

# FREIGHT INTERMODALITY



Results from  
the transport research programme



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### Frequently used acronyms

ITU	Intermodal Transport Unit
TEN-T	Trans European Network - Transport

### Definitions

**Transport telematics** Application and utilisation of new information, communications and guidance technologies in transport

Additional information on the transport research programme is available on the Internet. The programme's Knowledge Centre (<http://europa.eu.int/comm/transport/extra/home.html>) provides:

- structured guides to the results and projects for particular topics;
- summaries and final reports of individual projects;
- access to project web sites and other contact details.

References to some projects are included in this brochure, to help the reader access further information quickly through the Knowledge Centre.

Information on the wider transport activities of the European Union is also available on the Internet. It can be accessed through the Europa server ([http://europa.eu.int/comm/dgs/energy\\_transport/index\\_en.html](http://europa.eu.int/comm/dgs/energy_transport/index_en.html)).

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# THE NEED FOR RESEARCH



*In this brochure, discover how research will enhance door-to-door services based on intermodal transport, and identify topics worth investigating further on the web.*

**F**reight transport makes a vital contribution to the economy and society, and is at the heart of globalisation<sup>1</sup>. But its dramatic growth in the road sector is rapidly taking away the benefits, through impacts such as congestion, noise, pollution and infrastructure damage. Innovative policies and technologies can reduce these impacts by promoting the integrated transport chain for door-to-door services.

## Intermodal freight transport – a prerequisite for sustainability

Freight transport demand has been growing steadily at around 2% per annum over recent years and this rate of growth is expected to continue. Road freight has increased dramatically, while the modal share of rail has decreased. This is exacerbating the problems of road transport, particularly congestion.

The demand for alternatives to road freight is getting stronger, especially as a result of policy on sustainable mobility. Intermodal freight transport would also contribute to the European strategy for security of energy supply, through a shift to less energy-consuming transport modes. However, improving intermodal connections is critical, since road transport is likely to remain the first choice for the first and last leg of most freight journeys. After that, pricing policies may be needed to encourage more sustainable decisions on mode choice.

The transport research programme<sup>2</sup> has targeted a range of solutions in this area.

This brochure highlights significant results from the research. Its purpose is to raise awareness of the information and decision support that is now available, and to encourage readers to obtain further details through a web-based Knowledge Centre (<http://europa.eu.int/comm/transport/extra/home.html>).

Although intermodal transport still represents a small part of goods transport – between 2 and 4% – it is increasing rapidly, with an average growth rate of 10%. In a few important European corridors, intermodal transport has the potential to reach a market share of 30%.

Key areas of immediate action towards the realisation of intermodal freight transport in Europe are:

- pursuing the strategy on trans-European transport networks and nodes;
- harmonising regulations and competition rules in support of a Single Market in transport;
- eliminating obstacles to intermodality;
- implementing the Information Society in the transport sector.

Research has been active in each of these areas.

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**The transport research programme is helping to increase intermodal freight transport by supporting research into promising technologies and strategies.**

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# KEY RESULTS

*Research projects have a major impact on policy towards freight intermodality. Selected highlights are described in this section.*

**T**he European Union places considerable emphasis on improving its transport system in order to support economic growth and

international competitiveness. This will require improved intermodality and, as a prerequisite, interoperability between transport systems and modes.

## **A seamless information chain**

Intermodal transport operations require the establishment of a seamless information chain. A wide variety of communication flows already exist between intermodal operators and their clients, and many of them adopt such modern technologies as

computer-generated fax transmission, e-mail and electronic data interchange. Nevertheless it is necessary to make intermodal transport more attractive by harmonising information exchange processes. The transport research programme has pioneered a promising new approach.

### Improving information for customers<sup>3</sup>



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Research has demonstrated how different information systems can be interconnected and can offer standard client interfaces to customers.

A pilot system was established for communication between intermodal operators and their clients. The system provides clients with the opportunity to book transportation services and get information about the status of their

loading units directly via the internet. Clients do not need any specific programs installed on their PCs. Status information is stored in a central database which is continuously updated by the system partners, while a booking interface allows clients to contact intermodal operators directly.

The different data exchanged between intermodal operators and their clients have been organised in accordance with the EDIFACT standardised message structure, to allow direct electronic data interchange. Strict rules on access to information have been defined, since intermodal operators participating in the system may be competitors.

Other operators are expected to join the system, thus leading to a step-by-step development of European standards for client-operator and operator-operator interfaces.

## Efficient rail freight

According to survey results, the majority of shippers regard the quality of international rail transport as inadequate. Main criticisms include poor flexibility and reliability, a lack

of co-ordination between operators, inadequate information, high costs, inconsistent pricing policies, and a failure to co-operate in exploiting logistical systems. Research has evaluated a radical strategy aimed at overcoming these deficiencies.

### Towards a European rail freight network<sup>4</sup>



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Modelling work showed that, under a “current trends” scenario, rail will continue to lose market share to the road sector, falling from 14 to 9%. The modelling was then extended to assess the effects of changes in rail infrastructure and operations. A new assignment of routes to different services was devised, based on three sub-networks:

- a core network strongly dedicated to freight, covering the industrial regions of central Europe;
- an intermediate network mainly dedicated to freight but also carrying local passenger trains;
- a mixed network on which passenger trains would normally have priority.

The results indicated that traffic on the dedicated network could increase significantly, accounting for 85% of total freight traffic on just 20% of the rail network. Journey times on this network could be cut by 20 to 30%. The decline in modal share of rail could be reversed, taking the share back up to 16%. Gains in national markets would be of the same order of magnitude as gains in international transport, though varying between Member States.

The implementation of a dedicated freight network and operating system

would require a number of actions:

- infrastructure investment to remove bottlenecks (for instance crossing the Pyrenees and the Alps);
- the agreement and implementation of standards and systems to overcome a lack of interoperability across the network;
- the introduction of a slot scheduling and assignment method for international services;
- some degree of harmonisation of the subsystems used by the train operators (pricing, information, reservation, tracking and tracing etc.)

In a complementary investigation, a concept was developed for a new type of seaport-hinterland connection by train, integrating features such as hub-and-spoke systems, private rail carriers and advanced information systems.

The work provided a simulation tool and generic guidance which freight operators can use to improve the quality of such connections.



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## Integration of new telematic technologies

To cope with increasing demand and make the intermodal option a competitive alternative to road transport, improved terminal management and the integration of existing telematics systems are required. Research has identified the most promising technologies and solutions.

### Improved freight terminal management systems<sup>5</sup>

At present, freight forwarders and terminal operators are not co-ordinated and the movements of intermodal transport units (ITUs) are generally planned only manually. Computer-aided management, combined with automation, would reduce process times for various procedures, such as the planning of ITU trips, the positioning of ITUs in the yard, and road and rail gate management. New transshipment technologies for cranes and lifters would also allow the maximum terminal capacity to be reached.

The critical features of computer-controlled freight terminals were identified as:

- computer-based booking and dispatch systems for the reservation

of transport capacity and for the allocation of loading time and position;

- fast loading/unloading devices;
- intelligent gate procedures and automated guidance of trucks to reserved loading places;
- electronic devices to automatically locate and register the position in the yard;
- computer-aided yard allocation policies.

The research also demonstrated the importance of adopting new telematic technologies if intermodal freight is to be made cost-effective.

# AREAS OF RESEARCH



**T**he main aim of research on freight intermodality has been to find solutions to those problems impeding the further growth of integrated freight transport.

These problems arise in two main areas:

- Quality of transport networks:
  - access to network infrastructure, information and markets;
  - location of terminals for a more efficient network;
  - operations: transport organisation and interoperability;
  - infrastructure, vehicles and standard loading units;
  - use and integration of information and communication systems.
- Quality of terminals/transfer points:
  - terminal access: pre- and end-haulage, terminal connections;
  - operations in terminals: organisation and management;
  - information management.

The research has supported four main strands of policy development:

## Removing barriers and reducing costs

Identifying the barriers and opportunities that operators face in using intermodal transport, and devising strategies to minimise costs of modal transfers.

## Exploiting information and communication

Developing the opportunities offered by information and communication technologies as the key to seamless intermodal transport.

## Facilitating efficient operations

Promoting European-level co-operation between infrastructure planners and decision-makers on a cross-modal basis in order to provide a coherent and efficient infrastructure of networks and terminals; and facilitating integration between modes through standardisation and harmonisation activities.

## Introducing new concepts for city distribution

Developing frameworks and concepts for freight interchanges on the urban periphery, aimed at reducing inner city congestion and pollution.



# REMOVING BARRIERS AND REDUCING COSTS

*Identifying the barriers and opportunities that operators face in using intermodal transport, and devising strategies to minimise costs of modal transfers.*

## Strategies to improve intermodality

**T**he identification of impediments to interoperability in the European transport system and the evaluation of costs and benefits of changes led to the following recommendations for generic policy approaches:

- Stimulate the increased use of telematics and modern transport equipment.
- Promote strategic co-operation between transport operators and the improved interconnectivity and interoperability of transport networks.
- Standardise intermodal loading units, safety

and other technical equipment and procedures.

- Harmonise organisational/institutional structures and regulatory frameworks.
- Harmonise fiscal conditions for transport across Europe.
- Use pricing measures to make operators take account of the real costs of different modes, including external costs. This could include increasing fuel tax generally, introducing on-board measuring and debiting for emissions, and enabling the trading of emissions permits.
- Introduce an “eco-label” for companies achieving best practice in their logistic operations.

## Sector-specific actions to improve intermodality<sup>6</sup>

Case study investigations highlighted the following actions to promote intermodality:

- for parcel services, further liberalisation of the letter market, simplification of border crossing procedures, and abolition of regulatory requirements for documentation of parcels in some Member States;
- for road freight, funding the faster introduction of information technology, investing in border crossing facilities with Eastern Europe, and reform of regulatory controls on vehicle operations;
- for rail transport, applying a competition regime (e.g. concerning State Aid and market organisation) that creates an efficient Single Market;
- for waterborne transport, promoting the use of information technology, reducing and harmonising customs paperwork, and harmonising port and customs operating practices while minimising restrictive labour regulations and practices;
- for intermodal transport, setting up a competitive and non-discriminatory process for the management of infrastructure (such as rail freight freeways) and for the allocation of scarce capacity;
- for air transport, improving the systems for pricing the use of infrastructure and for slot allocation, improving air traffic control, and collecting more extensive statistical data to support policy development;
- for public transport, encouraging deregulation through franchising of routes, and promoting the appointment of transport authorities to manage through-ticketing structures and the use of smartcard ticketing.



## Statistical database – needs and framework

European integration has seen dramatic changes in mobility patterns to meet developments in economic activities. However, the statistical tools to monitor these patterns and support policy-making have changed little. In particular, there is a lack of data on international flows,

Trans-European Networks, new logistic services, transport chains and intermodality. Moreover, data availability has decreased due to deregulation and the abolition of border controls. Therefore the transport research programme has devised new methods for data collection and estimation, as well as defining a system for data sharing across Member States.

### The European Transport policy Information System (ETIS) <sup>7</sup>

A European Transport policy Information System (ETIS) has been proposed based on a network of co-operating systems. It would provide access to various databases across Europe, create a structured core database, and support the analysis of subsets of data that relate to specific policy issues at regional, national and European levels. It would also handle new statistical concepts such as transport chains, intermodality, and families of commodities with the same logistical requirements.

With respect to freight transport, immediate action was recommended in the following areas, in order to support policy-making in the short term:

- the collection of origin-destination data for goods transport at various geographic levels of aggregation;
- establishing a data bank related to major infrastructure projects;
- assessing the means of collecting data on intermodal flows, particularly from private sector companies, by exploiting telematics and electronic data interchange;
- reviewing the existing INTRASTAT system for the collection of trade statistics;
- establishing a neutral organisation to handle confidential data and maintain ETIS.



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## Decision support tools

Robust guidelines are needed to support decision-making on TEN-T and other transport investments, particularly to take

account of the impacts of multi-modal links on regional development. The transport research programme has funded a number of projects in this area.

### Guidelines for evaluating investments in multi-modal transport infrastructure <sup>8</sup>

An evaluation framework and a software tool have been developed to support the structured assessment of regional development effects. These research outputs cover the selection of criteria for the evaluation, the estimation of impacts, and the definition of weighting factors for combining different impacts

according to the selected criteria. Guidance is provided on the choice of traffic modelling methods.

For those cases where the decision-maker requires a quick low-cost evaluation of alternatives rather than a sophisticated evaluation, a simplified set of guidelines is available. The evaluation framework is designed for use on the TEN-T and other major long-distance transport projects.

# EXPLOITING INFORMATION AND COMMUNICATION

*Developing the opportunities offered by information and communication technologies as the key to seamless intermodal transport.*

**N**ew information and communication technologies (ICT) will lead to major improvements in the vital flow of information along the intermodal transport chain, enhancing the quality, efficiency and safety of the services provided. For example, by sharing information on vehicles and consignments between terminal operators, shippers, carriers and responsible authorities, efficiency savings can be made in the planning and delivery of intermodal services and the management of infrastructure.

One important area of research has been the integration, demonstration and validation of information and communication technologies in operational situations, across all the transport modes. At the same time, other research has improved infrastructure/

terminal efficiency, for example by developing improved designs for vehicles and terminals and devising innovative solutions for the ship-port-hinterland interface.

Developments in the waterborne transport sector have made a vital contribution, particularly by demonstrating new technologies and solutions. One of the strategic aims of this research has been to underpin the role and the opportunities offered by short sea shipping and inland navigation in seamless intermodal door-to-door transport chains, using sea ports and inland ports as nodal points. Therefore innovative solutions and best practices have been demonstrated, enhancing the awareness of both transport operators and cargo owners.

## Improving the waterborne contribution<sup>9</sup>



In the field of information and communication technologies, an important research output has been a cargo tracking and tracing box. This

technology enables the user to integrate and display ship routings as well as commercial operations in such a way that a “virtual road” is constructed. Ships and their cargo may be tracked and traced by different authorities such as customs, immigration and traffic managers, with as much reliability as if the ships were operating in the European road network. The development will allow for precise and permanent checks that could provide the basis for a fully-fledged “traffic facilitation system” (such as a TIR/truck system) for waterborne transport. This would reduce interface costs and delays due to port controls, and consequently promote waterborne transport as a key element in intermodal transport.

## Improving the waterborne contribution<sup>9</sup> (continued)



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In the area of e-transport, the potential of business-to-business tools (electronic brokerage, booking etc.) has been demonstrated and validated in real-life transport operations. For example, such tools facilitated just-in-time deliveries of paper products from the paper mills in the Saima area in Finland to the heart of Europe, by allowing the consignee to monitor their cargo around the clock, from origin to destination.

Research has also addressed the intermodal information links needed for improved logistics and supply chain management. The work demonstrated how the efficiency of intermodal transport can be improved through better information and communication. A prototype system for transport chain management was developed, tested and evaluated. This system provides a "total control node" for a logistic chain including rail, waterborne transport and trucking, as well as managing stock control and distribution by linking into existing consignor and carrier information systems.

With the goal of developing 'intelligent port/ship interfaces', significant research

effort has focused on enabling a fast transfer of cargo and trailers between the terminal and the vessel through innovative design and management of terminals and vessels. This is supported by automated transport and lashing operations to help waterborne services compete with truck operations.

In the area of efficient port and terminal operations, work has been done to build on the facilitation and simplification instruments already defined by the International Maritime Organisation (for instance through the IMO Convention on Facilitation of Maritime Traffic). The research concentrated on developing a new generation of organisational and administrative procedures in ports and improving the information flow related to the physical cargo flow. To achieve these objectives, efforts were concentrated on a thorough analysis, mapping and re-engineering of existing processes in order to generate proposals for improvements in port operations and management. These proposals were tested and validated with the help of simulation models.



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# FACILITATING EFFICIENT OPERATIONS

*Promoting European-level co-operation between infrastructure planners and decision-makers on a cross-modal basis in order to provide a coherent and efficient infrastructure of networks and terminals; and facilitating integration between modes through standardisation and harmonisation activities.*

## New strategic corridors and nodes

**T**he efficiency of the Trans-European Transport Network relies heavily on the strategic location of corridors and terminals. Decision-making about the future development of terminals

involves public and private bodies, each of which has its own selection criteria. A comprehensive tool has been developed to handle information about the merits of potential locations for intermodal terminals, suitable for use by multiple stakeholders.

## Optimal location of intermodal terminals<sup>10</sup>



The new tool allows an accurate evaluation of potential sites for passenger and freight terminals, based upon internal (technical, operational, costs) and external (public, private) requirements.

This is a prototype, but has been shown to meet decision-makers' and managers' real needs. Some further improvements are anticipated in the assessment module, the user interface and the database structure.

In addition, an appraisal was produced of tri-modal (waterway, railroad and road) transport chains aimed at reducing environmental impacts, in particular for Alpine regions along the main traffic corridors to Southern and South-Eastern Europe. Recommendations were made for the location of a proposed tri-modal freight terminal in Basle/Switzerland.

## Identifying user needs

The identification and quantification of important service characteristics for both single-mode and intermodal freight transport has shown that a gap exists between the quality of service desired and

the quality of service supplied. Ultimately, successful operators will be those who combine assurance in meeting service requirements with the lowest price. Studies in this area have provided the basis for European policy development as well as strategic commercial decision-making.

## Enhancing the quality of intermodal services<sup>11</sup>

Research has provided a comprehensive European-level analysis of the intermodal transport system, in which intermodality is considered against a broad transport context that includes:

- the quality requirements of end-users,
- strong competition from the road sector,
- questions about the future of rail organisation,
- the diversity of national and local policies.

New technologies have been assessed with regard to their integration within a transport chain subject to technical, economic and social constraints.

Information technologies often improve the quality of service for end-users, but technological development does not emerge as the most critical issue. Rather, the future of intermodal transport is more dependent on the quality of rail



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operating systems, and on the stabilisation of the institutional and political environment (to enable professionals to build “pro-active” strategies and not remain in a “reactive” position).

Overall, the research concluded that deregulation and competition are the key to new intermodal services, with the shippers and transport providers developing joint operations.

## Towards a new generation of intermodal terminals

Freight operators are dissatisfied with the presence of numerous administrative and institutional barriers at terminals, the quality

of operations and sub-optimal transshipment processes. This situation calls for new concepts for bundling freight into consignments and new transshipment schemes, which in turn will require advanced designs of intermodal terminals.

## Infrastructure requirements for integrated terminals<sup>12</sup>

To help the industry develop more effective terminals, the transport research programme has:

- promoted optimised terminal layouts, better operational procedures, and the use of advanced terminal management systems;
- performed a survey of current GPS-based identification, location and positioning systems, including systems already in development;
- defined and tested new features of automated freight handling by performing practical tests;
- designed, constructed and tested prototypes of new wagons suited to automated operation, and in particular

the efficient handling of intermodal transport units (ITUs);

- assessed working conditions and safety regulations at automated intermodal terminals;
- analysed the technical and organisational aspects of intermodal terminals;
- developed simulation models for full-scale scenarios, based on the field trials, namely: a microscopic-level model for evaluating different terminal designs and a macroscopic-level model for analysing the efficiency of the multi-modal network on a pan-European level;
- formulated recommendations on the functional layout of future intermodal freight terminals and the optimised design and operation of rolling stock.

# INTRODUCING NEW CONCEPTS FOR CITY DISTRIBUTION

*Developing frameworks and concepts for freight interchanges on the urban periphery, aimed at reducing inner city congestion and pollution.*

## Additional infrastructure

**I**ntermodal transport nodes – or freight villages – are considered the single most important building block of schemes to provide commercially attractive intermodal services

on a European scale. These terminals act as an interface between transport modes and between transport operations and any other logistics services. Site-specific evaluations have captured the lessons from limited European experiences and disseminated them to a wider audience.

## Freight platforms and villages<sup>13</sup>

A database of 96 European freight platforms has been created, identifying key characteristics such as transshipment volumes, infrastructure, on-site company interactions and financial arrangements.

Based on this analysis, a handbook was developed for local authorities and transport sector companies. The handbook was tested at different sites and provides guidance and evaluation methods for establishing new freight platforms. Topics include:

- financial and organisational issues, and their impact on the efficiency of platform operations;
- the impact of technology, equipment and design on platform efficiency;
- evaluation of potential impacts on urban traffic and the environment.

Case studies were performed in seven European countries covering a total of 14 freight villages (FV) representing two principal types, i.e. integrated FVs and non-integrated FVs. (The latter type does not allow for a change of transport mode at the terminal.) Major benefits were found for regional economic development where integrated freight villages have emerged, owed to improved

intermodality, the availability of attractive services, and the proximity of different transport and logistics activities at one site.

An assessment of the environmental impacts of FV operation, particularly with respect to dangerous goods, led to the production of three management tools:

- a good practice code in the form of a user-friendly handbook (available via the internet or on CD-ROM), addressing transport and storage operations in FV areas;
- a decision support system (DSS), field-tested by three FVs, that helps in assessing the risks involved in handling dangerous and flammable goods – this DSS builds on a database of some 160 substances and materials;
- a training software tool (again available via the internet or on CD-ROM) comprising technical guidelines for operators, and providing recommendations on communications, organisational matters, professional skills and related training of staff, ultimately promoting the implementation of environmental management systems in FVs.



## Organisation of urban freight distribution

Concepts for city logistics have been studied in abstract and with reference to approaches being considered in a number

of European cities. Estimates of utility values showed that integrated strategies combining infrastructure, information technologies and the provision of door-to-door freight services are the most effective in meeting stakeholder objectives.

### Innovative city distribution concepts<sup>14</sup>

Demonstrations have been made of two types of innovations:

- radical changes to logistic processes across a number of shippers or operators,
- improvements in existing processes.

These demonstrations tested in particular:

- a co-ordinated distribution concept including intermodal transport by sea/road and rail/road;
- co-operative inbound city logistics, where consolidation starts at the far end of the transport chain, with the consignee, and intermodal transport is used to cover the long haulage leg to a freight centre;
- the integration of real-time traffic information into transport logistics planning decisions;
- a new concept for linking multiple freight distribution centres and terminals by rail.

Two lean logistic concepts have also been developed:

- load zone management, a system for automated reservation of space in a city centre zone for loading and unloading lorries;



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- a logistics management system, providing a basic structure for electronic data processing from source to destination along a logistic chain, to facilitate integrated planning, monitoring and control of the movement of goods.

The research found that public administrations need to promote the co-operation between market actors that is essential in establishing city logistic solutions and providing multi-modal hubs for freight transfer.

# CURRENT DEVELOPMENTS IN TRANSPORT RESEARCH

*This section identifies current research projects in the freight intermodality sector. Further details are available from the Links section of the web-based Knowledge Centre.*

**T**he transport research programme has shown that the problems facing freight intermodality – more than for all single transport modes – can only be met by harmonised and integrated approaches on a European level. Research has identified a set of candidate concepts, systems and measures and has provided the information base and validation experience to support future actions.

While research to date has centred on the improvement of technical, logistical and

legal elements of the integrated transport chain, the focus of research in ongoing projects has shifted to an even more integrated approach. Six main areas have been targeted:

- meeting the targets for sustainable development and climate change;
- understanding new trends and changes;
- new intermodal technologies;
- new container concepts;
- infrastructure aspects in Central and Eastern European countries.
- the use of intelligent transport systems.

## Sustainable development and climate change

Sustainable development is the focal point of Commission policy on transport. This reflects concerns raised

by the Kyoto conference on climate change and the Commission's recent Green paper on energy supply. Intermodal freight transport has an important part to play, for instance in reducing CO<sub>2</sub> emissions and the use of fossil fuels.

Research will identify elements of the European production, processing and distribution systems where further contributions can be made in reducing environmental damage (particularly CO<sub>2</sub> emissions). For example, one project<sup>15</sup> will investigate the potential of intermodal freight transport in achieving modal shift, and will develop and demonstrate tools for companies to assess their freight flows and estimate the scope for using intermodal transport.



## Understanding new trends and changes <sup>16</sup>

Transport is a derived demand, which depends on the economic requirements of industry and decisions on the location of production as well as technological innovations and the political challenge of EU enlargement to the East.

Ongoing research will analyse the relationship between supply chain trends and freight transport operations in order to identify opportunities for supply chain integration at a European level. It is intended to provide practical guidance to industry on logistical/supply chain trends, performance measurement and optimisation. In addition, the role and impacts of third party logistics service providers will be investigated and the impacts of e-commerce on transport will be assessed.



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## New intermodal technologies<sup>17</sup>

Current intermodal handling of cargo is slow and needs to be speeded up. One possibility is the development of new handling technologies and equipment. Others include organisational changes and better utilisation of the transport infrastructure (e.g. exploiting automated scheduling technologies). The transport research programme is helping to develop

and demonstrate solutions that offer substantial improvements.

Air transport has the fastest growth rate of all modes, hence the integration of air freight into the intermodal transport chain is essential. Research will investigate the potential to relieve congested airports and avoid short-haul freight flights by providing an attractive intermodal alternative.

## New container concepts <sup>18</sup>



Harmonisation of standards for the sizes and weight of containers across modes will facilitate intermodal transfers for a high proportion of goods. New loading

units (especially for smaller consignments) and flexible trans-shipment technologies will allow modular capacity planning and utilisation. The more efficient use of small-sized containers in pooling or circulation systems will also contribute to higher load factors and avoid empty hauls.

Ongoing research is dedicated to the development, realisation and demonstration of new small-sized container concepts for use in door-to-door transport chains.





## Infrastructure in Central and Eastern European countries<sup>19</sup>

The forthcoming enlargement of the European Union will lead to a significant increase in trade between the existing Member States and the candidate countries. There is an obvious risk that this will further drive the growth in road transport. To counter this, research is looking at the current state of intermodal transport infrastructure and systems in the countries of Central and Eastern Europe to identify gaps and bottlenecks. This will allow subsequent investments to be targeted to help support the integration of the expected new Member States and the sustainable development of the enlarged European Union.

## Intelligent transport systems<sup>20</sup>

Networking activities are systematically defining a multi-modal ITS concept for freight transport that is user-accepted and demand-driven. A better understanding of how traffic and transport management systems should interact will improve the performance of applications aimed at enhancing traffic safety, optimising the use of transport infrastructure, and ensuring smooth and efficient door-to-door transport operations.

In the area of e-business, new research will enhance the integration of ports into intermodal transport chains by harmonising information exchange. The aim is to provide interfaces between software systems at ports and along the transport chain, for service providers,



administrative authorities and port operators. This will allow procedures to be standardised and data harmonised between parties without the need to modify existing software systems.

## References

Further information on the following projects can be obtained from the web-based Knowledge Centre.

Other key documents referenced in the brochure are available on the DG Energy and Transport web site ([http://europa.eu.int/comm/dgs/energy\\_transport/index\\_en.html](http://europa.eu.int/comm/dgs/energy_transport/index_en.html)).

1. *White Paper "European transport policy for 2010: time to decide", COM(2001)370*
2. *The transport research programme is part of the fourth framework programme for Community activities in the field of research, technological development and demonstration for the period 1994 to 1998*
3. *CESAR, INTRARTIP, PISCES and ITESIC projects*
4. *EUFRANET and OSIRIS projects*
5. *PLATFORM and PRECISE-IT projects*
6. *MINIMISE, SORT-IT, STEMM, REDEFINE and SHIFTING CARGO projects*
7. *INFOSTAT, INFREDAT and MESUDEMO projects*
8. *EUROSIL project*
9. *IPSI, PROSIT, INFOLOG, EUROBORDER and SPHERE projects*
10. *EMOLITE and APRICOT projects*
11. *IQ, PROMOTIQ, SCANDINET and WORKFRET projects*
12. *IMPULSE, PRECISE-IT and TERMINET projects*
13. *REFORM and FV-2000 projects*
14. *IDIOMA and LEAN projects*
15. *SPIN project*
16. *SULOGTRA and PROTRANS projects*
17. *CO-ACT and CESAR II projects*
18. *SAIL project*
19. *INTERMODA and INTERFACE projects*
20. *IP and WATERMAN-TS projects*

*The following documents on the topic may serve as valuable background information:*

- *Intermodality and intermodal freight transport in the European Union: Communication from the Commission to the European Parliament and the Council, COM (97) 243 final.*
- *Towards a European strategy for the security of energy supply, Green Paper, COM (2000) 769 final.*

The programme's Knowledge Centre is available at:

<http://europa.eu.int/comm/transport/extra/home.html>

It provides:

- structured guides to the results and projects for particular topics;
- summaries and final reports of individual projects;
- access to project web sites and other contact details.

Brochures on results from the transport research programme

are available for:

1. Sustainable mobility
2. Clean urban transport
3. European transport networks
4. Single European sky
5. Maritime safety
6. Freight intermodality
7. Getting prices right
8. Road safety
9. Intelligent transport systems



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