



Summary of projects and results from topic
Traffic management and restraint

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Urban Traffic Management

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INTRODUCTION AND METHODOLOGY

This report has been compiled by FCTUC to summarise the conclusions of the activities undertaken on the key topic Traffic Management as part of Work Package 2 of the PORTAL project.

1.1 Methodology

The work developed under the Work Package 2 of the PORTAL basically consists of a structured research exercise on European projects related to the topic Traffic Management. We focused on projects under the 4th Framework Transport RTD Programme.

This research included, for each one of the projects:

- General Information about participants including qualifications (experts);
- Identification of demo-sites or study sites;
- Materials produced by each one including web-sites;
- LEI's involved in the processes.

The starting point was the Internet available material, concerning specific information about the European Union projects.

For this first type of sites we focused on

- <http://www.cordis.lu/transport/> - European Community database CORDIS (Community Research and Development Information Service), and
- <http://www.eltis.org/> - (the European Local Transport Information Service).

We also found a few Internet sites where specific information about some of the projects was available. We used some searchengines (such as AltaVista or Google), because nothing about those sites was mentioned in the EU databases.

For each project, and because some information was still missing, we contacted two partners: the co-ordinator and other partner. We used personal emails or project emails. Unfortunately only two replied.

Problems encountered:

Some of them were already described above because the methodology followed had to be adapted to the amount and type of information obtained in each step.

We should make a statement on all the difficulties we found while collecting the information needed. As expected and in one project (MUSIC) where Portugal was involved, there were no difficulties but in other projects, especially those with no

Internet page or with unavailable reports it proved much more difficult to find out the information.

This is also due to the fact that our country is geographically away from other European countries and we cannot manage to collect the missing information in an effective way, as for example through personal contacts in a meeting.

Relevant and detailed information data was very difficult to get, especially concerning the materials produced in INCOME, PRIVILEGE and TASTE and if it contained books, CD's, leaflets, or materials of other kind. If nothing was mentioned we assumed that only written material was produced.

We did not find any information about IPR status but we cannot guarantee that the projects do not contain IPR status because as mentioned above, we had major difficulties in finding the correct information.

As mentioned above several contacts were made by email but only received replies for the projects SUTRA and MUSIC. It was observed that much of the information about the projects was not available at the European Union sites and/or was not updated, especially in respect of Internet addresses and personal e-mails.

2. URBAN TRAFFIC MANAGEMENT

2.1 Description of the key-topic Traffic Management

This Key-topic is related to a large field involving both traffic systems issues and urban development issues. Initially this topic was called 'Urban Traffic Management and Restraint' and is now simplified to 'TM' - 'Traffic Management'.

It is also one specific working area with specific disciplines both in Civil Engineering and in Urban Planning graduate courses and it also an area of specialisation in both types of Faculties. This is a multidisciplinary area and needs several contributions too.

Several public institutions and consultancy offices are also involved in this subject.

We see that this topic can be divided into 'standard' issues and 'new' issues.

In what concerns standard issues we considered mainly the following subjects

Standard

- Basic principles for urban and rural road (road hierarchy)
- Main Road networks elements (mainly intersections) design principles and tools
- Network optimisation principles and tools namely, area wide traffic signal coordination systems and network simulation models
- Parking management solutions and techniques
- Pedestrian and cycling networks design principles
- Arterial roads integrated management solutions
- Public transport priority oriented infrastructure management solutions namely bus lanes and PT actuated traffic signal solutions
- Traffic calming techniques applied both to through roads and to "sensitive" local networks
- Road accidents detection and prevention

New

- HOV Solutions
- Reversible lanes solutions
- Road pricing
- Route guidance
- "Incident" detection and management systems
- New Telematics solutions applied to data collection exercises, parking management and road network online management.

INCOME – Integration of traffic control with other measures

OPIUM – Operational project for integrated urban management

PRIVILEGE – Priority for Vehicles of essential user groups in urban environments

SUTRA – Sustainable Urban Transportation

TASTE – Analysis and development of tools for assessing traffic demand management strategies.

MUSIC – Management of traffic using traffic flow control and other measures

2.2 Results of the ICARO Project

ICARO : Increase of car occupancy through innovative measures and technical instruments.

The overall aim of ICARO was to investigate the measures and instruments that can increase car occupancy. And mainly focusing on transport policy research. At the end of the project recommendations and guidelines were delivered on how to increase car occupancy at both local and national levels. This Project also aimed at involving key decision makers in local, regional and national government and in planning and implementing traffic and transport policies. ICARO carried out a combination of both research and demonstrations, concentrating on the latter.

Basically the **objectives** in ICARO were:

- Identification of best practices concerning technical instruments and organisational measures to increase private car occupancy;
- Identification and understanding of the institutional, legal and cultural framework necessary for increasing car occupancy. There may be considerable differences between countries with respect to the acceptance of measures and instruments;
- Implementation in real life demonstrations of the techniques and measures that can increase private car occupancy, involving a mix of innovative and technical measures;
- Investigation in substitute behaviour that might occur as an undesired effect of schemes for increasing the car occupancy;
- Creating a methodology for selecting the right measures and instruments;
- Dissemination of the results to all interested parties.

Available **materials** are:

- Deliverable 1 - Best practice (on measures to increase car-pooling)
- Deliverable 2 - Institutional, Legal, Financial, Cultural and Legal Framework
- Deliverable 6 - Evaluation and Recommendations of ICARO
- Deliverable 7 - Implementation guidelines for increasing car occupancy
- Deliverable 8 - Brochure on car occupancy increasing measures
- Deliverable 9 - Video on car-pooling
- Deliverable 10 - CD-rom with all papers of interest

Deliverable 10 is the most important because it contains the most relevant conclusions about the project, but also D 9, D 7 and D 6 have interesting information concerning Car Pooling Strategies.

The **experts** from ICARO are Gerd Sammer from the Universitat Fuer Bodenkultur Wien who was the co-ordinator of the project; Bart Desmedt from Traject Jan Van Severen from Langzaam Verkeer who worked in measures to increase the car occupancy; Andres Monzon of the Polytechnic University of Madrid, Transport Department, ES. who was the responsible for the WP2 and WP6 dealing with the Institutional, Legal, Financial, Cultural and Legal Framework and with the evaluation and recommendations of ICARO; and Paul Timms from the University of Leeds who was the responsible for WP4A concerning the real life demonstrations.

Real life **demonstrations** or **test sites** were carried out in the following cities:

- Leeds (Great Britain) - a combined bus, cycle and HOV lane was introduced along sections of the existing nearside lane of the A647 route into Leeds from the west;
- Brussels (Belgium) - car-pool centre with matching service was established in co-operation with individual companies to promote car-pooling and to encourage employees to put car-pooling into practice;
- Salzburg (Austria) - small-decentralised car-pooling parking areas were established at important interchanges on motorways and regional roads surrounding the City of Salzburg. A car-pool co-ordination centre was established in combination with a widespread publicity campaign and several incentives for car-poolers.
- Pilsen (Czech Republic) - a large-scale information campaign was carried out to introduce the concept of organised car-pooling to the general public and encourage individual companies in the region to take an active part in promoting the scheme. In addition, a car-pooling co-ordination centre with matching service was established.
- Bern, Lyss, Oberglatt and Yverdon (Switzerland) - preferential parking for HOVs was introduced at a number of sites and the response of commuters assessed. The aim was to offer preferential treatment to railway customers at locations where parking spaces were limited.
- Graz (Austria) - organised hitchhiking scheme was introduced and tested in areas with little or no public transport provision. The objective of the scheme was to use car-pooling as a feeder service for the public transport.
- Rotterdam (The Netherlands) - guaranteed ride home scheme was introduced in the Rotterdam area to encourage car-pooling. The demonstration included a public awareness campaign.

The demonstrations were carried out in 4 European countries. These demonstrations were concentrated in simple and easy-implemented schemes and in HOV-lanes as a technical measure. In addition there were studies to analyse through modelling (changes in) the use of HOV-lanes (Saloniki, Salzburg, Leeds, Madrid).

Leading educational institutes that were involved in ICARO are the Universitat Fuer Bodenkultur, Wien in Austria, the Universidad Politecnica de Madrid and the University of Leeds.

The website of ICARO Project is <http://www.boku.ac.at/verkehr/icaro.htm>

Project results

ICARO produced a Final Report (Deliverable 11) and the conclusions of the Project were:

- Car-pooling can have significant advantages for people in individual transport situations, mainly significant cost or timesavings. However, it can only be regarded as an appropriate response in specific situations, (in the case of non competitive public transport).
- A number of sites – specific characteristics as well as mobility behaviour of potential users should be taken into account, in order to achieve good and permanent results.
- Car-pooling should be considered as part of any transport policy in the urban/metropolitan framework. The aim should be to reduce the dependence on cars by promoting various alternatives.
- The potential for car-pooling is somewhat limited, as it seems to be quite difficult to co-ordinate different people's trips (flexible working hours). Bigger demonstration sites have higher numbers of interested participants and a greater potential of success. It is also important to focus all campaigning efforts on specific target groups such as commuters or companies rather than to concentrate on general publicity campaigns.
- The idea of car-pooling is generally accepted and rated positively by the population. The surveys have indicated that incentive measures do have a positive influence on car occupancy rates, not by merely halting the current decline but actually increasing the occupancy level.

2.3 Results of the INCOME Project

INCOME : Integration of traffic control with other measures

The INCOME project concerned Urban Traffic Management and the main **objectives** were:

- Development and integration strategies for optimisation of Urban Traffic Control (UTC), Driver Information Systems (DIS) and Public Transport Systems (PTS) within Urban Traffic Management Systems (UTMS);
- Establishing EU, national and local policies/user requirements for integrated Urban Traffic Management Systems (UTMS) and strategies;
- Reviewing integrated UTMS in the EU and strategies/software for their optimisation;
- Evaluating integrated strategies through field trials supported by simulation in London, Turin, Gothenburg and Piraeus and
- Producing guidelines on effectiveness of different integrated strategies.

Available **Materials**: Deliverables from the project and the INCOME book with the results and guidelines for city authorities (available in the project CORDIS **web site** <http://www.cordis.lu/transport/src/income.htm>). But no other information besides this one was found.

Experts from INCOME are Claude Rochez from STRATEC SA who was the co-ordinator of the project, Michael McDonald from the University of Southampton, David Bretherton of the Transport Research Foundation and James Landles of the Traffic Control Systems Unit.

INCOME had **demonstrations sites** in

- London (serving for review and simulation in UTC/DIS; for review, simulation and field trial in UTC/PTS; for review and simulation in UTC/DIS/PTS);
- Turin (for review and field trial in UTC/PTS; for review and field trial in UTC/DIS/PTS)
- Gothenburg (for review and simulation in UTC/DIS; for review, simulation and field trial in UTC/PTS; for review, simulation and field trial in UTC/DIS/PTS);
- Piraeus (for review, simulation and field trial in UTC/DIS) (this information is available in <http://www.stratec.be/>).

The only **Leading educational institute** involved in INCOME Project was the University of Southampton.

Project results

INCOME project achievements and results have been disseminated through conference presentations, annual workshops and journal papers (some documentation in <http://www.eltis.org/>) as well as through project deliverables. The Final Report, including the INCOME book of results and guidelines for city authorities, provides a comprehensive project summary. Nevertheless we only found limited information (basically the INCOME book and some reports in newspapers), and that proved insufficient for a good knowledge of the project.

Exploitation is achieved in all of the INCOME cities by a significant 'roll-out' of the research results into real applications on street. In this way the INCOME project demonstrated the benefits which can be achieved through the implementation of advanced Urban Traffic Management systems and strategies. These can make a significant contribution to achieving local, national and European transport policy objectives and warrant increasing implementation in cities across Europe, as well as further research and development to maximise the benefits which can be achieved.

2.4 Results the OPIUM Project

OPIUM : Operational project for integrated urban management

In terms of general **objectives** the OPIUM project concerned the areas of parking management and guidance, traffic calming and bus priority measures. It designed and implemented a range of physical traffic management measures. The project evaluated also the impact of the measures on transport efficiency, safety and modal split in urban areas, with particular reference to the impact on vulnerable road user.

At the end of the project some recommendations were made for the future development of urban transport policies taking account of different urban environments including legal and institutional barriers, the need to improve the quality of life and the needs of different users of the urban transport system (including elderly and disabled persons).

The **materials** available are

- D1: Inception report, giving a detailed overview of all physical measures that the individual cities will introduce but also reviewing the correct state-of-the art in Europe;
- D2: Evaluation framework, developed together with the CAPTURE project, describing a detailed evaluation program at a city level, at a strategic level and a European level (comparative assessment);
- D3: City design measures, describing the measures designed within each city;
- D4: City implementation measures, describing all city demonstrations including an identification of all problems that occurred during the implementation as well as the associated measures and actions necessary to solve those problems;
- D5: Detailed city impacts, synthesis of the findings of the evaluation work;
- D6: Final report, providing a brief overview of the total project and recommendations for further developments in this field.

The **experts** involved in OPIUM are Neil Scales from MerseyTravel who was the Project Coordinator; David Blackledge from Transport & Travel Research who was the Project Manager and Dirk Engels from Transport Infrastructure and Telematics in Brussels who was the Technical Coordinator

The **test sites** were in Liverpool (UK), Gent (BE), Heidelberg (DE), Nantes (FR), Patra (GR) and Utrecht (NL). It was developed for each one a specific project and then evaluated:

- Gent: Bicycle measures and parking management;
- Heidelberg: Traffic calming and parking management;
- Liverpool: Bus priority measures;
- Nantes: Bus priority measures and parking management;
- Patra : Pedestrianisation;
- Utrecht: Restriction of private road space and parking management;

No Leading Educational institutes were involved in OPIUM project. This project had the participation of some municipalities who were interested in the results verified.

Project results

The project produced various and important recommendations in the Final Report, because all test sites had a different topic for development. For example in Heidelberg was traffic calming and parking management, for Liverpool was bus priority measures.

The OPIUM project was also important because it produces good material for another European project -LEDA (the cities of Heidelberg, Gent and Utrecht were case studies in both projects). This project is a good example of how to take advantage of the previous knowledge acquired in research projects of the EU.

2.5 Results of the PRIVILEGE Project

PRIVILEGE : Priority for Vehicles of essential user groups in urban environments

The PRIVILEGE project **objectives** were the identification and development of those categories of traffic, which may deserve higher priority than others in terms of guaranteed mobility in overcrowded road networks. The difficult task was to ensure uninhibited and uncongested access for those traffic categories with higher priority while maintaining a general level of accessibility to every destination for all travellers.

In order to achieve these objectives an analysis of existing household data relevant to transport was carried out. Measures to improve the use of the existing transport infrastructure were also analysed, including encouraging modal shift from private to public means of transport.

Available **materials**: Deliverables from the different stages of the project but we could not find specific information about those deliverables.

Experts from PRIVILEGE are Christiane Bielefeldt from MVA Ltd who was the coordinator of the project; George Hazel from the Lothian Regional Council; Olli-Pekka Poutanen from the Traffic Planning Division, City Planning Department – Helsinki; Rolf Andre from the Hessisches Landesamt Fur Strassen-Und Verkehrswesen; Peter Philipps from the Heusch/Boesefeldt GMBH and Michael Storch from the Stadt Schwerin, Dezernat v Bauverwaltung und Stadt-Entwicklung, AMT fur Verkehrsanlagen.

This project does not have **any Leading Educational Institutes**, only some institutions representing municipalities that functioned as ‘**test sites**’.

Project results

The toolbox approach was a useful means to tailor a wide range of packages, or schemes, to a wide range of local problems. Although there were many common features between the schemes short-listed by the different partners, every scheme is at the same time different in many ways from all others. This confirms the need for a flexible approach in tying individual measures to packages.

Every single one of the schemes short-listed by the partners showed that where Public Transport exists, this would always receive highest priority. This was even true when the starting point for considering a particular package for a particular area was to alleviate problems for commercial and domestic services or public utilities.

The social and political acceptability of any of the measures in general was seen as rather high, although in many cases acceptability problems may well arise from the implementation of a particular measure in a particular location.

Most of the open legal problems arise in the context of prioritising local and commercial services. Whether and how these problems can be solved needs to be investigated on a case-by-case basis.

We could not find a specific **Internet site** for this project and we used the CORDIS database.

2.6 Results of the SUTRA Project

SUTRA : Sustainable Urban Transportation

The general **objectives** of the SUTRA Project was to focus mainly on the development of a consistent and comprehensive approach and planning methodology for the analysis of urban transportation problems, which help to design strategies for sustainable cities.

This included an integration of socio-economic, environmental and technological concepts including the development, integration, and demonstration of tools and methodologies to improve forecasting, assessment and policy level decision support.

Available **materials**: Deliverables and a CD-rom but there is more information about the project in the **website** <http://www.ess.co.at/SUTRA/> but the site is only accessible to the participants of the Project.

As mentioned above, two persons from the project were contacted but did not answer our mail.

Experts involved in the project are: Kurt Fedra from the ESS-Environmental Software and Services GMBH who was the co-ordinator of the project; Carlos Borrego of the University of Aveiro who work in the environmental indicators; Guiba-Tziampiri from the University of Thessaloniki; Jan Godlewski of the Technical University of Gdansk; André Vifian from the University of Geneva who worked in Energy Systems Modeling; Ron Komar from the Government of the State of Israel who worked mainly with the economic subjects (but also related with environment); Thomas Schwerdtfeger from the PTV Planung Transport Verkehr AG who worked in transportation and emission modelling; and Osvaldo Navarro from the Fundation Universidad de Belgrano

The **test sites** were Buenos Aires, Gdansk, Genoa, Geneva, Madrid, Lisbon and Tel Aviv. Different types of cities were selected in order to test the tools and methodologies in various backgrounds.

SUTRA had the participation of various **Leading educational institutes**: University of Aveiro; Aristotle University of Thessaloniki; Technical University of Gdansk; University of Geneva and Fundation Universidad de Belgrano.

Project results

The primary expected impact was to improve the quality of urban life, health and safety by contributing towards sustainable transportation in sustainable, economically efficient, attractive, enjoyable and liveable, cities. For that the partners contributed with deliverables where they define the principal indicators that influence the city 'health' and, at the same time, how to measure some indicators related with transport, air emissions, and urban development scenarios.

The product of this work was the design of various tools who served for the direct use by city administrations, in this way they promote: the citizen and stakeholder participation in urban decision making processes, the building of the citizen awareness and improve the educational aspect of the population. It was a goal of the partners to make the project results available as a public information system on the Internet.

SUTRA also contributed to the implementation of European policies, Directives, and guidelines, including the European Community programme of policy and action in relation to the environment and sustainable development (OJ C 138, 17/05/1993), the Air Quality Framework Directive (96/62/EC) and several Community Directives and communications related to transportation and sustainable development.

2.7 Results of the TASTE Project

TASTE : Analysis and development of tools for assessing traffic demand management strategies.

Different Traffic Demand Management (TDM) strategies have been studied in various European pilot projects. However, there is still a lack of appropriate assessment tools. The design of TDM strategies requires the appropriate use of most relevant software tools (adequately integrated) in order to best fulfil the priorities of the Common Transport Policy. There is a lack of consensus of which tools are most appropriate for assessing TDM strategies at a European level. Moreover, intermodal aspects have not been sufficiently considered by the assessment tools developed so far.

To overcome the difficulties mentioned above, the TASTE project main **objectives** were:

- Identify common requirements and objectives for assessing TDM policies and strategies;
- Review and classify the existing TDM assessment tools;
- Identify gaps or inadequacies in the currently available tools, and modify available tools to meet the requirements better for the assessment of European TDM policies and strategies and to integrate selected TDM Assessment tools in a toolbox;
- Carry out and to document case studies to test adapted and integrated assessment tools;
- Provide guidance, validated through collaboration with a TASTE User Group, to use of the best available TDM assessment software tools;
- Elaborate guidelines for an appropriate use of the developed toolbox and as a common European framework for the assessment of TDM policies and strategies and elaborate tasks for further research and development in this field.

The **materials** available are:

- D1 - "Assessment Framework"
- D2 - "Review of Existing Tools"
- D3 - "Toolbox Development"
- D4 - "Case Studies"
- D5 - "Guidelines"

Experts from TASTE are Dr. Rolf Andree and Dr. Wolfgang Schwanzer from the Hessian Road and Transport Authority (Hessisches Landesamt für Straßen- und Verkehrswesen), Wiesbaden, Germany; Pentti Karvonen from the Finnish National Road Administration, Helsinki, Finland; Enric Brazis and Elisabet Viladomiu i Marnet from the Generalitat de Catalunya, Departament d'Indústria i Energia, Institut Català d'Energia, Barcelona, Spain; Dr. Richard Hibbert, Jim McMahon and Keith Taylor from the City of Newcastle upon Tyne, Department of Highways and Transportation, Newcastle City Council, Newcastle upon Tyne, Great Britain and Julio Garcia Ramon from the Sector de la Via Pública, Ajuntament de Barcelona, Barcelona, Spain.

Four **test sites** have been selected and implemented promoting how the assessment of TDM strategies can be carried out:

- Variable Direction Signing in Hesse (Germany);
- Park & Ride in the City of York (United Kingdom);
- Park & Ride in Granollers (Metropolitan area of Barcelona, Spain) and
- Mode Choice in Innsbruck (Austria). The experiences gained during the implementation of the case studies have been documented and are included in Deliverable 4.

In this project the only **Leading educational institution** is the University of Newcastle which was represented by Dr. Michael Bell, Dr. Richard Hibbert, Jim McMahon and Keith Taylor.

Project results

The main outcome of the project was the TASTE Guidelines. In particular, a general procedure for using assessment tools was developed. Special focus was put on the assessment process, particularly on the selection and application of TDM assessment tools, which is described exemplarily for some toolbox applications. Beyond that, all relevant steps of the general procedure for using assessment tools are described in the TASTE Guidelines. Therefore the general procedure for using assessment tools reflects the structure of the Guidelines.

An additional outcome of the project was the identification of development needs, which can be summarised in the following way:

When using software tools there may be deficiencies, most of which are specific to the application they are being utilised for. Therefore, it is not possible to cite specific development needs for individual tools here. However, the development needs of the toolbox are more general in nature. For a toolbox to be of the most practical use the following developments are recommended:

- standardising the definition of the road network and networks of other means of transport,
- building common databases to store input data in standardised formats,
- making the operating environment compatible for all tools to facilitate integration of tools,
- making better use of available information (e.g. from GIS databases) and
- encouraging the use of GIS products which can provide visual representation of results in a common format.

2.8 Results of the MUSIC Project

MUSIC: Management of traffic using traffic flow control and other measures

The general **objective** of the MUSIC project was to demonstrate that novel methods of traffic control can be used, alone or in combination with other measures (park & ride, re-allocation of road space to public transport, road pricing, information) in a cost effective manner in order to reduce congestion, improve the efficiency/cleanliness of urban travel and influence modal choice.

To accomplish this the project team constructed reliable simulation models of relevant parts of the road network, developed a common evaluation framework, developed new traffic management and control strategies for each demonstration site using the simulation models and developed guidelines for simulation which would allow cost effective application of the novel traffic control techniques in a range of networks.

The **materials** produced were:

- D1 - City Simulation Models
- D2 - Evaluation framework
- D3 - Traffic Management and Control Strategies
- D4 - Agreed Demonstration Projects
- D5 - Implementation of demonstration Projects
- D6 - 'Before' Studies
- D7 - 'After' Studies

- D8 - Results and Guidelines
- D9 - Dissemination of Results and Guidelines

Experts are Mike Smith from the University of York who was the co-ordinator of the project; Pires da Costa from the Engineering Faculty of the University of Oporto; Álvaro Seco from the University of Coimbra; John Bann from the York City Council; Panagiotis Papaioannou from the Trias SA Consulting; and Giulio Cantarella from the Consorzio “Centro de Ricerca in Matematica Pura Applicata”

The **test sites** were in York (UK), Porto (PT) and Thessaloniki (GR) where reliable simulation models of relevant parts of the road network were made

The **Leading educational Institutes** are the University of York who identified common requirements and objectives for assessing TDM (Traffic Demand Management) policies and strategies; Engineering Faculty of the University of Oporto and the Civil Engineering Department of the University of Coimbra which construct simulation models of relevant parts of the road network and designed, implemented and monitored the demonstration projects.

Project results

In two out of three demonstrations the project was a success and the third, whilst being less successful, did provide valuable feedback. Conclusions can be drawn in terms of the demonstrations, modelling problems and software to design traffic signal timings.

In terms of demonstrations York and Oporto were good experiences because both of them manage to decrease the congestion and the pedestrian red-light violations, in the case of Thessaloniki the results were not so good because they have difficulty to deal with the several authorities involved with the setting of traffic signals (some institutional problems) but the majority of the objectives were accomplished and congestion in the city was reduced.

Problems at all of the three demonstration sites were encountered with models overestimating re-routing.

The software to design traffic signal timings, after the project, was greatly improved and does take some account of the consequent re-routing of motorists. Furthermore the results in the end of the project showed that the software is capable of suggesting beneficial timings for a wide range of transport policy objectives.

3. RECOMMENDATIONS FOR NEW MODULES

The criteria used in the selection and organisation of the material collected is fundamental for the good development of the PORTAL project as it needs to be systemic and comprehensive in order to allow good teaching practice.

Some important material was collected and some important information is available in the European projects analysed but probably it is not enough.

That is why we repeated the list of issues we considered under our key topic, trying to identify them inside the contents of each one of the projects and the results were:

“Standard issues”

- Basic principles for urban and rural road (road hierarchy) (PRIVILEGE)
- Main Road networks elements (mainly intersections) design principles and tools
- Network optimisation principles and tools namely area wide traffic signal coordination systems and network simulation models (MUSIC)
- Parking management solutions and techniques (OPIUM, ICARO)
- Pedestrian and cycling networks design principles (OPIUM)
- Arterial roads integrated management solutions (INCOME, SUTRA)
- Public transport priority oriented infrastructure management solutions namely bus lanes and PT actuated traffic signal solutions (PRIVILEGE, SUTRA)
- Traffic calming techniques applied both to through roads and to “sensitive” local networks (OPIUM, TASTE)
- Road accidents detection and prevention (this is mainly a cross reference to other key topics)

“New Issues” (INCOME, TASTE)

- HOV Solutions
- Reversible lanes solutions
- Road pricing
- Route guidance
- “Incident” detection and management systems
- New Telematics solutions applied to data collection exercises, parking management and road network online management.

Note: ICARO was one of the projects attributed to us. It focused mainly on car-pooling which is also a Mobility Management issue.

Concerning the available information we think that all the projects had some relevance. However we distinguish the following projects:

In the terms of available information:

- ICARO (very good website and all the publications are available – although for some of them it is necessary to pay)
- SUTRA (although the technical parts of the project in the web site were not available to the general public)
- MUSIC (in this case the information about the project was easier to find because FCTUC was one of the partners)

In terms of subject relevance:

- INCOME (developing and integrating strategies for optimisation of Urban Traffic Control, Driver Information Systems and Public Transport Systems within Urban Traffic Management Systems, it is a crucial subject in this area).
- SUTRA (despite the generic character of this project – it covered issues like transport, environment and economics – the definition of the indicators that influence the city ‘health’ and the production of tools for the direct use by city administrators is quite important for the surveillance of city evolution in terms of transport - quality of urban life, health and safety).
- OPIUM (the project developed traffic management measures concerning parking management and guidance, traffic calming and bus priority measures. The project evaluated also the impact of the measures on transport efficiency, safety and modal split in urban areas, with particular reference to the impact on vulnerable road user – it is important to get more information about this project).
- MUSIC (more restricted area of project, concerning the modulation of software to design traffic signal timings, but also an important issue within the key topic).
- TASTE (the guidelines produced concerning Different Traffic Demand Management strategies - with the appropriate use of most relevant software tools - are important to divulgate because all the main subjects were taken in consideration including the multimodal aspects).

4. FINAL CONCLUSIONS

In the leading educational institutions point of view one main goal should be readapting the material available both to the systemic organisation of issues under each key topic and to more attractive materials.

Although it is central in PORTAL for the second type of adaptation, there are a few uncertainties in concerning the adaptation of the collected material to the key topic structure in each case. So, each key topic expert should refine and adapt the key topic structure in a way that it can be presented as teaching material.

Therefore, and in some situations, the fulfilment of each key topic contents as teaching material should also follow some actual bibliography and expert's articles whenever the information obtained through the European projects is not enough.

In fact there were several difficulties in obtaining the materials produced under the European projects analysed. Some information was missing and/or was difficult to find because the Internet pages and personal e-mail addresses were not updated.

So there should be a second main objective in PORTAL: whenever the European Projects did not accomplish the information needed in each key topic, a research on ways to improve that, should be taken.

PORTAL should also become a mega database on the Past, Present and Future of the European research related with transport issues.