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EXTR@Web Project

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Further information on EXTR@Web's editorial team for Thematic Research Summaries can be obtained from Annex III.

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Abbreviations and Acronyms Used

AG	High level Advisory Group (to the EXTR@Web project)
BG	Benchmark Group (associated with the EXTR@Web project)
CEEC	Central and Eastern European Country
DG TREN	EC Directorate-General for Energy and Transport
EC	European Commission
EFTA	European Free Trade Association (Norway, Iceland, Switzerland, Liechtenstein)
ERA	European Research Area (EU, EFTA and CEECs)
EXTR@Web	Exploitation of Transport Research Results via the Web (DG TREN FP 5 Accompanying Measure project)
EU	European Union
FP 4 (5, etc)	EC Fourth (Fifth, etc) Framework Programme
PAG	Programme Analysis Group (part of EXTR@Web project)
RTD	Research and Technical Development
TRKC	Transport Research Knowledge Centre; TRKC website at ec.europa.eu/transport/extra

Table of Contents

1. Introduction

This paper provides a structured guide to the results of Research and Technical Development (RTD) projects relating to **Intermodal Transport**, carried out in transport research programmes throughout the European Research Area (ERA).
It is one of a series of 28 papers. Two further from an original set of 30 transport themes – i.e. Long-distance Transport and Financing Tools – have been discontinued as separate reports, though all related projects will be covered elsewhere in Thematic Research Summaries.

	Paper no.	Transport theme
Dimension 1	1.1	Passenger Transport
	1.2	Freight Transport
	1.3	Urban Transport
	1.4	Rural Transport
	1.5	Regional Transport
	1.6	EU Accession Issues
Dimension 2	2.1	Air Transport
	2.2	Rail Transport
	2.3	Road Transport
	2.4	Waterborne Transport
	2.5	Other Modes
	2.6	**Intermodal Transport**
Dimension 3	3.1	Economic Aspects
	3.2	Efficiency
	3.3	Equity and Accessibility
	3.4	Environmental Aspects
	3.5	User Aspects (incl. ergonomics, quality, choice and rights)
	3.6	Safety and Security
Dimension 4	4.1	Decision-support Tools
	4.2	Information and Awareness
	4.3	Infrastructure Provision (incl. TENs)
	4.4	Integration
	4.5	Intelligent Transport Systems
	4.6	Regulation / Deregulation
	4.7	Land Use Planning
	4.8	Transport Management
	4.9	Pricing, Taxation and Financing Tools
	4.10	Vehicle Technology

Of the more than 5600 projects from research programmes the Transport Research Knowledge Centre (TRKC) ultimately has considered, a total of **61** projects deal partly or fully with the issues of **Intermodal Transport**.

1.1 How to use this paper

It is recommended that you use this paper to locate RTD (Research and Technical Development) results on sub-themes where you have a particular interest, rather than reading the paper from start to finish:

- Start in Section 2 to get an overview of the scope of the particular theme.
- Read Section 4 that summarises the findings for each sub-theme of interest to you.
- Consult Annex I to identify the individual projects, be they of European or national origin, relating to a particular sub-theme.
- If this is the first time you have used one of the series of thematic research summaries, it is strongly recommended that you read Annex II. This explains the background and purpose of the EXTR@Web project, and the basis upon which information in this document was selected and analysed.

The other sections of this paper can help you to gain an overall picture of the **Intermodal** theme, associated policy issues and the background of project EXTR@Web.

The analysis in this paper is the responsibility of the EXTR@Web project team, and does not represent the official viewpoint of the European Commission.

1.2 The link to the Transport Research Knowledge Centre website

Further details on individual projects can be obtained from the Transport Research Knowledge Centre (TRKC) website at: **ec.europa.eu/transport/extra**

The TRKC website includes summaries and full final reports of individual projects, as well as a variety of analyses, and publications prepared by the EXTR@Web project.

How to best use the online resource:

- The 'Projects & Analysis' section allows the user to specify a project-wide search on 'Publication date', 'Origin', 'Document type', 'Mode', 'Sector', 'Geographic area', 'Policy objective' and 'Tool', or any combination of these criteria.
- This may be complemented, or superseded, by the flexible 'Free text search'.
- On the query result screen, free text search criteria may be refined, as appropriate. Further tick boxes here allow limiting query results according to 'Project status' (five levels).
- Query results are presented in a table, which allows for sorting by column (click on relevant column header for alphanumerical sorting).
- Project-specific summaries may include links to project websites, or provide contact details for the project, where available.

It should be noted that the online Transport Research Knowledge Centre will be updated frequently, though dependent on input from project co-ordinators.
Other parts of the TRKC website cover transport research at Programme level, and expand on transport related issues, e.g. in the 'Links', 'Events', 'Glossary' and 'FAQs' sections.

2. Scope of theme

2.1 Definition of theme

"**Intermodal Transport**: The movement of goods in one and the same loading unit or road vehicle, which uses successively two or more modes of transport without handling the goods themselves in changing modes. *By extension, the term **intermodality** has been used to describe a system of transport whereby two or more modes of transport are used to transport the same loading unit or truck in a integrated manner, without loading or unloading, in a [door to door] transport chain*". Intermodal transport, where the major part of the European journey is by rail, inland waterway or sea and any initial and/or final leg carried out by road as short as possible [32].

2.2 Topics included in theme

The topics related to this theme are:
- Intermodal modelling and planning;
- communication technologies and electronic data exchange;
- handling equipment and intermodal transport standards;
- quality of transport networks;
- interoperable and interconnected operations & management;
- terminal and transfer point efficiency; and
- market-oriented strategies and socio-economic scenarios.

Intermodality is a quality indicator of the level of integration between different modes: more intermodality means more integration and complementarity between modes, which provides scope for more efficient use of the transport system.
The economic basis for intermodality is that transport modes that display favourable economic and operational characteristics individually can be integrated into a door-to-door transport chain in order to improve the overall efficiency of the transport system. The integration between modes needs to take place at the levels of infrastructure and other hardware (e.g. loading units, vehicles, telecommunications), operations and services, as well as the regulatory conditions.

Taking into account the complex interaction of sourcing, suppliers, manufacturers, retailers and consumers, freight intermodality requires the integration of a broad range of transport services in the supply and distribution chains.

Efficient information and communication flows are vital for the management of these chains. They allow pre- and on-trip information exchange, including service availability, negotiation procedures, tracking and tracing, information on disruptions and the flow of transport documents.

2.3 Significance of theme

Intermodal Transport is one of the approaches on the European level to solve the actual and the expected problems in freight transport. Road freight transport increased by 19.4% from 1990-1998, rail freight transport decreased in the same period 43.5%. For the period 1998-2010 an increase of freight transport of 50% is expected. As this increase cannot be solved by road transport and as the “classical” rail freight transport cannot compete with road freight transport, the EC and the governments of the Member States try to strengthen intermodal transport rail-road, waterways-road, and short sea shipping.

Because of growing freight traffic and increasing imbalance in the use of the various modes and infrastructure, the transport system in the European Union is showing signs of inefficiency from a socio-economic point of view. Increasingly, freight transport appears to its citizens as a source of social and environmental costs.
Equally, freight transport itself and the economic growth it supports are being hindered by the road traffic congestion resulting from the increasing use of cars. The ‘business as usual’ scenario, based on policies to improve individual modes, is unlikely to be able to cope with future mobility requirements in a sustainable manner. The present approach must, therefore, be changed to an integrated policy framework that takes full account of intermodal options.
Intermodality is not bound to certain modes. It is a trading and mobility issue in which rail, water, air and road are called to contribute to the optimisation of the whole, where they are supported by advanced information and communication services.

The demand for alternatives to road transport is getting stronger. Improved intermodality is therefore critical to the overall efficiency of the freight transport system, since road transport is likely to remain the first choice for the first and last leg of most freight journeys. Clearly, intermodality is not about forcing a specific modal split. However, by improving the connections between all modes of transport and integrating them into a single system, intermodality allows better use to be made of rail, inland waterways and short sea shipping, which often, individually, do not allow door-to-door delivery. After that, it is up to the policymakers to devise pricing policies that encourage mode choice decisions more closely related to external costs.

3. Policy context

Intermodality is an essential component of European Common Transport Policy for sustainable mobility. It provides the policy tool for a systems approach to transport in view of integrating the different modes into a coherent transport system which caters for the needs of European citizen and industry.

Intermodality is an important issue in European policy concerning freight and passenger transport. The PACT programme introduced in 1992 had led to a great many initiatives supporting appropriate objectives, with 167 projects launched between 1992 and 2000. When the PACT programme came to an end in December 2001 the Commission replaced it with a new programme to promote intermodality, called 'Marco Polo', with an annual budget of around EUR 30 million, which could be spread over four years. Marco Polo is open to all appropriate proposals to shift freight from road to other more environmentally friendly modes, promoting sea motorways evolution. The programme's aim is to support intermodal initiatives and alternatives to road transport in the early stages until they become commercially viable and economically viable reality.

As described in the White Paper 'European transport policy for 2010: time to decide' [6], it is planned to establish multimodal corridors giving priority to freight throughout Europe. In order to achieve this goal, high-quality rail infrastructure is required. The physical characteristics of the railways in Europe do not lend themselves to a mass transport system for freight. Nor is it possible to stack containers or make up long trains, and generally speaking the system has to cope with dense passenger train traffic sharing the same infrastructure as freight trains. This is why the Commission wants to encourage measures in favour of intermodality for people and pursue its action on users' rights in all modes of transport, while also considering whether in future it might not also introduce user obligations.

Actions must also be taken to ensure fuller integration of the modes, offering considerable potential transport capacity as links in an efficiently managed transport chain joining up all the individual services. The priorities according to the White Paper must be technical harmonisation and interoperability between systems, particularly for containers.

The Mid Term Review of the 2001 White Paper [1] emphasizes that a European sustainable mobility policy needs to build on a broader range of policy tools achieving shift to ore environmentally friendly modes where appropriate, especially on long distance, in urban areas and on congested corridors. Furthermore, each transport mode has to be optimised and all models must become more environmentally friendly, safe and energy efficient. With regard to transport logistics the industry has taken up the challenge of using existing infrastructure and vehicles more efficiently by developing sophisticated logistics chains. Advanced information and communication technologies support the aim to realise intelligent logistics solutions. The on-going tendency toward integrated logistics companies has to be fostered by public policies in order to enable the optimal use and combination ("co-modality") of different transport modes. This will contain actions to eliminate regulatory obstacles to co-modality, to stimulate learning and the exchange of best practices throughout the EU as well as promoting standardisation and interoperability across modes and to invest in transhipment hubs.

It is a general aim of European transport policy to reach a certain level of integration between maritime transport, inland waterway transport, and rail transport. Intra-Community

maritime transport, often referred to as short-sea shipping and inland waterway transport are two key components of intermodality which must provide a means of coping with the growing congestion of road and rail infrastructure and of tackling air pollution. Up until now these two modes have been underused, even though the Community has huge potential (35,000 km of coastline and hundreds of sea and river ports) and virtually unlimited transport capacity. The way to revive them is to build motorways of the sea and offer efficient, simplified services. To help to establish this trans-European shipping network, priority should be given at national level to ports which have good connections to the inland network, particularly along the Atlantic and Mediterranean coasts, and which could form part of an authentic logistics chain.

Experience has shown that short-sea shipping requires efficient, integrated commercial services. Thought should be given to bringing together all the links in the logistics chain (consignors, ship-owners and any others involved in the shipping industry, plus road, rail and inland waterway operators) in a one-stop shop to make intermodal transport by sea and inland waterway as reliable, flexible and easy to use as road transport. The development of advanced telematics services in ports can also improve operational reliability and safety. Active cooperation between the various partners, in particular through electronic data interchange, enhances both the quality and the efficiency of the intermodal transport chain.

In passenger transport, there is considerable scope for improvements to make travelling conditions easier and facilitate modal transfers, which are still highly problematic. Far too often passengers are put off using different modes of transport for a single journey. They have problems obtaining information and ordering tickets when the journey involves several transport companies or different means of transport, and transferring from one mode to another can be complicated by inadequate infrastructure (lack of parking space for cars or bicycles, for example).

4. Synthesis of findings from completed projects

Research projects contributing to the theme of **Intermodal Transport** can be broken down to the following sub-themes:

- Intermodal modelling and planning;
- communication technologies and electronic data exchange;
- handling and intermodal transport equipment;
- quality of transport networks;
- terminal and transfer point efficiency; and
- market-oriented strategies and socio-economic scenarios.

The Intermodal projects examined up to now are mainly related to the Thematic Programme “Competitive and sustainable growth” (GROWTH programme) of the European Commission, Key Actions “Land transport and marine technologies” and “Sustainable mobility and intermodality” as well as to the Interreg III Initiative. Single projects belong to the Thematic Programme “User-friendly information society” (IST Programme) and to the COST Transport European Framework.

With regard to the projects among the Interreg III Initiative, all of them belong to Strand B – transnational cooperation – that involves national, regional and local authorities with the objective to promote better integration within the Union through the formation of large groups of European regions. Interreg III B includes 11 zones:

- Alpine Space;
- Archimed (Greece, Italy, Cyprus, Malta, Lebanon, Syria, Gaza, Israel, Jordan, Egypt, Libya, Turkey);
- Atlantic Area;
- Baltic Sea Region;
- CADSES (Central, Adriatic, Danubian and South-East Europe);
- Northern Periphery (Finland, Scotland, Sweden, Norway, The Faeroes, Greenland);
- North Sea Region;
- South West Europe;
- North West Europe;
- Western Mediterranean; and
- Caribbean Space, Açores-Madeira-Canarias, Réunion.

The main objectives of Interreg IIIB are to:

- Draw up regional development strategies at transnational level, including cooperation between towns or urban areas and rural areas;
- foster effective and sustainable transport systems, together with better access to the information society by enabling the communication between island or peripheral regions; and
- promote protection of the environment and natural resources, particularly water resources.

You may wish to further consult the following Thematic Research Summaries that present research findings which are complementary to those covered in this paper:

- D2.E-4.3 Infrastructure provision (incl. TENs);
- D2.E-4.4 Integration; and
- D2.E-4.10 Vehicle technology.

Results from the following **22** projects have been included in this Thematic Research Summary:

Research sub-theme	Contributing projects
Intermodal modelling and planning	CO-ACT; COST 340; INTERMODA; INTERMODESHIP; NIM; SPIN; RECORDIT; European sea transport and intermodalism – waterborne transport – and Switzerland; Road to rail: open access intermodal gateway to the UK – TDG European Chemicals (GPCS 399)
Communication technologies and electronic data exchange	MOCONT; PREDIM; SPIN; Analysis of the research-studies-orders interface regarding transport interchanges
Handling and intermodal transport equipment	CARGOSPEED; SAIL; Feeder systems in combined transport
Quality of transport networks	CO-ACT; COST 340; INTERMODA; INTERMODESHIP; MOCONT; RECORDIT; SAIL; SPIN; THEMIS; European sea transport and intermodalism – waterborne transport – and Switzerland; Intermodality between high-speed rail and air transportation: linkage between networks and populated areas; The attractiveness of multimodal transport
Terminal and transfer point efficiency	CARGOSPEED; MOCONT; SAIL; Efficient terminals for intermodal transport; Railport-Linz; Systems for combined transport between road and railway
Market-oriented strategies and socio-economic scenarios	COST 340; NIM; RECORDIT; Market analysis in trans-Alpine freight transport; Intermodality between high-speed rail and air transportation: linkage between networks and populated areas

4.1 Intermodal modelling and planning

Modelling of the drivers of demand for freight transport and analysing European connections and intermodal transportation systems can help policy makers to plan and develop strategies to improve freight transport and logistics. Research in this area is mainly based on the development of guidelines and recommendations, but also on the creation of investment and financial plans.

4.1.1 Research objectives

In the area of intermodal modelling and planning research aims to observe and present – independent of ideology and without theoretical preconceptions – the successive realities of the development of trans-European connections and of intermodal transportation, two major factors in the integration of transportation networks within Europe. In this context, the main objective is to provide a framework of analysis that can act as a decision aid in transport policies and a set of recommendations that will help, thanks to lessons learnt from history, to establish the priorities to be given to different projects involving trans-European connections and intermodal transport. This should be realised by:

- Evaluating European and national projects and public decisions concerning transport networks;
- exploring the factors favourable to the establishment of transnational and intermodal infrastructures, and to the creation of transport networks integrated at all the European, national and regional European levels. When necessary, analyzing the obstacles, which hindered or even excluded these factors;
- analyzing the actors' strategy in each country's private sector, and the strategy of professional organisations and interest groups representing the different modes of transport;
- showing the benefits of intermodality in a context characterized by a continuous growth of transport demand and by the current integration of the European area (East-West, North-South); and
- showing how these advantages will benefit the governments and internationals or national organisations in charge of representing the different modes of transport at the European level.

Further research in this area deals with:

- Identification and development of viable solutions for multi-modal cargo transport, with specific focus on the transportation of air- and time-critical cargo (e.g. flowers) by rail. Therefore it is necessary to develop concepts for fast cargo-trains at a European level, and to implement intermodal cargo-transport systems, thereby improving sustainable mobility.
- Development of an innovative waterborne transport concept for inland/short sea operations, which accommodates various types of cargo units, allows for faster cargo handling and better use of cargo space. This concept will replace current fragmented and traffic-jams-sensitive road, rail and waterborne transport.
- Promotion and marketing of new, speedy and safe intermodal transport system across the Mid-Nordic countries with connection from East and West. An overall strategy of fully developed sustainable transport solutions and intermodality in the Mid-Nordic Region should be launched. The strategy contains, among other things, complete investment and financial plans based on feasibility studies for identified bottlenecks and missing links along the corridor.

- Definition of an intermodal transport network for goods transport between EU and CEECs (rail, road, inland waterways, short sea shipping).

4.1.2 Main findings

A Pan-European intermodal transport network has been identified, the specification of technical performance indicators, market determinants and parameters for regulatory framework conditions as well an analysis and assessment of status quo and forecast on future demand has been carried out. With regard to the development of trans-European connections and to intermodal transportation, a comprehensive bibliography on transport and intermodality in all the social sciences, particularly history, geography, and transport economics has been created. Deficiencies and mistakes inherited from the past are highlighted under the following items:

- Intermodal transport: from concept to solutions
  - First lesson: Intermodal transport was a fact well before it was celebrated as a concept and became a political requirement.
  - Second lesson: Some reminders about transport history. How do technical systems succeed each other. When considering the past 150 years, historians identify main stages in transport history after the predominant mean of transport of the time. They show how each successive transport system aimed to ever cheaper, faster and more comfortable transport and competition with other modes. The trend led each of them from a pioneering stage to a dominant position, then towards decline.
- Identifying ‘obstacles’ on the path towards intermodal transport
  - First lesson: Intermodal transport as transport organisation has been inefficient till now.
  - Second lesson: ‘obstacles’ originating in transport technology.
  - Third lesson: the role played by the ‘actors’ on the transport stage: public authorities and customers.

Europe will thus be able to take these elements into account and gain some time in the implementation of transnational infrastructures (missing links), and of integrated intermodal transport networks and chains. Historical studies carried out so far stress on several facts of consequence for the future of European transport, and, then, for integration of the Europe of tomorrow. Ultra-liberalism on the transport market should be counterbalanced by restrictive measures for the sake of sustainable development, for freight transport as well as for passenger transport. This implies a transport policy designed in such a way as to anticipate problems which are likely to occur as well as the consequences of previous decisions, instead of being aimed at answering questions asked by immediate crises.

In the context of intermodal modelling and planning several new services have been explored, existing ones have been improved and transparency about the complex intermodal market as well as the awareness of the opportunities of intermodal transport have been created. An innovative waterborne transport concept for inland/short-sea operations that accommodates various types of cargo units, allowing a faster cargo handling and better use of cargo space. This concept is able to replace current fragmented and traffic-jams-sensitive road, rail and waterborne transport and will reduce congestions of trailers on European roads.

The connection of airports to (high-speed) passenger rail networks has been considered as a strategic advantage, placing them in the centre of a transport system. In the medium to long-term view, the connection to future fast cargo train networks will be of similar importance. This will guarantee the position of the main airports as freight hubs and foster

the attractiveness of airport regions as centres of high-value logistics-based activities. Furthermore, a tool, which can identify opportunities and barriers in achieving a modal shift in freight transport has been developed. The application of the tool will contribute to the promotion of intermodal transport and to a better alignment of services with supply chain requirements. The concept has already been used in a number of business cases in Europe.

4.2 Communication technologies and electronic data exchange

The use of telematics, combining information systems and telecommunications, will improve the feasibility of customer-oriented transport services. In particular, telematics can provide automated interfaces between the ordering of goods, transport management, invoicing and payment. However, open and easy-to-use information systems are essential for the widespread use of these electronic services. So far, research in this area has been focused on the development of single tools distributing information, knowledge and know-how in order to support the various players in an intermodal transport system.

4.2.1 Research objectives

In the field of communication technologies and electronic data exchange several studies are concerned with development of tools covering the following demands:

- To develop a tool that can identify opportunities and barriers in achieving a modal shift in freight transport. Application of the tool will contribute to the promotion of intermodal transport and to a better alignment of intermodal services with supply chain requirements. The objectives include the development of a toolbox to be applied on business and on region level, to assess and demonstrate the potential of intermodal transport for various user groups; to practically test and evaluate the toolbox by means of in depth case-studies in various businesses and Member States; to gain insight on the impact of a modal shift on supply chains; to gain insight on the potential for modal shift on EU-level; to provide wide access to the scanning tool by means of a Web-based installation.
- Development of a tool for data capture and processing, covering different modes of transport, to support operations relevant to modal changes during containerized transport.

4.2.2 Main findings

The information gap between the supply and demand side of intermodal transport will be filled with a kind of toolbox including three decision support tools to assess the intermodal transport potential on company and on regional level. The concept has already been practically tested and evaluated by means of in depth case studies in various businesses and Member States.

Another key result in this area is the development of a system to trace container within the terminal yard in real time, reducing the intervention of human operators. It is composed of a location and an identification system. The location system integrates D-GNSS and Inertial Navigation, and is dedicated (but not limited) to reach stackers. Reach stackers are 'small' container handling machines used in several ports throughout Europe. The identifi-

cation system will be applicable to any lifter, and it will be a visual-based one, since most terminal operators deny the application of tags on containers for identification purposes. With this aim, the solution does not imply any intervention on containers, or major installation of equipment on the yard, neither for location, nor for identification purposes. Finally, an interface (the middleware) will be added to adapt the system to any TOS without changing its characteristics. The target is to eliminate time and personnel consuming control activities performed to check the status of the yard (i.e., the position of containers inside the yard).

4.3 Handling and intermodal transport equipment

Research is needed on the optimal integration between transport modes in order to facilitate customer-oriented, door-to-door transport services that draw on the strengths of each mode. A key interest here lies in harmonising and optimizing the variety of loading units (such as containers of different sizes) and transport equipment to meet common technical and user requirements.

4.3.1 Research objectives

Within the area of handling and intermodal transport equipment, in a very special case research aims at the development of a flexible adaptation of existing inland vessels to make them suitable for the transportation of edible liquids. This development will enable multimodal transport of such liquids. Furthermore, research is based on:

- The improvement of intermodal transportation of semi-trailers in Europe. This will be done by increasing the percentage of semi-trailers of transported by rail and by analysing and assessing semi-trailers transported by road and rail using an integrated systems approach. Technical and operational aspects will be regarded. The optimisation potential will be identified with a special emphasis on the interfaces of the system's elements. The worked out solutions will be practically demonstrated and evaluated on a relevant typical route in Europe.
- Supporting the sustainable flow of cargo from road to rail and addressing the congestion problems on the roads within Europe.

4.3.2 Main findings

The adaptation of existing inland vessels to make them suitable for the transportation of edible liquids has been achieved by installing a large number of standard (stainless) 20" ISO tank containers in the hold, which will be insulated to keep the products at the required temperature. A piping system and a pump unit in a way that a fully self-supporting tanker vessel is created at minimal cost will interconnect the tank containers. The system offers a high level of flexibility, since ships can be equipped with the tank container system to the extent needed.

Transportation throughout Europe is a European challenge. Operators all along the European transport chain are involved and required to collaborate if solutions with a transnational value are to be developed. Problems in the Intermodal transportation chain are mostly caused by the lack of quality of interfaces between the different elements: constructive interfaces between transportation means like wagon and semi-trailer, operational inter-

faces like the shifting process from road to rail or interfaces of legal nature like different transport regulations in different countries. All kinds of interface solutions require the participants of the whole network. Aiming at the optimisation of semi- trailers in Intermodal transport, interesting results have been provided that can contribute to various aspects of European policy. The needs of the European market for transport means have been supported by offering a new quality to transportation of semi- trailers by rail. Especially the provision of alternative transport routes (far from road) for semi- trailers is important taking into account their high and increasing share in comparison to other transport means on road. Since the connections between business locations are not subject to a permanent change, this means that the rising transportation traffic concentrates on the same routes and leads there to a very high traffic density. A clear overview of the potential and limits for the use of semi trailers in intermodal transport chains in Europe and partly in Third Countries as well as recommendations on technical, organisational and operational standardised solutions to enhance and ease the use of semi trailers in intermodal transport have been given.

By supporting the sustainable flow of cargo from road to rail and addressing the congestion problems on the roads within Europe, the costs for road/rail intermodalism will be reduced and the speed of the operation at combined terminals will be increased. It halves the economic break-even distance for intermodal freight movements. Furthermore, it is an innovative solution to the transfer of semi trailers that will permit a functioning rail freight system to operate within a truly balanced and sustainable intermodal transport system.

4.4 Quality of transport networks

The optimisation of nodal areas and terminals, key elements of seamless intermodal networks, requires planning and design tools to better integrate ports, airports and inland terminals in the network as well as good practice guidance in planning, development and efficient running of infrastructure.

4.4.1 Research objectives

Research in the area of quality of transport networks addresses the following themes:

- Developing the inland waterways in the Baltic Sea region with partners from Sweden, Finland, Germany, Poland, Lithuania and Russia. The project works to connect and analyse future infrastructure investments in the Inland Waterways network in the Baltic Sea Region for maximum utilization. The existing tourist and logistic Inland Waterways in the Baltic Sea Region will all be evaluated. The multi and intermodal transportation chains will be valuated to identify operational and organizational structure problems. The potential modal shift from road to inland waterway in an environmentally friendly way is also an important task. Regional development is a key word for the project that concerns also the use of inland waterways of the population for recreation and tourism. How to further develop this growing usage of the Inland Waterways is another important aspect.
- To contribute to the creation of a European intermodal transport network by defining a framework of references and concepts to guide current European policy in this area. This will be achieved by identification and analysis of the obstacles that intermodality has encountered to date. The choice between different modes of transport studied over

the long term, will be assessed in order to understand the historic characteristics of intermodality in Europe in the following specific areas:
  - flow of tourists between the north and south of Europe,
  - freight traffic on inland waterways.
- To develop a novel waterborne transport concept for inland/short-sea operations for various types of cargo units, faster cargo handling and better use of cargo space.
- To solve and validate by means of virtual and experimental methods problems arising from the above novel concept (hydrodynamics, low-weight structures, cargo handling), also regarding consistency and compliance with societal & economic constraints.
- To describe the present strategies of maritime operators and the evolution trend in the maritime transport as a consequence of the diffusion of the container technology; to analyse the development of the Italian ports after the port reform and to compare it with the Northern Range ports; to assess the container traffic from and to the European ports across the Alps; to determine the impact of the ongoing evolution in container sea transport on the hinterland freight traffic across the Alps and evaluate its aspects on the ecological and transportation level.
- To integrate 'Traffic Management Systems' with 'Intermodal Freight Information Systems' by disseminating activities, project clustering activities, and the experts' workshops.

4.4.2 Main findings

One of the principal measures identified by the European Commission is to turn intermodality into reality and make it really competitive with road transport. This goes together with the aim to revitalise the railways and promote the use of short-sea shipping ('sea motorways') and inland waterway transport. This should contribute to an optimal integration of different modes so as to enable a more efficient and sustainable use of the transport system. An innovative waterborne transport concept for inland/short-sea operations, which accommodates various types of cargo units, allows for faster cargo handling and better use of cargo space. This concept will replace current fragmented and traffic-jams-sensitive road, rail and waterborne transport.

Bottlenecks in railway infrastructures and, more recently, lacking quality in railway service jeopardise considerably the opportunities for Italian port's further expansion. Therefore new railway infrastructures are the backbone for further growth in Italian ports. Only in the long term might Italian ports expand their market area north of the Alps and give new impetus to the container flow across the Alps. This demands overcoming the bottlenecks in the railway infrastructure and the operational difficulties as well as regaining the trust on the part of the shippers and forwarders north of the Alps.

One broad-ranging study has analysed the history of network connections between different modes of transport since 1945, which can contribute to define the possibilities for developing a European intermodal transport network. Within the study national and European policies that have tended to favour this connection since 1945 have been examined and the stages and characteristics associated with national/international and national/local network connections have been defined. The interoperability of different geographic networks (intramodal) and of different transport networks (intermodal) is the key to the set up of an effective European intermodal transport network. The project has identified the conditions which permit this interoperability by analysing successful case studies in the are of interoperability through technical standardisation (e.g. Europallet), interoperability through commercial cooperation (e.g. air and rail reservation systems) as well as intramodal interoperability between national networks, (e.g. high speed rail).

4.5 Terminal and transfer point efficiency

Efficient intermodal transport requires infrastructure planners and managers across Europe to cooperate in establishing coherent networks of efficient transfer points and terminals. Some of these transfer points will become centres of local economic activity, integrating regional supply and demand into the logistics structures and markets for long-distance transport.

4.5.1 Research objectives

With regard to terminal and transfer point efficiency, research is based on the integration of the well-known RoRo technology into the rail industry, due to the following situation:

- The intermodal transfer times currently required for road to rail interchanges make it uneconomic to use for stage distances of under 500 km.
- There are hundreds of thousands of standard non-liftable semi-trailers in Europe.
- There is strong resistance from the Road haulage industry to invest in the costly specialist trailers required by existing piggyback Lift On - Lift Off solutions.

Another research objective is the intention to improve the intermodal transportation of semi-trailers in Europe, which is important, because the European road transport is dominated by semi-trailers on average for 60% to 85% of total road volume, whereas the percentage of semi-trailers transported by rail has decreased down to 10% of the intermodal transport volume. The percentage of semi-trailers transported by rail should be increased. Using an integrated systems approach, semi-trailers transported by road and rail will be analysed and assessed. Technical and operational aspects will be regarded. The optimization potential will be identified with a special emphasis on the interfaces of the system's elements. The worked out solutions will be practically demonstrated and evaluated on a relevant typical route in Europe.

Another objective is to provide terminal operators with a precise knowledge of the container positioning in the yard, which could make profitable the utilization of optimization tools in terminal operating systems.

4.5.2 Main findings

Concerning the integration of the well-known RoRo technology into the rail industry a system has been developed that supports the sustainable flow of cargo from road to rail, addressing the congestion problems on the roads within Europe. The system reduces the costs for road/rail intermodalism and increases the speed of the operation at combined terminals. It halves the economic break-even distance for intermodal freight movements. The reduction of costs of the complete system in comparison to common techniques amounts to 30%. Outcome of the project are a prototype including a rail-wagon and the transfer mechanism. A specific wellfloor for the wagon and a Pop-up lifting and turning mechanism was constructed and demonstrated. In order to achieve a reliable and cost efficient system a simulation and animation of the terminal has been prepared and comprehensive dissemination and exploitation measurements are carried out. The marketability has been proven.

Most terminals throughout Europe operate a terminal operating system, which is a software tool running on standard PC boards (sometimes on mainframes), to record the positioning of containers inside the yard and to plan handling operations. Even if these sys-

tems are well designed and implemented, they are usually fed with man-gathered information, which are often unreliable or late. This is often a cause of several problems and reduces the effectiveness of the terminal operating system, which decreases the overall terminal logistics, and consequently reduces its performance. A tool for data capture and processing, covering different modes of transport has been developed in order to support operations relevant to modal changes during containerised transport. It is composed of two parts: a location and an identification system. The location system integrates D-GNSS (Differential Global Navigation Satellite Systems) and Inertial Navigation, and is dedicated (but not limited) to reach stackers. Reach stackers are 'small' container handling machines used in several ports throughout Europe. The identification system will be applicable to any lifter, and it will be a visual-based one, since most terminal operators deny the application of tags on containers for identification purposes. With this aim, the solution does not imply any intervention on containers, or major installation of equipment on the yard, neither for location, nor for identification purposes. Finally, an interface (the middleware) will be added to adapt the system to any TOS (Terminal Operating System) without changing its characteristics. The target is to eliminate time and personnel consuming control activities performed to check the status of the yard (i.e., the position of containers inside the yard). That is to say that, container handling shall be tracked by the system, reducing the intervention of human operators.

4.6 Market-oriented strategies and socio-economic scenarios

The different transport modes (road, rail, waterborne and air) are at different stages of their development, their optimization will continue to be necessary. A main focus of research will be the enhancement of integration between the different transport modes and to enable a better, efficient use of existing capacities. This should be done considering safety and security as well as economic, social and environmental aspects.

4.6.1 Research objectives

Research in the area of market-oriented strategies and socio-economic scenarios focuses on the improvement of the competitiveness of intermodal freight transport in Europe through the reduction of cost and price barriers which currently hinder its development, while respecting the principle of sustainable mobility. Against this background the following objectives should be fulfilled to:

- Design a comprehensive methodology for the calculation of real (internal & external) costs of intermodal freight transport and for the understanding of cost formation mechanisms;
- validate this methodology through its application to three meaningful European corridors;
- analyse current charging and taxation systems to understand price formation mechanisms;
- carry out a systematic cost comparison for intermodal and all-road alternatives;
- assess current imbalances and inefficiencies;
- develop a decision support module to foster generalisation;
- identify and analyse technical and organisational cost reduction options;
- formulate recommendations on public policies and business actions to reduce real costs and to internalise external costs;

- promote consensus building among operators and users;
- provide basic elements to support decision-making in the field of promotion of combined transport solutions; and
- improve the competitiveness of intermodal freight transport in Europe through the reduction of cost and price barriers, which currently hinder its development, while respecting the principle of sustainable mobility.

4.6.2 Main findings

The findings on cost structure, its components and the factors determining the total social cost were incorporated into a Decision Support Module, which has enabled interested parties to estimate the internal and external costs for door-to-door or corridor movements, of their choice. Different design and policy scenarios were evaluated for those corridors and different geographical regions. An interactive software has been designed (Decision Support System (DSS)) to simulate the impact of transport policies on the competitiveness of intermodal transport services and the corresponding implications in the area of sustainable development. The different stakeholders involved in the current debate on intermodal costs and prices, i.e. intermodal companies, intermodal transport agencies, road operators, are among the more proximate end-users of the outcomes. In addition, the nature of the outcomes, an extensive overview on intermodal and road transport costs and prices, is also being able to interest policymakers at national and EU level. The flexible characteristics of the DSS, i.e. the possibility to simulate costs and policies on different European corridors for road and intermodal transport modes allow the outcomes to exploit potential market segments in the field of consultancy for intermodal market analysis.

Another major output, in conjunction with the intermodal industry, was to identify potential means that could improve the competitiveness of intermodal transport in specific corridors. Barriers (of a financial, governmental, organisational or technical nature) that inhibit the adoption of these opportunities were identified and assessed before final recommendations for improvement were made.

With information about the private (internal) and social (external plus internal) costs of intermodal transport and its competitor road freight transport, it was possible to identify how and why this gap varies in different parts of the European transport network. COM(97) 243 and COM(99) 519 suggest that "many of today's transport problems result from differences in transport taxes and charges between Member States and between transport modes". The final results inform the debate on "fair and efficient pricing", and show the necessary charges (taxation) that are required for road and rail transport in different countries in order to meet those twin objectives of efficiency and fairness. The results of the research also demonstrated the benefits that would flow from a harmonised pricing system together with the reduction in road freight transport (and increase in intermodal transport) that would occur. Major benefits resulted from the application of the findings and recommendations of the project. In particular it provided vital support and guidance to the initiatives in EU freight policy.

An increased competition will permit to realise unused productivity potentials and thus to increase quality of supply. The improvement of time related qualities of combined transport services and an increase in reliability will be crucial. In the short run, a shift from road to rail will not be feasible, however, without significant price reductions, allowed for by subsidies. The optimisation potentials created by infrastructure improvements and optimisation of the transport chain will only be effective in the medium and long run. Furthermore, an important modal shift in favour of sustainability will not be possible, without an internalisa-

tion of external costs on a European level and a consequential implementation and control of social norms, speed limits and the like on the road.

4.7 Conclusion

In the last decades, intermodal freight transport has become an important part of the freight transport sector. The transport demand in Europe has been strongly driven by overall policy and socio-economic backgrounds (economic growth, globalisation, liberalisation, and privatisation). The transport systems of today are faced with many challenges, like improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity as well a protecting the environment. Additional impacts come from the transport sector in terms of planning policy and practice in the development of transport infrastructure and operations on a national and international level. This results in the strengthening of requirements for operation of more efficient and more environmentally friendly transport systems, which would be able to link modal infrastructure and related services on one side, and the nodes of national and European economy on the other side.

The research actions in this area have been done in the scope of four programmes: the COST actions, the 4th and 5th Framework Programme and – when the PACT programme came to an end in December 2001 – in the Marco Polo Programme. For the majority of the projects analysed, it might be too early to determine the extent to which real-life impacts had occurred or would occur. A lot of dissemination has been done, but in some cases there has been a poor availability of project results and interim outputs. The main focus of the projects examined so far primarily lies on “Intermodal modelling and planning” and “Quality of transport networks”. Potential areas in which further research seems to be important might be the technical area, such as communication technologies, as well as in the market oriented and socio-economic fields.

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Annex I: Contributing projects

Preface This Annex lists all the projects (European and national) which belong to the **Intermodal Transport** theme, in alphabetical order of project acronym (for projects with acronyms), followed by projects without acronyms in alphabetical order of the project's name in English. Where results have been made available to the EXTR@Web project, a summary of key findings and policy implications relevant to this theme are given.

In 'Origin' column, use ISO 3166-1 country designators as follows:

Austria – AT; Belgium – BE; Bulgaria – BG; Cyprus – CY; Czech Republic – CZ; Denmark – DK; Estonia – EE; European – EU; Finland – FI; France – FR; Germany – DE; Greece – GR; Hungary – HU; Iceland – IS; International – INT; Ireland – IE; Italy – IT; Latvia – LV; Lithuania – LT; Luxembourg – LU; Malta – MT; Netherlands – NL; Norway – NO; Poland – PL; Portugal – PT; Romania – RO; Slovakia – SK; Slovenia – SI; Spain – ES; Sweden – SE; Switzerland – CH; United Kingdom – UK; Other countries – Oth

Theme: **Intermodal Transport**			Last update: **15 August 2006**
Acronym	Project title (in English)	Origin	Research sub-theme
Key findings / Policy implications / Project website or contact			
CARGOSPEED	Cargo rail road interchange at speed	EU	Terminal and transfer point efficiency; Handling and intermodal transport equipment

Key findings

CARGOSPEED is an innovative solution to the transfer of semi trailers that will permit a functioning rail freight system to operate within a truly balanced and sustainable intermodal transport system. The main CARGOSPEED task is to design, build and test the CARGOSPEED system, which includes a wagon with a moveable well floor and a Pop-Up system, placed on a dedicated terminal.

Policy implications

- To halve the economic break-even distance for intermodal freight movements from the current 500-600 kilometres to around 300 kilometres.
- To be operational within piggyback gauge, thereby avoiding the massive expense of upgrading tunnels to UIC 'C' gauge or super gauge (as Eurotunnel).
- To accommodate standard non-liftable semi trailers, including high-cube and aerodynamic semi trailers.
- To achieve random-access at interchanges, thereby enabling 'bus-stop' type operations along the route.
- To achieve RoRo interchanges of 30 or more arriving standard semi trailers with 30 or more departing semi trailers SIMULTANEOUSLY instead of the existing one-by-one Lo-Lo practice.
- To minimise the times intermodal trains spend in terminals. Rail wagons only earn when moving freight.

Project contact

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CO-ACT	Creating viable concepts for combined air/rail cargo transport	EU	Intermodal modelling and planning; Quality of transport networks

Key findings

In conclusion, a number of observations can be made:

- WP 1 showed that there is definitely a market potential for fast train transport of cargo, and that facilities throughout Europe can be developed to serve as multi-modal transhipment points.

Theme: **Intermodal Transport**			Last update: **15 August 2006**
Acronym	Project title (in English)	Origin	Research sub-theme
Key findings / Policy implications / Project website or contact			

- WP 2 showed that transhipment is a key friction area in the multi-modal chain and that through harmonisation of load units, transhipment equipment and administrative procedures and technology this friction can be lessened.
- WP 3 produced a number of interesting concepts for terminals and overall systems which would fulfil the requirements of the system, the characteristics set by WP's 1 and 2, and the requirements set by the users.
- WP 4 produced a detailed procedure for the validation of concepts and showed that both qualitative and quantitative results can be included in the multi-level assessment of concepts.
- WP 5 demonstrated that the realisation for fast cargo transport by rail is possible with the right approach, and details the important areas of focus and procedural approach for such development.
- WP 6 developed a concept design scenario based on a case study for Fraport, hence producing a platform on which to build development scenarios for other inter-modal terminal situations.
- WP 7 developed a simulation model specifically tuned for such networks as CO-ACT, and allows the implementation of the model for the design of effective and efficient networks within Europe.
- WP 8 produced some useful items for communication purposes and ensured that communication was sufficient throughout the project lifespan. Final dissemination of results will take place at a later stage.
- WP 9 effectively managed the large and widely spread consortium through the lifespan of the project.

Currently, the connection of airports to (high-speed) passenger rail networks is considered a strategic advantage, placing them in the centre of the transport system. In the medium to long-term, being connected to future fast cargo train networks will be of similar importance. It will guarantee the position of the main airports as freight hubs and support the attractiveness of airport regions as centres of high-value logistics-based activities.

Policy implications

On international origin-destination connections, it becomes more and more difficult to realise fast transport by truck at acceptable costs. National governments make this happen by raising costs and sharpening rules for the use of infrastructure. Besides, the backbone of Europe's road network becomes more and more congested. As an interesting alternative to road-transport, fast rail-transport of air freight and other time critical cargo is expected to become a big player on a European scale. Therefore the presence of a backbone for a European rail network is taken into account by planning distribution and production locations. A number of market developments indicate an increasing potential for inter-modal time critical cargo/ rail transport.
Currently, transport for time critical cargo is mostly entrusted to trucking companies. These trucking companies integrate flows and create own networks in order to decrease costs and improve service levels. Both the trucking and integrator networks could offer non-airline based freight for time critical and fast rail-transport of air freight and other time sensitive cargo within Europe. The integrator market will see a fast development in the coming years influenced by the growth of European integrators out of the express and postal organisations, the accelerating growth in the use of e-commerce (internet purchases) and the penetration of some integrators into the traditional airport-to-airport market. As a consequence, it can be expected that the integrators will generate an impressive demand for new integrated inter-modal ground-transport services (especially high speed).
In the context of these developments and the extensive rail network available, inter-modal cargo transport for time critical cargo by rail will become an interesting alternative to trucking. Different initiatives are taken to start these developments and make it commercially viable. CO-ACT is one of these initiatives. The time critical cargo and air transport sectors will shift to rail transport if the rail sector will provide it with services that seamlessly fit into the logistics chain of which airlines are part. To become integrated into the networks of airlines, integrators, industries and retail distributors, rail connections should be provided at a high frequency of 2 to 4 connections per day at regular intervals. Given the relatively small demand for capacity from individual companies, these frequent trains services can only be provided through consolida-

Theme: **Intermodal Transport**			Last update: **15 August 2006**
Acronym	Project title (in English)	Origin	Research sub-theme
Key findings / Policy implications / Project website or contact			

tion or combination, i.e. combining air cargo with other time critical and high value cargo, such as express cargo.

Project contact

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COST 340	Towards a European intermodal transport network: lessons from history	EU	Quality of transport networks; Intermodal modelling and planning; Market-oriented strategies and socio-economic scenarios

Key findings

The researchers worked together in thematically defined teams which have been met periodically (four seminars). They have used and improved existing statistical data bases (e.g. mobility and freight traffic in Europe) and computerised bibliographies.
The results of the Action include:

- A comprehensive summary of existing research which will address the contribution of the work to the definition of concepts of intermodality, linkage connections and interoperability and to the assessment of political and technical factors which have encouraged or slowed the creation of a European intermodal transport network;
- case studies (presented in accordance with the common principles defined by the research team in order to allow comparison); and
- a critical bibliography.

Policy implications

Thanks to this COST Action, successes, deficiencies and mistakes inherited from the past are highlighted. Europe will thus be able to take these elements into account and gain some time in the implementation of transnational infrastructures (missing links), and of integrated inter-modal transport networks and chains. Historical studies led up to date in the Action stress on several facts of consequence for the future of European transport, and, then, for integration of the Europe of tomorrow.

- Ultra-liberalism on the transport market should be counterbalanced by restrictive measures for the sake of sustainable development, for freight transport as well as for passenger transport; and
- this implies a transport policy designed in such a way as to anticipate problems which are likely to occur as well as the consequences of previous decisions, instead of being aimed at answering questions asked by immediate crises.

Project website

www.cordis.lu/cost-transport/src/cost-340.htm

FINESSE	Freight Intermodality and Exchange on Sea and Straits in Europe	EU	Intermodal modelling and planning

Project website

www.nweurope.org/page/projet.php?p=31&id=474

INTERFACE	Improvement of intermodal terminal freight operations at border crossing terminal	EU	Intermodal modelling and planning

Project website

w3.uniroma1.it/interface/

Theme: **Intermodal Transport**			Last update: **15 August 2006**
Acronym	Project title (in English)	Origin	Research sub-theme
Key findings / Policy implications / Project website or contact			
INTERMODA	Integrated solutions for intermodal transport between the EU and the CEECs	EU	Quality of transport networks; Intermodal modelling and planning

Key findings

Identification of a Pan-European intermodal transport network, specification of technical performance indicators, market determinants and parameters for regulatory framework conditions, analysis and assessment of status quo and forecast on future demand (horizon 2015).

Policy implications

Intermodal transport is one of the key topics in current European transport policy. One of the principal measures identified by the European Commission is to turn intermodality into reality and make it really competitive with road transport. This goes together with the aim to revitalise the railways and promote the use of short-sea shipping ('sea motorways') and inland waterway transport. This should contribute to an optimal integration of different modes so as to enable a more efficient and sustainable use of the transport system. INTERMODA contributes to this objective as it comprises an important step in the development of an effective transport system, enabled through the identification of measures which collectively will improve the intermodal network between the EU and the CEECs and thereby facilitate economic growth.

Project contact

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INTERMODE-SHIP	The intermodal ship	EU	Intermodal modelling and planning; Quality of transport networks

Key findings

An innovative waterborne transport concept for inland/short-sea operations, which accommodates various types of cargo units, allows for faster cargo handling and better use of cargo space. This concept will replace current fragmented and traffic-jams-sensitive road, rail and waterborne transport. The INTERMODESHIP, optimized for inland / short-sea operations:

- A door–to-door waterborne solution;
- positive effects on quality of life;
- reduced pollution and noise;
- reduced number of accidents;
- improved utilization of infrastructure; and
- improved mobility of goods.

Policy implications

This concept will reduce congestions of trailers on European roads resulting in a reduction of the following problems:

- High rates of accidents;
- high levels of pollution;
- high levels of noise;
- reduced infrastructural mobility; and
- reduced mobility of citizens.

Project website

www.kockumseng.se/intermodeship/Intermodewelcome.html

Theme: **Intermodal Transport**			Last update: **15 August 2006**
Acronym	Project title (in English)	Origin	Research sub-theme
Key findings / Policy implications / Project website or contact			
INTRASEA	Inland Transports on Sea Routes	EU	Intermodal modelling and planning; Quality of transport networks
Project website www.intrasea.org			
MOCONT	Monitoring the Yard in Container Terminal	EU	Communication technologies and electronic data exchange; Quality of transport networks; Terminal and transfer point efficiency
Key findings The objectives which had been fixed at the very beginning of MOCONT Research Project, summarised in the final report, chapter 2: Overview of the objectives of MOCONT research project, have been successfully achieved at the end of the two-years work, as shown by the description of the first MOCONT working prototype in Chapters 3 to 8. The project satisfactory results have also produced, in the last weeks of the project life time, a further interest from the European Commission who decided to co-finance a take up measure, acronym MOCONT-II, in order to equip a fleet of reach stackers with 8 MOCONT 'boxes', and test their behaviour during six months of normal operation. Policy implications MOnitoring the yard in CONtainer TermInals - TrIals - MOCONT II. The objective of MOCONT-II is to verify the impacts MOCONT has on the operation of a container terminal. The specific target is to investigate the potential of MOCONT leading to a marketable industrial product. From an economic and financial point of view, the aim is to estimate the return of investment a terminal operator may have using MOCONT, together with the business opportunities for the supplier. Economic and financial analysis will be the key to show the benefits of the technology application. MOCONT-II will realise 8 replications of the MOCONT functional prototype in order to equip a fleet of reach stackers. The fleet will operate for a period lasting 6 months and relevant data will be collected for off-line evaluation. The analysis will allow a thorough evaluation, ranging from the economic impacts on the terminal operation and management to the reduction of handling time, to the impact on the working conditions for the terminal workers. Project website www.ikerlan.es/mocont/pub/			
NECL	North East Cargo Link	EU	Intermodal modelling and planning
Project website www.europaforum.nu/efns_IV/crauser/necla.htm			
NIM	New, Integrated Mobility Services	CH	Intermodal modelling and planning; Market-oriented strategies and socio-economic scenarios
Key findings A season ticket for rail and bus transport and, if necessary, access to a car - such a 'mobility package' has considerable market potential and could make a contribution to the reduction of environmental pollution. A combination of a season ticket for public transport with easy access to car rental or CarSharing - such 'mobility packages', or similar offers like the 'Mobility Rail Card 444', have become increasingly popular in			

Theme: **Intermodal Transport**			Last update: **15 August 2006**
Acronym	Project title (in English)	Origin	Research sub-theme
Key findings / Policy implications / Project website or contact			

Switzerland. The study has shown that between 7% and 10% of Swiss driving licence holders would be prepared to test such 'mobility packages'. About half of them (90,000 people) would be willing to buy such an offer immediately. A survey among users of such 'mobility packages', and comparisons with non-users, has revealed that a move to 'mobility packages' would reduce usage of the car. If the market potential in the urban conurbations could be exploited to the full, then some 15 to 50 million litres of petrol could be saved annually (0.4% to 1.4% of Switzerland's consumption). This would reduce related costs for environmental measures by 10 to 40 CHF million. According to the survey and further analyses, this potential is particularly large in the French and Italian speaking regions of Switzerland where 'mobility packages' are less well known, because larger mode shift effects could be achieved. In these regions, it appears that technological innovations such as chip card systems in particular would be in demand. The research team concludes that 'mobility packages' need to be kept simple but offer high quality public transport and car rental systems. Improved provision for cycle traffic is also required. Technical systems should be standardised throughout Switzerland. It is recommended that Communities, Cantons and the Federal Government should increase their support for 'mobility packages'.

Policy implications

Possible measures in politics and administration:
National authorities, cantons and local authorities can implement the following direct instruments promoting integrated mobility services:

- Making use of their room for manoeuvre as 'buyer' of transport-related services (parallel to reforming public transport as well as when introducing the principles of New Public Management);
- participation in the development of criteria for a quality management (compilation of the thematic basics necessary for quality management, establishment of the respective structures and procedures);
- (initial) financing of pilot-projects for the further development of know-how and for the development of transferable solutions; and
- buying of services by public authorities for the business trips of their employees (this helps administrative bodies to save money and at the same time supports integrated mobility services by way of better legitimation).

Moreover there are indirect ways for public bodies to promote the spreading of integrated mobility services:

- Promotion of know-how transfer for an early multiplication of successful solutions;
- promotion of innovative processes (targeted financial support for certain projects, initiative programmes to support social innovation processes);
- far-reaching communication measures (awareness campaigns, e.g. in schools); and
- setting-up of supporting frameworks: internalisation of external costs of transport, regional and town planning less focused on cars; traffic calming and accompanying measures to support pedestrians and cyclists; more rigid conditions for parking areas; taking into account car-sharing in building regulations and road traffic laws).

There are a number of reasons why the promotion of integrated mobility services is of public interest:

- The developments described make new solutions to improve the traffic and transport situation in agglomerations possible; they contribute to the reduction of the emission of air pollutants and to the reduction of external costs in transport;
- the resources used are indeed investments for an increase of the degree to which public transport companies are self-financing; and
- the suppliers of transport services in Switzerland can distinguish themselves on the growing market for mobility services by innovative and cooperative solutions; the orientation towards service on the providers' side increases; the development and use of appropriate information and communication media in traffic/transport are promoted; moreover jobs in vehicle-manufacturing and with public transport companies are secured.

Theme: **Intermodal Transport**			Last update: **15 August 2006**
Acronym	Project title (in English)	Origin	Research sub-theme
Key findings / Policy implications / Project website or contact			
Project website www.nfp41.ch			
PIRENE II	Freight Intermodality and Exchange on Sea and Straits in Europe	EU	Quality of transport networks
Project website www.pirene.net			
PREDIM	Research and demonstration platform for multimodal information	FR	Communication technologies and electronic data exchange
Project contact jean-francois.janin@equipement.gouv.fr			
RECORDIT	Real Cost Reduction of Door-to-door Intermodal Transport	EU	Quality of transport networks; Intermodal modelling and planning; Market-oriented strategies and socio-economic scenarios

Key findings

The findings on cost structure, its components and the factors determining the total social cost were incorporated into a Decision Support Module, which has enabled interested parties to estimate the internal and external costs for door-to-door, or corridor movements, of their choice. Different design and policy scenarios were evaluated for those corridors and different geographical regions: the RECORDIT DSS.
The RECORDIT DSS is an interactive software designed to simulate the impact of transport policies on the competitiveness of intermodal transport services and the corresponding implications in the area of sustainable development. The different stakeholders involved in the current debate on intermodal costs and prices, i.e. intermodal companies, intermodal transport agencies, road operators, are among the more proximate end-users of the RECORDIT outcomes. In addition, the nature of the RECORDIT outcomes, extensive overview on intermodal and road transport costs and prices, in addition to a Decision Support System (DSS), a software tool, for policy simulation, is also being able to interest policymakers at national and EU level.
The flexible characteristics of RECORDIT DSS, i.e. the possibility to simulate costs and policies on different European corridors for road and intermodal transport modes allow the RECORDIT outcomes to exploit potential market segments in the field of consultancy for intermodal market analysis. Another major output of the project, in conjunction with the intermodal industry, was to identify potential means that could improve the competitiveness of intermodal transport in specific corridors. Barriers (of a financial, governmental, organisational or technical nature) that inhibit the adoption of these opportunities were identified and assessed before final recommendations for improvement were made.

Policy implications

With information about the private (internal) and social (external plus internal) costs of intermodal transport and its competitor - road freight transport, it was possible to identify how and why this gap varies in different parts of the European transport network. COM(97) 243 and COM(99) 519 suggest that 'many of today's transport problems result from differences in transport taxes and charges between Member States and between transport modes'.
The final results of the project inform the debate on 'fair and efficient pricing', and show the necessary charges (taxation) that are required for road and rail transport in different countries in order to meet those twin objectives of efficiency and fairness. The results of the research also demonstrated the benefits that would flow from a harmonised pricing system together with the reduction in road freight transport (and in-

Theme: **Intermodal Transport**			Last update: **15 August 2006**
Acronym	Project title (in English)	Origin	Research sub-theme
Key findings / Policy implications / Project website or contact			

crease in intermodal transport) that would occur. Major benefits resulted from the application of the findings and recommendations of the project. In particular it provided vital support and guidance to the initiatives in EU freight policy that took place after the project's completion.

Project website

www.recordit.org

SAIL	Semi Trailers in Advance Intermodal Logistics	EU	Terminal and transfer point efficiency; Quality of transport networks; Handling and intermodal transport equipment

Key findings

- A clear overview of the potential and limits for the use of semi trailers in intermodal transport chains in Europe and partly in Third Countries; and
- recommendations on technical, organisational and operational standardised solutions to enhance and ease the use of semi trailers in intermodal transport.

Policy implications

A real-scale demonstration of the findings that would serve as a basis for wide applications in Europe.

Project website

www.zlw-ima.rwth-aachen.de/forschung/projekte/sail/index.html

SIMTAG	Safe InterModal Transport Across the Globe	EU	Intermodal modelling and planning

Project website

www.simtag.org

SIT-TN	Research and demonstration platform for multimodal information	EU	Communication technologies and electronic data exchange; Quality of transport networks

Project contact

peter.colon@bciglobal.com

SPIN	Scanning the Potential of Intermodal Transport	EU	Communication technologies and electronic data exchange; Quality of transport networks; Intermodal modelling and planning

Key findings

The SPIN project has developed the SPIN TOOLBOX. It consists of three decision support tools to assess the intermodal transport potential on company and on regional level: # QuickScan # Advanced Scan # MacroScan The concept has already been used in a number of business cases in Europe. New services have been explored, transparency about the complex intermodal market and awareness of the opportunities of intermodal transport have been created.

Policy implications

SPIN tries to fill substantially the information gap between the supply and the demand side of intermodal transport.

Theme: **Intermodal Transport**			Last update: **15 August 2006**
Acronym	Project title (in English)	Origin	Research sub-theme
Key findings / Policy implications / Project website or contact			
Project website www.spin-eu.com			
THEMIS		EU	Quality of transport networks
Key findings • Report on the integration of traffic management systems and freight transport management systems; • links with various initiatives in the THEMIS domain, (various national initiatives); • state of the art for transport and traffic management systems; and • identification of state of the art ITS architecture and standardisation. Policy implications • State of the art for transport and traffic management systems (all modes); • point to information sources on current and past ICT projects; • contribute to ITS architecture and standardisation to improve ICT interconnectivity; • link people and companies with similar or matching challenges in the transport sector; and • point to sources for funding of R&D and implementation projects. Project website www.themis-network.org			
–	Analysis of the research-studies-orders interface regarding transport interchanges	FR	Communication technologies and electronic data exchange
Project contact gerard.brun@equipement.gouv.fr			
–	Efficient terminals for Intermodal transport	SE	Terminal and transfer point efficiency
Project website peter.grundevik@sspa.se			
–	European sea transport and intermodalism – Consequences for Switzerland	CH	Quality of transport networks; Intermodal modelling and planning
Key findings Development of Italian ports Through the changes of the Italian port reform 1994, the Italian ports have reached the necessary conditions to operate efficiently, according to the standard of best practice. The cost of each container movement could be reduced by two thirds and is more or less the same as in the ports of Northern Europe. The container hub of Gioia Tauro is located very close to the principal route for the deep-sea container vessels between the Suez Canal and Gibraltar. This geographical position is of strategic importance, in particular, in the Far East container market. It can be reached by a minimum diversion from the main route and permits a significant time saving with regard to the Northern Range ports, creating a new situation in the European container traffic. Container traffic from and to the European ports across the Alps The total port related freight traffic across the Alps is less than 7.425 Million tons. The freight traffic volume			

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from or to the European ports across the Alps accounts for about 5% of the whole freight traffic across the Alps. The share of the railway might be particular high, because of the considerable bundling effect of ports, which explains the increasing interest shown by the railway companies.
Impact
The scenario, in which the alpine mountain chain builds a natural divide between the catchment areas of the ports north and south of the Alps (Scenario II), is the most probable. Therefore, the container flows across the Alps might decrease in coming years with some positive environmental effects. However, the ecological benefits should not be overestimated, since they derive from a reduced volume of railway traffic. However, a substantial quantitative change in these container flows across the Alps may not be expected in the short and medium term.

Policy implications

Bottlenecks in railway infrastructures and, more recently, lacking quality in railway service jeopardise considerably the opportunities for Italian port's further expansion. Since they depend strongly on railway given the modal split in the hinterland between 30% and 50%. Therefore new railway infrastructures are the backbone for further growth in Italian ports. In particular the new railway tunnel through the Apennines on the mountain side of Genoa (Terzo Valico) is fundamental as well as the connecting line to the port of Gioia Tauro. Only in the long term might Italian ports expand their market area north of the Alps and give new impetus to the container flow across the Alps. This demands overcoming the bottlenecks in the railway infrastructure and the operational difficulties as well as regaining the trust on the part of the shippers and forwarders north of the Alps.

Project website

www.nfp41.ch

–	Feeder systems in combined transport	CH	Handling and intermodal transport equipment

Project website (or contact)

www.aramis-research.ch/d/2321.html

–	Intermodality between high-speed rail and air transportation: linkage between networks and populated areas	FR	Quality of transport networks; Market-oriented strategies and socio-economic scenarios

Project website (or contact)

anne.grenier@ademe.fr

–	Market Analysis in Trans-Alpine Freight Transport	CH	Market-oriented strategies and socio-economic scenarios

Key findings

This synthesis report summarises the three individual studies on the market for Trans-Alpine goods traffic. It provides a summary of the economic aspects of this highly topical issue of Trans-Alpine goods traffic. From the point of view of supply (materials Vol. M7), of demand (M8), and possible policy support strategies (M9), the central conclusion is that reliable and punctual deliveries, primarily overnight, are critical for success in this market.
The Summary demonstrates the impact of banning goods traffic at night, and the impact of (premature) closing times of terminals, as well as the potential benefits of faster handling and speeding-up combined transport schemes. Differentiating between the market segments of 'full truck load' (FTL) and 'less than

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truck load' (LTL) becomes increasingly important.
On the demand side, the impact of monetary values and flexible switching between transport modes on reliability and travelling times have been identified (adapted stated preference survey), which could serve as important inputs for traffic models and scenarios.
Finally, an analysis of policy support strategies demonstrates how current policies could be improved, and that the expected shift from road to rail can only be achieved if the railways – as a result of competitive pressure – drastically improve their performance.

Policy implications

If one tries to give an overall judgement on the base of the above evaluation, the following picture emerges with respect to the possibilities of promoting competitiveness of combined transport on transalpine links and hence to shift transport from road to rail: A central role is played by the promotion of competition on rail through a non-discriminating access on the network.
An increased competition will permit to realise unused productivity potentials and thus to increase quality of supply. The improvement of time related qualities of combined transport services and an increase in reliability will be crucial.
In the short run, a shift from road to rail will not be feasible, however, without significant price reductions, allowed for by subsidies.
The optimisation potentials created by infrastructure improvements and optimisation of the transport chain will only be effective in the medium and long run.
Furthermore, an important modal shift in favour of sustainability will not be possible, without an internalisation of external costs on a European level and a consequential implementation and control of social norms, speed limits and the like on the road.
Given that Switzerland has introduced the kilometre dependent tax on road freight traffic, the EU should follow this strategy in order to improve the competitiveness of rail bound transport services.
The strategy proposed by the Swiss government (1999) proposes a package of measures containing most of the instruments discussed in this report that can be introduced unilaterally.
Apart from the measures already introduced (NEAT, LSVA), the key instruments are subsidies on access prices and tendering of combined transport services (accompanied and unaccompanied).
These priorities can be confirmed on the base of the studies undertaken. Given the actual context, it is correct to define the regulatory environment well and leave the initiative to the combined transport operators. Additional interventions are justified for start up and co-ordination.
As a consequence, the key to success lies in the implementation of the Swiss measures.
The main pillars of such a policy are:

- Active promotion of competitive allocation of access rights, allocation of slots by the confederation (active regulator, international involvement to promote free access, dialogue with Italy).
- Equal treatment of Swiss links with regard to subsidies on access prices to avoid introducing a bias in transit competition. The tendering should promote a market-oriented policy of subsidisation. This would avoid negotiation of single subsidies.
- Provision of funds for subsidies on request in specific cases of new transport and for the funding of important investments that improve the quality of the transport chain (above all in Italy).
- Introduction of a monitoring that permits to allocate subsidies in function of changing market performance. A containment of the piggyback transports and subsidies on access prices for full wagon load traffic should be considered.
- The non-alpine part of Switzerland should be opened to 40 tons trucks for transports from and to the combined transport terminals. A distance independent partial abolition of the LSVA promotes these transports and avoids a distortion in favour of long distance transports. The latter would endanger traditional rail transport as a terminal feeder.
- The night ban on truck should be kept in place and the controls on road transport (driving hours,

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weight, speed) should be intensified because of their important positive effect on combined transport.
How much transport will in total be generated and how much can be shifted from road to rail by introducing the various measures?
The potential analysis based on actual data on transit flows through the Alps demonstrate that in the year 2005 63% or 1.2 m. consignments potentially passing through Switzerland could be using combined transport – given their distance and their characteristics. If these transports could effectively be shifted on rail, the combined transport volume through Switzerland would triplicate.
According to Swiss regulations, an amount of 600,000 consignments per year should be shifted to rail. This means half of the maximum potential.
First estimates have shown that this is only possible if the measures do not only comprise lower relative prices of rail transport but at the same time a promotion of quality and flexibility of combined transport services offered.
The subsidies together with free access to the network have, therefore, to function as a catalyst for further improvements. Only if also the reliability improves, as the analysis of shippers' behaviour has shown, will the potential be realised in the medium run.

Project website

www.nfp41.ch

–	Railport-Linz	AT	Terminal and transfer point efficiency

Project website

www.bmvit.gv.at/sixcms_upload/media/180/isb_handouts.pdf

–	Road to Rail: Open Access Intermodal Gateway to the UK - TDG European Chemicals (GPCS 399)	UK	Intermodal modelling and planning

Key findings

As a direct result of this initiative, it is predicted that 360,000 tonnes of bulk traffic will be transferred to rail in 2006. Without the new terminal 14,500 truck round-trips would have to be performed, totalling 5.9 million miles a year and using 3.35 million litres of diesel fuel. This quantity of fuel, if used, would have generated 8.85 million kilograms of carbon dioxide.

Policy implications

An example of best practice in intermodal freight depot utilisation.

Project website

www.transportenergy.org.uk/downloads/GPCS399.pdf

–	Systems for combined transport between road and railway	SE	Intermodal modelling and planning; Terminal and transfer point efficiency

Project contact

arne.jensen@handels.gu.se

–	The Attractiveness of Multimodal Transport	CH	Quality of transport networks

Project website

www.nfp41.ch

Annex II: General information on the Transport Research Knowledge Centre and analysis process used

The Knowledge Centre's background

The EXTR@Web project – Exploitation of Transport Research Results via the Web – attempts to collect, structure, analyse and disseminate transport research results, covering not only EU supported but also nationally financed research in the European Research Area (ERA), as well as selected global transport RTD programmes and projects.

The EXTR@Web consortium has brought together eight main contractors to combine strong and in-depth technical knowledge of transport technology and of EU and national transport RTD programmes with solid communication and dissemination experience.

The current project's direct predecessor, EXTRA (a Fourth Framework Programme Transport RTD project), co-ordinated dissemination activities on the European level for the first time. While FP4 addressed transport research on a mode-by-mode basis, the current Fifth Framework Programme (FP5) focuses on generic themes that consequently reflect transport policy objectives.

The EXTR@Web project will provide support to research at European and national levels by building up and promoting an electronic hub. The key objectives are:

- To establish a comprehensive web-based Knowledge Centre, providing structured and timely access to both detailed and user-oriented summary information on transport research programmes and their results across Europe;
- to provide an electronic hub for inter-connecting European and national programmes and individual networks concerned with transport research into an easily navigable European network;
- to establish a common best practice scheme for the structure and content of the reporting of transport research results;
- to provide high-quality analytical outputs that are structured and tailored according to the type of stakeholder and medium; and
- to raise awareness of the new service, the implications of emerging results, and the wider opportunities under national research programmes across Europe as a whole.

EXTR@Web will provide a comprehensive pool of programme, project and results related information to users, principally in electronic format via the Internet. The approach is based on three main strokes of work covering:

- Monitoring, analysis and information preparation;
- website and electronic news service, the principal dissemination channels; and
- management of knowledge transfer, including dissemination by non-electronic means, and also the maintenance of a contact database and e-mail enquiry service and evaluation of the performance of EXTR@Web.

Definition of transport research

For inclusion into the Transport Research Knowledge Centre, Transport research programmes and projects have to be within the definition of research and transport simultaneously. This will define the eligibility of projects.

Definition of research

General OECD definition:
"Creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of humanity, culture and society, and the use of this stock of knowledge to devise new applications."

Additional transport research criteria:

- Targeted – in line with transport policy aims, strategies and processes to solve the inherent problems for society.
- Accessible – a public activity, open to scrutiny by peers.
- Transferable – useful beyond the specific research project, applicable in principle to other researchers and research contexts as well as decision-makers in policy, industry and science.

Definition of transport

In order to clarify expectations from the Transport Research Knowledge Centre, and to ensure a common understanding of important terms, the Programme Analysis Group of EXTR@Web has come up with the following definition of transport.

- Transport is the means by which a person or material of any kind is passed from its origin to its destination.
- Transport comprises:
  - the transport users: passenger, business, freight;
  - the transport vehicles (full life cycle issues);
  - the transport infrastructure (full life cycle issues);
  - the transport system: the interaction of users, vehicles and infrastructure;
  - the impacts of transport: contribution to objectives, and hence to overall sustainability; and
  - the transport tools: methods and instruments to help ensure an effective contribution to the objectives.

Three levels of analysis

Project level analysis

For European, national and international projects the following harmonized process was agreed:

- For each eligible project, the project co-ordinator will be requested to draft a Project Profile;
- the EXTR@Web consortium identifies, for each project all relevant themes (typically up to five), and provides the project linkage;
- for each eligible project, the project co-ordinator will be requested to draft the other elements of the reporting scheme – Progress Summary and Result Summary – due to the project progress and provides the final report;
- projects with highest relevance and best available final results will be selected for analysis;
- for every such relevant theme within each project a short and concise paragraph – structured with bullet points as appropriate – will be written to present the key findings of the project in relation to the objectives of the theme; and
- this information will be searchable on the Knowledge Centre website.

Thematic analysis

The thematic analysis has been exploiting existing project level analysis. The consolidated project wise findings have been structured and analysed along 30 themes, which are fixed for the project life time and fed into annual Thematic Research Summaries and Annual Compendia. However, for reporting purposes Thematic Research Summaries have been limited to 28 volumes (cf. Chapter 1).
The sequence of outputs has been comprising an explanation of the overall structure, and regular reports treating national, European and international research in a comprehensive way.

Deliverable number	Title	Release date (final version)
D2.A	"Thematic structure and definitions – all themes"	August 2006
D2.B	"European, national and international project database"	July 2006
D2.C	"First annual thematic research summary"; 30 vol.	December 2004
D2.D	"Second annual thematic research summary"; 10 vol.	March 2006
D2.E	**"Third annual thematic research summary"; 28 vol.**	**August 2006**

Table: The sequence of deliverables

Policy level analysis

Whilst the 30 themes are fixed, this type of analysis should give the flexibility to provide information on ad hoc policy priorities. Hence, policy level analysis will synthesize key findings of projects across combinations of themes. As an output, policy brochures shall be prepared depending on ad hoc requirements by DG TREN or by the high-level Advisory Group (AG).

Annex III: Editorial team for Thematic Research Summaries

Please note that – in principle – all EXTR@Web partners and sub-contractors will be contributing to a particular Thematic Research Summary because all project level findings that are of some relevance to one of the 28 (30) individual themes are presented in the comprehensive format of these papers.
The following summary of authors and peer reviewers is presented in alphabetical order while the main author of this paper is given on page i of the document.

Fabien Dreveton, ISIS; France
Mr Dreveton has an electrical engineering post-MSc degree, an MBA and over 8 years experience in Intelligent Transport Systems for road transport. He has been a senior engineer with ISIS since 2001, specialising in traffic control, motorway management, ITS standards development process and system architecture.
Co-author: Road Transport

Prof J Augusto Felício, Neptune – CEGE/ISEG; Portugal
Professor Felício, holding a PhD in management, is teaching graduate and post-graduate courses such as 'Maritime transport and port management' and 'Land transport and logistic management' at ISEG, School of Economics and Management (Technical University of Lisbon). His activities include participation in transport research where he has published several related articles and books.
Main author: Waterborne Transport, Intelligent Transport Systems
Peer review: Efficiency, Vehicle Technology

Dr Paul E Firmin, Institute for Transport Studies, University of Leeds (ITS); UK
Dr Firmin has 30 years of experience in transport planning and engineering, including local authority, consultancy and academia. His research specialities are: traffic management, transport survey design & analysis, traveller information systems; driver route choice behaviour and transport telematics. He is currently the MSc(Eng) degree programme leader and international student adviser at ITS, University of Leeds. He teaches computing skills and traffic management, and supervises student dissertation projects.
Main author: Information and Awareness
Peer review: Safety and Security

Dr Nils Gendner, Neptune – University of Bremen, ISL; Germany
Dr Gendner has been working for more than four years at the University of Bremen, Institute of Shipping Economics and Logistics. His main topics include the analysis of processes, functions and data flows in shipping and within the rail sector. He contributes to ongoing efforts in intermodality by participating in several projects dealing with intermodal concepts and developments.
Main author: Intermodal Transport, Integration
Peer review: Financing Tools, Pricing and Taxation

Wolfgang Helmreich, Industrieanlagen-Betriebsgesellschaft mbH (IABG); Germany
Mr Helmreich is a civil engineer from the Technical University of Munich. He has more than 15 years experience with transport planning and infrastructure design in the rail, road and air sector, and sound knowledge of vehicle technologies. His expertise also includes project management, web publishing and dissemination skills. He joined IABG in 1999 as a senior transport consultant after working as project manager at several German engineering companies. He is principal editor of all Thematic Research Summaries.

Main author: Air Transport, User Aspects, Safety and Security
Peer review: Regional Transport, Rail Transport, Waterborne Transport, Environmental Aspects, Land Use Planning

Cristina I Ivan, Group of Independent Experts Ltd (GIE); Romania
Ms Ivan has a law degree and has graduated a Master course in project management. Ever since 1998 she has participated in various projects financed by international donors in Romania. The main areas of her expertise cover: project management, legal approximation of the EU acquis & drafting of environmental legislation, as well as the carrying out of awareness raising and dissemination activities, including those for the transport sector.

Main author: EU Accession Issues
Peer review: Economic Aspects, User Aspects, Transport Management

Dr Ann Jopson, Institute for Transport Studies, University of Leeds (ITS); UK
Dr Jopson is a Research Fellow whose main interests and expertise lie in the areas of travel behaviour psychology, transport marketing and urban transport planning and policy, with particular emphasis on travel demand management through attitudinal and behavioural measures. Her PhD thesis was based on the role of psychology in reducing car use.

Main author: Environmental Aspects
Peer review: Rural Transport

Dimitris Koryzis, Systema; Greece
Mr Koryzis is a production & management engineer from the Technical University of Crete and holds an MSc in Decision Sciences from Athens University of Economics & Business. He has more than 8 years experience as technical and managerial consultant for 30 European programmes in the transport sector (road, maritime and intermodal) as well as in research and innovation technology EC projects.

Co-author: Pricing, Taxation and Financing Tools
Peer review: Integration

Ulrich Leiss, Industrieanlagen-Betriebsgesellschaft mbH (IABG); Germany
Mr Leiss is an aerospace engineer from the Technical University of Munich. His professional career includes 24 years experience with research, technical analyses, monitoring and managing national and European projects and programmes. These activities cover the areas aerospace, transport, energy and new technologies.

Main author: Other Modes, Vehicle Technology

Bryan Matthews, Institute for Transport Studies, University of Leeds (ITS); UK
Mr Matthews has 9 years experience of transport research and project management in both consultancy and university settings. His research expertise is in transport policy analysis and transport economics. He has worked on a number of EU, UK DfT and Research Council projects. He also contributes to teaching activities, lecturing on Air Transport Systems and supervising student projects.

Main author: Rail Transport
Peer review: Air Transport

Prof Anthony D May, Institute for Transport Studies, University of Leeds (ITS); UK
Professor May has over 35 years' experience in transport planning and traffic engineering. He has been a professor at Leeds since 1977, and has served as Head of the Department of Civil Engineering, Dean of the Faculty of Engineering, Pro-Vice Chancellor for Research and Director of the Institute for Transport Studies. He also has practical experience with the MVA consultancy and the GLC in London. His research specialities include: land use planning, traffic management, road pricing, sustainable urban transport, integrated transport and environmental impacts of transport.

Supervision of entire process of thematic reviews

Batool Menaz, Institute for Transport Studies, University of Leeds (ITS); UK
Ms Menaz is a transport economist from the University of Leeds. She has been involved in a number of various projects including research into transport pricing reform issues in air, road and rail for the IMPRINT-Europe thematic network project, and research for the UK Rail Research Centre looking at the alternative visions for the future of the British rail system.

Main author: Regulation/Deregulation
Co-author: Passenger Transport, Equity and Accessibility, Land Use Planning
Peer review: Road Transport

Christina Paschalidou, Systema; Greece
Ms Paschalidou is a transportation engineer from Aristotle University (Thessaloniki), with a MSc in Urban and Regional Transport from Laboratory of Transport Economics in Lyon. Her field of interest is transport planning and engineering, EU and national transport policies, sustainability issues and research. She joined Systema in 2005, while her previous experience includes an internship in ISIS, traffic studies elaborated individually and research activities in the Aristotle University.

Main author: Transport Management
Peer review: Information and Awareness

Ignacio Rada Cotera, Neptune – IkerConsulting; Spain
Mr Rada Cotera is a lawyer from Deusto University in Bilbao, holding a diploma and certificate of European studies from Deusto and Saarland Universities, respectively. He has been working on EU projects since 2000. His main expertise is European commercial and regional policy, maritime transport and port affairs, legal aspects of international economic relations, urban planning, regional benchmarking and development.

Main author: Regional Transport

Marco Valerio Salucci, Università di Roma "La Sapienza", DITS; Italy
Mr Salucci holds a degree in mechanical engineering from the University of Rome “La Sapienza”. His past research experience has focused on computer modelling of the operations of freight terminals and automatic passenger transport systems, the latter being carried out within EC funded research projects. His current research for a doctorate is in the area of transhipment and information and communication technologies for intermodal freight transport.

Co-author: Freight Transport, Urban Transport, Rural Transport, Efficiency, Decision-support Tools
Peer review: Intermodal Transport

Dr Karsten Seidel, Neptune – European Networks and Cooperation; Belgium/Germany
Dr Seidel has graduated as economist and holds a PhD from the University of Bremen. He has been working on EU projects since 1988. His main expertise is in European industrial and regional policy, telecommunication research projects, maritime transport and port affairs, evaluation of technical aid, urban planning, regional benchmarking development.

Co-author: *Regional Transport*

Dr Paolo Delle Site, Università di Roma "La Sapienza", DITS; Italy
Dr Delle Site holds an PhD, and is a senior research fellow at DITS, Transport Area, University of Rome “La Sapienza”. He combines professional experience with research activities, the latter mainly being carried out within EC funded research projects. Related activities comprise urban transport planning, urban public transport design, transport project assessment, and policy analysis. His teaching activities include courses in transport planning. Furthermore, he is author of papers in Transportation Research Part A – Policy and Practice and in the European Journal of Transport and Infrastructure Research.

Co-author: *Freight Transport, Urban Transport, Rural Transport, Economic Aspects, Infrastructure Provision, Pricing, Taxation and Financing Tools*
Peer review: *EU Accession Issues, Intelligent Transport Systems, Regulation/ Deregulation*

Damian Stantchev, Institute for Transport Studies, University of Leeds (ITS); UK
Mr Stantchev holds a degree in Economics and Trade from Varna University of Economics in Bulgaria and an MA in Political Science from the Central European University in Hungary. His early research experience was in the area of small business development in transitional economies of Central and Eastern Europe. Damian has also contributed to an extensive report on the role of the logistics and transportation sector in society for the Logistics & Transportation Corporate Citizenship Initiative of the World Economic Forum. His research for a doctorate examines the role of logistics in enhancing the competitiveness of the regional economy and encompasses all aspects of original research and data collection including the design, conduct and analyses of large scale surveys as well as the collection of commercial data and development of case studies.

Main author: *Passenger Transport, Land Use Planning, Equity and Accessibility*
Peer review: *Freight Transport*

Andrew Winder, ISIS; France
Mr Winder is a transport planner with a BSc in transport management (Aston University, England) and over 15 years experience in consultancies and public transport authorities covering transport planning and policy, particularly at UK, French and Europe-wide levels. Since 1998 he has been a senior engineer at ISIS, responsible for a wide range of European projects focusing primarily on Trans-European Networks, ITS for road traffic management, urban and regional public transport and EU enlargement aspects.

Main author: *Road Transport*
Peer review: *Passenger Transport, Urban Transport, Other Modes, Equity and Accessibility, Infrastructure Provision*

Ard Wolthuis, Università di Roma "La Sapienza", DITS; Italy
Ard Wolthuis graduated in Science & Innovation Management, in the field of Transport and Mobility, from the University of Utrecht. He has been involved in transport projects and analysed socio-economic, environmental, political and legal aspects, such as the Phileas project, the Fokker bankruptcy, and innovation policy of companies in the Netherlands. Has participated in a European project on innovation in urban public transport systems. Since spring 2005 has joined DITS as a research fellow. His main areas of activities are policy analysis and dissemination of research results.
Co-author: Efficiency, Decision-support Tools

Dr Zhaomin Zhang, ANAST – University of Liege, Neptune; Belgium
Dr Zhang has got the university degrees of Civil Engineering, Mechanical and Marine Engineering; Master of Transportation Sciences and Doctor of Philosophy. He is a senior engineer and led the important projects related to the "Establishment of a mathematical traffic model on the Belgian waterway network" (Belgian national research program "Transport and mobility"), the project called "On computerisation and management in real-time of operations relating to the exploitation of fluvial traffic to organise the waterway transport", Belgian Regional Ministry of Public Works) and the Project related to the development of a transport cost model in the inland navigation sector. He has also been involved in numerous simulation and operation research activities.
Peer review: Decision-support Tools