffic volume. Therefore a general correlation between traffic volume and red light violation cannot be established.

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Document link:
http://www.easyway-its.eu/download/470/372/

2.8.2. Design, setting up and installation of ramp metering on motorways intersections

Description of the ITS project
From 6:30 a.m. the traffic volume on motorway A 57 increases severely. Between 7:00 and 9:00 the traffic flow is tough-flowing with several short breakdowns. Distinctive shockwaves can be observed.

Moreover, due to dense traffic, converging vehicles cannot merge in zip-fastener manner. This leads to uncontrolled jostles. Due to breakdowns on the motorway and high volumes of converging vehicles, tailbacks on the on-ramps can be observed. The average driving speed decreases to about 20-40 km/h.

Results:
AS Krefeld-Gartenstadt: During rush-hour (between 7 and 9 a.m.), an increase in travel speed is noticeable. Additionally, traffic volume increase by about 5% during rush hour at the upstream control section. Another positive effect is a harmonised entering of vehicles from the on-ramps onto the carriageway during operation of the system. Vehicles drive until the end of the acceleration lane and then merge with traffic. Uncontrolled merging, as happened prior to implementation of the system, is not observed anymore. Furthermore a reduction of shockwaves can be achieved.

AS Krefeld-Zentrum: During rush-hour (between 7 and 9 a.m.), an increase in travel speed is partly noticeable. An increase in travel speed cannot be observed at the downstream control
section during operation of the system. But one hour before and after operation an increase of 10km/h can be measured. Furthermore the traffic volume increases between 3 and 5% between 7 and 8 a.m. All together this means a reduction of congestion affected time by about 2 hours. Further positive effects that can be observed are a harmonized inflow from the on-ramp onto the carriageway and a considerable reduction of shockwaves.

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**Document link:**

### 2.8.3. Dynamic HGV Information at A5 in Baden Wuerttemberg

**Description of the ITS project**
Along German motorways, HGV parking areas are greatly lacking. A demand exists for area-wide information on free parking spaces directly before the exit to an HGV parking area. A German pilot project in Aichen installed for the first time an HGV parking information about available free parking spaces for HGVs. The system was developed and tested by the state of Baden-Wuerttemberg and Dambach GmbH in 2007 and 2008. HGV drivers receive information about free parking spaces via an LED-based information panel on the A8, directly before the exit to the service and rest area Aichen on the Swabian Mountains.

As expected, the trips searching for free parking spaces declined. The German Federal Ministry for Transport, Building and Urban Affairs intends to integrate this new information panel into the road traffic regulations. This ensures standard information of HGV drivers throughout Germany in the future.

**Results:**
The project shows high reliability, availability and acceptance of the services. An Internet service will inform HGV drivers and dispatchers about the occupancy rate as well as the point in time when the parking facility will be fully occupied. Service providers will have the opportunity for further service individualization (information on parking places on the actual route of the HGV driver). Standard information of HGV drivers will be ensured through integration of the new display panel into the German road traffic regulations.

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**Document link:**
2.8.4. **Evaluation of the cross-border Re-routing System Mosel-Saar Network**

**Description of the ITS project**

The Mosel-Saar network is a wide-area motorway network allowing long-distance traffic to choose different routes and therefore offers itself for alternative route control. Due to the high traffic volumes on the Mosel-Saar-Network a great influencing potential for re-routing measures is given. Therefore parts of the network have already been equipped with dynamic direction signs. It had to be decided, if an enhancement over the whole Mosel-Saar network is reasonable and profitable.

**Results:**

In total, the impact analysis has shown a positive result, which is based particularly on major incidents. Accidents and road works accompanied by lane reductions on supra-regional links, however, have minor impacts.

Following the impact analysis the determined benefit does not allow for a cost-benefit relation which may justify the investment in dynamic signing. But the need for alternative route control in case of major incidents has been ascertained for the Mosel-Saar network.

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**Document link:**

http://www.easyway-its.eu/download/480/335/

2.8.5. **Hazardous Goods in the Alpine Region – Preparatory Activity**

**Description of the ITS project**

The establishment of a management centre with the capability to monitor all hazardous goods transports can support not only the implementation and improvement of prevention procedures but also the identification of potential traffic “black spots”. The objective is the provision of a number of services over the basis of a system able to meet the demanding requirements of a challenging environment such as the Alpine space. The Figure below shows an overview of the system / service architecture.

**Results:**

- No matter the services agreed at the end to be provided by the management centre, their scope shall be Europe, as hazardous goods are not a regional problem.
- Awareness is important to let different and relevant stakeholders around Europe know about the project and generate the necessary support.
- Institutional players are willing to support such a European solution, but they need to know if a technical solution is possible in order to implement it also in the relevant regulatory frameworks.
• Data privacy is a must. The management centre needs to be operated by a trusted partner and there must be guarantees concerning the proper utilisation of the information stored.

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**Document link:**
http://www.lkzprien.de/files/SECCOH_2/LKZ_Executive_Summary.pdf

2.8.6. *HGV On-site Parking Information at the Motorway A61 Service and Rest Area “Brohltal-Ost”*

**Description of the ITS project**
The number of vehicles is detected by magnetic field sensors. The sensors cannot differentiate between the vehicle types like passenger cars, trucks or busses. Therefore, the sensors have to be located in the accesses and exits of each HGV parking area. On the service and rest area “Brohltal-Ost”, three sections were identified to count the HGVs. The data is transmitted via WLAN to different access points, which are connected to a roadside station. The data will be processed and it controls the VMS at the motorway. The operation of the detectors and the data processing is verified by webcam images. The system infrastructure and workflow are supervised by the traffic control centre especially in the evening when the parking area fills with HGVs.

**Results:**
Eight truck drivers were interviewed. Two drivers have not noticed the VMS. Five drivers think that the information supports the work by overall better roadside information. One truck driver believes that the system is not useful because he has to fully utilise the legal driving hours. With or without the information, he cannot change the characteristics of his basis route. Five truck drivers are convinced that the system makes a contribution to a better traffic safety to avoid fatigue accidents especially in three cases rear-end collisions and in two cases bearing away accidents.

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**Document link:**
http://www.easyway-its.eu/download/487/1188/

2.8.7. *Investigation on the effects of the line control system on motorway A61 Meckenheim – Mending*

**Description of the ITS project**
In the concerned section, some parts of the motorway A 61 are constructed with two and some with three lanes, with and without hard shoulder. Furthermore the line is characterised by the topographical circumstances (strong slopes resp. descents in parts), which have impact on the traffic flow, especially with regard to HGV-traffic.

Both the Federal Ministry of Transport, Building and Urban Affairs of Germany and, on a European scale, for respective measures financed by the BMVBS and supported by the European Union request an evaluation of the systems’ effects achieved.

The efficiency analysis has to consider the so-called „Pattern for the evaluation of the influence of motorway control systems on the road safety by analysis of accidents“. Furthermore also statements on the general effects of the existing systems on the incident situation and the traffic flow are to be made. Within this, the connections between the obtained effects and the control model deposed at the control centres and/or the implemented restrictions by VMS are also considered.

Results:
The present investigation shows that the procedures frequently used during the analysis of effects and optimization of systems for line control in Germany are well suitable to point out the existing effects of the system. On the other hand further improvements can be suggested, verified and implemented with justifiable expenditure.

Thus, the investigation approach, if necessary modified with regard to the system characteristics in terms of hard- or software, may also be suitable for comparable telematics systems abroad Europe in order to conduct a specific validation and optimization of these installations.

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Document link:

2.8.8. Line control system A6 Kaiserslautern

Description of the ITS project
Due to the tense situation in peak hours with daily traffic volume of some 60,000 vehicles/24 h on the section between the AK Landstuhl and AS Kaiserslautern-Ost, the motorway A cross section expansion to continuously 6 lanes will not be realised in the short term. In addition, the accident situation in the course to AS Wattenheim is classified as very critical according to the assessment of the responsible accident commission. With the connection of the A63 to the A6 in the immediate area of the AS Kaiserslautern-Ost (new intersection A6 / A63) it can be expected that the traffic rate and therefore the incident situation will significantly worsen again without traffic improvement measures. This is based on existing experiences with
similar situations (e.g. area intersection Essen-Ost and AS Essen-Frillendorf, connection of the A52 to the A40).

The objective is to address particularly road safety with the effect of the above mentioned traffic management system. Other problem areas were not in focus in the course of the planning of the system.

**Results:**
The line control system A6 meets all technical capabilities of a modern traffic control system for traffic management. Components implemented are: low-power and low-maintenance LED VMS, simple and stable software for the centre sub system and performance-based data communication equipment with the use of DSL to some extent.

**Document link:**
http://www.easyway-its.eu/download/487/4724/

### 2.8.9. Mobility Portal Rheinland-Pfalz

**Description of the ITS project**
The objectives are generally hard to quantify since the mobility portal is just one of several measures developed. However the potential benefits are large. For example, if just 10% of trips are redirected in case of road blockings, severe weather problems or heavy congestion, both individuals’ as well as collective time loss decreases considerably. Daily, there are 1 million trips made on the motorway network of Rheinland-Pfalz, resulting in 350 million trips. If just 2% of trips are affected by the conditions mentioned, a 10% reduction results of these in a figure of around 70,000. If each driver saves just 30 minutes, there is already more than 1 million € saved in time cost, without taking into account safety benefits or other effects.

**Results:**
- Daily average visits are between 1000 and 5000 visits per day.
- Traffic state and cameras are the most frequented parts of the portal
- Frequency is strongly dependent on road events (weather, severe incidents with strong impact on network, e.g. December 2010)

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**Document link:**
http://www.easyway-its.eu/download/489/4725/

### 2.8.10. Munich Tram and bus prioritization

**Description of the ITS project**
The activity refers to traffic control measures for public transport (PuT) prioritisation. The measures that have been applied to Munich for the optimization of the PuT services are provided below:

- Traffic lights (Green waves for trams, prioritization at traffic lights)
- Separate Right of Way (speeding up public transport)
- Vehicles and operation (low floor vehicles, “kneeling” to reduce height difference, boarding by all doors, no ticket control by driver)

Quality Management (analysis of travel time at signal, of traffic light data and position of vehicles)

Results:

- Number of traffic lights with transit priority = 435. For tram, priority is provided to the 100% of the traffic lights (in all 11 tram lines), while for bus to 40% of all traffic lights.
- Total length of Separate Right of Way Tram = 51 km (69% of the tram network)
- Total length of Separate Right of Way for buses = 23 km (6% of the bus network)

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Document link:
https://docs.google.com/viewer?a=v&q=cache:NdnDe_0lIl4J:sutip.mine.nu/TUMasia_its_singapore/Singapore2012_Werner.pdf+&hl=el&gl=gr&pid=bl&srcid=ADGEESha2ZXskC5Gfs2BSY-NH7-l-I-AiAbeqHzykH9ecpI79qeDQUunLMT1HMKgqdPpyG6sWciTlwVbSI-2jry59ZCeXC-OM4yVQ95sODwUDytC6UTnuicwBIY8uiDtEZm3iaz9Iful&sig=AHIEtbQ0_7wRSWqQjzL
vNqvrRNj808S6bA

2.8.11. Realization of online-centres for super-heavy and dangerous goods vehicles

Description of the ITS project
The project is divided into three segments:

- Pre-feasibility study & draft planning of a hazardous goods management centre (SECCOH → Security Control Centre for Hazardous Goods Transports)
- Pilot applications for testing basic functions and for a concept test:
  - Dagobert (Dangerous Goods coordination By Exact Road-Traffic management)
  - Infoselector (Information service for the provision of weather information and routing recommendations in winter)

Results:
• The fully automatic and location specific information service worked.
• Individual contact of the user was possible.
• The matching of the truck data with the hazardous material data base and the decisions of stopping the truck were realised by a mainframe computer without tracing the trucks.
• The location accuracy was satisfactory.

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Document link:
http://www.easyway-its.eu/download/487/4270/

2.8.12. Telematics-Controlled Truck Parking at the Motorway A3 Service and Rest Area “Montabaur”

Description of the ITS project
The system of TCP is working with success. The evaluation study shows a positive attitude of the drivers towards the system. They accept having no free choice of their parking space and being placed in the middle of a row when they understand that the capacity of the parking lot has been increased. More than 50% of the truck drivers have no or light problems to be captured by trucks before and after its own one. Contrary to the situation without TCP, they consider it is a great advantage to find vacant parking spaces at night.

The objectives were the contribution for the improvement of traffic safety by providing sufficient parking spaces in order to avoid that HGV divers exceed the permitted driving hours.

Results:
Parking Information systems are a supporting tool to manage the traffic flow more seamless and effective. Direct impacts on traffic flow, traffic safety and environment cannot be quantified directly. It is to be expected that an information system will influence positively traffic safety by reducing accidents by fatigue. Truck drivers will be informed directly about the parking situation on their route.

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Document link:
2.8.13. Temporary ITS applications during major road works on motorway E22 / A1 in Bremen, Germany

Description of the ITS project
The temporary installation of a dynamic rerouting system and ramp metering at one junction had the main objective to increase the network efficiency during the road works and to minimise congestion. Other objectives were not directly targeted but implicitly ramp metering and the re-distribution of traffic that can increase the overall safety.

Results:
On the basis of traffic data, it could be shown that whenever a detour recommendation was given, a significant share of traffic could be shifted to the alternative route. E.g. about 44% of truck drivers at the Stuhr interchange followed the recommendations. The cost-benefit-analysis for the temporary re-routing system included apart from traffic data, socio-economic data concerning the cost of congestion and fuel consumption whereas accidents and reduced CO₂ emissions have not been included. The temporary traffic rerouting with LED-panels scored a very good cost-benefit-ratio of 6.0, which demonstrates the high benefit of the measure.

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Document link:

2.8.14. The Safemap Project

Description of the ITS project
The aim of the SAFEMAP project is to develop a new navigation map or geo-localised database concept including road safety-related data, evaluate its socio-economic impact and its suitability to drivers and subsequently propose examples of an on-board application to ‘aid anticipation’.

Franco-German partners have decided to get together as part of the DEUFRAKO programme with a view to developing technical specifications for a standardised on-board application.

Results:
Recent or on-going projects help classify the support to be developed into three categories in order to increase the safety offered to drivers:

- An example of the existing signalling system, which offers the advantage of reminding the driver, or displaying a traffic sign that may not have been seen, or understood, or that he may have forgotten;
• New support functions enabling the driver to anticipate road-related difficulties: on bends, at crossroads, etc.
• Supplements to driving aids to increase their reliability (lateral control, inter-distance control, anti-collision, etc.).

Document link:

2.8.15. Traffic Information Agency Bavaria (VIB)

Description of the ITS project
The strategic goal of the VIB on the public side is to exploit all available transport capacities at the best possible level in order to alleviate traffic problems, which is in the focus of the public side. On the other hand, the private partners operating the VIB systems want to generate an attractive added value in the traffic information and data to be able to offer them freely and generate revenues based on this business. Also, specific services, mostly for public authorities, can best be generated by the VIB and thus open up a significant competitive advantage concerning specific tender actions. Resulting from both goal complexes, high quality in the whole production chain is the single most decisive aspect and thus is heavily supported by all involved parties.

Results:
The implementation is nearing completion and the publicly available internet platform can be found at www.bayerninfo.de. While the VIB System is extremely complex in terms of technical and organisational aspects the implementation was executed rather smoothly. Several obstacles were discovered during the implementation phase, on being, for example, the design of the public internet platform with required significantly more resources than originally anticipated. Thus, it would be advisable, to commence significant organizational resources to the discussion of the look-and-feel concept in the very beginning and follow the discussed concept without alterations to the very end, any amendments and changes should be discussed within the operational phase where these time consuming actions can benefit from a more convenient time frame and first experiences of the users. Also, specific tasks like the realization of complex features within the user concept of the platform might require the integration of project partners mastering specific knowledge in these fields.

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Document link:
### 2.9. Greece

<table>
<thead>
<tr>
<th>Title</th>
<th>Mode of Transport</th>
<th>ITS-Services addressed</th>
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| e-Trikala ITS system | - Public Transport  
- Road  
- Parking | - Public Transport Services  
- Traffic Management and Operations Services  
- Transport-related Electronic Payment Services  
- Traveller Information Services |
| H.I.T. PORTAL – An Online Portal for Integrated Transportation Data Management and Processing | - Public Transport  
- Rail  
- Road  
- Waterway  
- Air | - Freight Transport Management  
- Public Transport Services  
- Traffic Management and Operations Services  
- Traveller Information Services |
| Intelligent Urban Mobility Management System of Thessaloniki | - Public Transport  
- Road  
- Car-sharing  
- Pedestrians | - Traffic Management and Operations Services  
- Traveller Information Services |
| ITS services in Egnatia National Motorway | - Road | - Traffic Management and Operations Services  
- Traveller Information Services |
| MOBINET – Mobility Centre of the Kalamaria Municipality and development of electronic traveller information services through the Internet | - Public Transport  
- Rail  
- Road | - Public Transport Services  
- Traveller Information Services |
| Myroute Portal | - Road | - Traveller Information Services |
| Telematics services for the Organization of Urban Transportation of Thessaloniki (OASTH) | - Public Transport | - Public Transport Services  
- Traveller Information Services |
| Traffic Management System (TMS) of the Athens Traffic Management Centre (ATMC) | - Road | - Traffic Management and Operations Services  
- Traveller Information Services |

**Table 9:** Overview of Greek projects
2.9.1. **E-trikala ITS System**

**Description of the ITS project**
The e-Trikala project refers to a number of individual ICT projects that aims at simplifying public transactions, reducing telecommunication costs and delivering new services related to the citizens’ everyday life. e-Trikala has implemented an ITS system in order to manage the urban transport fleet and provide information to citizens regarding mass transport itineraries and parking.

**Results:**
The Municipality of Trikala has developed and operates an integrated Intelligent Transportation System that includes 25 digital information boards installed at all city’s stations, 4 information boards informing about parking places and spaces, 5 inductive loops for the study of the city’s traffic data and a system for the monitoring and management of the Municipal vehicle fleet, based on GPS equipment installed in 20 Municipal vehicles and 25 public buses.

2.9.2. **H.I.T. PORTAL – An Online Portal for Integrated Transportation Data Management and Processing**

**Description of the ITS project**
H.I.T. PORTAL is a web based application (http://www.hitportal.gr) aiming to provide data content and transportation services to all parties interested in the Greek transport system. H.I.T. PORTAL provides the following services:

- Transports Observatory
- Traffic Forecasting and Network Simulation
- Test Bed:
  - Freight Urban Routing
  - Infomobility

**Results:**
The outcomes of the project can be summarized as follows:

- Integrated data storage and processing systems, focusing on transportation in Greece
- Transport Observatory
- State of the art advanced traveller information services
- Infrastructures/Equipment, forming the basis for further projects and activities of CERTH-HIT and any interested entity active in the field of transport
- Creation and maintenance of times series traffic databases
- Development of advanced transportation modelling and optimization tools
- Possibilities for continuous further development

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2.9.3. *Intelligent Urban Mobility Management System of Thessaloniki*

**Description of the ITS project**

The Intelligent Urban Mobility Management System of Thessaloniki provides, through its Urban Mobility Centre, e-services to travellers, in order to facilitate their mobility and raise their environmental awareness, as well as to improve traffic management and control in the central area of Thessaloniki through its Traffic Control Centre.

The operations of the Traffic Control Centre include:
- Dynamic estimation of traffic conditions for future periods within a day
- Dynamic management of traffic lights based on the estimated traffic conditions
- Incident Detection and Management using real-time information

**Results:**

Overall, the results of the project for the city, the travellers in the city and the city’s related entities can be summarized as follows:
- Cooperation and interfaces between involved stakeholders
- State of the art intelligent urban mobility management system
- State of the art advanced traveller information services
- Infrastructures/Equipment
- Traffic data – Times series databases
- Updated traffic models and decision support systems
- Know-how in the field of urban mobility management
- Possibilities for continuous further development

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2.9.4. *ITS services in Egnatia National Motorway*

**Description of the ITS project**

The ITS services and operations in Egnatia National Motorway include the following:
- Traffic count system
- Traffic surveillance
- Vehicle Detector System
- Traffic monitoring
- Provision of information to drivers
- Management of emergency situations within tunnels
- Detection of frost conditions and other hazardous environmental conditions
• Surveillance and monitoring of the electromechanical infrastructure
• Toll control system

Results:
The ITS in Egnatia Motorway result to improved services to the Motorway users, both in terms of safety and road efficiency (see also impacts below).

Document link:

2.9.5. **MOBINET – Mobility Centre of the Kalamaria Municipality and development of electronic traveller information services through the Internet**

Description of the ITS project
The Mobility Centre of Kalamaria (KEM) aims to provide mobility related information and services to the travellers of Kalamaria, focusing on public transport modes but, also on other modes like trains, cars and pedestrians. The overall goal was to provide an “one stop shop” to the citizens looking for alternative transport modes and to promote the use of public transport modes, thus addressing the problem of traffic congestion. KEM operates through an info-point located in the Municipality of Kalamaria, Thessaloniki (working hours are from 9:00am to 3:00pm, Monday to Friday) that any interested person can visit or contact by phone and email. Further to the above, one can be informed through the official website of the KEM.

Results:
During the period 01.07.2011 – 31.05.2012, 14.892 people visited KEM. 13.501 of them bought tickets and boarding cards of OASTH and 1.391 were informed on optimal routing and received traveler information. The majority of the inquiries to KEM mainly concerned routings of urban bus transport and of the Hellenic Railways Organization.

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Document link:
http://www.involve-project.eu/assets/assets/2-Study-Visit-Thessaloniki-Presentation-KEM.pdf

2.9.6. **Myroute Portal**

Description of the ITS project
“Myroute” Portal is an integrated portal that provides information on traffic and transportation in Greece. It is a web-based application that consists of the following services:

• Traffic: Through the service, the user is informed in real time on all kinds of traffic events, such as traffic accidents, sport events, road works, traffic jams, etc in Athens.
Urban Area. The user receives dynamic information regarding the traffic situation on selected routes information on the travel times and average speed.

- Services to Citizens. The Portal “Myroute” enables citizens to report problems on the roads. In case of Municipalities that are connected with the Portal, they automatically receive reports on the aforementioned problems. In case of Municipalities that are not connected with the Portal, the services acts like a wiki for road problems in which the reported problems are available to and editable by everyone.

- Services to Municipalities. The platform provides the ability to Municipalities to be informed on the problems of their road network and inform citizens on planned road work or events, which can cause traffic jams or road blockages.

Results:
The Portal services are provided free-of-charge through the website: http://www.myroute.gr

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2.9.7. **Telematics services for the Organization of Urban Transport of Thessaloniki (OASTH)**

Description of the ITS project
The telematics services of O.A.S.TH. include a number of installations and applications that allow the surveillance of the bus fleet and the provision of public transport related information to passengers. The telematics of OASTH include the following services:

a. Telematics services for public bus tracking and optimum bus circulation management
b. Passenger Information service
c. “Smart bus” functions that enable: the connection of the ticket validation machines with the telematics device on the bus and the wireless transfer of the collected data to the system administrator
d. Interactive information services to passengers via Interactive Voice Response (IVR) technology.
e. Real-time passenger information services through smart phone technologies.

Results:
The telematics system of OASTH has been applied to the bus fleet of the organization and in 200 selected Smart Bus Stops located in the city of Thessaloniki. The system enables the real time monitoring of the bus fleet, as well as the provision of information (real time or not) to passengers through a variety of means: VMSs located at bus stops, on-board message signs, website and smart phones.

2.9.8. **Traffic Management System (TMS) of the Athens Traffic Management Centre (ATMC)**

Description of the ITS project
The TMS of the ATMC deals with the monitoring of traffic conditions in main roads of Athens, the adoption of measures for dealing with emergency incidents (accidents, vehicles immobilizations, abstractions, works in progress, events, etc.) and the provision to the drivers of real time traffic information mainly concerning travel times and traffic conditions. The decision-making algorithms programmed into the TMS determine the best actions to be implemented:

- Variable message signs inform the road users about the current traffic conditions, possible emergency incidents that have occurred and estimated times of travel in selected routes.
- Traffic signals phases are being adjusted to ensure continuity of traffic signals in given traffic conditions and in case of emergency incidents, the relevant Services are being alerted.

**Results:**
The traffic management system is operated by ATMC 24 hours per day, 365 days per year. TMS collects the relative traffic data through various sources situated in main road arterials - close circuit television cameras, traffic signals and ground loop detectors - analyses and processes them and displays the output – real time travel time and traffic conditions – using a graphic user interface (GUI).

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**Document link:**
2.10. Hungary

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<th>Title</th>
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<td>TEMPO Evaluation of a traffic monitoring pilot project on Hungarian motorway M7</td>
<td>Road</td>
<td>Traffic Management and Operations Services</td>
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</table>

Table 10: Overview of Hungarian projects

2.10.1. TEMPO Evaluation of a traffic monitoring pilot project on Hungarian motorway M7

Description of the ITS project
With the installation of this pilot project, two functions could be examined at the same time. On the one hand, the accuracy of camera-based traffic counting and the widespread loops can be compared. Our expectation is that the camera-detector should feature similar parameters to those of loops, and represent a less vulnerable solution (entailing smaller costs on the long run).

On the other hand, the main goal has been to test an automatic incident detection video camera system (AID) that can give prompt and well-grounded information on the traffic and congestions of the monitored section without human intervention), and occasionally on any unexpected incident. Another requirement is that the system should generate reliable automatic alarms to the operating personnel or any other TIC or TMC.

Results:
The availability of the system throughout a test period of 239 days was 94.77%. We have reviewed 4,024,526 data lines of the system during the testing of the traffic monitoring function.

The difference of the traffic monitoring from the control calculation in the nearside, inner lane was 5.46 %, in the passing one 15.55% and 27.02% in the passing two. The results of the evaluation show that the congestion and event monitoring function has been introduced after a long calibration process. In the light of the initial problems, the trust of the operator in the system has faltered.

With respect to the alarm signals, we had a database of 2,508 lines to evaluate. Alarm signals were detected on 16 days, and took place between 20.00 and 24.00 p.m. As the alarm signals could be associated with the road construction works carried out at the sites, it may be assumed that this function of the system has operated appropriately.

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Document link:
2.11. Italy

<table>
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<tr>
<th>Title</th>
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<tr>
<td>Evaluation of the dynamic speed control system on the Mestre beltway</td>
<td>Road</td>
<td>Traffic Management and Operations Services</td>
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<tr>
<td>System for detecting contraflow vehicles near service areas</td>
<td>Road</td>
<td>Traffic Management and Operations Services</td>
</tr>
</tbody>
</table>

**Table 11:** Overview of Italian projects

2.11.1. Evaluation of the dynamic speed control system on the Mestre beltway

**Description of the ITS project**

The main objectives pursued are:

- **Traffic flow:** improving traffic conditions by means of an optimal use of the infrastructural resources available, increasing the capacity of the Beltway system whenever necessary and thus obtaining:
  - A more homogeneous and higher speed and therefore a shorter journey time;
  - Infrastructure capacity to better get traffic flows moving along the section concerned, in particular during rush hours, with a reduction of the unsatisfied demand share.
- **Safety:**
  - Ensuring that speed limits indicated by VMS are respected;
  - Decreasing accidents caused by micro-collisions due to congestion and “stop & go” by regularizing traffic flows.
- **Environment:** indirectly reducing the emissions of polluting substances, vehicles flows being equal, by improving traffic fluidity and decreasing congestion that causes particularly polluting driving cycles.

**Results:**

The comparison between the days with the Dynamic Speed Control on and the days when the system was deactivated showed that the Dynamic Speed Control installed on the Mestre Beltway improves traffic conditions. In particular during the hours when congestion is higher, an improvement results in the values of the average speed, which increased by 6%, in density, which decreased by 9% and in the time under congestion, which decreased by 21%.

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**Document link:**

Deliverable D3.2: Final Report: Mapping of European best practices in ITS 70
2.11.2. System for detecting contraflow vehicles near service areas

Description of the ITS project
The main purpose of the installed system is to detect and prevent drivers driving the wrong way out of service areas by monitoring the entrance ramps of the aforementioned rest areas, and in case a vehicle is moving in the wrong direction (i.e., trying to exit the rest area via the entrance ramp), alert immediately the driver using audio-visual signals (flashing signs and siren horn).

Simultaneously, a warning signal is sent to the A22’s TCC, so that countermeasures can immediately be taken should the driver continue to proceed in the wrong direction.

Results:
The system works efficiently if the deceleration lane of the service area is long enough and not curved. Otherwise, above all if lanes are too curved, it has been found that the shape of heavy goods vehicles trailers partly invades the defined area and launches false alarms.

It is necessary to simplify the signalisation process of the wrong-way manoeuvre. Often drivers notice they are undertaking wrong-way manoeuvres, an alarm is launched, but no wrong-way vehicle is detected along the motorway as it stops before arriving on the carriageway.

Document link:
http://www.easyway-its.eu/download/489/6041/
2.12. Netherlands

<table>
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<tr>
<th>Title</th>
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| Additional Lanes Program – 10 Projects in The Netherlands | Road | • Freight Transport Management  
• Traffic Management and Operations Services  
• Traveller Information Services |
| Cross Border Management Evaluation: Eindhoven – Cologne, Rotterdam – Antwerp, Arnhem - Oberhausen | Road | • Traffic Management and Operations Services |
| Evaluation Field Trials with Dynamic Speed Limits | Road | • Freight Transport Management  
• Traffic Management and Operations Services  
• Traveller Information Services |
| Evaluation of Ramp Metering on the A10 Amsterdam Ring road | Road | • Freight Transport Management  
• Traffic Management and Operations Services  
• Traveller Information Services |
| Travel Time Information on Dynamic Route Information Panels | Road | • Freight Transport Management  
• Traffic Management and Operations Services  
• Traveller Information Services |

Table 12: Overview of Dutch projects

2.12.1. Additional Lanes Programme – 10 Projects in The Netherlands

Description of the ITS project
In the Additional Lanes Programme, the main focus was on the use of the hard shoulder as extra lane. This is considered as an example of ‘traffic management services’. In order to evaluate the effects of these services, traffic monitoring was used to collect traffic data. The overall objectives of the Additional Lanes Programme are:
- to improve traffic throughput at traffic bottlenecks; and
- to make travel time more reliable,
• both by speeding up the (initial) design and construction period

Results:
The impact of the first ten projects evaluated is impressive:
• The total acceleration time counted up to 2,220 work days.
• Without the Additional Lanes Programme, congestion would still exist at the majority of these ten bottlenecks.
• Thanks to the extra lanes, an average reduction of vehicle hours lost could be achieved of 65% on these stretches of roadway.
• The direct total reduction of vehicle hours was almost 3.5 million, thanks to the acceleration. The reduction in the coming years is calculated to be 4 million hours annually.
• Direct economic savings were M € 51.1, the annual savings expected to be M € 67.4. The total capital investments will be recovered in four to five years’ time.

The reduction of congestion on these stretches of roadway is larger than the EasyWay objective, which is 25% by 2020.

Contact data of main author:
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Document link:
http://www.easyway-its.eu/download/489/6192/


Description of the ITS project
In the ’90s, a mutual need to reduce congestion on busy cross border corridors led to CBM cooperation. CBM involves a number of pre-defined procedures to deal with major incidents affecting cross border traffic. It usually deals with several different organisations like traffic information centres, regional traffic centres, traffic police and service providers.

CBM facilitates international traffic in case of major incidents. As a result traffic is rerouted in case of long lasting incidents to reduce travel time and improve driving comfort.

Results:
The evaluation shows that drivers benefit from CBM measures. All together they save about 250 (Arnhem - Oberhausen), 300 (Eindhoven - Cologne) or 600 (Rotterdam - Antwerp) vehicle loss hours per CBM event. The total time benefit for all drivers in the queue is larger than the total travel time benefit for all drivers changing their route. Although the travel time benefit for each driver in the queue is minor, there are many drivers enjoying this benefit.
The drivers changing their route have more (travel time) benefit, but their number is much smaller.

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**Document link:**
http://www.easyway-its.eu/download/487/7/

### 2.12.3. Evaluation Field Trials with Dynamic Speed Limits

**Description of the ITS project**
The overall objective of the trials was to gain more insight into the impact of dynamic, tailor-made, speed limits. The Dynamax project tested dynamic speed limits in five trials with the following (different) objectives:

- Improving throughput: travel time reduction by increasing the speed limit during quiet periods of the day.
- Improving local air quality, by reducing the speed limit in case of high concentrations of PM10.
- Improving throughput, by reducing the speed limit using a specific shockwave algorithm.
- Improving traffic safety by reducing the speed limit using a specific rain algorithm.
- Improving throughput by increasing the speed limit during the peak period, within a certain air quality restriction.

**Results:**
The results of the field trials in The Netherlands are quite convincing and demonstrate that dynamic speed limits can be applied to achieve various policy objectives, such as improving throughput, traffic safety and air quality. Road users appreciate the dynamic speed limits and adapt their behaviour accordingly. Undesired side effects were shown to be very limited to non-existent.

**Contact data of main author:**
Feiko van der Veen, DHV

**Document link:**
http://www.easyway-its.eu/download/489/4262/

### 2.12.4. Evaluation of Ramp Metering on the A10 Amsterdam Ring road

**Description of the ITS project**
In the ‘Improving traffic flow A10’ (VDA10) project, mainly traffic management services were installed, but also VMS’s to inform the road users, although they were not operational during the evaluation. In order to evaluate the effects of these services, driver behaviour (driver opinions) was investigated through questionnaires and traffic monitoring was used to collect traffic data.

Results:
The main conclusion of the VDA10 traffic management measures is that they have a positive effect on the traffic flow of the A10 Ring road. Congestion on the Ring road was evidently less in the after situation than in the before situation, namely a 10% reduction of vehicle loss hours (including waiting time at on-ramps). The impact was unquestionable on the highway during the afternoon peak, but no significant improvements were identified there for the morning peak. The preconditions for the urban road network were met.

All in all, the set of measures had to a large extent the impact that was expected and described in the project definition document. The results of the ex-post evaluation are largely in line with the ex-ante model simulation study.

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Document link:
http://www.easyway-its.eu/download/487/2034/

2.12.5. Travel Time Information on Dynamic Route Information Panels

Description of the ITS project
The main focus of the Travel Time on DRIPs Project was to improve the quality of the existing traveller information on Dynamic Route Information Panels (Variable Message Signs, roadside system).

In order to evaluate the effects of these services, surveys to road users were used to investigate their opinion.

Results:
- Travel time information turned out to be a success.
- The difference in perception between regions was almost absent;
- Still a substantial portion of the road users did not understand the presented travel time information in first occasion.
- A new presentation method should be introduced in all regions in the same way and at the same time in order to avoid confusion.
- Changing route in case of a ring road does not make sense for people who only have to follow a small part of the ring road.
• Commuters liked, understood and used the graphical information on DRIPs more than irregular passing road users.
• A good understanding of travel times starts with a good knowledge of the road network.
• ‘younger’ generations enough in the coming years.

Contact data of main author:
Feiko van der Veen, DHV

Document link:
http://www.easyway-its.eu/download/489/6040/
2.13. **Norway**

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<th>Title</th>
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<tr>
<td>Fully automated free flow road toll stations in Tønsberg and Bergen, Norway</td>
<td>Road</td>
<td>Transport-related Electronic payment Services</td>
</tr>
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</table>

**Table 13**: Overview of Norwegian projects

2.13.1. **Fully automated free flow road toll stations in Tønsberg and Bergen, Norway**

**Description of the ITS project**

The free flow toll collection system does not include separate lanes, where the drivers can stop and pay with cash. It is rather supported by the so called AutoPass* tags. A signal, sent by radar equipment places in the toll gates detects the AutoPass electronic tag mounted on the windshield of passing cars and deducts the appropriate fee from a pre-paid account. The owners of vehicles that do not have an AutoPass tag are identified through the video enforcement system and receive a bill by mail approximately once a month, covering the exact toll fee.

**Results:**

- Increased efficiency for toll operators, due to the elimination of the queues caused by the payment systems; higher average service rate in comparison to the electronic toll collection
- Simplified infrastructure and accounting system and reduced fuel waste at toll stations; vehicle emissions are reduced, due to higher vehicle speeds through the toll plaza (accelerations and decelerations are minimized).

**Document link:**

2.14. Romania

<table>
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<td>Integrated system for optimizing the cashing and the costs in the</td>
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<td>• Public Transport Services</td>
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<td>Public Transport Company of Timisoara (RATT)</td>
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<td>• Transport-related Electronic payment</td>
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<td>Services</td>
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<td></td>
<td></td>
<td>• Traveller Information Services</td>
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</tbody>
</table>

Table 14: Overview of Romanian projects

2.14.1. Integrated system for optimizing the cashing and the costs in the Public Transport Company of Timisoara (RATT)

Description of the ITS project
The integrated system developed is an innovative and complex system, which has two major subsystems: A new, intelligent ticketing system and an automated vehicle location supervising system.

Results:
1. Increasing of the attractiveness of the public transport, materialized in the increased ridership.
2. Increased safety and security of the passengers and of the personnel of the company.
3. A very high accuracy of resource management of the company.

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2.15. Slovenia

<table>
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<tr>
<th>Title</th>
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<td>Evaluation of Detection of wrong way driving pilot deployment on road split Sermin</td>
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<td>• Traveller Information Services</td>
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<tr>
<td>Evaluation of Estimation of cargo traffic flows in Slovenia</td>
<td>- Rail, - Road, - Waterway, - Air Traffic</td>
<td>• Freight Transport Management</td>
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<td>• Traffic Management and Operations Services</td>
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<tr>
<td>Evaluation of VMS deployment on Slovenian part of corridor V</td>
<td>- Road</td>
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<td></td>
<td></td>
<td>• Traveller Information Services</td>
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</tbody>
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Table 15: Overview of Slovenian projects

2.15.1. Evaluation of Detection of wrong way driving pilot deployment on road split Sermin

**Description of the ITS project**
Wrong way driving on a highway presents a serious safety threat. In Slovenia, there is no complete integral system developed yet, which would, in case of wrong way driving, automatically warn drivers and all competent services and document the situation. In order to be able to detect wrong way driving, the pilot project, that is addressing this issue, was prepared on the highway junction with automatic light warning for the offender and alarm warning for the operator in the control centre, which could estimate the situation and react appropriately in time.

**Results:**
- High level of availability,
- High level of correctness of displayed information,
- Positive users attitude toward the system was NOT possible to determine,
- More than 10 % reduction of occurrences of wrong way driving on concerned road section,
- Slight increase of the number of traffic accidents on concerned road section.

**Contact data of main author:**
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**Document link:**
2.15.2. Evaluation of Estimation of cargo traffic flows in Slovenia

Description of the ITS project
The intention of the study was to systematically collect, put in order and analyse the data regarding the volume, structure, characteristics and dynamics of cargo traffic flows inside Slovenia and cargo traffic flows from and in Slovenia, with the intention to create enough qualitative information and competent base for the development of possible implementation instrumentation in the field of managing, organising, optimising and carrying out the logistic (transport) measures on the level of the region or the entire country.

Results:
Strategic developmental study “Estimation of cargo traffic flows” has enabled the increase of available knowledge regarding cargo traffic flows in terms of volume, structure and dynamics, which is enabling the pointed development of adequate new system and service technologies and is the base for creation of directives, with which one can approach toward optimization and systematic solving of problems linked with the cargo traffic flows.

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Document link:

2.15.3. Evaluation of VMS deployment on Slovenian part of corridor V

Description of the ITS project
Variable message signs are intended for displaying the messages in order to inform the drivers in case of exceptional situations on the road. The messages can include warnings regarding danger, limitations, interdictions, instructions for re-routing and other useful instructions and information. It is expected, from the driver’s side, to take into account displayed messages, because doing so, they contribute to the re-establishment of higher level of traffic safety and optimal traffic flow in case of exceptional situations on the road.

VMS is the most important part of TMS, which is an integral traffic system enabling, on the road section, where it's introduced, re-establishment and sustenance of optimal traffic conditions.

Results:
The system has, during its operation, proven high availability of the activities, as well as high level of reliability of displayed information, which certainly positively affects traffic safety, optimal traffic flow, disburden of the natural environment and positive users attitude towards the system.
VMS is integrated into the central national TCC/TMC/TIC, which presents the central point for traffic management and control and for traffic information on V. and X. corridor and enables cross-border cooperation and data exchange.

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**Document link:**
### 2.16. Spain

#### Table 16: Overview of Spanish projects

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<td>ARENA (Accidentes de Tráfico: Recogida da information y análisis): a system for reporting road accidents</td>
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<td>eTraffic: Integration of traffic information and Google Maps</td>
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<td>FREILOT Delivery Space Booking scheme, Bilbao, Spain</td>
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<td>• Freight Transport Management</td>
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<td>Information via VMS. Segment Málaga - Nerja</td>
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<td>• Traffic Management and Operations Services</td>
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<td></td>
<td>• Traveller Information Services</td>
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</tbody>
</table>

2.16.1. ARENA (Accidentes de Tráfico: Recogida da information y análisis): a system for reporting road accidents

**Description of the ITS project**

The main aim of the ARENA project is to make a system to gather, store and manage information about traffic accidents for the Directorate General of Traffic (DGT), which groups all the mechanisms existing nowadays in order to develop the actual tasks and to give a unique and user friendly interface for the data insertion by authorised users. The system should also allow to process the information gathered to elaborate statistics and reports about accidents.

**Results:**

This project has produced a global system to inform, analyse and manage information about road accidents in Spain. ARENA has been designed to collect information to the traffic management authorities and centres (DGT, CGTs) in several ways (e-mail notifications, summary reports). ARENA design has made it possible to group different questionnaires into one only report from, which will imply in a reduction on the time that users need to report about accidents (basically, data input time).

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**Document link:**

http://www.easyway-its.eu/download/473/360/
2.16.2. Dynamic speed control in the area of Barcelona

Description of the ITS project
Issues Addressed:
In order to implement the system, three phases were planned:

1) In the first stage (2007-08), two areas were defined: the Southern area (Zone 1), which is the area where the pollution levels and congestion were the highest, and the Northern area (Zone 2) surrounding Barcelona city. In this first phase the maximum speed limits in both sections were set. There was a mandatory 80 km/h in Zone 1, and a speed recommendation of 90 km/h for Zone 2.

2) In the second phase (2008-09), a 24-hour dynamic speed control started from 15th January 2009 until today on the C-31 and C-32 motorways, in the Southern area near Barcelona airport.

3) In the third phase DSC will be stepwise implemented on the whole network in the upcoming years.

Results:
The main conclusions are:
- A reduction of global costs of 17% (this is due to the fall of traffic demand between the two years)
- Fluidity cost reduction of 14%
- Minus 31% in Emissions and minus 20% in accidents cost.

Traffic data have been entered in an emission simulation model called HERMES and the results are:
- emissions fall both in 2008 and 2009
- In the 80 kph limit area, the fall of particles and nitrogen oxides raises by 11%, with 80 kph limit in 2008, and only 2% more in 2009 with VSM, these falls are due to the traffic flow reduction (caused by the crisis situation).

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Document link:
http://www.easyway-its.eu/download/487/1311/

2.16.3. eTraffic: Integration of traffic information and Google Maps

Description of the ITS project
eTraffic is a web service for road traffic information offering much more than traffic information. It is the answer of how to put all information the Public Administration has, into the hands of the end user. End users (drivers or any other private / public traffic information provider) can now access (via a friendly web application) both:

- Developed traffic information
• Rare traffic data provided by any ITS equipment installed in the road

Results:
eTraffic service is fully deployed and operational. Moreover, it complies with the Web Accessibility Initiative (WAI) at level A. It is possible to use the service without maps having the level AA on the WAI.

eTraffic service currently offers access to 390 CCTV cameras, 2242 road traffic sensors, 284 weather road equipment and 1162 VMS and could be considered as the biggest source of traffic information worldwide.

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Document link:

2.16.4. FREILOT Delivery Space Booking scheme, Bilbao, Spain

Description of the ITS project
The aim of the project is to tackle the severe congestions and the high fuel consumption caused by the road transport of goods in the centre of Bilbao. Parking toll machines for drivers are located in delivery spaces in the centre of Bilbao in order to manage the parking places and the reservations. The machines are equipped with loop detectors that receive places occupancy and Programmable Logic Controllers (PLCs) that send the data to the control centre. Vehicles are equipped with chip cards that validate the reservation on the delivery spaces.

Results:
Four FREILOT Delivery Space Booking areas are located in the centre of Bilbao in the areas of Licenciado Poza, Santutxu, General Concha and Pérez Galdós. In July 2011, 61 fleet operators (124 trucks in total) participated in the FREILOT Delivery Space Booking pilot in Bilbao.

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2.16.5. Information via VMS. Segment Málaga - Nerja

Description of the ITS project
This project will install all necessary elements to allow dynamic traffic management in the segment mentioned above. The communication system will be that existing in DGT.

Objectives:
• Traffic management improvement
• Information on trip
• Information capture about weather conditions by installing weather sensors and pollution measurement sensors.
• Traffic control and safety by installing television cameras (CCTV).

Results:
It is a fact that the new ITS equipment installed in the studied segment has contributed to improved ability to adopt better traffic management decisions and to make road user travel easier, since the information showed that it is accurate and clear. It also contributes to improved safety and the benefits in the environment are collateral because of the reduction of traffic jams.

Document link:
http://www.easyway-its.eu/download/489/4338/
## 2.17. Sweden

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<td>Optis – Optimised traffic in Sweden</td>
<td>Road</td>
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<td>• Traffic Management and Operations Services</td>
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Table 17: Overview of Swedish projects

### 2.17.1. Assessment of attitudes to variable accident road sign, Sweden

**Description of the ITS project**
The overall objective is to show if the use of the road sign "Obstruction due to accident" can contribute to better understanding among the road users and if the road sign "Obstruction due to accident" is self-explainable for the road users?

The road sign "Obstruction due to accident" has been implemented in the databases that are used for traffic messages on the DRIP's. The road sign is used in normal operation and displayed together with the additional text “Olycka” (“accident”).

Two assessments of road users attitudes where carried out in Stockholm and Gothenburg respectively.

**Results:**
Only about 30% of the respondents say they have ever seen the activated sign. A reason for this might be that the sign is not noticeable and therefore not remembered. An explanation could also be that the majority of the drivers did not actually pass by a traffic information board when the road sign was activated.

A clear majority (80-90%) have a fairly accurate idea of what the sign means. This shows that the understanding of the meaning of the sign is high.

A majority of the drivers claim that the accident road sign affects their driving behaviour. Most of them (75% in Stockholm and 62% in Gothenburg) raise their attention, many try to get more information and a surprisingly large proportion is trying to take an alternative route, especially in the Gothenburg study where there is access to a good alternative.

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**Document link:**

2.17.2. *Bus priority system (project SMILE)*

**Description of the ITS project**

**Objectives:**
- To introduce bus priority systems at 42 traffic lights
- To improve the attractiveness of public transport in Malmö by decreasing the intervals from 10 minutes to 7.5 minutes intervals without increasing the number of buses. In the long term to reduce the use of private cars among commuters into the city centre

**Results:**
- Key result 1 – Bus priority in intersections increases the travel speed for the buses with at the most 1.4 km/hour during afternoon peak. During other times the travel speed increased by 0.6-0.7 km/hour.
• Key result 2 – Bus priority does not imply more delay for other traffic. In fact, it meant less delay as a whole for those three intersections evaluated. Depending on the intersection, the delay decreased with 0-1% during off traffic, 2-14% during morning peak and 0-13% during afternoon peak. This would probably not be the case for optimised signal systems.

• Key result 3 – Bus priority means increased punctuality. The variation of driving times for a specified distance is smaller with bus priority and as a result of that, the percentage of departures “in time” (departure not earlier than 30 seconds and not later than 3 minutes after time table) have increased by 2-5% for the bus line studied.

Document link:

2.17.3. Driver Assistance Systems for Quiet Vehicle Operation

Description of the ITS project
The aim of this report is to explain the work in WP H.3 of the silence project. The scope of H3 was to implement selected noise reduction systems in a truck and to evaluate driver acceptance and potential noise reduction. This was done by a field study where drivers’ perception of noise reduction, design and acceptance was considered.

Results:
In total, it can be concluded that the drivers noticed information that came up on the display in the majority of the situations. In the first three situations, (30km/h zone) the information was in time for the drivers to be able to act upon it but in the last two situations the drivers would have wanted the information sooner. In situation 1 (30km/h zone) and 4 (road information) the drivers thought the information was clear but in the other situations they had a few comments on how to change the information.

Contact data of main author:
Andreas Wiberg

Document link:

2.17.4. Environmentally adjusted speed on E18 Sweden

Description of the ITS project
The main objective of the project was to identify correlations between vehicle speed and PM10 levels. These results are supposed to be used to control the variable speed limits and thus prevent further emergence of high PM10 concentrations.

Results:
The results are in line with the outcome from several earlier studies. When using studded tires, road wear increase. In addition to the speed, the wear is dependent on type of road surface, type of studs and whether the road surface is dry or damp.

Particle emissions along the roads in the Stockholm region occur probably as directly related to road surface wear, not as much due to the suspension of accumulated materials on the roadway. The emission factors cannot be applied to inner-city streets where road and traffic conditions often are different; jerky driving can contribute to increased wear, more accumulated material at roadway, a larger portion of particulate emissions is due to whirled up elements of gritting in combination with salt. Mobile measurements indicate that the impact rate on PM10 emission decreases at lower speeds (below about 50 km/h). Further studies are needed to investigate how the vehicle speed affects particle emissions on other sites.

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2.17.5. Evaluation of Enhanced Information at pedestrian crossings
Sweden

Description of the ITS project
The purpose of this study is to evaluate the effectiveness of the enhanced information system (FIVO), and to capture pedestrians, cyclists and drivers views on the systems. The intention is to provide a description of the effectiveness of the system expressed in terms of possible changes in speed. Furthermore, the results indicate possible decision criteria for each system, where it can be expected of being advantageous to implement.

Results:
The main finding is that enhanced information at crossings, as designed in the tested system, is efficient in terms of increasing the pedestrian experience of safety and security at the crossing. A preliminary examination of accidents at crossings, speed measurements and interviews show that most accidents at crossings occur in urban areas, in connection with intersections where the speed limit is 50 km/h. At the sites selected for evaluation, the results of the speed measurements show a significant speed reduction (~2.2 km/h) when FIVÖ system was activated compared to when it was not activated. Furthermore, the results show that both pedestrians and cyclists feel that the system contributes to an increased safety and sense of security. Both motorists, pedestrians and cyclists believe that the light used in the tested FIVÖ systems can be improved and amplified.

Contact data of main author:
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Document link:
2.17.6. New Dynamic Road Sign Activated together with Speed Limits at Poor Air Conditions

Description of the ITS project
Several studies have shown a correlation between high speeds and negative environmental effects such as noise and emission of CO2, NOx and particles. This study evaluates if information about poor air quality can help reduce speeds and thereby improve the local environment. The effect of air quality information together with changed speed limits is also studied.

The main objectives of the ITS project are to:
- Evaluate the effect of information about poor air conditions on measured speeds.
- Compare effects of information only to the situation when information is given together with reduced speed limits

Results:
The 2010 study concludes that the environmental message needs to reach and be noted by a large share of the drivers in order to have an effect on speed. A speed recommendation or changed speed limit is important to achieve speed reductions. The VMS sign should also be combined with other information channels.

The follow up study concludes that combining an environmental message with reduced speed limits leads to a small but positive effect on the environment.

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Document link:
http://www.easyway-its.eu/download/489/5232/

2.17.7. New Travel Time VMS in Gothenburg, Sweden

Description of the ITS project
The main objectives of the ITS project are to:
- Compare travel time understanding and cost-effectiveness of alternative VMS signs.
- Improve traveller information quality and inform travellers about traffic disruptions.
- Make travellers choose alternative routes in congested situations.

Results:
- The VMS signs are noticed by the drivers: 60-90 % (depending on sign type) of drivers state that they have noticed the signs
- Drivers change behaviour because of the VMS signs: 16-28 % (depending on sign type) of drivers state that they have changed behaviour because of the signs
• Graphical signs (with coloured map) are noticed by more drivers than numerical signs and also effect driver behaviour to a greater extent
• User acceptance of the VMS signs is high
• The main purpose of the VMS signs is perceived by drivers to be “improvements for travellers” and “to enable travellers to choose a faster route”

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Document link:
http://www.easyway-its.eu/download/489/4911/

2.17.8. Optis – Optimised traffic in Sweden

Description of the ITS project
The objective of the OPTIS project is to develop a system to provide new information services to road users. These services can consist of calculation of travel time; identification of queues, recommendation of alternative routes and other information. In Gothenburg, the project is to develop a functioning line of suppliers from collection of data via calculations and modelling to a traffic status database from which data is distributed to different operators. The operators are free to further process the data and distribute to the road users.

Results:
The following conclusions could be made from the simulation studies:
• With the expected number of FCD in the field trials (0.5% of the vehicles equipped), OPTIS will be able to give accurate and real time (updates each 5-10 minutes) travel times on major arterials and motorways in Gothenburg during normal peak hour conditions. (The real number was in practice significantly lower, 0.05%)
• Full implementation (3% vehicles) will significantly improve the update frequency (updates each minute) on major arterials during normal peak hour conditions
• The optimal probe sampling frequency will be 15-30 seconds during field trials
• Detection of severe incidents (e.g. 1-2 lane closure on motorway) within minutes requires a larger penetration of equipped vehicles, typical in the range of 5-10% vehicles

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Document link:

2.17.9. Quiet City Transport

Description of the ITS project
The QCity project is mainly related to noise mitigation measures on vehicles or along the road, reducing noise but not affecting traffic itself. In this work package, we study measures affecting the noise source directly, i.e. traffic. The nature of such measures is different in two important ways: The first is that they impact not only noise, but also accessibility, other emissions and accidents etc. The second is that traffic management measures, undertaken to obtain an effect at some desired site, also will have redistribution effects, i.e. diverted traffic will cause noise (and other) effects elsewhere. These effects need to be considered to avoid sub optimization. Here, we studied examples of measures related to traffic control using a traffic forecasting system and a noise mapping software. Noise reduction and noise redistribution is considered as well as impacts on accessibility.

**Results:**
The study examples and calculations of daytime noise levels show that closing off through traffic can give a large noise reduction, up to – 14 dB(A). This causes less people being exposed to high noise levels in the range 55 to 75 dB(A). In our cases, diverted traffic gives noise increases around up to 4 dB(A). But if traffic can be diverted to roads with no close by dwellings the negative effects would be reduced. The implementation cost of this measure is relatively low but one should consider overall effects in a cost-benefit analysis.

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**Document link:**

### 2.17.10. Road weather controlled variable speed limits, Sweden

**Description of the ITS project**
The overall objective is to show if VSL can contribute to better speed adaptation in a cost-efficient way. The test sites were selected to show how VSL could achieve this objective in risky situations. The focus was therefore to gain knowledge about:

- The impact on road safety, accessibility and the environment
- Changes in behaviour, attitudes and acceptance
- Appropriate technology and organization
- Economic considerations, including the socio-economic benefit

**Results:**
It can be concluded that the road weather controlled VSL system gives only a minor contribution to better speed adaptation at fairly difficult conditions. At hard and very rough conditions (snow, ice, and severe ice) however, the VSL system gives significant extra stimuli to the drivers to adjust their speed properly. These conditions should be the focus of future improvements of the system. The motorists have particularly great need for support under hoar-frost or black ice conditions that are not visible with the naked eye.
Long term studies point to the fact that these behavioural effects are deepened over time especially for low signalled speed limits.

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**Document link:**

### 2.17.11. Time Controlled Variable Speed Signs in Gothenburg, Sweden

**Description of the ITS project**
The effect of the time controlled variable speed signs are evaluated in order to understand if they have improved traffic safety, increased traffic flow throughput and reduced average speed.

The main objectives of the ITS project are to reduce number of accidents/conflicts on this road section which has heavy traffic during peak hours, increase total traffic flow and reduce environmental impact.

**Results:**
- The road section under evaluation reaches capacity limit during peak hours with speeds decreasing from 110 km/h to significantly under 90 km/h in both lanes. The effects of the time controlled variable speed signs are therefore limited. This type of sign is therefore recommended to be used when flow is not so close to capacity limit.
- Traffic flow and speed are somewhat higher in the left lane than in the right lane.
- Changes in traffic flow between the before and after situation are negligible.
- A minor decrease in average speed is observed in the southbound direction (towards Gothenburg) in the after situation.
- Time gaps are unchanged in the after situation.
- Number of accidents decrease in the year after implementation of the new signs.

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**Document link:**
http://www.easyway-its.eu/download/489/6046/

### 2.17.12. Traffic controlled variable speed limits, Sweden

**Description of the ITS project**
The overall objective is to show if VSL can contribute to better speed adaptation in a cost-efficient way. The test sites were selected to show how VSL could achieve this objective in risky situations. The focus was therefore to gain knowledge about:

- The impact on road safety, accessibility and the environment
• Changes in behaviour, attitudes and acceptance
• Appropriate technology and organization
Economic considerations, including the socio-economic benefit

Results:
The examined sites have functioned well technically, except for Ölandsbron. The functional accessibility meets the set demand to display the correct speed limit during at least 99,5 % of the total time. There have been many operational interruptions on the Ölandsbron installation due to communications problems. These problems were later identified and solved.

Some drivers have given feedback and foremost reacted to the speed levels. Many of them consider the displayed speed limits sometimes lower than justified. According to the police, the system at E18 Norrtäljevägen did not work satisfactorily. The police consider the drivers to believe that the displayed speed limits are recommendations and thus they disregard the regulations and drive according to the prevailing conditions. Some adjustments of the system will be undertaken later this year.

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Document link:
http://www.easyway-its.eu/download/487/693/

2.17.13. Variable speed limits at intersections, Sweden

Description of the ITS project
The overall objective is to show if VSL can contribute to better speed adaptation in a cost-efficient way. The test sites were selected to show how VSL could achieve this objective in risk situations. The focus was therefore to gain knowledge about:
• the impact on road safety, accessibility and the environment
• changes in behaviour, attitudes and acceptance
• appropriate technology and organisation
• economic considerations, including the socio-economic benefit

Results:
Starting with the current experiences at the tested intersections, some patterns and trends are apparent. These have been the base for a preliminary strategy concerning conditions when VSL may be a suitable measure to deal with safety and passability problems at intersections.
• Variable speed limit signing should be applied when the traffic on the primary road amount to 10000 vehicles/day or more and the secondary traffic at the same time amount to 20-30%. Also with a lower traffic volume on the primary road VSL can be motivated if the visibility is limited.
• If the traffic on the secondary road is less (< ca 10%) a dynamic warning sign should instead be applied (road sign "crossing traffic" as VMS). The sign should be activated with the same criteria as for variable speed limit.
• If the traffic on the secondary road is greater (> ca 40%) local fixed speed limit should be considered.

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Document link:
http://www.easyway-its.eu/download/485/300/
# 2.18. United Kingdom

<table>
<thead>
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<th>Mode of Transport</th>
<th>ITS-Services addressed</th>
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<td>Description of the ITS project</td>
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Table 18: Overview of British projects

2.18.1. **A55 North Wales Tunnels Area Video Automatic Incident Detection**

### Description of the ITS project

The core objective of the video AID upgrade project was to improve the detection of incidents within the A55 tunnels, thus reducing the number of secondary incidents and the corresponding related severity. Secondary objectives of the project were to reduce...
congestion caused by such incidents with the subsequent reduction of vehicle emissions during incidents between junctions 15 and 18.

Results:
The video AID system is a very useful tool in the aid of running a control room with limited staff that also have the responsibility for the monitoring and control of multiple tunnel and road based control systems. The video AID system allows the control room operators to concentrate on the various tasks without the constant requirement for the stringent monitoring of the CCTV cameras in and around the A55 tunnels area.

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Document link:

2.18.2. ATM Monitoring and Evaluation

Description of the ITS project
This is the 12 month evaluation report on the operation of 4L-VMSL for the primary and secondary indicators (see Section 4.6). A comprehensive 6 month report on the performance of 4L-VMSL has already been produced. This report follows the same evaluation approach as that in the 6 month report and provides detailed assessments of all the indicators considered. This report uses larger data sets and a longer monitoring period compared to the 6 month results; hence it supersedes the 6 month report in estimating the effects of the operation of 4L-VMSL.

Results:
The operation of 4L-VMSL on the M42-ATM section has increased the observed capacity of the motorway by an average of 7% (compared to NO-VSL) and 9% (compared to 3L-VMSL). In general across the defined peak periods, analysis shows that there is spare capacity during 4L-VMSL operation.

Statistically significant (at the 5% level) traffic growth has been observed between the NO-VSL and LVMSL cases. On average over all day-types, the 24 hour total flow has increased by 6% and 9% with respect to the northbound and southbound directions. This increase in total flow is in line with the average overall motorway traffic growth of 7.9% between NO-VSL and 4L-VMSL which has been derived from National Traffic Statistics (www.dft.gov.uk). The trend analysis has shown that the traffic demand increases from the winter to the summer season in all the assessed cases.

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2.18.3. **Congestion Charging in London**

**Description of the ITS project**
The central London Congestion Charging scheme was introduced with the aim to reduce traffic and congestion in central London, to make radical improvements to bus services, to improve journey time reliability for car users and make the distribution of goods and services more efficient.

The Congestion Charge applies to all vehicles being driven within the Congestion Charging zone from 7am to 6pm, Monday to Friday.

The scheme operates with CCTV cameras located at entrances, exits and around the zone that read the number plates of the vehicles that enter the zone. ANPR (Automatic Number Plate Recognition) technologies enable the system to check the vehicle plates against a database in order to find out whether there has been a valid payment or not, or whether charging exemptions and discounts apply.

**Results:**
The central London Congestion Charging zone currently covers a total area of approximately 42 square kilometres. TfL continuously introduces changes to the scheme, including the level of daily and penalty charge, the charging area, payment methods, discounts and exemptions from the charge.

**Contact data of main author:**
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**Document link:**

2.18.4. **CURACAO Coordination of Urban Road User Charging Organisational Issues**

**Description of the ITS project**
The aim of CURACAO is to support the implementation of urban road user charging (URUC) as a demand management tool in urban areas. The project does this by working with a User Group of cities interested in pursuing road user charging to identify the barriers to their doing so, and providing evidence on ways of overcoming those barriers. This is done by continually identifying user needs and delivering products which can satisfy those needs. CURACAO aims at reviewing the complete process of setting up a RUC scheme. This includes setting
objectives, designing the scheme, selecting the appropriate technology, predicting impacts and achieving acceptability. Its target audiences range from cities where road user charging schemes are already in place to those engaged in a fact finding exercise.

Results:
In conclusion, cities that have pursued or are considering the introduction of road user charging have, as their dominant objectives, to improve the efficiency of transport system, to improve the urban environment, and to generate revenue to pay for infrastructure improvements. The evidence from cities with implemented schemes is that all of these objectives can successfully be achieved by road user charging. The urban road user charging schemes that have been implemented in Europe have demonstrated substantial reductions in private car trips and levels of congestion, increased use of public transport, and improved environmental conditions. However, some urban areas (notably Edinburgh and Manchester) have tried but failed to introduce schemes. Therefore it is clear that pure economic arguments are not enough.

Contact data of main author:
ISIS

Document link:

2.18.5. Datex II Evaluation Results

Description of the ITS project
By developing language and cultural independent traffic data dictionary, the objectives to be achieved are:

- Enable drivers to find out traffic conditions across European network;
- Enable better management of European road network from operational perspective;
- Include local authorities and service providers in traffic information exchange.

Results:
DATEX 2 implementation has been successfully achieved across a number of pilot sites. In terms of physical implementation:

- All partners found D2LCP straightforward to implement within their TCC with some additional work.
- Quantity of data being transferred still not optimised for application, consequently causing “server overload” and potential for message transmission delay;

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Document link:
2.18.6. *Integrated Traffic Management at Junction 33 of the M1*

**Description of the ITS project**

ITM, as implemented at M1 Junction 33, has sought to integrate the traffic signal control of the all-purpose network directly to the ramp metering of the southbound access slip road to the M1 main carriageway. At its inception, ITM was expected to provide additional ‘storage’ capacity at the junction to enable the more efficient use of ramp metering. However, it was feared that it might also have an overall detrimental impact upon all-purpose through traffic at the junction.

**Results:**

The weighted journey time saving for traffic using the local road network is 8.7% across all periods, with an increase in the saving during peak times to 9.8%. In addition, we have reassessed the journey time savings to traffic on the motorway southbound carriageway. Following the introduction of ramp metering at this site, the average journey time saving was 9.1%. Using the same sources and methodology, the measured benefit after ITM was introduced increased this to 14.7%.

Reliability of journey times in the local network before and after the introduction of ITM is approximately constant.

**Contact data of main author:**

KA Butler, Atkins

**Document link:**


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2.18.7. *Intelligent Road Studs Evaluation*

**Description of the ITS project**

Astucia is a company who has produced a system of Intelligent Road Studs (IRS) which have the potential to provide the same functionality as COMPANION at a reduced price and with less obtrusive infrastructure.

The Scottish Executive therefore decided to trial the IRS and compared their impact on traffic speeds and behaviour with the impact of COMPANION to determine if the IRS would offer a feasible solution to problem routes where the problems are caused secondary incidents or due to poor visibility.

**Results:**

The evaluation sought to ensure that the IRS is technically competent and have a similar positive impact on motorists as the COMPANION system:
1. The system was available for 96.4% of the trial period (although 3.15% of the unavailability was due to system maintenance);
2. All speed activations took place when appropriate
3. Fog activations show a good correlation with independent meteorological office data;
4. Feedback about the system has been positive, with one negative point about the studs being too bright at night time being addressed by a retrofit dimming facility
5. Activation of the flashing studs resulted in a decrease in speed, increase in headway and decrease in lane change manoeuvres.

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Document link:

2.18.8. Local Journey Time System Evaluation

Description of the ITS project
Previous evaluation work has been undertaken to establish the suitability of the algorithm developed for this application using FVD surveys. This evaluation report will consider the application following implementation with two key objectives:
- To determine the accuracy of the information as presented to drivers on the variable message signs.
- To establish preliminary qualitative public feedback (Full market research will be undertaken as part of the NADICS Market Research in the future)

Results:
The system is considered to be a success addressing the market research issues raised which prompted delivery of the system, being technically accurate and providing information to people which most regard as being useful.

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Document link:
http://www.easyway-its.eu/download/467/379/

2.18.9. M90 COMPANION Hazard Warning System (Tabasco project & subsequent Scottish Executive research)

Description of the ITS project
COMPANION is designed for use on inter-urban roads, with its main objective being to reduce the number of ‘shunt’ style accidents by warning drivers in advance of stationary...
vehicles ahead. This is done through roadside electronic guide markers, which emit yellow or orange signals, to indicate that there are incidents ahead.

**Results:**
During phase 1 operation, the COMPANION system was refined until it became reliable. This included repositioning of the repeater units from an in-ground location to a post mounted location.

During the two year phase 1 trial period, Fife police activated the system on average 7.6 times a month. During phase 2 of the project (AID implementation), the system was automatically activated 633 times during the 6-month trial to address 170 incidents.

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**Document link:**
http://www.easyway-its.eu/download/448/458/

2.18.10. **Mobile Journey Time System**

**Description of the ITS project**
Road works on the trunk road network cause unavoidable delays for the travelling public. Studies have shown that drivers are caused a high level of discomfort from not knowing the length of delay if they are held in queuing traffic. A fully operational MJTS is able to determine the length of delay at road works. This information can be passed onto the travelling public through VMS or other en route traffic information sources. The information may also be used by network operators for strategic routing or for evaluating performance against criteria related to effective traffic management at road works.

**Results:**
In summary, the recent evaluation period showed that the MJTS produced results that were good and as expected. Feedback received from the NNCC was also positive however the need for specific adjustments and improvement was recognized.

Communications concerns, fault defining, lag in journey time displays and the overall operational status of the MJTS are all factors which could be enhanced to improve overall system capability. The requirement for intense monitoring on site was essential throughout the period to ensure system operations.

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**Document link:**
http://www.easyway-its.eu/download/484/310/
2.18.11. **NADICS Journey Time Planner**

**Description of the ITS project**
Expected Journey Times have been identified as key information asked for by road users. This evaluation exercise has determined whether the floating vehicles on the Scottish network are effective in providing accurate and reliable journey times to the public via the Journey Time Planner website. Their function as an incident detection tool has also been investigated.

**Results:**
- Technical Updates - A series of updates were made to improve the usability of the website.
- Comparison with Driven Journeys
- Correlation with NNCC Incident Logs
- Usage Levels
- User Feedback

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**Document link:**

2.18.12. **Own Language Information System**

**Description of the ITS project**
The Objective of the project is to prove the concept of the system. Following successful trial and further roll out it is envisaged that such a system could help reduce the number of accidents on the Scottish Trunk Road Network and help EasyWay meet the objective of improved safety.

**Results:**
The evaluation of the Own Language Information System proved the concept and the feasibility of linking ANPR technology with roadside VMS to display the message “Drive on Left” to drivers in the language of origin of their vehicle as they pass the VMS.

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**Document link:**
http://www.easyway-its.eu/download/487/698/

2.18.13. **Parking Guidance and Information**
Description of the ITS project

Parking Guidance and Information can assist in delivering many highway authority policy objectives and provide a safe, efficient and environmentally friendly transportation network. PGI systems can deal effectively with the following network problems:

- Excess queues at car parks;
- Congestion on the surrounding road network;
- Poor air quality; and
- High percentage of visitors in tourist areas.

Results:

Case studies illustrate that there are significant benefits that can be derived from PGI systems both in terms of quantifiable and qualitative benefits. Some of the key findings include:

- A survey in Southampton found that drivers reduced the time spent searching for a parking space on average by 50% from 2.2mins to 1.1mins (3);
- A survey of over 600 people in Valencia, Spain found that 61% of people were influenced by the information on VMS signs and 30% had changed their parking destination as a result (3);
- Improved parking information can raise the public’s image of the area, which can lead to improved revenue generation within that area;
- Improved parking information could lead to safer driving behaviour, as drivers are guided straight to an available space; and

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Document link:

2.18.14. Pilot Study into the use of Automatic Traffic Counters for Event Monitoring

Description of the ITS project

The study was commissioned to establish whether ATC sites could be adapted to provide operational data to assist in the management of events on the network. Events were defined as a temporary reduction in road network capacity as a result of a variety of possible incidents, such as, but not limited to: debris, recurrent congestion, accidents, maintenance activities, etc.

Results:

The proof of concept trial demonstrated that alternative communications (both wireless and fixed) can be used successfully, without any degradation in event monitoring system performance. During the trial, the use of GPRS mobile communications was investigated. It was found that GPRS is better suited to direct communications to a PC hosted on the
internet (i.e. having an IP address). As this proof of concept trial was based on a "standalone" system without connection to the internet, demonstration of GPRS was not taken forward.

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**Document link:**

### 2.18.15. **Probe IT Evaluation Results**

**Description of the ITS project**
The aim of the ProbeIT project is to develop a fully working system for the transmission of position-related information from a dynamic map database to and from in-vehicle systems. The overall objective is to demonstrate the concept of an end-to-end process of information transfer utilizing, emerging, commercially available wireless communications technology.

**Results:**
As the main aim was to prove the concept of the project the results of some tests were limited, but provided enough data at this stage to indicate that the prototype system successfully achieved the main concept aim of the end-to-end transfer of information from a remote server to a vehicle system.

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**Document link:**
http://www.easyway-its.eu/download/461/408/

### 2.18.16. **Ramp Metering Operational Assessment**

**Description of the ITS project**
With increasing levels of congestion across the UK motorways there is greater emphasis being placed on the need to manage the demand for travel and also to make the most efficient and effective use of the existing road network. As a consequence Atkins were commissioned by the Highways Agency (HA) to undertake all the necessary design, monitoring and evaluation work to implement RM at 30 sites (RM30) across the motorway network.

**Results:**
Across all the sites evaluated the observed average journey time saving is approximately 13% compared to the 5% saving assumed in the initial economic appraisal. This confirms the view that the initial economic appraisal was likely to result in a conservative assessment of the economic benefits of RM.
2.18.17. **Ramp Metering – Summary Report**

**Description of the ITS project**
Ramp metering aims to maximise throughput on the main carriageway without disrupting the local road network. It does this by controlling the discharge of traffic from the slip road to reduce the interference of merging traffic on the main line flow thereby maintaining flows at a higher level. Maintaining higher flows will postpone the onset and reduce the duration of flow breakdown on the main carriageway. The ramp metering system relies on the measurement of traffic conditions on the main carriageway and attempts to maintain this at ‘target occupancy’ by restricting the flow from the on slip road.

**Results:**
The overall increase in peak period traffic flows observed on the mainline after the installation of ramp metering varies by site with individual increases in traffic flow ranging from 1 – 8%. Despite the increases in traffic flow the implementation of ramp metering has resulted in downstream traffic speed increasing by between 3.5% and 35%. In many cases, ramp metering operation has led to a delay in the onset of flow breakdown and/ or earlier recovery from flow breakdown conditions. The large variation in the encountered benefits can be explained by the range of different road and traffic conditions existing at the junctions (e.g. downstream traffic disruptions, weaving for approaching downstream junction etc.). A full evaluation is available from the Highways Agency describing the benefits and conditions encountered in detail.

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**Document link:**

2.18.18. **Reading UTMC 29B**

**Description of the ITS project**
The key aim is to reduce the number of people travelling to the centre of Reading by private car, and increase the number of people travelling by public transport. Through the UTMC project the objective was to contribute to the outcome of this aim by using the improved
functionality and enhanced operational options achieved with information exchange & interoperable systems.

Results:
The Reading UTMC Demonstrator has been seen from inception as a project with important links to the strategic network. In part this is because of Reading's responsibility, to the Highway Agency and neighbouring authorities, for UTC control and CCTV surveillance of sections of the motorway and trunk road network. In addition the location of Reading itself is of strategic importance as a major regional centre within easy reach of London and both Heathrow and Gatwick airports.

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Document link:
http://www.easyway-its.eu/download/484/308/


Description of the ITS project
The UK is a densely populated European nation with a congested road network. There are often parallel routes and there is a need to get information to motorists in the event of incidents to ensure travel time is minimised. The UK Government wanted to demonstrate the merits of an RDS TMC service with the intention of the service being provided by commercial travel information providers. The UK Government therefore part funded a two year TMC demonstration service, with travel information provided by the UK’s Automobile Association (AA) and the Royal Automobile Club (RAC).

Results:
During the six-month trial, 37% of respondents using Blaupunkt VIKING radios (n 255) and 48% Volvo RTI satellite navigation users (n 25) changed route as a result of a TMC message. 23% of Blaupunkt Viking users had changed journey plans as a result of pre-trip TMC information, although the majority of trips were cancelled as a result of the TMC information. In excess of 80% of users who had changed plans as a result of a TMC message were pleased that TMC had saved them stress or time.

Users’ willingness to subscribe and pay for the services would increase if certain improvements were made to the service. An additional 50% of users would consider subscribing at a price of £130 per annum. Overall the majority of respondents considered the service provided ‘useful’. There appeared to be a correlation between the quality of information provided and the ‘usefulness’ of the service.

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2.18.20. Traffic Information Kiosk

Description of the ITS project
The deployment of traffic information kiosks at service stations provides real time traffic information to travellers en-route. It is expected that the kiosks will increase the level of information available to travellers and therefore allow them to make better and more informed decisions regarding their onward journey.

The Objective is to prove the effectiveness of the TIDs in terms of driver acceptance and usability.

Results:
Overall, it can be concluded that the travelling public will benefit from implementing more kiosks on the trunk road network. This will increase coverage to include more strategic locations and create an en-route traffic information network throughout Scotland at a low price. It will also increase patronage of the Traffic Scotland website as users who are first made aware of it through the kiosk may then consult it from their workplace or home.

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2.18.21. Traffic Wales WTO Airwave Radio System Evaluation

Description of the ITS project
The objective is the design and installation of a highly available, secure Tetra based radio system within Traffic Wales and Wales Trunk Road Agencies allowing highly available, secure and efficient communication between Traffic Wales, Wales Trunk Road Agencies, The Welsh Police Forces and partner organizations.

The move to a Tetra based radio system is a key requirement of the Wales Traffic Officer (WTO) trials that are taking place. The WTO’s will be providing assistance to the Wales Police forces by taking over some of the day to day duties in relation to the motorway and trunk road network in Wales.

Results:
- Measurement of the three main indicators: congestion, safety environment
- Results from questionnaires, models etc
• Comparison with reference case and expected performance

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Document link:

2.18.22. Traffic Scotland Web Information Services

Description of the ITS project
The Traffic Scotland web service represents an enhanced traffic management and travel information service from Transport Scotland. The web site expands the provision of information for motorists by providing real-time and future traffic information for the Scottish trunk road network. Traffic Scotland provides detailed information on incidents, congestion, journey times, current and future road works, major events and weather information for the country’s 3200km of trunk roads.

Results:
It can be concluded that the travelling public will continue to benefit from the Traffic Scotland Web Service. The on-going development of the Traffic Scotland web information services is recognition by Transport Scotland and the Scottish Government of the importance of disseminating traffic information to the public. Through continued partnerships, data sharing and public transport integration Traffic Scotland is leading the way in providing a world class service and meeting government targets.

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Document link:

2.18.23. Urban Traffic Management & Control (UTMC)

Description of the ITS project
UTMC is a UK-based initiative which has developed an open technical framework for traffic and transport management systems. The UTMC systems enable the integration and management of ITS including:

• Strategic network management
• Comprehensive performance monitoring
• Traveller information
• Congestion monitoring
• Streamlined fault management
• Consolidated asset management
Results:

- Framework Technical Specifications, which presents the core technical standards that are recommended for use by UK Traffic Managers in their systems.
- Objects Registry, which presents the data standards recommended for use by UK Traffic Managers in their systems.
- Product Register, which is an online catalogue of available products which Local Authorities may use in planning their Traffic Management Systems.

Contact data of main author:
UTMC Ltd.

Document link:

2.18.24. Video Information Highway Trial

Description of the ITS project
The impetus for the VIH trial came about as a result of requests from outside bodies for access to the HA CCTV images. Some local authorities and police forces were already making images available for use in local traffic broadcast slots on radio and television news. This project was launched to allow that to take place in a more structured and flexible manner.

The VIH trial had two main aims:
- to provide a technical model for a national rollout of CCTV distribution; and
- investigation of the institutional aspects of providing HA CCTV images to third parties, by contributing to a VIH feasibility study.

Results:
The Video Information Highway Trial was predominantly a technical evaluation to test and optimise digital video transmission and access options within the UK.

The trial successfully demonstrated the digital encoding and transmission of video images at various levels of quality over dedicated and shared networks. Whilst the most important factor in the trial was showing that the Video Information Highway (VIH) architecture worked satisfactorily, there were some quantifiable results to emerge from the evaluation.

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Document link:
http://www.easyway-its.eu/download/486/293/
3. CONCLUSIONS

The objective of the present activity was a thorough scientific and literature review concerning best practices on ITS applications across Europe. The aim is to identify best practices on ITS services and as a result identify different transport needs and users profiles from different countries with provided ITS services correlated.

As a first step a definition of “best practices” for a common understanding between all partners was defined as:

*Best practice is used to describe the process of developing and following a standard way of doing things that multiple organizations can use. Best practices are used to maintain quality as an alternative to mandatory legislated standards and can be based on self-assessment or benchmarking.*

As a second step, a template for the collection of best practices on ITS applications across Europe was designed and distributed amongst all WP3 partners. The requirement was to report as many ITS activities as possible and which could be of importance for this project. The emphasis was on the collection of projects/implementations in order to learn from success as well as from projects which did not reach the expected impact. It is very important to consider the lessons learned in other projects.

As a result of this collection phase, 122 best practices across Europe were identified, which reflect the ITS activities of the past years. The majority of the projects/implementations identified as best practices were from UK, France and Germany. Most of the collected evaluation reports concern measures for the road (80%). The fewest transport mode addressed, with just 1%, is bicycle.

All the collected reports provide a help for decision makers in the SEE-countries in order to get an overview of which projects are reasonable to implement. Furthermore, the best practice collection should represent a support function and demonstrate the benefits of ITS projects and implementations.

Figure 3 gives an overview of the ITS services addressed by the collected reports. In a large part the reports address “Traffic Management and Operation Services” and “Traveller Information Services”. With each just 1% “Disaster and response management and coordination” and “Emergency Services” are the ITS services which are addressed the least.

Chapter 2 of this report gives an overview of each collected project/activity with a short description of the ITS project, the result and if available provides contact information of the main author and a document link.
Figure 3: ITS services addressed by best practices

All collected reporting templates will be available for download as PDFs at the SEE-ITS platform.