CONCERTED ACTION ON SHORTSEA SHIPPING

Contract No. WA-96-CA.95/186

Public Final Report

Volume 1: Executive Summary

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1. Introduction

This Executive Summary is Volume 1 of the Public Final Report of the Technical Secretariat of the Concerted Action on Shortsea Shipping, or contract No. WA-96-CA.95/186 ("the SSS-CA project"). The initial contractual period of the project has been the period 1/4/1996 to 31/3/1999, subsequenty amended to end at 31/4/1000.

The Technical Secretariat of the SSS-CA project has been managed by the following 4-partner consortium:

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Volume 1 is organized as follows: Section 2 describes the objectives of the project. Section 3 describes the workplan and deliverables of the project. Section 4 describes the main accomplishments of the project. Section 5 presents its conclusions.

In addition to Volume 1, which provides an executive summary of the project, major deliverables of the project provide full detail of all work achieved. These deliverables correspond to additional volumes of this Public Final Report, as follows:

- Volume 2: State of the art study, part I.
- Volume 3: State of the art study, part II (listing of database contents – see webpage)
- Volume 4: The concerted action's views on terms of reference for SSS pilot projects.
- Volume 5: Requirements as regards SSS statistical data (final).
- Volume 6: Advanced technologies to better collect SSS data.

2. Objectives

The Concerted Action on Shortsea Shipping played an important role in the Commission's Waterborne Transport Research programme (DGVII - 4th FP). Its objectives were defined as follows:

- setting up of a discussion platform and knowledge network of R&D in SSS
- co-operation, co-ordination and consensus building
- compiling the state of the art in this (broadly defined) area,
- contributing to the co-ordination of relevant research and other related work,
- defining ‘pilot projects and demonstrators’,
- discussing criteria for interoperability and SSS logistical efficiency,
- identifying the key focal areas shortsea shipping future development,
- performing a comprehensive analysis of SSS statistical data, and
- providing the wide exposure and dissemination of the results of the action.

The plan for achieving these objectives called for a broad European representation to the action, an effective scientific and technical leadership, a sound management plan and schedule, and above all, the commitment of all participants to contribute and help make this action a success.

Representation was open to all EU countries and other countries associated with the research programme (according to the association protocol). In fact, fourteen (14) countries- all EU countries except Austria and Luxembourg, plus Norway- participated. The action had funds to reimburse up to two representatives per member country per meeting, according to the Commission's rules for travel.

As per the rules for waterborne transport concerted actions, the representatives of each participating country contributed input, advice, and other expertise to the action. Such input typically represented information coming from the specific country (e.g., relevant research carried at the national level, suggestions for pilot projects, etc.). In addition to nominated regular action participants, several "observers" were invited to action meetings, representing organizations with an interest in shortsea shipping. Such organizations included ECSA, ESPO, EFIP, and FEPORT.

3. Workplan and deliverables

3.1 Work breakdown structure

To accomplish the above objectives, there have been ten (10) main workpackages (or tasks) to the work of the Technical Secretariat. Their description and allocation among partners are as per the following table.

Work-package	Description	Partner No.
A	Compile state of the art study. Additional input would be solicited from other sources.	1
B	Monitor area 6.1 DGVII projects, provide scientific & technical advice on other projects, provide technical coordination of action	1
C	Provide input for state of the art of information/ telecommunications (telematics) projects related to SSS. Information on DG XIII related activities.	3
D	Provide input for state of the art of shipbuilding/ engineering projects related to SSS. Information on DG XII related activities.	4
E	Write 'terms of reference' for pilot projects, demonstrators, and integrative studies.	1
F	Write final report of action, including technical input for action's brochure.	1
G	Provide administrative support for action meetings: Organize meetings, book rooms, write & circulate agendas & minutes, administer travel reimbursements, administer fund for integrative studies. Produce action's brochure.	2
H	Requirements as regards SSS statistical data	1
I	Use of advanced technologies to better collect SSS data	1
J	Provide administrative support for statistics group meetings. Book rooms, administer travel reimbursements.	2

Additional information on these workpackages is provided below.

3.1.1 Workpackage A

Workpackage title: State of the art study
Workpackage leader: Partner No. 1
Starting events/inputs: First action meeting
Objectives: Compilation of state of the art study

Description of activities and technical approach

Input to be solicited from action participants and other sources on the following:

1. National research programmes or studies, either privately or publicly funded.

2. EU research programmes or studies.
3. Demonstration projects.
4. Technology development projects in related areas (ISC, VTMIS, ECDIS, EDI, shipbuilding, ship design, cargo handling, etc).
5. Policy studies.
6. Regulatory studies.
7. Any related publication.
8. Other.

Outputs and deliverables: Report (see deliverables no. 1,2,3)

Duration/Schedule of workpackage: 2 months (after date of contract signature).

3.1.2 Workpackage B

Workpackage title: Monitor DGVII projects
Workpackage leader: Partner No. 1
Starting events/inputs: Action kickoff

Objectives: Monitor area 6.1 DGVII projects, provide scientific & technical advice on other projects, provide technical coordination of action

Description of activities and technical approach

Area 6.1 DGVII projects to be monitored included the following:

- E-EIS
- ASDSS
- EMMA
- IPSI
- EUROBORDER
- SPHERE
- BOPCOM
- MARNET
- INTRASEAS
- PROSIT
- INFOLOG
- ARCDEV
- INSPIRE

The Commission has included in the contract of each of the above projects the obligation to attend at least one action workshop per year and to give presentations during the workshop, as well as to answer Coordinator's queries on the project.

Outputs and deliverables: Report and presentations (see deliverable no. 1)
Duration/Schedule of workpackage: 48 months.

3.1.3 Workpackage C

Workpackage title: DGXIII activities
Workpackage leader: Partner No. 3.
Starting events/inputs: Action kickoff.

Objectives: Provide input for state of the art of information/telecommunications (telematics) projects related to SSS. Information on DGXIII related activities.

Description of activities and technical approach

1) Input to state of the art solicitation to be provided for information/ telecommunications (telematics) projects related to SSS.

2) DGXIII (transport telematics) projects to be 'monitored' throughout the duration of the action.

Outputs and deliverables: Report (see deliverable no. 1)
Duration/Schedule of workpackage: 48 months.

3.1.4 Workpackage D

Workpackage title: DGXII activities
Workpackage leader: Partner No. 4.
Starting events/inputs: Action kickoff.

Objectives: Provide input for state of the art of shipbuilding/ engineering projects related to SSS. Information on DGXII related activities.

Description of activities and technical approach

1) Input to state of the art solicitation to be provided for shipbuilding/ engineering projects related to SSS.

2) DGXII (industrial materials technologies) projects to be 'monitored' throughout the duration of the action.

Outputs and deliverables: Report (see deliverable no. 1)
Duration/Schedule of workpackage: 48 months.

3.1.5 Workpackage E

Workpackage title: 'Terms of reference 'for pilot projects.
Workpackage leader: Partner No. 1.
Starting events/inputs: State of the art study, input from participants.

Objectives: Write 'terms of reference' for pilot projects and demonstrators

Description of activities and technical approach

Shortsea shipping pilot projects and demonstrators were a crucial element of the Commission's Waterborne Transport Programme, planned for the 3rd call of proposals in 1996. The purpose of these projects was to provide a framework for the validation and assessment of innovative concepts in shortsea shipping, and, possibly, pave the way for their full scale implementation in the future. The role of this action with respect to pilot projects and demonstrators was to help the Commission define the terms of reference for all these projects .

Outputs and deliverables: Report (see deliverable no. 3)
Duration/Schedule of workpackage: 3 months.

3.1.6 Workpackage F

Workpackage title: Final report
Workpackage leader: Partner No. 1
Starting events/inputs: Next to last meeting.

Objectives: Write final report of action.

Description of activities and technical approach

All activities and results of the action to be described in this final report.
Separate technical input to be made for action's brochure.

Outputs and deliverables: Report (see deliverables no. 6, 7).

Duration/Schedule of workpackage: 5 months.

3.1.7 Workpackage G

Workpackage title: Administrative support
Workpackage leader: Partner No. 2.
Starting events/inputs: Action kickoff

Objectives: Provide administrative support for action meetings and produce action's brochure.

Description of activities and technical approach

1) Provide administrative support for action meetings, that is:
- Organize meetings.
- Book rooms.
- Write & circulate agendas & minutes.
- Administer travel reimbursements.
- Administer fund for integrative studies.

2) Produce action's brochure.

Outputs and deliverables: Administrative support/deliverable no. 8.
Duration/Schedule of workpackage: 48 months.

3.1.8 Workpackage H

Workpackage leader: Partner no. 1
Workpackage title: Requirements as regards SSS statistical data
Starting events/inputs: Immediately upon contract amendment.

Objectives: To monitor the developments and trends within the shortsea market and its sub-markets, in order to assess the impact (on the volume of goods carried by SSS in the EU) of certain policy measures.

Description of activities and technical approach

Collect data from all EU/EEA ports concerning cargo carried by maritime transport in general, with a breakdown including shortsea cargo specifically; in terms of volumes expressed in tonnes. The data relating to shortsea cargo would be defined in one of two ways. Either by O/D matrices showing maritime trade within the EU/EEA, or, alternatively, by type of ship.

In parallel, or as an alternative in case 1 proves infeasible, a representative sample of major ports (spread over the Mediterranean, the Baltic, the North Sea, and the Atlantic Arc) could be selected which would report at regular intervals on cargo handled in these ports and carried by shortsea vessels.

The workpackage is to be coordinated by partner No. 1 and is to be performed as follows. First, each participating country is to nominate to the concerted action an expert on statistics. The role of these statistics experts would be to provide input to the workpackage, including data from the corresponding countries. Second, a «core group» of experts from institutions with recognized expertise in the area of statistical analysis of maritime transport flows would be subcontracted with the approval of the Commission to perform the analysis of the workpackage. The core group would appoint a leader, who would be responsible for synthesizing and delivering to Partner No. 1 the technical work of the subcontractors, including material for all the deliverables of the workpackage.

Collectively, the statistics experts, an ex-officio representative of Partner No. 1, and the «core group» would form the «statistics group».

There would be four (4) meetings of the statistics group, all in Brussels. The tickets of the statistics experts and of the ex-officio representative of Partner No. 1 (as many as 15 persons per meeting) would be reimbursed by the special fund for travel in the contract and according to normal Commission rules (see also workpackage J).

The core group representatives and the ex-officio representative of Partner No. 1 form the Statistics Coordination Committee (SCC). Partner No. 1 may call for meetings of the SCC before or after a regular statistics group meeting or before or after a regular SSS-CA meeting.

Outputs and deliverables: There would be three deliverables.

- An interim report (deliverable No. 9), delivered after 6 months from workpackage start, describing progress on the workpackage (up to step 3).
- A draft final report (deliverable No. 10), delivered after 10 months from workpackage start, and
- A final report (deliverable No. 11), delivered at the end of the workpackage.

Duration/Schedule of workpackage: 12 months

3.1.9 Workpackage I

Workpackage leader: Partner no. 1
Workpackage title: Use of advanced technologies to better collect SSS data
Starting events/inputs: Delivery of workpackage H interim report.

Objectives: To recommend advanced technologies that would aid in the collection of SSS data.

Description of activities and technical approach:

As a result of progress in workpackage H (interim report), this workpackage would take a critical look at systems and advanced technologies that are available or are under development with the goal to better collect, standardize, classify, and store SSS data.

Outputs and deliverables: Report (deliverable No. 12).
Duration/Schedule of workpackage: 3 months

3.1.10 Workpackage J

Workpackage leader: Partner no. 2
Workpackage title: Administrative support for statistics group
Starting events/inputs: First meeting of statistics group.

Objectives: Provide administrative support for statistics group meetings.

Description of activities and technical approach

This is a workpackage that complements workpackage G of the action, and aims to provide administrative support for the statistics group meetings, that is:

- Book rooms.
- Circulate meeting announcements and agendas.
- Administer ticket reimbursements.

Deliverables: Administrative support.
Duration/Schedule of workpackage: Ends at last meeting of the statistics group.

3.2 Deliverables

The list of official deliverables follows. In parentheses are the partners responsible for each deliverable. Those deliverables that are included in this Public Final Report are also shown.

No. 1: Input for state of the art study (partners No. 3 and 4).
No 2: State of the art study (partner No. 1)- see also Volume 2.
No. 3: 'Terms of reference' for pilot projects (partner No. 1)- see also Volume 3.
No. 4: Project monitoring (partners No. 1, 3, and 4).
No. 5: Semi-annual progress reports (all partners).
No. 6: Final report on the action (partner No. 1)- see also Volume 4.
No. 7: Technical input for action's brochure (partner No. 1).
No. 8: Action's brochure (partner No. 2).
No. 9: Interim report on SSS statistics (partner No. 1).
No. 10: Draft final report on SSS statistics (partner No. 1).
No. 11: Final report on SSS statistics (partner No. 1)- see also Volume 5.
No. 12: Report on advanced technologies to better collect SSS data (partner No. 1)- see also Volume 6.

4. Main accomplishments of the action

4.1 Introduction

Overall progress has been according to both the objectives that were set for this Concerted Action *and* with the workplan that was set forth to accomplish these goals. The contract for the Technical Secretariat of the Concerted Action on Short Sea Shipping started of April 1, 1996. The action itself was predecessed by three preparatory 'expert meetings' hold in Brussels, of which the first took place June 30, 1995, followed by two additional meetings (on November 24, 1995 and on February 23, 1996).

Work within the three expert meetings laid the foundation for the later concerted action, but also for the waterborne transport research programme in FP4 in general.

The action held a total of 12 meetings, as follows (all in Brussels unless otherwise noted):

- June 4, 1996
- June 22, 1996 (Bergen, Norway)
- November 8, 1996
- January 27, 1997
- June 13-14, 1997 (Piraeus, Greece)
- December 3, 1997
- April 7, 1998
- June 8, 1998 (Lisbon, Portugal)
- December 9, 1998
- May 20, 1999 (Kavala, Greece)
- September 16-17, 1999 (Gothenburg, Sweden)
- March 30-31, 2000.

The meetings in Bergen, Piraeus, Lisbon, and Gothenburg and the final meeting in Brussels were in a workshop format, with broader industrial participation.

In addition, the SSS statistics group had 4 meetings, as follows (all in Brussels unless otherwise noted):

- December 8, 1998
- April 22, 1999
- September 16, 1999 (Gothenburg, Sweden)
- March 3, 2000.

In our opinion, the main accomplishments of this concerted action have been the following:

4.2 State of the art study and database

Volumes 2 and 3 of this Public Final Report provide more information on this subject. The SSS state of the art study was produced by NTUA with specialized input from

partners ISL and WEGEMT and from all participants of the action and several other sources (conferences, the Commission, etc.). It catalogues some 467 entries relating to projects, studies, papers, reports, or articles in the area of shortsea shipping.

In order to facilitate the compilation of the study, and in the process of collecting this information, a computerized tool was developed by NTUA so as to handle the extensive input that was provided from all these sources. The creation of an integrated dBase program became indispensable, in order to enter, update, and retrieve easily the collected data and extract statistics and reports fast and securely.

It was decided that the package should fulfill the following criteria:

- compatibility with as many as possible other software packages, and capability of data interchange among several software environments;
- friendly and smart interface between the user and the machine;
- capability of upgrade from time to time, so all this information can be useful in the future.

Based on the above, it was decided to use Microsoft's Visual FoxPro v3.0™ because of previous experience with this package and FoxPro's ability to provide communication with all major operating environments: Windows, DOS, UNIX and Macintosh. The database is formatted and constructed in a way that allows the user to import data of another format and retrieve it via its own interfaces.

The interface allows the user with a variety of options, and is essentially structured in two levels. Level I provides bibliographical information on each entry (title, author, type, sponsor, country, status, language). Level II provides a matrix-type description, where the columns indicate the object(s) under investigation (ships, ports, cargo, networks, telematics) and rows indicate the methodological disciplines (engineering, economics, regulatory, safety). The interface also has buttons which allow the user to perform the following functions:

- enter a new entry
- preview an existing entry
- edit an existing entry
- print ready-to-use reports
- search the database

All this proved a very helpful means to produce the deliverable of the state of the art study. Specifically, all Level I information was included in Volume 2, and all Level II information was included in Volume 3.

From a contractual perspective, it is important to point out that the development of such software and database was *not* foreseen at the time the Technical Annex of the SSS-CA contract was finalized (December 27, 1995). The need for such development was realized afterwards, and actually much of this development (although not all) was realized before the official start of the SSS-CA contract (April 1, 1996).

This was the first such development to take place within the other concerted actions on waterborne transport. With the encouragement of the DGVII there was talk between the

SSS concerted action and others (mainly the ones on VTMIS and inland waterway) to adopt a similar approach.

Another related parallel and perhaps more important development concerns the use of the internet. NTUA Maritime Transport has been working independently since late 1995 to develop a set of web pages describing its educational and research activities. These pages are now operational on the WWW, and SSS-CA (as well as all other Commission projects) are prominently featured in them. The user can surf these pages and obtain up-to-date information on the action. He or she can even download the state of the art study by remotely logging in the NTUA web site (www.maritime.deslab.naval.ntua.gr).

Links to the web sites of AMRIE, ISL, and INRETS have also been established.

One of the features of the presence of SSS-CA on the internet is the ability of the user to download reports produced by the action. This can be done either by following on-line instructions at the SSS-CA web site, or by directly logging in at the NTUA web site. All reports of the action are available for download (all are Word 6.0/7.0 documents):

Another implemented feature has been the development of a "Search Engine" that allows the user to search the state of the art database and submit entries via the internet. The user can do so either by filling in a form that can be submitted electronically, or by submitting a Word document by e-mail. NTUA then looks at the submission, and, if relevant, adds it to the SSS database.

4.3 Terms of reference for pilot projects

Volume 4 of this Public Final Report provides more details on this subject. The process for the formulation of the terms of reference for pilot projects and demonstrators in the area of shortsea shipping (which began in the spring of 1996, continued with a specialized workshop in Bergen in June 1996, and culminated with a discussion of a draft report among the participants of the action in the fall of 1996) ended with the delivery of the final version of a report to the Commission in December 1996.

The report on the terms of reference for pilot projects (which was launched in the third call for proposals) reflected *the Concerted Action's views* on this subject, and did not intend to replace the terms of reference officially stipulated in Commission documents dealing with general information on the Transport Research Programme, or with more specific information on Waterborne Transport Research. Any terms of reference or other guidelines for proposal preparation, evaluation and selection (either general or specific) stipulated in such documents are assumed to be valid in all cases.

Given that the spectrum of possible projects ranging from the level of a feasibility study all the way to the level of full scale implementation (such as for instance opening a new SSS line) is extremely broad, it became clear that a number of issues had to be resolved before one could proceed with more thematic discussions. These issues included the following:

- Project size
- Scope/ kinds of projects
- Validation criteria

On the basis of all the discussions among concerted action participants and the Commission about pilot projects, the following general principles constitute *a minimum common basis of consensus* regarding the scope of a pilot project:

- A pilot project should have a substantial real-world content, with significant end-user participation.

- The demonstration phase is the main vehicle for testing and validating the results of a pilot project.

- Any approach that is used is expected to be technically sound and rigorous in the reflection of the assumptions, parameters, or other data used, as well as in the criteria and process for project validation.

- No specific technical approach (such as simulation or other) can be a priori encouraged or discouraged.

The list of validation criteria for pilot projects is really open ended. The following is a non-exhaustive sample. Pilot projects in SSS should clearly demonstrate one or more of the following:

- compliance with the broad objectives of the Common Transport Policy

- removal of bottlenecks or other obstacles that hamper logistical efficiency

- relief of land-based networks from congestion

- promotion of European trade competitiveness

- technologies, policies and/or procedures that improve interoperability

- cost-effective scenarios by which cargoes can be shifted from land to sea

- measurable improvements in logistical efficiency (properly defined)

- enhancement of connectivity and cohesion of peripheral and less developed regions

- sustained mobility

- achievement of higher safety and/or environmental friendliness

As all public deliverables of the action, this report is available to the public via download from the NTUA web site.

4.4 SSS flow statistics

Volumes 5 and 6 of this Public Final Report provide more details on this subject. The issue of maritime statistics, and specifically, SSS-related statistics has occupied the attention of the action since the Bergen meeting. The main problems that have been identified in that regard have been lack of homogeneity, lack of quality, and, in most cases, lack of appropriate data. Since then, a draft document has been prepared by Prof. M. Zachcial of ISL Bremen identifying the problems and proposing the formation of a small group of experts that would produce the terms of reference of what needs to be done to overcome problems in this area. This document was discussed in the two meetings of the action within the reporting period, and most extensively in the January 1997 meeting.

The discussion on SSS statistics that had started at that time and continued extensively in the previous reporting period was finalized, and a concrete technical description of the relevant workpackages was produced.

The DGVII Transport Research Committee (TRC) endorsed an amendment to the contract of this concerted action specifically to tackle this problem, with a budget increase of 150 kECU.

Discussions held during the SSS-CA meetings in Brussels (27/1/97) and Piraeus (14/6/97) concluded the finding that there was an urgent need for valid and reliable data concerning freight flows information along the whole transport chain including mixed/combined land/sea movements. This also includes the wide variety of ferry and ro/ro traffic from/to the Continent. Several attempts have been undertaken to create consistent data on this topic. In most cases, individual trading areas have been analyzed. A full – scale consistent approach, however, did not yet exist. For several reasons the use of these data causes substantial methodological problems.

Even the quality of overall foreign trade data among European countries and also between these and countries overseas reveal remarkable inconsistencies. This is particularly true for land/sea trade flows. Adequate shipping statistics are lacking. Therefore seaborne foreign trade and its separation from land transport must predominantly be elaborated from foreign trade statistics.

OECD trade statistics (after certain refinements) can be used as key data supplemented by EU external trade statistics by mode of transport. The mode of transport used relates to the moment when the goods cross borders into or out of importing or exporting countries. The foreign trade transport data are available since 1989 or intra and extra community trades. There are several national data sources available concerning trade, transport, ports and ferry/ro-ro operations. They show, however, substantially different levels of quality, validity, and reliability. Figures of OECD, and this is also true for EU external trade statistics are not identical with regards to the importing and exporting countries. In some cases there exist substantial differences between figures of import recorded by an importing country and figures of export recorded by the relevant exporting country.

Recent research activities show that in view of the Intra-EU trades, in more than 400 cases there have been discrepancies of at least 50,000 t between import and export

figures. The analysis indicates further that differences are to a large degree attributive to UK related trades due to the Kingdom's definition of seaborne foreign trade.

There is no doubt that the only way to set up a more or less acceptable data base of foreign trade data among the European countries and especially among them and others is to balance out discrepancies by assessment of algorithms based upon functional relationships and matrix operations. Respective results have then to be cross-checked against other data source of national and regional information.

The work had to be based on all reliable statistical data available on a national level. This means usage of:

- Foreign trade data (sources: OECD, Eurostat, individual countries)
- Transit statistics from individual countries (Netherlands, Germany, Belgium, etc) including country of origin/ destination.
- transport statistics by modes (rail, road, inland waterways) for Netherlands, Germany, Belgium, France, Spain, Portugal and others to be identified).
- Port statistics from individual ports concentrating on the major ones and then going down to the minor ones (samples); cooperation with ESPO required.

The regional pattern of origin/destination flows would have to be established by using all existing traffic information on the regional level in combination with a restricted number of the determinants of demand for transport (population, gross domestic product by economic sectors and/or sectoral employment). Moreover, whenever international O/D flows are not available, domestic traffic volumes can be used as proxies for simulation of the generation of international flows.

The split of freight flows by modes requires some computer modelling which has been applied successfully in previous studies.

In order to identify European shipping flows it was necessary to use port related information as well as data from shipping lines. These data would be raised for the identification of transshipment cargo as well as for route choice considerations. This approach has been applied as part of a recent large-scale study on freight flows between Scandinavia and the Continent.

The matrices to be established should be used as a comprehensive framework for market studies as well as a basis for the evaluation of certain policy measures.

The main objective is to monitor the developments and trends within the short sea market and its submarkets on a valid basis. However, it would not be possible to repeat the whole exercise every year.

In order to derive developments and trends within the short sea market on a permanent and actual basis, well-defined samples of cargo movements would have to be drawn.

In parallel to the O/D matrices generation, a representative sample of major ports (spread over the Mediterranean, the Atlantic Arc, North Sea and Baltic Sea) would be

selected which would report at regular intervals on cargo handled in these ports and carried by short sea vessels.

Time series beginning with 1992 data would be delivered for selected key variables with respect to short sea shipping markets.

The scope of work could only be carried out in close cooperation among leading institutions within this specific topic. Accordingly, those institutions would bring their particular experience and data bases into the co-operative work, thereby providing considerable added value to the action. In parallel, a group of nominated national statistical experts was formed and was used as a resource in order to provide data and other necessary information.

Implementation met the following timetable:

- step 1 start of work (month 0)
- step 2 analysis of existing data and merging of data files being already processed
- step 3 establishment of country- by country trade data by mode and loading categories including transshipment considerations (interim report, month 6)
- step 3 state of regionalisation of national data according to the zoning system defined
- step 5 derivation of preliminary outcomes on a sampling basis (month 8)
- step 6 draft final report (month 10)
- step 7 final report (month 12)

Three workpackages, H, I, and J, were added to the amended work program of the concerted action (see Section 3 above).

The four statistics subcontracts that were signed by Partner No. 1 were with the following subcontractors:

- ISL (Germany)
- MDS Transmodal (UK)
- NEA (the Netherlands) and
- Cetena SpA (Italy).

The work of the subcontractors was to synthesize the data submitted by the national experts, in line with the work described in the amended contract.

4.5 Various dissemination/exploitation activities

In addition to the regular meetings of the action, SSS-CA activities were disseminated and well received in various other for a throughout the duration of the action. These included the following:

1. A publication of the state of the art study in the proceedings of the European roundtable conference on SSS in Bergen, Norway, June 1996.
2. A demo of the SSS-CA database at the BOPCOM project kickoff meeting in Luebeck, Germany, November 1996.

3. An invited SSS-CA presentation within the Maritime Task Force (DGIII) meeting in Dublin, Ireland, November 1996.
4. A paper by O. Schinas and H. Psaraftis entitled “New Frontiers Through Shortsea Shipping”, presented at the annual Society of Naval Architects and Marine Engineers (SNAME) meeting in Ottawa, Canada, in October 1997. The paper was refereed and appeared in the SNAME Transactions.
5. An invited SSS-CA presentation within a DGVII RTD-industry event in Rotterdam, the Netherlands, in March 1999.
6. An invited SSS-CA presentation within “International Maritime Forum”, an event organized by the DGIII and the Greek Ministry for Development in Kavala, Greece, in May 1999.

In addition to the above, a brochure on SSS-CA has been prepared. All public material on the action will be written on a CD-ROM, which will be distributed by the EU.

All material produced by the action is also available for browsing and download at NTUA’s web site, www.maritime.deslab.naval.ntua.gr.

Plans for the future include the further dissemination of the results of this concerted action within industry circles.

5. Conclusions

Although from a contractual viewpoint the Concerted Action on Shortsea Shipping started on April 1, 1996, from a substantive viewpoint it started with the kickoff meeting in Brussels on June 30, 1995. So for all practical purposes it spanned almost 5 years.

It is fair to say that quite a lot was accomplished during these 5 years, not only in terms of fulfilling all formal contractual obligations of the Consortium toward the European Commission, but also in terms of providing additional material, much useful toward the objectives of the programme.

A prime example of this has been the development of the SSS database (both PC-based and Web-based), something that was not foreseen in the action's Contract, but was developed on an ad-hoc basis as a result of input received for the state-of-the-art study and also in parallel within the Neptune network. We consider this as one of the most important outputs of the Concerted Action.

Of course, updating the database on an ongoing basis is something that should receive special attention, so that it does not become obsolete in the future.

The terms of reference for pilot projects, discussed in detail within SSS-CA, were also a significant output, setting the stage for some important SSS projects in the 3rd call of the 4th FP, with significant industry participation.

The work on SSS statistics, resulting from an amendment to the initial contract, is also one of the most important deliverables of the action, by providing for the first time a picture of European intermodal trade flows, and of the various methodological issues associated with developing such a picture. We believe that this work, which was conducted on a pilot basis, should continue in the future.

Monitoring a wide spectrum of SSS-related RTD projects, both within and outside the DGVII, provided a lively forum of information exchange and cross-project interaction. We believe that now that this work is over, there should be aggressive dissemination of the relevant results, exploitation of those ideas and concepts that have an industrial value, and exploration of the potential policy ramifications of all this work. It was actually stressed at the last workshop that RTD and policy should be closely linked.

Looking back in the 5 years of the action, we view the issue of industrial participation crucial and as an area for future improvement. The most interesting meetings of the action were the various workshops in which the SSS shipping industry participated: Bergen (1996), Piraeus (1997), Lisbon (1998), Gothenburg (1999) and finally Brussels (2000). This should serve as a model for future action in this area, in related Thematic Networks and other related activities.

6. Acknowledgments

Sincere thanks are due to all those who contributed toward making this programme a success. The number of people involved is substantial, and apologies are due to any omissions.

First and foremost, to Jose Anselmo, who has been the driving force behind the Commission's effort to significantly advance RTD in this area, and who monitored the work carried out from a technical and administrative viewpoint. Astrid Schlewing assisted in this task and took over it in the final years of the action. Her assistance has been invaluable.

The other members of the action's Technical Secretariat, Associated Contractors AMRIE (Jacques Mazieres and Milena Noviero), ISL (Volker Speidel) and WEGEMT (Jim Grant and Apostolos Papanikolaou) contributed significantly toward the objectives of the action, by providing secretarial support as well as input for the compilation of the SSS database.

On the statistics package, Subcontractors ISL (Manfred Zachcial), MDS Transmodal (Mike Garratt), NEA (Philippe Tardieu) and Cetena (Carlo Camisetti) synthesized a broad array of data and helped produce a significant report.

The regular nominated representatives of the 14 countries who participated in SSS-CA, the nominated experts of the 11 countries who participated in the statistics exercise, along with regular observers such as ECSA (Herman de Meester) and ESPO (Pamela Le Garrec) provided important input and contributed to the success of the project.

The same should be said of the representatives of the various RTD consortia, who came to the SSS-CA meetings on a regular basis so as to update the action on their activities.

Last but not least, credit should be paid to the other members of the team at NTUA, and especially to Orestis Schinas, Jerry Dokos, and Dimitris Lyridis, for their motivation and overall effort.

CONCERTED ACTION ON SHORTSEA SHIPPING

Contract No. WA-96-CA.95/186

Public Final Report

Volume 2: State of the art study, part I

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Abstract

There has been an explosive growth in shortsea shipping related research during the last six years. In this period there have been about 80 papers presented at the three European Research Roundtable on Shortsea Shipping conferences to date (1992, 1994, and 1996). In addition, the three FAST international conferences on fast waterborne transport (1991, 1993, and 1995) presented close to 300 papers, of which about 70 directly focus on shortsea shipping. Various projects, national and international, have been also initiated in this area. In the context of the 4th Framework Programme, the European Commission/ Directorate General for Transport (DGVII) has launched in early 1996 several shared cost projects, as well as a concerted action explicitly targeted to shortsea shipping. Other directorates such as DGXII and DGXIII have also launched related projects in early 1996. In view of such a boom of research activity, it becomes imperative to critically survey such work, and also make a taxonomy of it, so that all this work is sorted out, and the baseline for further research becomes clear. Failure to do this will inevitably result in duplication of effort, gaps in research, lack of vision on what is needed, and other negative ramifications. The purpose of this report is to carry out a critical survey and taxonomy of such work. The survey has involved a European-wide solicitation of input on related work, mainly in the context of the "Concerted Action on Shortsea Shipping", but also from other sources. The survey also presents a software tool developed to assist in information entry, update, and retrieval, and also attempts to identify common trends on research topics. Without claiming that the contents of the survey are encyclopaedic, or that each and every piece of material collected has been reviewed in depth, we can at least claim that the 441 entries catalogued represent an unprecedented compilation of material in this area. Perhaps the most important trend identified within this vast collection the material is a significant degree of "fragmentation" of R&D effort in the SSS field, in the sense that problems that are methodologically similar in many contexts have been typically addressed in isolation. The most obvious consequence of this fragmentation is that the impact of R&D efforts to serve the real needs of European SSS has been so far limited. Commission-sponsored activities such as the Concerted Action on SSS, the SSS Roundtable Conferences, the collaborative R&D projects under way, and other related activities are expected to alleviate this situation in the future[1].

[1]Acknowledgments: The work of this survey was supported in part by the Commission of the European Communities, Directorate General for Transport (DGVII), within the context of the "SSS-CA" concerted action (Waterborne Transport Research, 4th FP, contract No. WA-96-CA.95/186). The assistance of several individuals in providing input is gratefully acknowledged. In addition to the contributors listed within the report, special gratitude is due to Prof. A. Papanikolaou and Mr. J. Grant of WEGEMT for providing input on ship design/ shipbuilding/ engineering research, and to Prof. V. Speidel of ISL Bremen for providing input on telematics research. Last but not least, sincere thanks are due to Dr. W. Blonk, Director of DGVII/E, for his comments on an earlier (draft) version of this document, and to Dr. J. L. Anselmo and Ms. A. Schlewing of DGVII/E for their input and administrative assistance.

1. Introduction

The state-of-the-art survey presented in this document is one of the deliverables of the "Concerted Action on Shortsea Shipping," sponsored by the Commission of the European Communities, Directorate General for Transport (DGVII). This document (part I) is the main report of the survey[2]. Part II provides with additional details on the collected material .

Shortsea shipping is emerging as an important focal point of the transport policy of the European Union. As intra-European borders are rapidly being dismantled, and Eastern Europe is gradually becoming more open, shortsea shipping's significance gains a prominent role, and its potential in enhancing the EU's competitiveness, economic and social cohesion, and sustained mobility is very real. Developments in information technologies and telecommunications have significantly increased the potential for efficient intermodal transport, which opens new horizons for shortsea shipping. A number of important Commission documents, including (among others) the White Paper on the future development of a Common Transport Policy (COM(92) 494 final), clearly identify shortsea shipping as an important element of a total integrated transport chain, one in which goods and people travel from door to door in a seamless and cost- effective manner.

Addressing the entire spectrum of problems in shortsea shipping is a monumental task. It calls for (among other things) significant R&D to determine policy priorities in this area. Fora such as the Maritime Industries Forum and various conferences deal with many of the relevant issues. Much of the necessary R&D is being sponsored by the Commission. Individual countries are also sponsoring related programs.

It is fair to say that the growth in shortsea shipping related research during the last six years has been explosive. Conferences such as the European Research Roundtable in Shortsea Shipping (1992, 1994, and 1996) and the FAST international conference on fast waterborne transport (1991, 1993, and 1995) have collectively presented about 150 papers directly focusing on shortsea shipping and close to 250 others peripherally related to the subject. In addition, various projects, national and international, have been initiated in this area. In the context of the 4th Framework Programme, the European Commission/ Directorate General for Transport (DGVII) has launched in early 1996 several shared cost projects in areas related to shortsea shipping, as well as a concerted action explicitly targeted to shortsea shipping. Other directorates such as DGXII and DGXIII have also launched related projects.

In view of such a boom of research activity, and in view of ambitious plans for further research in this area (5th Framework Programme, to state one example) it was felt that the time was ripe to take stock and critically survey such work, and the baseline for further research becomes clear. Failure to do this would inevitably result in lack of knowledge on where one stands, duplication of effort, gaps in research, lack of vision on what is needed, and other negative ramifications.

The "Concerted Action on Shortsea Shipping" (task 6.1.2/4) is expected to play an important role in the Commission's Waterborne Transport Research Programme (4th FP). It does so by setting out the following goals:

- compiling the state of the art in this (broadly defined) area,
- synthesizing all relevant research and other related work,
- monitoring related projects,
- defining relevant pilot projects and demonstrators,
- defining criteria for interoperability and SSS logistical efficiency,
- identifying the key focal points for shortsea shipping future development, and
- providing the widest possible exposure and dissemination of the results of the action.

Representation is open to all EU countries and other countries associated with the research programme (according to the association protocol). As many as 13 meetings are envisaged for the action in the period 1995- 1998. The Technical Secretariat of the action is managed by a 4-partner consortium, with the

[2]A version of this document (ref. [PSA96P]) has been presented at the "Shortsea'96" conference in Bergen, June 1996.

National Technical University of Athens as Coordinator, and with the Alliance of Maritime Regional Interests in Europe (AMRIE), the Institute of Shipping Economics and Logistics (ISL Bremen), and the WEGEMT Association as partners.

Participants of this concerted action have provided significant input regarding SSS-related research in their countries.

In that context, the purpose of this report has been to carry out a survey and taxonomy of such work.

The goal of compiling a comprehensive "inventory" of shortsea shipping related research presents a number of significant difficulties. The following are the most important:

1) Lack of an unambiguous delineation of the field: Does a paper or a project on the hydrodynamic or structural analysis of fast catamarans belong to shortsea shipping? Is a project on risk analysis in coastal waters a shortsea shipping project? What about projects on integrated ship control, marine propulsion performance, or the analysis of maritime law? Even though shortsea shipping is a multi-disciplinary field, there are no unique answers to these questions, much of which are matters of subjective judgment. This paper is no exception. As in all surveys, the composition of material in this paper is in many ways (although by no means exclusively) a product of our judgment call on what should be included in it and what not.

2) Lack of information on every conceivable project, paper, or related work: Much of the material in this survey has been provided to the authors by individuals who undertook the task of collecting such information either for a specific country (eg, Finland or Italy), or for a specific discipline related to shortsea shipping (eg, telematics or ship design). In either case, there is absolutely no way to guarantee that information collected is absolutely complete and up to date. In this paper, this has been manifested by a lack of complete homogeneity of the collected material, some of which is very detailed, and some is very general.

3) Sources of information are diverse, disconnected, and non-homogeneous: To our knowledge, no single source of information exists that contains a comprehensive list of SSS-related material across Europe. If it did, the work behind this document would be a duplication of that effort. Even national databases, for the few European countries in which these exist, collect maritime transport material that is not specific to SSS.

In spite of the above main difficulties (which will be further elaborated upon in the sections that follow) we feel that the results of this survey are interesting and significant, for at least the following reasons:

a) They represent, to our knowledge, the most extensive array of information on shortsea related work that has been compiled to date. This information can form the baseline for further research in this area.

b) A concrete methodology for indexing, classifying, and further updating this information has been developed, including a user-friendly software package that can be used for entry, retrieval, update, and searches of related material.

c) The material collected shows, in our opinion, a significant degree of "fragmentation" of R&D effort in the SSS field, in the sense that problems that are methodologically similar in many contexts have been typically addressed in isolation. This situation can only be remedied by aggressive dissemination of research results (including those of this survey) and by common fora of discussion of issues among all involved players (one of these fora being the concerted action on SSS).

The rest of Part I is organized as follows: Section 2 presents the approach that was followed. Section 3 gives an overview of collected material, broken down by source. Section 4 describes the software. Section 5 draws conclusions. Finally section 6 is a bibliographical list of all collected material.

2. Approach

Work that has been surveyed has focused primarily (but not exclusively) on Europe, and has fallen into at least the following categories:

1. National research programmes or studies, either privately or publicly funded.
2. EU research programmes or studies.
3. Demonstration projects.
4. Technology development projects in related areas (vessel traffic management, telematics, shipbuilding, ship design, cargo handling, etc.).
5. Policy studies.
6. Regulatory studies.
7. Any related publication.
8. Other.

2.1 Sources of information

Sources of information for this survey have been the following:

1) Input from concerted action participants

This has been a major source of material for this survey. In a process that started on June 30, 1995, the nominated representatives of the concerted action on SSS were solicited to provide input on SSS-related work in each of the participating countries. Work was expected to fall in any of the categories outlined above.

2) Proceedings of European Research Roundtable Conferences on Shortsea Shipping

Since 1992, these biennial conferences have been the main scientific forum for dissemination of SSS-related research results. All papers presented at these conferences (1992, 1994, and 1996) have been catalogued.

3) Proceedings of International Conferences on Fast Sea Transportation (FAST)

Since 1991, these biennial conferences have been the main forum on all aspects of fast waterborne transport. By contrast to the SSS conferences (which are European in focus and have a roundtable format), the FAST conference have a worldwide scope and have the traditional parallel session format. This is perhaps the reason that the three FAST conferences to date number close to 300 papers. However, not all of these papers have been catalogued here, since many (in fact most) approach the subject from specific engineering disciplines such as computational fluid dynamics, structural analysis, etc. Although all of these papers have merit, we felt it would serve no meaningful purpose to include them in our survey (in fact, doing so could very well shift the focus away from important issues in SSS). By exercising some judgment, we have identified a number of papers that can be considered to fall into the SSS mainstream, and we have included these papers into our database.

We note here that even though the above two conferences (European SSS and FAST) were the only two conferences that were specifically targeted as sources for this survey, material in other related conferences has also been included, so long as it was brought to our attention. The main vehicle for doing so has been through the concerted action on shortsea shipping, as described below.

4) Additional sources

The Commission services (DGVII) have provided additional information on related projects. Also, ISL Bremen and WEGEMT have collected additional information related to telematics and ship design aspects. All of this information has been catalogued.

2.2 A two-level taxonomy

In classifying all this material, a two-level taxonomy was used, with the first level providing the "indexing format" by which each entry was catalogued, and the second level providing some additional information on each entry.

Level I: The indexing format for each entry is [ABCYRXn], where:

ABC are the first three letters of the first author, in case of a published entry, or the first three letters of the organization responsible for the entry if the latter is a project or study (see also index X below);

YR are the last two digits of the year in which the work represented by the entry was finished (for ongoing projects or for entries for which no year is supplied YR is set to 96);

X is an index defining the type of work, and taking on the following values:

A for a magazine article;
B for a book or proceedings volume;
H for a research or pilot project;
P for a published paper (in a journal or in a conference);
S for a study;
and T for a technical report, working paper, or thesis;

and finally n is an index that is present only in case there are two or more entries for which all other indices [ABCYRX] are the same (in which case these entries are distinguished by n=1, n=2, etc.).

Examples:

[AKA91P] Akagi, S., (1991), Synthetic Aspects of Transport Economy and Transport Vehicle Performance with Reference to High Speed Marine Vehicles. Vol1, pp 277-292, Proc. FAST'91 Conference, Trondheim, Norway.

[AHL95S] Ahlers Lines International and Delta Consultancy (1995), Pilot Project: Specialised Shortsea Transport System Feasibility Study: Ro-Ro Services Leixões (Portugal) - Zeebrugge (Belgium). Final Report to the Commission of European Communities, Directorate General for Transport.

It should be realized of course that there might be more than one entry catalogued for a specific piece of work: for instance, one for the project under which the work was done (research project or study), and one or more for publications related to this project. At the same time, not all entries referring to each and every piece of work have been received (or catalogued). Also, the way a specific entry could be classified is not necessarily unique (for instance a research project could be classified as a study, or as a report). We followed the designations submitted to us by the contributors of the material, or in their absence, our own judgment.

The indexing scheme described above is the basis of the bibliographical section (6) of this volume. It is also used in the database management software developed (see section 4).

Level II: This level provides additional information on the entries submitted by the concerted action participants, although it can be extended to all other entries eventually. It is also one of the main features of the database software. The scheme provides a matrix representation of each entry, with rows indicating methodological disciplines, and columns indicating SSS objects under study. One or more boxes that apply can be checked:

	Ships	Cargo	Ports	Networks	Telematics
Engineering					
Economics/ logistics					
Business/ management					
Regulatory/ policy					
Environment/ safety					

In addition to the subject classification as per the above matrix, a “free text” section is also provided, with additional information on the specific entry.

Due to space limitations, it was impossible to reproduce in this volume the matrices and other information of the material received. However, this information is included in Part II and in the database associated with the software model that is described in Section 4. We attempt to give an overview of this information in the section that follows.

3. Overview of collected material

The first solicitation for input on the state of the art study was issued on June 30, 1995, the first meeting of the concerted action. As of May 10, 1996, the general tally from the collected material is as follows.

Source	Number of entries
SSS and FAST conferences	146
Concerted action participants (by country)	176
Commission projects	29
Additional input from WEGEMT (by country)	90
TOTAL ENTRIES	**441**

All collected material is listed in Section 6 of this volume (Level I) and in Part II (Level II). In this section we attempt to *highlight* some important features of this material, realizing that presenting a *detailed* analysis of such a large number of entries is an impossible task. Equally difficult is any attempt to sort out the forest from the trees, identify trends, methodological gaps, or possible research overlaps within this vast collection. Therefore we stress that the material of this section is, by necessity, imperfect.

3.1 SSS and FAST conferences

We have little to add to the results of the two previous European Roundtable SSS conferences (references [WIJ93B] and [WIJ95B]), and, a fortiori, to the results of the one in Bergen (June 1996). Collectively, about 80 papers have been presented, spanning the entire spectrum of SSS related topics. Reference [PEE94P] does a good job of reviewing the previous two conferences from the perspective of a European SSS policy. The active participation of the European Commission (DGVII) and the mix of maritime researchers and maritime policy makers in these events contributed to a sharp focus on relevance of research as regards actual implementation of technologies, practices and policies.

The material of the three FAST conferences is far more extensive. In spite of (or maybe because of) a rather specific focus on the object of study (the fast ship), the perspective of these conferences has not been very helpful in sorting out the strategic ramifications of these technologies, both in general terms, and as regards shortsea shipping in particular. The (about 70) references we selected for inclusion in this survey are representative of papers that are (in our judgment) mostly SSS-related. Many of them are from outside Europe. In fact, it is interesting to note that the Yokohama conference (FAST'93) contributed about 30 of these papers, which is more than its expected share. Whether this difference is "statistically significant" or whether it is due to a different attitude of non-Europeans on the subject of fast ships is subject to speculation.

3.2 Input from concerted action participating countries

The contributions of the fourteen (14) countries participating in the concerted action merit some more extensive discussion. These are all EU member states except Luxembourg and Austria, plus Norway[3]. A first feature of the collected material has been its volume. At the time of the writing of this paper, 176 entries had been received, not counting some entries that had to be suppressed (for reasons see below).

A second feature of the material was lack of complete homogeneity. In spite of a standardized solicitation for input, the following have been observed:

- Some countries submitted many more entries than others.

[3] The UK joined the concerted action in the spring of 1996 and no "official" contribution from it has been received. However, the UK section is not empty, representing input submitted by WEGEMT (see section 6.7.10).

- Some countries provided detailed information on their entries, whereas others provided much fewer details.
- Some countries submitted entries in their own language (other than English). Although all Community languages are official languages of the EU, the working language of the concerted action is English, so such entries have been temporarily put on hold from our database (and will remain so until an English translation can be obtained).
- Some countries submitted as entries mostly studies or projects, others submitted mostly publications, and others submitted a mix.
- Finally, some countries submitted some entries that fall on the periphery of SSS, addressing detailed technical problems, such as ship resistance, seakeeping, etc. These entries are similar to some of the entries of the FAST conferences that we decided to suppress. However, and by contrast to conference material, we decided not to suppress *on the basis of subject* any of the entries submitted by individual countries. All of these entries are part of our database.

Other than feedback to the contributors for clarifications (eg "please translate" or "please provide this again in the appropriate format"), it has been outside the scope of our own work to fill out possible gaps of information that exist in the submissions, extensively reformat them, translate them, or generally undertake a deeper search of information about the material. A reasonable assumption has been that ensuring an appropriate representation of a country within the European state of the art in SSS research falls within the responsibility of the nominated representatives of that country.

With these clarifications, the following can be said *very briefly* about the country-by-country submissions:

Belgium
Most Belgian submissions are in the economics, logistics and policy areas, and mainly study ships, cargoes, and ports. Among them, we highlight a study of the connection between Zeebrugge and Leixões (Portugal) by [AHL95S], a research project on cargo tracing [WES95H], and some policy studies on ports [POL96S] and logistics [POL95S].

Denmark
A list of published reports on shipping was submitted by Denmark, mainly covering topics such as deregulation [DER95T] and transport policy [TRA93T, DTP93T, EUT93T]. A report on the future of the coaster [FUT91T] is also included.

Finland
Some papers on ship resistance [LAH91P, HAN95P] and seakeeping [KAR95P] are identified. There are also many entries on economics and logistics [VAI90H, VAI94T, VAI92T], and several entries on innovative ship designs [NII91P, NII94P]. Some papers that are included in FAST conference entries [LEV92P, LEV93P] are not included in this list.

France
France submitted a general discussion paper on a new approach to SSS [FRA95T], and two proposed studies/projects, one on the concept of Sea/River Road [SRR95S](an extension of the all-Road and Sea/Road transport), and another on the impact of time delays due to road congestion and restrictions [ITD95T]. The main view in these documents seems to be that inland waterway shipping should be promoted as a means to alleviate congestion and aid SSS. Some entries on the "Arc Atlantique" project have also been submitted.

Germany
Entries refer to the SUMO study (scenario investigation of maritime transport systems in the Baltic) [ATL94P], and to some economics/logistics studies related to SSS [ZAC91S, HAD95S, KRA95S]. A large number of entries submitted in German (computerized list from Ministry of Transport) were suppressed as it was impossible to obtain a translation in spite of several solicitations to that effect.

Greece
As expected, studies or projects on Greece's coastal system [IMP95S, PRA95S, DRO93S, NTU94S, PSA94A] are predominant. Some of this work, including a modal split analysis for 2004, the year of cabotage deregulation, has been presented at the SSS conferences (and is not repeated in this list). Also studied heavily is the connection with Italy [COM94H, TRA93S, SCH95T].

Ireland
Ireland's submissions are diverse, spanning areas that include unitized cargoes [TRA94S], ship design [TRA95H, KEN92T], vessel traffic services [RVT95S], casualty database [TRA95H2], passenger transport [COL91S], and ports [COL91H].

Italy
Two large-scale "umbrella" projects stand out in Italy's list. The first is a multi-year national project on transport, all modes included [BIA92H]. The second is BRITE-EURAM's "Targeted Research Action" on new ship concepts in shortsea shipping, also known as TRA-NESS, which is coordinated by Italy [TAR95H]. It consists of several multinational projects spanning a spectrum of advanced engineering problems related to fast surface-effect ships/SES.

Netherlands
The spectrum of projects considered is very broad, covering subjects such as intermodal transport [SSS93S1], feeders [DGS93S, ROT91H], shift of cargo from road to sea [HOO91H, DGS90H], ports [BUC94T1], policy issues [BAG94T], and telematics [DGS95T1, T2, T3].

Norway
These include a multiyear national programme on SSS [MAR98H], programmes on fast marine vehicles and ships of the future [MAR97H, KVA96H], a programme on "green" ships [DNV94H], and an umbrella programme on maritime information technology (the so-called MiTS system) [MAR93H]. Some entries in the economics and logistics area were also submitted ([NOR95P, STR94P, WER95T], among others).

Portugal
Transport between Leixões and Zeebrugge [POR93H], and between mainland Portugal and the Azores [MAU91S, CAR92S1,S2] are included in the Portuguese list. Some port navigation systems are also listed [GAM95S, IHN95H].

Spain
Of particular emphasis are studies on maritime cabotage [PEE93S, CAR92S, MER94S, CON93S1], and ports [CON93S3, GOM95P]. Some "engineering" entries have been also submitted, on topics such as ship design [SIE95P, SIE93P, MOR93P] and (interestingly enough) propeller performance [PIR94P1, ZAT92A].

Sweden
Innovative loading and intermodal systems [WIJ94S, LUM93S, SJO90S2], feasibility studies [SJO93S], and general SSS studies [ALE94H, SJO95H] are highlighted.

3.3 European Commission projects

The projects catalogued fall into 4 categories: DGVII 4th FP projects, DGVII studies (sponsored by Directorate D and generally dealing with policy issues), DGXIII (telematics) 4th FP projects, and DGXII (BRITE-EURAM) projects. The 29 entries included here span a diverse spectrum, from "hard-core" engineering research all the way to "policy/regulatory " studies.

It is interesting to note that projects examining problems that appear, at least at first glance, very similar, have been launched *in parallel* in different DG's (some port projects in DGVII and DGXIII are examples). According to the Commission, such projects are *complementary*, with each Directorate General looking at a problem from its own perspective (for instance, the DGXIII mostly focusing on the telematics technologies of a port, whereas the DGVII is mostly focusing on policy implications).

The concerted action on SSS will monitor these projects and try to identify overlaps, gaps, or other synergies among them.

3.4 Input from WEGEMT

WEGEMT, one of the 4 partners of the consortium managing the concerted action on SSS, submitted an impressive collection of material, broken down by country, on projects and publications focusing on the engineering side of SSS. All of this material has been catalogued, and in a sense should be viewed as complementary to the material of section 3. 2. However, a word of caution is necessary. It is our opinion that some of these entries are outside the *mainstream* of SSS, addressing detailed technical problems, such as ship resistance, seakeeping, hydrodynamics, ship structural analysis, etc. This is particularly true for entries submitted by Italy and the UK. Still, as some of the other entries (eg, those of Germany) fall clearly within the realm of SSS, following our policy to avoid suppressing material directly supplied, we included all entries in this paper for the sake of completeness. Finally, it is interesting to note that all of Norway's WEGEMT entries are covered in the list submitted by Norway's representatives in the concerted action.

4. Software model

As soon as this extensive material started coming in, we quickly realized that there was a need to find an easy way to handle all this available information. The creation of an integrated dBase program became indispensable, in order to enter, update, and retrieve easily the collected data and extract statistics and reports fast and securely.

It was not an easy task to choose the most suitable package among all the available in the software market. We decided that the package should fulfill the following criteria:

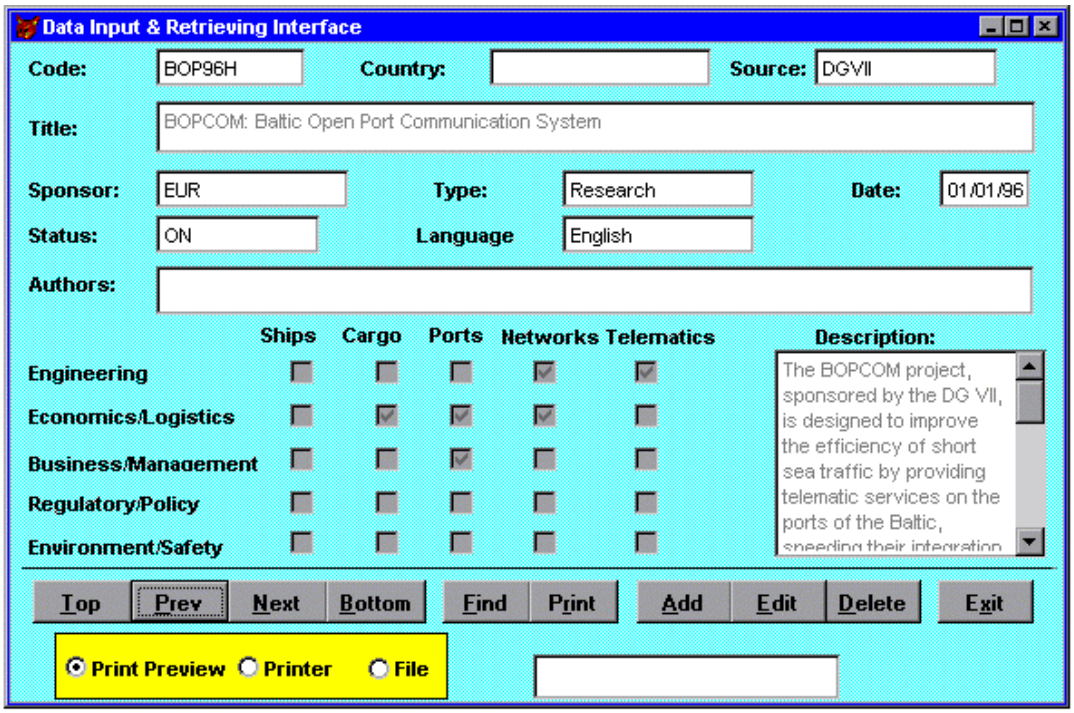
- compatibility with as many as possible other software packages, and capability of data interchange among several software environments;
- friendly and smart interface between the user and the machine;
- capability of upgrade from time to time, so all this information can be useful in the future.

Based on the above, we decided to use Microsoft's Visual FoxPro v3.0™ because of previous experience with this package and FoxPro's ability to provide communication with all major operating environments: Windows, DOS, UNIX and Macintosh. The database is formatted and constructed in a way that allows the user to import data of another format and retrieve it via its own interfaces.

A typical screen is shown in Fig 1. The interface contains the matrix of Level II, and several windows displaying information on a specific entry. It also has buttons which allow the user to perform the following functions:

- enter a new entry
- preview an existing entry
- edit an existing entry
- print ready-to-use reports
- search the database

Figure 1: Typical user interface screen



All 441 entries catalogued here are part of the database. The user has the option to look at the database either according to Level I (which is essentially as this information is listed in Part I), or according to Level II (matrix representaion and additional information). Searches can be performed according to a number of criteria, such as for instance "show me all research projects sponsored by the Commission", "show me all studies attributed to Spain", and so on.

At the time of the writing of this report, this software can only be run on a "local" mode, that is, on a PC (386 or higher) on which it is installed. The entire contents of Part II (or of Part I, for that matter) can be available on diskette. They can also be downloaded by remotely accessing the NTUA ftp site, or any other mirror site that contains this database. To download from the NTUA site, the user should do the following (unix commands are in bold):

1) **ftp ftp.deslab.naval.ntua.gr** (connect to NTUA's ftp site).
2) login as **anonymous** with **user ID** as password.
3) **cd pub/mtrans/sss_ca** (go to appropriate directory).
4) **get volume1.doc** (download Part I, a Word 6.0 document, 36 pages).
5) **get volume2.doc** (download Part II, a Word 6.0 document, 156 pages).

It should be clarified that downloading by ftp will only provide the user with a copy of these documents, but it will *not* provide him/her with the capability of *searching* the database as if he or she were using the software model described above. The idea of providing a "remote" search capability, such as for instance putting the database *and the software model* (or another similar database management tool and/or search engine) on the World Wide Web or on a similar medium is being currently explored.

5. Concluding remarks

Part I of the state of the art study described the effort to compile and classify material related to shortsea shipping research. A two level taxonomy and a software model were developed, with the purpose to facilitate information entry, update, retrieval, and search. We believe that this scheme can form the infrastructure for a permanent update of knowledge on the status of research activity in this area. It can also form the baseline for further research, by helping identify what has been done, what gaps exist, and what possible overlaps can be avoided. Last but not least, it can facilitate the critical activity of dissemination of research results, a process that is recognized to be far less perfect than desirable.

Toward that end, we believe that the taxonomy developed in this survey, as well as the observations made in it, can be useful to a number of players in the field, such as:

- the SSS and waterborne transport research community;
- the waterborne transport industry;
- maritime policy makers;
- national R&D agencies;
- the European Commission.

Venturing a first observation from the material collected, it is fair to say that research in this area has been growing at a very strong rate, at least within the last 6 years or so. It is interesting to note that most of the research being done is still at the national level. However, an important trend seems to be taking place: this is the inclusion of SSS-related research into European Commission R&D programmes (mainly that of the DGVII, but also those of the DGXII and DGXIII). This trend is only recent, and mainly concerns the 4th Framework Programme. It is undoubtedly a reflection of the priority the Commission attaches to SSS, as a tool for the development of the Common Transport Policy. It is clear that events such as the Roundtable Conferences have played a key role in identifying the need for more research in this area.

Some related European Commission initiatives, such as the "Task Forces" on topics such as "Transport Intermodality" and "Maritime Systems of the Future", as well as the MARTRANS activity of the MARIS programme are expected to further add to the momentum in this area.

Since most of these activities are just starting, it is too early to make an assessment of their potential impact on real world SSS technology, practice, and policy. However, one of their *potential* contributions is worthy of discussion.

Looking at the material collected, one can observe that, with few exceptions, a significant degree of *fragmentation* exists, and this is essentially across country lines. As one example (and there can be many others), topics such as cabotage that have been studied mostly in Spain and Greece have been studied essentially in isolation, even though it is clear that much in common exists. The same can be said about other topics, such as ports. Lack of aggressive dissemination of research results, or of common fora in which such results are presented are the main causes for such a state of affairs. Although such fora do exist, clearly more can and should be done, *particularly at the end-user level*, which where the greatest degree of fragmentation exists.

The most obvious consequence of this fragmentation is that the impact of R&D efforts to serve the real needs of European SSS has been so far limited. There is certainly significant room for improvement in that regard, but as long as this fragmentation continues, the potential impact will likely continue to be low and diluted.

It is precisely one of the roles of collaborative R&D efforts such as those sponsored by the European Commission to help alleviate this situation. These collaborative projects are expected to reduce the risk of further fragmentation, by bringing together partners from several countries and by cross-fertilizing ideas both from the research end and from the maritime industry end.

An implicit assumption is of course that fragmentation does not spread to the EU projects too. In our opinion, a risk that is clearly present is that each Directorate General of the Commission that deals with

Transport Research proceeds independently of what the others are doing. As at this point in time there are several DG's dealing with Transport Research, either directly, or indirectly (DGVII, DGXII, DGXIII, DGIII, among others), there is a clear need for internal Commission coordination of such R&D activities.

Although from an SSS researcher's viewpoint the funds allocated to SSS (as a percentage of the Commission's total transport R&D budget) can still be considered low, the fact that such funds practically did not exist a few years ago is certainly encouraging. Activities such as the Concerted Action on SSS, the Roundtable Conferences, and others, are expected to further maintain the focus on this important topic, so that SSS obtains a share equivalent to its overall importance in European transport[4].

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6. Bibliography

The bibliographical section is organized in the following way:

6.1 Conferences
6.2 Input from concerted action participating countries
6.3 DGVII 4th FP projects
6.4 DGVII/D studies
6.5 Telematics projects (ISL input)
6.6 BRITE-EURAM projects
6.7 Other ship design/shipbuilding/engineering projects (WEGEMT input)

6.1 Conferences

Catalogued below are all papers from the European Research Roundtable Conferences on Shortsea Shipping (1992, 1994, and 1996) and SSS-related papers from the FAST conferences (1991, 1993, and 1995).

Further to the indexing scheme [ABCYRXn] defined earlier, the following acronyms are used:

ESSS'92: First European Research Roundtable Conference on Shortsea Shipping, Delft, The Netherlands, 1992.
ESSS'94: Second European Research Roundtable Conference on Shortsea Shipping, Athens (Vouliagmeni), Greece, 1994.
ESSS'96: Third European Research Roundtable Conference on Shortsea Shipping (Shortsea'96), Bergen, Norway, 1996.
FAST'91: First International Conference on Fast Sea Transportation, Trondheim, Norway, 1991.
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FAST'95: Third International Conference on Fast Sea Transportation, Lubeck-Travemunde, Germany, 1995.

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[QSD95H] Quick Ship Dispatch Centers, Project developed in the port of Sines.

[SIN95H] SINAVE Port System, (1995). Computerised system developed by the Administration of the Port of Sines.

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[CAR92S] Carlier M., (1992), Analysis of the EEC national cabotage trades, as a part of the global European SSS market. Study sponsored by Spanish Shipowners Association (ANAVE).

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6.2.12 Sweden (A. Sjöbris)

[ALE94H] Alexandersson, A., et al, (1994), Potential Development in Sea Transport Systems Europe, MARITERM AB. Sponsored by the Swedish Transport and Communications Research Board (KFB).

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[BOP96H] Project "BOPCOM": Baltic open port communication system.

[EBO96H] Project "EUROBORDER": Identifies bottlenecks, develops functional specifications and proposes demonstrators to improve the ports' function as intermodal hubs.

[EEI96H] Project “E-EIS Transport Sector”: Development of the E-EIS methodology for the European transport sector and its application to the European shipping sector.
[EMM96H] Project “European Marine Motorways”: The potential for transferring freight from road to high speed sea transport.
[IPS96H] Project “IPSI”: Improved port-ship interface.
[SPH96H] Project “SPHERE”: Small/medium sized ports with harmonised, effective re-engineered processes.
[SSS96H] Project “SSS-CA”, concerted action on shortsea shipping.

6.4 DGVII/D studies

[EUR96S] Europaeisches Entwicklungszentrum fuer die Binnenschiftfahrt, feasibility study on the establishments of river-sea transport between Portugese sea ports and Duisburg.
[INT96S] Intermodal European Logistic Center, Short sea shipping pilot - project German North Sea - Nordic countries / Western and Southern Europe.
[MER95S] Mercer, (1995), Evaluation of the potential for a coastal cabotage service in the Mediterranean rim.
[MST96S] MST Transmodal, Feasibility Study on the development of short sea shipping and inland waterway links between Holstebro-Struer and Duisburg.

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[COR96H] COREM(1996). Cooperative Resource Management for the Transport of Unit Loads, DGXIII project, 4th FP.
[COS96H] COST330 (1996). Teleinformatics Links Between Ports and their Partners, Project of the Commission of European Community, DG VII and national sponsors.
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[INT96H] INTERPORT, (1996). Integrating Waterborne Transport in the Logistic Chain, DGXIII project, 4th FP.
[ISE95H] Innovative Seaport Technologies (1995), German Ministry for Research and Technology, Project.
[LOC96H] LOCALE (1996). Low Cost Applications for Linking EDI, Project of the Commission of European Community, MARIS Programme, DG VII.
[MUL96H] MULTITRACK (1996), Tracking, tracing and monitoring of goods in an intermodal and open environment, DGXIII project, 4th FP.
[POS96H] POSEIDON (1996). DGXIII project, 4th FP.
[TIL96H] TILEMATT (1996), DGXIII project, 4th FP.
[VAD96H] VADE MECUM(1996), DGXIII project, 4th FP.
[WEL96H] WELCOM (1996), DGXIII project, 4th FP.
[WIS96H] WISDOM (1996). Waterborne Information System Distributed to Other Modes, DGXIII project, 4th FP.

6.6 BRITE-EURAM (DGXII) projects

[HYD95H] HYDROSES (1995). An integrated theoretical/experimental hydrodynamic procedure for design of large SES Ships.
[MAI95H] MAINCOMPSES (1995). Improvement of main system components and ride control system for fast passenger and cargo large surface effect ship.
[MAT95H] MATSTRUTSES (1995). Advanced materials and design procedure for large size SES structures.
[SHI95H] SHIP (1995) Ship hull integrity program.

[SES95H] SESLAB (1995) Development of an experimental tool for design of large SES Fast Ships.

6.7 Other ship design/shipbuilding/ engineering projects (WEGEMT input)

6.7.1Belgium

[TRU96H] Truijens P., Preliminary design of a low profile coaster, Research (privately founded), U.Gent.

6.7.2 Denmark

[DES95H] Design of fast ferries (1992 - 1995), Research, Technical University of Denmark (DTU), Danyard and Danish Academy of Technical Sciences (ATV).
[DES96H] Design of a Harbour ferry, Research, Technical University of Denmark (DTU).
[WAV96H] Wave-induced hydroelastic response of fast mono-hull ships, Research, Technical University of Denmark (DTU) and Danish Technical Research Council (STVF).

6.7.3 France

[ENA94H] Enault J.E., (1994), MONOQUE, Research.
[HOO94H] Hoof van R.W., (1994), Project Trimaran High Speed Ferry, Research.
[LAN95H] Lancelot E., (1994), Feasibility study for the route Marseilles to Barcelona by a fast marine transportation system (in French), Research.
[MAR94H] Marchand P., (1994), MENTOR, Research.
[PER94H] Perdun P., (1994), AGNES 200, Research.
[QUI94H] Quillici J.F., (1994), An estimate of the need for fast passenger transportation, Research.

6.7.4 Germany

[BER96T] Bertram, V. (1996), Various Aspects of Fast Sea Transportation (9 publications), Technical Report, Univ. Hamburg.
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[LIN95S] Linde, H. (1995), Inland and combined inland/coastal shipping in the Oder river and the Baltic Sea, Study, Local State Governments of Brandenburg and Berlin.
[MAR93S] MARITERM AB, (1993), Coastal and Short-Sea Shipping - Technical Feasibility Study.

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[PUS94S] Pusch, (1994), Protection of the local conditions for the maritime industry in Germany (in German), Study.

[WIE95B] Wietasch, K. (ed), (1995), School Notes of 21st WEGEMT Graduate School on Ships for Coastal and Inland Waters (Design, Building, Operation).

[WIE96H] Wietasch, K. (ed), (1996), Colloquium in Shipbuilding and Ocean Technology, Research.

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[ZIP95T2] Zips, J. (1995), Development of Surface Effect Ships - SES (4 projects within the national R&D program SUS, in German), Technical Report, German Ministry for Research and Technology.

[ZIP95T3] Zips, J. (1995), Development of SWATH ships (project within the national R&D program SUS, in German), Technical Report, German Ministry for Research and Technology.

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[PAP94H] Papanikolaou, A. C. Koskinas, K. Pigounakis, N. Bouliaris, (1994), SMUCC - Development of a fast intermodal transportation system for shortsea shipping in Europe based on a SWATH Multipurpose Container Carrier design, Research, Ship Design Laboratory - NTUA

[PAP95H1] Papanikolaou, A. (1995), Hydrodynamic Analysis and Feasibility Study of a fast catamaran ferry for Greece, Research, Ship Design Laboratory - NTUA

[PAP96H] Papanikolaou, A., N. Daphnias, (1996), Development of the 80m LOA catamaran passenger car ferry SUPERCAT HAROULA, Project, ALPHA MARINE Ltd.

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[BRU94H] Bruzzone, D., Sebastiani L (1994), Application of a panel method to the hydrodynamic analysis of advanced vehicles, Research, Italian Ministry for the University and Scientific and Technological Research.

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[HEN95B1] Hengst, S. (1995), The future of waterborne transport, Delft University Press.

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[HEN95B3] Hengst, S. (1995), Total Quality Management - Theory or Practise? (in Dutch), Delft University Press.

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6.7.8 Norway

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6.7.9 Spain

[ROU95H] Optimizing routing system for the advanced design cruiser ship (1995), Research, Spanish Admistration (CICYT), managed by the CDTI.

[VTS95H] Implementation of the VTS in the Spanish coast (1995), Project sponsored by the Spanish Transport Department, Maritime Administration.

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[BUR96H] Burns, R. S., G. N. Roberts, M. M. Pourzanjani. Modelling and control of small vessels, Research, EPSRC (MTD), Marinex, Polytechnic South West.

[KIN96S] King, G. A., D. C. Keith, M. J. Dove. Prediction modelling the visibility of small maritime targets, Study, Southampton Institute.

[MOL96H1] Molland, A. F., J. F. Wellicome. The identification of the resistance components of catamarans, Research, EPSRC (MTD), Southampton. University

[FAU96H] Faulkner, D., A. Incecik , Non-linear hydro-structural behaviour of fast multi-hull marine vehicles in waves, Research, EPSRC (MTD), Univ. of Zagreb, Yarrow.

[WEL96H] Wellicome, J. F., P. Temarel, A. F. Molland, The determination of the motions and hull loading characteristics of catamarans in waves, Research, EPSRC (MTD), Southampton University.

[PRI96H] Price, W. G., R. A. Shenoi, P. Temarel, Design of aluminium structures subjected to high frequency, high cycle loadings, Research, EPSRC (MTD), Vosper Thornycroft, FBM Ltd, Southampton University.

[SHE96H] Shenoi, R.A., H. G. Allen, Fatigue design of weight-critical FRP sandwich structures, Research, EPSRC (MTD), Southampton University.

[DOV96H] Dove, M.J., C.T. Stockell, R.S. Burns, A navigation and collision avoidance system for marine vehicles, Research, ESPRC (MTD), Kelvin Hughes, WS Atkins, University of Plymouth.

[GRI96H1] Grimble, M. J., Integrated advanced propulsion and ship control for marine systems, Research, ESPRC (MTD), MoD, Strathclyde University.

[MOL96H2] Molland, A. F., The development of improved techniques for the prediction of ship rudder performance characteristics, Research, ESPRC (MTD), MoD, Southampton University.

[BET96H] Bettess, P., P. Sen, J. B. Caldwell, Development of intelligent knowledge-based design systems for marine technology, Research, EPSRC, Newcastle University.

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[MIL96H] Millward, A., J. L. Sproston, Numerical modelling of the flow around ship hulls with special reference to high-speed hulls and shallow water, Research, ESPRC (MTD), Liverpool University.

[SME96H] Smeaton, G. P., W. O. Dineley, A marine electronic chart system based on interactive video, Research, ESPRC (MTD), Kelvin Hughes, Action Information Ltd, Liverpool John Moores University.

[ROB96H] Roberts, J. B., J. F. Dunne, On-line assessment of ship stability parameters, Research, EPSRC (MTD), BMT, University of Sussex.

[FLO96H] J. O. Flower, M. M. A. Pourzanjani, M. R. Belmont, A sea surface estimator, Research, EPSRC, Exeter University.

[THO96H] Thompson, J. M. T., Safe transient basins: a new tool for designing against capsize, Research, EPSRC (MTD), University College London.

[CAL96H] Caldwell, , J. B., M. Pawlowski, Development of knowledge-based design systems for marine technology - ship safety, Research, EPRSC (MTD), Newcastle University.

[FAI96H] Fairlie-Clarke, A. C., I. E. Winkle, Construction of hydrodynamic lifting surfaces, Research, EPSRC (MTD), Brown Brothers, Glasgow University.

[SEN96H] Sen, P., M. J. Downie, Voyage management using parallel processing, Research, EPSRC, Newcastle University.

[HOR96H2] Horsley, E., Modelling of fires in steel ships and offshore structures, Research, EPSRC (MTD), Portsmouth University.

[HOC96H] Hockey, G. R.,C. M. Crawshaw, Human performance in highly-automated bridge systems, Research, EPSRC, University of Hull.

[POR96H] Pourzanjani, M. M. A., J. S. Habberley, M. J. Dove, Human performance in highly-automated bridge systems, Research, EPSRC (MTD), Southampton Institute.

[FAN96H] Fan, M., Fluid impact loading on wedge-shaped bodies, Research, Strathclyde University.

[GRI96H2] Grimble, J., M. R. Katebi, M. A. Johnson, Introducing adaptation into integrated ship control, Research, EPSRC, Strathclyde University.

[ATK96H] Atkins, A. G., The tearing of ships' plating upon grounding, Research, EPSRC (MTD), MoD, University of Reading.

[SME96H] Smeaton, G. P., S. K. Watson, P. G. Brooks, Real time decision support for marine pilotage, Research, EPSRC, Liverpool John Moores University.

[SHE96H] Shenoi, R. A., Assessment of damage tolerance levels in FRP ships' structure, Research, EPSRC (MTD), MoD, Southampton University.

[BEL96H] Belmont, M. R., E. L. Morris, A sensor for remote sea surface measurement, Research, EPSRC (MTD), MoD, Vickers Shipbuilders, Exeter University.

[MOL96H] Molland, A. F., S. R. Turnock, , Enhanced ship manoeuvring performance estimates through the effective design of rudder-propeller systems, Research, EPSRC (MTD), Southampton University.

[VAR96H] Varyani, K. S., A. Incecik, A theoretical and experimental investigation of the hydrodynamics of a manoeuvring ship in deep and shallow water, Research, EPSRC (MTD), Glasgow University.

[HEA96H] Hearn, G. E., A theoretical and experimental investigation of the hydrodynamics of a manoeuvring ship of deep and shallow water , Research, EPSRC (MTD), Newcastle University.

[VAS96H] Vassalos, D., Ship capsizing in severe following/quartering seas by broaching-to (Visiting Fellowship), Research, EPSRC (MTD), Strathclyde University.

[EAT96H] Eatock Taylor, R., A. G. L. Borthwick, , Non-linear fluid-structure analysis of a fast ship during slamming, Research, EPSRC (MTD), Oxford University.

[MCG96H] McGregor, R. C., J. Howell, A. Fairlie-Clarke, SWATH SHIPS. 1. Design and evaluation of control systems; 2. Optimum geometry for resistance, sea-keeping, slamming; 3. Design and evaluation, Research, EPSRC (MTD), MoD, YARD, YSL, VSEL, Brown Brothers, ARE, Glasgow University.

[FAU96H] Faulkner, D., D. M. Warwick, A. Incecik, Integrated structural design of SWATH ships, Research, EPSRC (MTD), Glasgow University.

[ROB96H] Roberts, G. N., J. Davis, Advance control strategies for motion control of vessels, Research, EPSRC (MTD), MoD, RNEC Manadon.

[VAS96H] Vassalos, D., Ship capsize in severe following/quartering seas by broaching-to: a dynamical systems approach, Research, University of Strathclyde.

CONCERTED ACTION ON SHORTSEA SHIPPING

Contract No. WA-96-CA.95/186

Public Final Report

Volume 3: State of the art study, part II

prepared by:
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prepared for:
the Commission of the European Communities
(Directorate General for Transport/DGVII)
and the participants of the concerted action

July 8, 1996

READ ME FIRST

This is Part II of the State of the Art Study. It should be used as a companion document to Part I. Part II is essentially an edited computer listing of the contents of the state of the art database, as described in Part I.

Part II was produced by (a) producing an ASCII dump of the entire contents of the database using the software model described in Part I, (b) suppressing redundant material (such as empty sections, etc) to save space, (c) converting to a Word 6.0 file, and (d) (minimally) editing. Contents are arranged by alphabetical Level I code order. Wherever supplied, information on the Level II subject classification matrix and free text description are also provided. No attempt has been made to substantially edit the material provided by the participants of the Concerted Action.

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As this is only a Word document, no capability of searching it other than what is provided by Word is available. This is rather rudimentary. For instance, to view the contents of the entry on project BOPCOM, which is code BOP96H (as per Part I), one can use the Find command from the Edit menu. To perform more sophisticated searches of the database (as described in Part I), the software model described there is required.

Key explanation:

1) Code: Level I code ABCYRXn.
2) Country: Country to which the entry is attributed [could be blank for certain entries].
3) Source: Source of info. [CASS= concerted action participants, DGi= Directorate General i (i=VII, VII/D, XII), ESSSxx = European Shortsea Shipping Conference year xx (xx =92, 94, 96), FASTyy = FAST Conference year yy (yy= 91, 93, 95), ISL= ISL Bremen, WEGEMT= WEGEMT].
4) Title: Title of entry.
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6) Status: Status if project or study [F= finalized, ON= ongoing].
7) Type: [research, study, paper, article, book, technical report]
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9) Authors: Authors [if applicable].
10) Subject classification according to the given matrix:

Example 1:

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
business		business		

[Entry dealing with business/management aspects of ships and ports].

Example 2:

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

[Entry dealing with engineering aspects of ships].

Note: Vertical matrix entries are (see also Fig. 1 of Part I):
engineering.
economics [incl.logistics]
business [incl. management]
legal [incl. regulatory]
environment [incl. safety]

11) Short description: Free text info. on entry [if provided].

Comments or questions on this document should be sent to Professor Harilaos N. Psaraftis, tel: +3017721403, fax: +3017721408, email: hnpsar@deslab.ntua.gr, WWW site: http://www.deslab.naval.ntua.gr/~mtrans/

Code: AHL95S Country: Belgium Source:CASSS

Title: Ro-Ro Services Leixous - Zeebrugge

Sponsor:PCR **Status:** F

Type: Study **Language:** English

Authors: AHLERS LINES

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
business		business		

Short Description:

Set up of an RORO shortsea traffic connection between the ports of Zeebrugge, Leixous, eventually also by a third port Poole (UK). The aim is the introduction of a regular ro-ro service, organized by two private enterprises Ahlers NV Antwerp and Portline SA Lisbon, in the line with the promotion efforts introduced by the DGVII tot stimulate the transfer of goods carriage from road to sea, rail or inland water. The concept is the carriage of unaccompanied TIR trailers by Roll-on Roll off vessels on a port to port basis. Ro-Ro services may introduce a workable alternative to road haulage. In almost all intermodal cargo movements the first and last links of the transport chain require movement by road. While the trend may be away from the overland door-to-door movement of cargo, this does not mean that importers/exporters are prepared to forego the convenience of trailers in exchange for containers. The proposed RO-RO service seeks to retain the advantages to the importers/exporter of the use of TIR as this transport mode combines the advantages of road with sea transport, find no hindrance of measurements taken against international roads haulage and introduces a more environmentally friendly mode of transport.
The study contains a market research (Evaluation of the market in Belgium, Luxemburg, UK, France and Germany), technical and operational aspects (vessels choice, vessels chartering, sailing schedule, trailer leasing, shore organization), as well as a financial analysis. The research includes four scenarios; port tot port services Leixoes-Zeebrugge / Leixoes - Poole Zeebrugge, door-to door services, Ro-Ro Services Leixous - Zeebrugge and a combined cargo vessel door to door.
Given the present trade volumes and cost structure, the success of a Ro-Ro service is not guaranteed.

Code: AKA91P Country: Source:FAST91

Title: Synthetic Aspects of Transport Economy and Transport Vehicle Performance with Reference to High Speed Marine Vehicles

Sponsor: **Status:**

Type: Paper **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics				

Code: AKA93P1 Country: Source:FAST93

Title: A Study of Transport Economy and Market Research for High Speed Marine Passenger Vehicles

Sponsor: **Status:**
Type: Paper **Language:** English

Authors: Akagi, S.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics				

Code: AKA93P2 Country: Source:FAST93

Title: Flyable Hydrofoil Catamaran (FHC) - A New Seaplane Concept

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Akashi, K.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Code: ALB92H Country: Netherlands Source:CASSS

Title: ShortSea

Sponsor: NCR **Status:** F

Type: Research **Language:** English

Authors: Albus W., Kees van der Hoeven

Short Description:
A selection of articles concerning short sea shipping. European shortsea shipping concerns all traffic by sea between European ports, and can be divided into national traffic, internatio-nal traffic and feeder. Furthermo-re, the fleet, shipping companies, ports and conge-stion.

Code: ALE94H Country: Sweden Source:CASSS

Title: Potential Development in Sea Transport Systems Europe

Sponsor: NCR **Status:** ON

Type: Research **Language:** English

Authors: Alexandersson, A., et. al., MARITERM AB

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS

engineering
business business business

Short Description:

The project is to work out the fundamental relation of logistic variables when transporting general or unit cargo in short sea shipping or ferry services. The relation between ship's speed and frequency of sailings is analysed for various transport concepts considering transport cost, energy consumption and environmental effects, which are quantified

Code: AND94P Country: Finland Source:CASSS
Title: Finland the logistics centre between East and West

Sponsor:PCR Status: F

Type: Paper Language: English
Authors: Andersson L.

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
business

Short Description:
Overview presentation

Code: ARC95S Country: Ireland Source:CASSS

Title: Arc Atlantique 3.8

Sponsor: Status: F

Type: Study Language: English

Authors: ARC
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
Development of a Vessel Traffic Service strategy for the Maritime Area within the regions of the European Community.

Code: ARE93P1 Country: Source:FAST93

Title: Operational and Cost Analysis of Fincantieri's Fast Ferries

Sponsor: Status:

Type: Paper Language: English

Authors: Arena, G., L.De Martini

Subject Classification according to the given matrix
SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

economics

Code: ARE93P2 Country: Source:FAST93

Title: Introducing Eurofast

Sponsor: Status:

Type: Paper Language: English

Authors: Arena, G., V. Farinetti
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
economics				

Code: ARI93P Country: Source:FAST93

Title: Developmeent of a Foil-Assisted Catamaran "Superjet-30".

Sponsor: Status:

Type: Paper Language: English

Authors: Arii, T., H. Miyata, H. Kawaguchi, K. Hatta, Hitachi Zosen
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Code: ASD96H Country: Source:DGVII

Title: ASDSS: Analysis of supply and demand of shipping services

Sponsor:EUR Status: ON

Type: Research Language: English

Authors:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics	economics	economics	economics	
business				
environment				

Short Description:
A DGVII project. Aims to provide insight into the commercial realities of today's maritime industry and to recommend practical initiatives that will enhance the competitiveness of the EU maritime sector.

Code: ATK96H Country: UK Source:WEGEMT

Title: The tearing of ships' plating upon grounding

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Atkins A.G.

Subject Classification according to the given matrix

SHIPS **CARGO** **PORTS** **NETWORKS** **TELEMATICS**
engineering

Short Description:

PROJECT OBJECTIVES:1. To determine the resistance to crack initiation (plate denting, perforation and puncturing) and subsequent propagation of long tears in ships' plating. To be done by experiments on full size and scaled plates, and also by analytical investigations using proven methods of rigid plastic fracture mechanics for full size and scaled bodies. Guidelines will be given for likely extent of damage upon grounding, amount of cargo spillage etc.
PROPOSED WORK PROGRAMME:The resistance to crack initiation (plate denting, perforation and puncturing) and subsequent propagation of long tears in ships' plating will be investigated using
The tearing of ships' plating upon grounding experimental and analytical methods of rigid-plastic fracture mechanics which have been successful in the solution of related problems in large deformation flow and fracture. Simple strain criteria, without allowance for biaxiality effects, are inappropriate for design in these circumstances. Better still is the use of proper fracture toughness data as proposed here. Such data will enable answers to be given to the problem of how long a tear is likely to be produced when a ship of a given mass and velocity strikes an obstruction and is brought to rest (and thereby, for example, what spillage of liquid cargo may occur). Guidelines will emerge from the study for the amount of damage that can be sustained before piercing and fracture occurs. The question of scaling from measurements on small samples and/or models versus the behaviour of large ships will be included as part of the study.
CURRENT PROJECT POSITION:
UPDATE DATE: 23/06/94Construction of the basic outer "double-torsion" test apparatus to obtain the fundamental fracture toughness. Research data for this type of fracture at the point of crack initiation has been completed and tests are under way. The construction of the apparatus to simulate a tear in a ship in motion has just been completed. In such cases, the ship plate is made to move relative to an obstruction. The obstructions vary in shape and sharpness from which we may obtain: (a) plate denting; (b) plate perforation; (c) after plate perforation - crack propagation. These tests are still in the initial stages, on a trial basis to eliminate any teething problems, and only thin sheets up to 1 mm have yet been tested. Sheets are gridded in order to determine strain histories. Plate denting up to perforation on this apparatus, with a blunt obstruction causing biaxial stretching is currently being investigated. Results will be compared with independently determined "fracture-forming limit diagrams". Sharp obstructions may also be tested in a similar manner. The apparatus, as yet, has no facility for in-plane pre-tensioning in the sheets, but ideas for checking the influence of transverse loads in the plastic range for built-in specimens will be considered.

Code: ATL94P Country: Germany Source:CASSS

Title: SUMO Senario Investigation of Maritime Transpor Systems in the Baltic Area

Sponsor: NCR **Status:** F

Type: Paper **Language:** English

Authors: ATLAS

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering	engineering	engineering		enginee
economics	economics	economics		econonm
business	business	business		busines
legal	legal	legal		legal
environment	Environment	environment		environ

Short Description:

The maritime contribution within an integrated transport concept must be matched to the regional traffic demands and take account of the existing structures. In the study these aspects, as well as the potential developments for maritime transport systems in the Baltic area are being analysed using scenario techniques. The following elements were taken under consideration: ship, cargo handling facilities, standardised cargo units, transfer to other carriers, telematics & information systems.

Code: ATL95S1 Country: France Source:CASSS

Title: An atlantic arc vessel traffic service

Sponsor: **Status:**

Type: Study **Language:**

Authors: Atlantic Arc Commission

Code: ATL95S2 Country: France Source:CASSS

Title: Transhipment Study

Sponsor: **Status:**

Type: Study **Language:**

Authors: Atlantic Arc Commission

Code: BAA92T Country: Norway Source:CASSS

Title: Fast Boat Industry

Sponsor: **Status:** F

Type: Technical **Language:**

Authors: Baardsen T., SNF

Code: BAG92P Country: Source:ESSS92

Title: Autostrade Del Mare

Sponsor: Status:

Type: Paper Language: English

Authors: Bagchus, R.C., B. Kuipers

Code: BAG93H Country: Netherlands Source:CASSS

Title: Sea change for road freight (Coaster and feeder traffic plan)

Sponsor:NCR Status:

Type: Research Language: English

Authors: Bagchus, N.S. Winkel

Short Description:

This memorandum describes the shortsea policy of DGSM.
Five projects have priority: trial shipping line, information, Load/Unload, coastal networks and promotion / marketing

Code: BAG94T1 Country: Netherlands Source:CASSS

Title: Statement on Shortsea shipping by the Dutch Ministry of Transport, Public Works and Watermanagement (the Netherlands, Belgium,
Sponsor:Germany);

Type: Tech. Report Status: F

Authors: Bagchus, R. C. Language: English

Code: BAG94T2 Country: Netherlands Source:CASSS

Title: Report symposium on shortsea shipping by DGSM

Sponsor:NCR Status: F

Type: Language: English

Authors: Baghus, R. C., Winkel, N. S., P. Bleumink,

Code: BAG95S Country: Netherlands Source:CASSS

Title: Shortsea shipping: Plan van Aanpak, 1995 en

volgende jaren, ("Short-sea shipping: a strategy for 1995 and the following years")
Sponsor: Status: F

Type: Study Language: English
Authors: Seignette R., DGSM, EVO

Code: BAI96P Country: Source:ESSS96

Title: The Marine Motorway: Opportunities for coastal freight ferry services in the United Kingdom

Sponsor: Status:

Type: Language:

Authors: Baird, A.
Subject Classification according to the given matrix

Code: BEL96H Country: UK Source:WEGEMT

Title: A sensor for remote sea surface measurement

Sponsor: Status:

Type: Tech. RepoLanguage: English

Authors: Belmont M.R., Dr E L Morris
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
PROJECT OBJECTIVES:The detailed design, construction and testing of a first stage remote sea surface measurement system.PROPOSED WORK PROGRAMME:1. Detailed design and specification of the system.2. Construction and testing of the electronic subsystems of a) the laser system, b) the detector/wave slope estimator.3. Laboratory testing.4. Initial field trials.5. Project review and any necessary redesign.6. Main field trials.7. Consolidation and recommendations for the next stage of development.CURRENT PROJECT POSITION:The detailed design and construction of the laser scanner control of the signal processing system and the data capture/overall coordination system are all well underway. The major optical components and the signal detection unit have been acquired, and the precision mechanical alignment system is currently being specified. Two strategies have been developed for the actual slop measurement of the sea, which will provide the reference data against which to compare the actual sea surface estimator readings. One is based on image analysis, and the other relies on direct physical measurement of the local sea A sensor for remote sea surface measurement slope. The work is currently well on course with project milestones.

Code: BEN96P Country: Italy Source:WEGEMT

Title: Environmental impacts of land and maritime transports in urban areas

Sponsor: **Status:** F

Type: Paper **Language:**

Authors: Benevenuto G, Fiagri M, Rossi E

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
environment				

Short Description:

The papers describe a methodology to evaluate a global environmental impact of different urban transportation systems in coastal metropolitan areas. In particular, a proposal of a new sea passenger line covered with innovative high speed vessels (SES) in the metropolitan area of Genoa is considered. The aim of the study is to evaluate both economical feasibility and environmental impact of the proposed sea passenger line. For this reason the Environmental Impact Assessment (EIA) is used; in fact EIA enables, for its own characteristics, a global evaluation of a studied process, taking into account different aspects (i.e. economical, environmental, social, etc). The study is divided into two different parts:
the set up of a methodology to assess the environmental impact of fast ferries which can, in principle, be used for other maritime transportation processes;
the environmental assessment, in the considered area, of the actual impact of urban transport systems (car and train) in relation to SES.other more detailed reports on the same project:"Application to the field of maritime transports of criteria of evaluation of the impact on the environment". Figari M, DINAV Report n.6 MF195, Dec 95"Evaluation of the maritime transports impact on the environment" (in Italian). Figari M, DINAV Report n.7 MF195, Dec 95

Code: BER95P Country: Source:FAST95

Title: Hybrid Hydrofoil Monohulls

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Bertram V., H.J. Schmidt

Code: BER96T Country: Germany Source:WEGEMT

Title: Various Aspects of Fast Sea Transportation (9 publications)

Sponsor: **Status:** F

Type: Tech. RepoLanguage:

Authors: Bertram V.

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering
economics
business

Short Description:

Various publications relating to concepts of fast marine transportation (SWATH, HYSWAS, Hydrofoils, Monohulls) and to containerships

Code: BET96H Country: UK Source:WEGEMT

Title: Development of intelligent knowledge-based design systems for marine technology

Sponsor: Status:

Type: Tech. RepoLanguage: English

Authors: Bettess P., Dr P Sen, Prof J B Caldwell
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
Traditional procedural approaches to computer aided ship design usually combine design knowledge and processing information in such a manner that incremental advances in design expertise are rather cumbersome to incorporate about extensive re-programming but this difficulty is more helpfully addressed in the knowledge based approached by an effective separation of logical processing elements from the knowledge elements. This is particularly helpful in the area of design of ships for safety because design knowledge in this domain is rather scarce and often becomes available experimentally. This project deals with some aspects of the knowledge based design of passenger ferries with particular reference to subdivision using the alternative probabilistic regulations, and arrives at some guidelines on the basis of a critical examination of the premises of the regulations. These rules are then applied to show how designs can be improved from the subdivision point of view. The probabilistic regulations for passenger ships have existed as a alternative to the more familiar "factor of subdivision" approach for over 15 years. The probabilistic approach offers a rational method for dealing with the problem of ship subdivision as it is essentially risk based, goal-setting and non-prescriptive and is therefore capable of incorporating changes in designs as they evolve in a more natural way. However, although the above rational framework exists, very few ships have been designed globally on the basis of these regulations. The main reason usually articulated is that their application is more difficult. This, in a sense, is probably true because the probabilistic regulations do involve much more computation. Another argument standing in the way of more universal application of the probabilistic regulations in that it does not assist the designers in identifying a suitable subdivision arrangement. Furthermore, since this is a relatively new area of work, experience and hence Development of intelligent knowledge-based design systems for marine technology
design knowledge is limited but can be expected to evolve over time. Hence a knowledge based framework

is probably beneficial. A further consideration that has a bearing on the problem is that from February 1992 all cargo ships are required to have subdivision assessments using a modification of the internal subdivision by the user, whenever it is considered necessary, or a pictorial representation of the hull during the systematic adjustment of the subdivision under the guidance of the expert system. The use of the probabilistic method of subdivision for the design of passenger ships must take account of the fact that experience in using these rules is rather scare. Thus, a program structure is required that permits periodic updating of knowledge with the minimum of interruption. A knowledge based expert system to handle these design problems therefore becomes feasible and in many respects even desirable. To facilitate the development of rational design strategies , a "local" index of subdivision was identified and incorporated. Experience to date indicates that this local index can be very helpful in rapidly arriving at an efficient arrangement of subdivision for a given number of bulkheads. This is what ESPSDS does today. Work is continuing on several fronts to improve the design strategies and the time required to arrive at acceptable designs. For example, the calculations are inherently parallel and the use of parallel processing will produce obvious gains. This is currently being explored. Similarly there is scope for arriving at more efficient improvement strategies using the local information to reduce the number of design iterations.
Development of intelligent knowledge-based design systems for marine technology

Code: BIA92H Country: Italy Source:CASSS

Title: Progetto Finalizzato Trasporti 2 (PFT2)

Sponsor:NCR Status: ON

Type: Research Language: English

Authors: Bianco L.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
business		business	business	

Short Description:
PFT2 has been divided into 5 main areas:1. Planning tools2. Vehicles3. Infrastructures4. Urban transport5. Commodities transportThe main scopes of the Project are:· increasing the transport system efficiency· rationalisation of the transport mobility· environment protection (urban transport)· increasing the transport system reliability· increasing the national transport industry competitiveness

Code: BLO93P Country: Source:FAST93
Title: Prospects for Harg Chine, Monohull Vessels

Sponsor: Status:
Type: Paper Language: English

Authors: Blount, D.L

Code: BMB94H Country: Germany Source:WEGEMT

Title: STN, ISSUS, BV scenarios: Maritime Transport systems for the Baltic Sea

Sponsor: PCR **Status:** F

Type: Research **Language:** German

Authors: BMBF

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
legal		legal	legal	

Short Description:

State of the art and future prospects of maritime transport in the Baltic Sea

Code: BOG93P Country: Source:FAST93

Title: New IMO High Speed Craft Code and the Problems of Ekranoplanes Certification.

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Bogdanov, A.I., D.N. Synitsin

Code: BOO93S Country: Ireland Source:CASSS

Title: Evaluation of actions in the fields of telecom and transport in Greece, Italy and Portugal

Sponsor: EUR **Status:** ON

Type: Study **Language:** English

Authors: Booz-Allen & Hamilton

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics		economics		
			economics	
business		business	business	
environment		environment	environment	

Short Description:

The thematic evaluation of investments in transport and telecoms sectors is aimed at providing input to the potential discussions on priorities for funding investments in Greece, Ireland and Portugal

Code: BOO95P Country: Source:FAST95

Title: Seaworthiness of Aquastrada Class of Ships

Sponsor: Status:

Type: Paper Language: English

Authors: Boote D., M. Ragone, A. Sculati
Subject Classification according to the given matrix

Code: BOP96H Country: Source:DGVII

Title: BOPCOM: Baltic Open Port Communication System

Sponsor:EUR Status: ON

Type: Research Language: English

Authors:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		engineering		enginee
	economics	economics	economics	
		business		

Short Description:
The BOPCOM project, sponsored by the DG VII, is designed to improve the efficiency of short sea traffic by providing telematic services on the ports of the Baltic, speeding their integration into the European transport network. Although initially confined to the Baltic, this project aiming at the harmonization of the European port communications system, will include contributions of the Atlantic and Mediterranean ports. This action started on November 1st, 1995, will be concluded October 31st, 1998.

Code: BRE92P Country: Source:ESSS92

Title: Ferry Transport in the Southern Baltic Sea and its Prospects.

Sponsor: Status:

Type: Paper Language: English

Authors: Breitzmann, K.H

Code: BRU92H Country: Italy Source:WEGEMT

Title: Numerical evaluation of the steady free surface flow for catamaran hull forms

Sponsor:NCR Status:

Type: Research Language:

Authors: Bruzzone D, Ferrando M (DINAV- University of
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS

engineering

Short Description:
The aim of this paper is to investigate the capabilities of a boundary element method for computing the free surface flow around high speed vessels. It was originally developed to evaluate the wave resistance and the wave patter of monohulls and has recently been extended to twin hull configurations and SES vehicles. The boundary value problem of the steady motion of a ship is solved by distributing sources on flat panels approximating the hull and a part of the calm water surface and collocating the relevant boundary conditions on the centre of each panel. Preliminary results for twin hulls were already shown for a bi-Wigley mathematical hull at different separations. The method is herein applied to a series of catamarans fitted with a transom stern. Such shape is in fact present in many vessels and, in the case of high speed ships, the flow may be properly treated by a suitable dry transom condition which relies on the observation that for sufficiently high vessel velocity the water clears the transom. Quite extensive published experimental values of the wave resistance coefficients and interference factors Numerical evaluation of the steady free surface flow for catamaran hull forms have been used for validation. Besides the applications to different demi-hulls separations, the influence of the grid density upon the convergence is studied. In addition to pressure integration, the wave resistance coefficients are computed by a numerical transverse cut in the case of finer grids.

Code: **BRU94H1 Country: Italy Source:WEGEMT**

Title: **Application of a panel method to the hydrodynamic analysis of advanced vehicles**

Sponsor:NCR Status:

Type: Rerearch Language:

Authors: Bruzzone D (DINAV - University of Genoa) and
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
The present paper illustrates the potentialities of a Rankine source panel method to the hydrodynamic analysis of advanced vehicles. The framework of the mathematical model was the linear steady Rankine source formulation for the monohulls wave resistance characterisation presented in ref 1. The theoretical formulation of the linearised boundary value problem for the steady wave perturbation which takes into account also the perturbation due to an air supported catamaran (SES) is provided. Extension of the monohull methodology has been carried out to account for twin hull configurations and air cushion catamarans. The former problem was more troublesome from a computational point of view as it involved a redefinition of the free surface grid and of the finite difference operator in the transverse direction. The latter problem was accomplished by adding some terms into the free surface boundary condition. All the hydrodynamic

computation is evaluated for given trim and draft conditions assuming a given fixed geometry. Equilibrium condition can be obtained by the user be iteratively running the program. Applications are herein presented for simple configurations in order to validate the methodology.

Code: BRU94H2 Country: Italy Source:WEGEMT

Title: A unified panel method for steady and unsteady free surface calculations

Sponsor: NCR Status:

Type: Research Language:

Authors: Bruzzone D (DINAV - University of Genoa) and

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

An existing Rankine source based methodology for free surface steady potential flow for monohulls has been extended to compute the wave resistance and wave patterns in calm water for twin hull configurations and air cushion vehicles and to calculate the hydrodynamic behaviour of a diversity of ship configurations and air cushion vehicles. The theoretical framework of the method is based on a liner potential theory with a free surface. The boundary-value problem for the perturbation potential is solved by means of a distribution of Rankine sources over the free and the hull wetted surfaces which are discretised by quadrilateral panels determined from structured grids. The formulation relies on the use of the same approach both for the steady (wave resistance) and unsteady (seakeeping) problems. The total fluid disturbance is decomposed into a double-model flow and a perturbation flow which is further subdivided into a steady and unsteady part. Applications of the methodology for some twin hull configurations and a SES configuration are given for the steady problem.

Code: BRU95P Country: Italy Source:WEGEMT

Title: Feasibility of a second order strip theory of the longitudinal strength of ships

Sponsor: NCR Status:

Type: Paper Language:

Authors: Bruzzone D, Pittaluga A, Podenzana-Bonvino C

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

Use of linear strip-theory to derive wave bending moments and shear forces in ships is nowadays a well established design tool and the relevant theories

are well developed. Unfortunately the linear assumption is valid for small waves only and a non linear model is needed for the longitudinal strength assessment in extreme waves. Second-order theories are very promising and a very useful method, based on the second-order extension of the Gerritsma-Beukelman's strip-theory has been presented by Jensen and Pedersen in 1979 in the RINA Transactions. The scope of the present paper is to propose a similar extension to the theory of Salvesen, Tuck and Faltinsen, which has some advantages over the Gerritsma-Beukelman's and is theoretically more rigorously founded. In this paper the basis for such development will be introduced and the complete theory will be highlighted.

Code: BUC94T1 Country: Netherlands Source:CASSS

Title: Shortsea transport, a product of the port of Rotterdam and four Northwest-euro-pean competitors by AVV

Sponsor: NCR Status: F

Type: Tech. Repo Language: English

Authors:

Short Description:
A comparison has been made of shortsea (container) liner services from Rotterdam, Hamburg, Felixtowe, Antwerp, and Zeebrugge

Code: BUC94T2 Country: Netherlands Source:CASSS

Title: Shortsea transport, a product of the port of Rotterdam and four Northwest-euro-pean competitors, the final survey by AVV

Sponsor: NCR Status: F

Type:
Language: English

Authors:

Short Description:
A comparison has been made of shortsea container liner services from Rotterdam, Hamburg, Felixstowe, Antwerp, and Zeebrugge

Code: BUR96H Country: UK Source:WEGEMT

Title: Modelling and control of small vessels

Sponsor:NCR Status:

Type: Tech. RepoLanguage: English

Authors: Burns S., LCdr G N Roberts, Dr M M Pourzanjani
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering
business

Short Description:

A collaborative research project between South West Marine & Industrial Control Consortium and Marinex Industries Ltd has recently been completed. The overall aim had been to conduct an indepth study into an intelligent autopilot for small vessels with applications in the inshore fishing and leisure industries. The consortium, consisting of University of Plymouth (lead partner), the Royal Navy Engineering College Manadon and Southampton Institute of Higher Education was formed to provide a framework of shared expertise and facilities in order to create an environment where research programmes and other activities could be undertaken. Marinex Industries Ltd have a reputation for high technology marine control and instrumentation systems and are a leading UK exporter of these products to over 40 countries world-wide. In the design of an autopilot for a large vessel it is usually only necessary to consider a ship model with 3 degrees of freedom (surge, sway and yaw). However, small vessels are more sensitive to environmental disturbances (wind, waves and current) resulting in additional ship motions (heave, pitch and roll). A further implication is that most leisure craft can operate over large speed ranges (0-20 knots) and behave as displacement vessel at low speeds and semi-planning vessels at high speed. A well designed autopilot must cope with all of these effects. However, in practice, controller parameters usually remain unchanged and therefore an autopilot, intelligent enough to cope with a wide range of speeds. In addition the controller should retain optimality during bad weather conditions resulting in extreme vessel motions. Following a review of possible alternatives it was decided, in this initial study, to concentrate on Fuzzy Logic and Self Organising control algorithms. A comprehensive simulation investigation was conducted comparing Fuzzy Logic control with a well-tuned PID autopilot over a range of sea states. The work was then extended to investigate Self Organising control and the use of performance indices. Running parallel to the autopilot study was a theoretical investigation into a 6-degree of freedom mathematical model for small vessels. Hydrodynamic parameters were measured from towing tank model tests. A fully instrumented ship with an extensive data acquisition system was used to conduct the sea trials. In the photograph the fully integrated system with the intelligent autopilot included can be seen. During each test run, heading, rudder angle, engine speed, yaw rate, yaw acceleration, pitch rate, roll rate, surge acceleration, heave acceleration, sway acceleration, wind magnitude and direction, position (different GPS), and forward speed were measured. This data was used to assess autopilot performance and validate the ship mathematical model.

Code: CAL96H **Country:** UK **Source:** WEGEMT

Title: Development of knowledge-based design systems for marine technology - ship safety.

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Caldwell J.B., Dr M Pawlowski

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS

engineering

Short Description:

Dr Pawlowski's work during his year as a visiting fellow can be summarised under two headings:1. Participation in the EPSRC-funded project "Development of knowledge-based systems for design of ships for safety". Dr Pawlowski's knowledge and experience were of great benefit to this project, in particular in (a) the development of the probabilistic approach to the assessment of ship survivability following collision or grounding; (b) the introduction and elaboration of a new concept, local indices of subdivision, now being incorporated in the expert system. This is a major contribution towards creating a system that will guide designers towards optimal schemes of ship subdivision that satisfy the new probability-based regulations; (c) generalisation of the existing method of calculating ship stability for freely floating vessels of arbitrary geometry. This new method, which is both faster and more powerful than existing techniques, will further strengthen the scope and capability of the IKBS system being developed in the EPSRC project. 2. Participation in the general work of Newcastle University's Marine Safety Research Group. Dr Pawlowski made many contributions to both the internal and external activities of this group. Both undergraduate and postgraduate students have benefitted from his input on a number of projects, including those concerned with ship collision mechanics and survivability, ro-ro ship safety and design, the effects of new regulations on design, and the development of probability-based design codes.

Code: **CAR92S** **Country:** **Spain** **Source:CASSS**

Title: **Analysis of the EEC national cabotage trades, as apart of the global European SSS market**

Sponsor:ANAVE **Status:** **F**

Type: **Study** **Language:** **English**

Authors: **Carlier Manuel**

Subject Classification according to the given matrix

SHIPS **CARGO** **PORTS** **NETWORKS** **TELEMATICS**
economics

business

Short Description:

This study was produced during the last stages of the political negociations that eventually produced the agreement on Reg. CEE 3577/1992, on maritime cabotage transport services.The paper analyzes the most important cabotage EEC national cabotage trades (UK, Denmark, France, Italy, Portugal, Greece and Spain): demand, cargo flows, fleets, etc.It then presents the objectives of the liberalizacion that was then under negociation and the main obstacles for this process, pointing out the competitive problems of the southern fleets and suggest possible ways for a compromise agreement.

Code: CAR92S1 Country: Portugal Source:CASSS

Title: Evaluation of Costs for Sea Container Cargo System Between Azores Islands and Mainland

Sponsor: NCR **Status:** F

Type: Study **Language:** English

Authors: Carichas E.

Short Description:

The study had analysed existing date of origine, destination and port taxes, for containers in Azores and Mainland Portuguese Ports, and the container vessels operation costs, in order to evaluate the global costs of the system . Following this first analysis, the study performs some different sceneries in order to evaluate costs, optimizing distribution circuits aiming to get the best freight rate maintaining an allowable social level.

Code: CAR92S2 Country: Portugal Source:CASSS

Title: Study on Sea Transport for General Cargo in Azores Islands

Sponsor: NCR **Status:** F

Type: Study **Language:** English

Authors: Carichas E.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
business				
environment				

Short Description:

The study had analysed first all statistical data available and investigate population needs. Next, the study evaluates the costs for different sceneries of distribution regarding social aspects of this particular service, and established the dimensions, speed and general arrangement of two small multipurpose cargo vessels

Code: CAR95P Country: Italy Source:WEGEMT

Title: Notes on the characterisation of the acoustical performances of viscoelastic materials to be used in the floors of cabins on board ship.

Sponsor: NCR **Status:** F

Type: **Language:** Italian

Authors :

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:
The paper describes the main results of a research carried out at the Department of Naval Architecture (DINAV) of the University of Genoa regarding the characterisation of viscoelastic materials used for noise reduction on board ships. The subject is related to the request of high comfort stands in the field of fast marine transportation of passengers and in general to the improvement of working conditions on board. In particular the constrained layer configuration of viscoelastic materials is considered, with specific reference to the construction procedure adopted for the floors of cabins in merchant and passenger ships. An analysis is contained on the non-standardised test procedures presently available. The meaning of the physical quantities that can be measured and of the ratios that can be defined with them is described and discussed. A practical procedure for the comparison between different viscoelastic materials is proposed and applied to a set of simple specimens. The first experimental results are discussed.other more detailed reports on the same subject:"Comparison of viscoelastic materials to be used in constrained layers on board of ships". (in Italian). Carrera G, Rizzuto E, DINAV University of Genoa."Notes on the acoustical characterisation of floors of cabins on board ships". (in Italian). Carrera G, Rizzuto E, DINAV University of Genoa."Comparison of viscoelastic materials to be used in constrained layers on board of ships". (in Italian). Carrera G, Rizzuto E, DINAV University of Genoa.

Code: CAS92P Country: Source:ESSS92

Title: Logistic Requirements and Shortsea Shipping

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Caspers, F.N., R. ter Brugge

Code: CAS95P1 Country: Italy Source:WEGEMT

Title: Hydrodynamic performances of catamarans

Sponsor: **Status:**

Type: Paper **Language:** Italian

Authors: Cassella P, Miranda S, Pensa C, Russo-Krauss G

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
the first results obtained within an experimental research on the motion resistance of fast catamarans for passenger transport on short routes. The study regards the different components of the resistance from some configurations of catamarans having the same displacement. A comparison is also presented among the mentioned catamarans and a semi-planing

hull with the same displacement.

Code: CAS95P2 Country: Italy Source:WEGEMT

Title: Comparison between the catamarans and the monohull resistance characteristics

Sponsor:NCR Status:

Type: Paper Language:

Authors: Cassella P, Miranda S, Pensa C, Russo-Krauss G

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS engineering

Short Description:
The paper summarises the results of an experimental work, which intends to compare the resistance characteristics in still water of various types of high speed catamarans with those of high speed monohulled vessels to be adopted for Italian coasting routes. For this research programme we have carried out until now routine model towing tank resistance tests and afterwards we plan to carry out model tests in order to obtain the direct measurements of the viscous resistance component with the wake survey and of the wave resistance component with the longitudinal cut.

Code: CAS96P Country: Italy Source:WEGEMT

Title: Feasibility of second order strip theory of the longitudinal strength of ships

Sponsor: Status: F

Type: Paper Language:

Authors: Cassella P, Pensa C, Russo-Krauss G

Subject Classification according to the given matrix
SHIPS CARGO PORTS NETWORKS TELEMATICS engineering

Code: CHE92P Country: Source:ESSS92

Title: Recent Developments in Feeder Transport by Coasters

Sponsor: Status:

Type: Paper Language: English

Authors: Cheetham, C., P. Hornby, R. Papenhuijzen

Code: CHL96P Country: Source:ESSS96

Title: Investment policies in ports' infrastructure in

the perspective of the European Shortsea Shipping Networks: The case of Greece.

Sponsor:
Status:
Type:
Language:
Authors:

Code: CHU91P Country: Source:FAST91

Title: EKRANOPLAN: A High-Speed Marine Vehicle of a New Type

Sponsor: Status:

Type: Paper Language: English

Authors: Chubikov, V., V. Pashin, V. Treshchevsky, A.

Code: CIO96P Country: Source:ESSS96

Title: Perspective of short sea navigation in the Black Sea basin.

Sponsor: Status:

Type: Language:

Authors: Ciortan, R.

Code: CLI94P Country: Source:ESSS94

Title: Water-Based Multimodal Terminals: an Eclectic Site Evaluation Model

Sponsor: Status:

Type: Paper Language: English

Authors: Clinckers, L., E. Declercq, C. Peeters, A.

Code: COL91H Country: Ireland Source:CASSS

Title: Cross Channel Pass Traffic 1960 -1990

Sponsor:NCR Status: F

Type: Project Language: English

Authors: Coleman M.
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
business

Short Description:
The paper analyses the movement of passengers by air

and sea between and the Republic of Ireland, taken into account the impact of a wide variety of economic and social factors which prevailed between 1960-1990.

Code: COL91P Country: Ireland Source:CASSS

Title: Ports and Shipping

Sponsor:NCR Status: F

Type: Paper Language: English

Authors: Coleman M.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
business		business		
		environment		

Short Description:

The paper discusses Ireland's role in trade, and includes factors such as the impact of the Channel Tunnel and the proposed development plans for Irish Ports.

Code: COL92P Country: Ireland Source:CASSS

Title: Modal Competition on the Irish Sea

Sponsor:NCR Status: F

Type: Project Language: English

Authors: Coleman M.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
business				

Short Description:
The paper analyses the movement of passengers by air and sea between Britain and the Republic of Ireland, taken into account the impact of a wide variety of economic and social factors which prevailed between 1960-1991.

Code: COL92P Country: Ireland Source:CASSS

Title: The southern corridor - the Gateway to Europe

Sponsor:PCR Status: F

Type: Paper Language: English

Authors: Coleman M
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		engineering		
business		business		
		environment		

Short Description:

The paper, read by Mr Peter Riberio, discusses the strategic location of Rosslare as being the ideal port for the development of The Gateway to Europe, on the Southern Corridor.

Code: COL93P **Country:** Ireland **Source:** CASSS

Title: A Japanese Lesson for Irish Shippers and Carriers.

Sponsor: PCR **Status:** F

Type: Paper **Language:** English

Authors: Coleman M.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering		engineering	engineering	
business	business	business	business	busines

Short Description:

The paper, read by Mr Pat Mullen examines the success and historic supremacy of the Japenese in industry and the implications for achieving success for Irish Shippers and Carriers, by using innovative procedures

Code: COL94P **Country:** Ireland **Source:** CASSS

Title: Sailing into the Millennium

Sponsor: PCR **Status:** F

Type: Paper **Language:** English

Authors: Coleman M.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering		engineering	engineering	
business		business	business	

Short Description:

The paper read by Helen Gallivan addresses the challenges facing the transport industry and the need for flexibility in adapting to change vis a vie the impact of intermodal networks on conventional systems, and responding to a rapidly altering market place.

Code: COM94H **Country:** Greece **Source:** CASSS

Title: Greece - Italy - Germany Multimodal FreightTransportation Corridor

Sponsor: EUR **Status:** F

Type: Research **Language:** English

Authors: Combimare, ADK Consulting Engineers and Triton Consulting Engineers

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
			business	
		business		

Short Description:
This pilot project aimed at developing a multimodal freight transportation corridor between Greece and North Europe. It included market research, feasibility assessment, port selection to facilitate operation at both sides of the Adriatic Sea, the Ports of Patras and Brindisi and cost analysis for the development of a combined freight transport by hauling of unitized unaccompanied loads between Greece and Germany

Code: CON93S1 Country: Spain Source:CASSS

Title: Maritime liner services in Spanish cabotage

Sponsor: MOPTMA **Status:** F

Type: Study **Language:** English

Authors: CONSULTRANS

Short Description:

The study describes the situation of the sector of liner maritime transport services in the Spanish cabotage trades: supply of services, ships used, demmand, level of freights, etc.The shipping companies providing these services are also analized, including their main economic and finantial ratios.Policy criteria for the sector are derived and proposed.

Code: CON93S2 Country: Spain Source:CASSS

Title: Present situation and perspectives for the maritime cargo transport with the Canary and Balearic islands

Sponsor: MOPTMA **Status:** F

Type: Study **Language:** English

Authors:

Short Description:
This study analyzes the problems existing in the maritime cargo transport between the Spanish peninsula and the Canary and Balearic islands: service efficiency, competition, etc. and the influence that the liberalization introduced by the EU may have on these services.Policy recommendations are included.

Code: CON93S3 Country: Spain Source:CASSS

Title: Analysis between the competition between Spanish and EU ports

Sponsor: MOPTMA **Status:** F

Type: Study Language: English

Authors: CONSULTRANS
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		business environment		

Short Description:

The study is a comparative analysis of the Spanish ports and those of other EU member States (with regard to costs, productivity, labour and social conflicts, land transport infrastructure connecting with the hinterland, etc.) in the context of both the main world trade flows and the short sea traffics and their expected future evolution. Attention is focussed on specific cases of competition between some Spanish ports and their main european potential competitors.

Code: COO92P Country: Source:ESSS92
Title: Hydraulic Research Studies Increase Efficiency at North Sea Ports

Sponsor: Status:

Type: Paper Language: English
Authors: Cooper, D.H., N.E. Denman, F.D.R. Yell

Code: COR91P Country: Source:FAST91

Title: SES 500 - Fincantieri - Design Criteria

Sponsor: Status:

Type: Paper Language: English

Authors: Cordano, A., L. De Martini

Code: COR96H Country: Source: ISL

Title: "COREM" (Cooperative Resource Management for the Transport of Unit Loads)

Sponsor:EUR Status: ON

Type: Research Language: English

Authors:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
	economics	economics		econonm
	business	business		busines

Short Description:

A DGXIII project. New logistical trends and concepts require new ways for cooperastion in transport in order to satisfy the requirements of industry and trade to make intermodal transport chains (also

including SSS) as smoothly as possible. On the other hand, all companies involved in transport have to manage their resources (trucks, trailers, vessels, straddle carriers, container bridges, storae areas etc.) which is performed today almost without any relation to the planning and operation of the other players in the transport chain.
COREM intends to support cooperative work among companies in the transport area along the scientific lines of Computer Supported Cooperative Work (CSCW). Advanced technological means as multimedia communication and the handling and integration of multimedia documents will be used for this purpose.

Code: COS96H Country: Source: ISL

Title: "COST 330", Teleinformatics links between ports and their partners

Sponsor: EUR **Status:** ON

Type: Research **Language:**

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
	economics	economics		
				econonm
	business	business		busines

Short Description:

The study concentrates on ports as distribution centres for improving of logistics by use of modern IT.
Expected results are:
-
Describe and assess the impact from the latest technical developments.
-
Identify the difficulties of implementing the creation of a more open communication environment for maritime industries.
-
Definition of scenarios for the long term telematics needs of ports and their partners.
-
Clarifiy what is going on in this sector, analysis of technical trends.
-
Gather data on the introduction of innovative technologies/tools/products and examine the common rationale.
-
Comprehensive examine the reasons for the slow take-off of the use of Telematics in general, including EDI is the maritime sector; and to look at differences and common elements with other innovative tools/products/technologies.
-
Design of a set of recommendations allowing for the development of tools and actions to enchance and faciliate the use of Telematics, including EDI in maritime transport.
-
Disseminate pertinent information for commercial operations about openess, including networking and multimedia.

Code: CRI92P Country: Source:ESSS92

Title: Shortsea Shipping and the World Cargo Carrying Fleet - A Statistical Summary

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Crilley, J., C.J. Dean

Code: CZI91P Country: Source:FAST91

Title: Concept of a Large Surface Effect Ship for Fast Ocean Transport

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Czimmek, D.W., B.H. Schaub

Code: DEJ93P Country: Netherlands Source:CASSS

Title: Maritime Journal 1993: Van kleine naar grote vaart (From home-trade to ocean-going trade), (p. 73-82),

Sponsor: NCR **Status:** F

Type: Paper **Language:** Dutch

Short Description:
Politicians are increasingly interested in the possibilities of European short sea shipping, and less interested in Dutch short sea shipping. Since the ships in the European trade are becoming larger, it is better to replace te name home-trade by short trade. Against short trade stands ocean-going trade. Small ships can participate in ocean-going trade, and large ships in short trade.

Code: DEM94P Country: Source:ESSS94

Title: Maritime Research Priorities for Europe

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: deMeester, Th. H. de

Code: DEM95T Country: Belgium Source:CASSS

Title: Report of the Shortsea Shipping Panel

Sponsor:PCR **Status:** F

Type: Tech. RepoLanguage: English

Authors: deMeester H

Short Description:

MIF Plenary meeting in Bremen June 1995:Development and implementing concrete action to stimulate Shortsea transport in becoming a viable alternative to land transport modes. Description of the follow-up since the Rotterdam Plenary meeting of the MIF. Objectives of the MIF Marseilles Workshop (4-5. 5.95). Press release of the continuous work of the promotion of shortsea shipping. Conclusions and recommendations of the WG1: Procedures, WG II: Port Operations and Overall Efficiency and WG III: "SSS, the right Alternative" Marseilles round-table.

Code: DER95T **Country:** Denmark **Source:**CASSS

Title: Deregulation of the Transport Sector

Sponsor:NCR **Status:** F

Type: Technical **Language:** English

Authors:

Short Description:

-
At present deregulation/liberalization of the transport industry's frame conditions is taking place

-
This is taking place due to the desirability of effectiveness/inten-siveness of international exchange of goods/services/development of new transport services

-

Deregulation is taking place especially in relation to EU

-
Deregulation of shipping, two areas: 1) Abolishment of cabotage limitations and 2) Increase of competition between ports by limitation of public subsidies

-
The Commission is particularly occupied with the enforcement of the competition rules for liner conferences

Conclusions

-
Danish deregulation initiatives are taking place by implementation of EU directives/national initiatives

-
Danish deregulation initiatives/regulation initiatives: Traffic Port Act, regulation for part owners, VAT on passenger transport, DIS

-
Important that deregulation secures free access to the market

-
Deregulation can be a dilemma which creates a need

for re-regulation

Code: DES95H Country: Denmark Source:WEGEMT

Title: Design of fast ferries (1992 - 1995)

Sponsor: NCR **Status:** F

Type: Research **Language:**

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

The objective of the study has been to establish a broad view of the concepts that could possibly be used to produce the fast car ferries of the future. The study includes monohulls, catamarans, SESs (Surface Effect Ship), SWATHs (Small Waterplane Area Twin Hull) and also some of the interesting hybrids based on technology from more than one of the above-mentioned concepts.On the basis of the above conceptual study and model test results of the first SEAJET design, it was decided to study the advantages of the Semi-SWATH concept in depth. This first SEAJET Semi-SWATH model was tested at SSPA in Sweden. The model was tested under several conditions with very promising results and would therefore serve as a good platform for further analyses of the Semi-SWATH concept.Based on the demihull of the original SEAJET project as "anchor point" a series of hull forms was developed ranging from the pronounced Semi-SWATH hull form to a conventional high-speed catamaran with a typical U-shape. Due to there being very little interference and interaction between the demihulls both regarding resistance and seakeeping, it was decided that the calculation and model test should be carried out with the demi-hull only, this was furthermore validated via the model test program.

Code: DES96H Country: Denmark Source:WEGEMT

Title: Design of a harbour ferry

Sponsor: PCR **Status:** ON

Type: Research **Language:**

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

In order to better connect the small island Amager to central Copenhagen, a small harbour ferry capable of accommodating 50 passengers has been designed. The ferry is a catamaran of a length of 15m and powered by two water jets. The speed is 15 knots.In the design special emphasis is given to easy one-man operation using for instance a magnetic mooring

system. Also much concern is given to the architectural design of the superstructure for which the design was awarded a second prize in the 1995 Royal Danish Academy of Fin Arts - School of Architecture. Present extensive model testings are performed in order to optimise the hull.

Code: DEV92P Country: Source:ESSS92

Title: Information System for Improving Market Activities in the Shortsea Trade

Sponsor: Status:

Type: Paper Language: English

Authors: deVos, H.de

Code: DEW92P Country: Source:ESSS92

Title: The Demand for Sea Transport in Smaller Sea Ports: An Application to the Port of Brussels

Sponsor: Status:

Type: Paper Language: English

Authors: Dewulf, B., H. Meersman, E . van de Voorde
Subject Classification according to the given matrix

Code: DGS90H Country: Netherlands Source:CASSS

Title: Potentiele verschuiving vervoerstromen van weg naar zee ("Potential shift of cargo from road to sea")

Sponsor: NCR Status: F
Type: Research Language: English
Authors:

Short Description:
An examination of the possibilities to move cargo from road to sea.

First, a review is given of transport flows in 1986 to a selected number of countries. Further, an analysis has been made of potential short sea cargo, now transported by road, and a comparison of trans-portation costs by road and by sea. The study focuses on the home-trade.

Code: DGS93S Country: Netherlands Source:CASSS

Title: Shortsea shipping and feedertransport by DGSM (8 pages)

Sponsor: Status: F

Type: Study Language: English

Authors: DGSM

Short Description:

The concept memorandum "Short sea shipping and feeder-transport" has been used for discussion with the compa-nies, involved in short sea shipping.

Several actions, mentioned in the memorandum "Sea change for road freight" have already been carried out. Main question in the discussion with the companies: which further actions can be carried out to improve short sea shipping.

Code: DGS95T1 Country: Netherlands Source:CASSS

Title: Telematics in shortsea shipping: first memorandum: an analysis of the information- en communicationstructure by DGSM
Sponsor:
NCR Status: F
Type:
Language: English
Authors:

Short Description:
Results of the first phase of the feasibility study "Telematics in shortsea shipping": an analysis of the recent and future information- en communicationstructure in the shortsea sector.

Code: DGS95T2 Country: Netherlands Source:CASSS

Title: Telematics in shortsea shipping: second memorandum: the possible applicati-on of telematics in shortsea shipping by DGSM
Sponsor:
NCR Status: F
Type:
Language: English
Authors:

Short Description:
A selection of applications in telematics most suiteble for short sea shipping. The selection is based on harmony between supply and demand.

Code: DGS95T3 Country: Netherlands Source:CASSS

Title: Telematics in shortsea shipping: third memorandum: Proposals for projects "Telematics in the Shortsea chain" (concept) by DGSM
Sponsor:
NCR Status: F
Type:
Language: English
Authors:

Short Description:
Global proposal for a project, directed on the use of telemati-cs in shortsea shipping.

Code: DIB92P Country: Source:ESSS92

Title: Shortsea Shipping in Europe and the Americas: Status and Prospects.

Sponsor: Status:

Type: Paper Language: English

Authors: Dibner, B

Code: DNV94H Country: Norway Source:CASSS

Title: Green Ships

Sponsor: NCR/PCR **Status:** F

Type: Research **Language:** English

Authors: DnV

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

R&D programme which will help the Norwegian shipping community to give them a leading edge in the development of environmental-friendly shipping. Major project areas are: Atmospheric pollution during normal operation; Marine pollution during normal operation; Marine pollution at accidents; Organisation / Personnel.

Code: DOB94P Country: Source:ESSS94

Title: Growth Prospects of High-Speed Car-Ferries Utilization on European Shortsea Routes

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Dobler, J.P.

Code: DOV96H Country: UK Source:WEGEMT

Title: A navigation and collision avoidance system for marine vehicles

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Dove M.J., Dr C T Stockell, Dr R S Burns

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
business				

Short Description:

The main objectives of this project were to undertake further work in the use of Kalman filters in marine integrated navigation systems, and to incorporate automatic collision avoidance within the integrated system. The filter was considerably enhanced by improvement of off-diagonal terms, together with the incorporation of disturbance models and simplification of the mathematical model of the vessel. Work then proceeded to incorporate a non-linear model of the vessel within the filter. The modelling process was linearised about the most recent optimal estimate as evaluated by the filter. Initial results showed the model deviating from the true state, primarily because of the effects of wind, tide and current. These forces were then

estimated from an analysis of previous fixes and fed back to the filter, but, while an improvement was seen, the model and hence the filtered estimate still diverged from the true states. These errors were shown to be caused by inaccuracies in some of the hydrodynamic coefficients used to model the vessel. In order to overcome the difficulties experienced in evaluating the model coefficients in a practical system, a new methods of on-line system identification was developed. The method involved augmenting the state vector with the coefficients of the stat transition matrix. Thus the Kalman filter estimates both the state vessel and the hull coefficients simultaneously while the vessel is underway. The gave considerable improvement over the linear system, and enabled cost effective evaluation of the model coefficients, a process essential for the development of an accurate filer, to take place whilst the vessel is at sea. A comprehensive and realistic test environment that simulates a dynamic marine traffic situation has been developed. Provision has been made to simulate a variable number of hazard vessels, the number being limited only by the available memory in the computer. Each hazard simulator has its own simplified Expert System, which causes it to obey the Collision Regulations. The provision of a facility to control the hazard vessels has been used in multi-ship encounters between the hazard vessels. The final stage of the programme was to develop a Small Ship Information System, the aim of which was to provide the mariner with the correct information at the correct time in the correct form. This is achieved by a combination of optimal algorithm design and forethought in shipborne operations. It is assumed that the information system is provided with updated values through rapid passage between the devices of all the data immediately it has been generated.

Code: DRE93A Country: Netherlands Source:CASSS

Title: Feeder and shortsea container shipping : regional market structures, modal competition and economics

Sponsor:

Status:

Type: Article **Language:** English

Authors:

Code: DRO93S Country: Greece Source:CASSS

Title: Strategic Transport Plan - Greece 2010

Sponsor: NCR **Status:** F

Type: Study **Language:** English

Authors: DROMOS Consultants et. al.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering		engineering		

Short Description:

This study dealt with the development of a transport strategic plan for Greece for the year 2010. Among the topics examined, sea transport and port development were included mostly from an infrastructure point of view.

Code: DTP93T Country: Denmark Source:CASSS

Title: Danish Transport Policy

Sponsor: NCR **Status:** F

Type: Technical **Language:** English

Authors:

Short Description:

-
In 1992 the Danish Parliament decided that with respect to the inner market the government must take initiative to the strengthening of railway transport, sea transport and combined transport.

-
The transport policy is made up of the area's investment policy, acreage and other physical planning, policy on rates and duties together with section policy

-
Denmark follows the line of general liberalization of ports

Conclusions

Railway traffic must be supported

-
Need for new knowledge and improved planning tools for Danish transport policy

Code: EAT96H Country: UK Source:WEGEMT

Title: Non-linear fluid-structure analysis of a fast ship during slamming

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Eatock Taylor R., Dr A G L Borthwick

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:

PROJECT OBJECTIVES:1. To develop a methodology for non-linear domain analysis of free surface flows around deforming structures, with particular emphasis to slamming.
2. To produce a computer program for predicting slam-pressures on a hull, coupled with a finite element structural analysis package.
3. To obtain and interpret results generated by the coupled analysis for a simple archetypal structure, and for a case study specified following discussion with the Steering Committee of the High Speed Marine Vehicles Managed Programme.

Code: EBO96H Country: Source:DGVII

Title: EUROBORDER

Sponsor: EUR **Status:** ON

Type: Research **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics	economics	economics		
			economics	
		business		
			legal	

Short Description:

A DGVII project. Identifies bottlenecks, develops functional specifications and proposes demonstrators to improve the ports' function as intermodal hubs.

Code: ECL94H Country: Netherlands Source:CASSS

Title: Electronic communication in short sea shipping: an exploration by Coopers & Lybrand

Sponsor: EUR **Status:**

Type: Research **Language:** English

Authors: Coopers & Lybrand

Short Description:

This study investigates the need for electronic communication in the shortsea sector; ten companies haven been interviewed on this matter.
Conclusion: the use of electronic communication improves particularly the communication between parties involved in shortsea shipping (agents, shippers, stevedores-).

Code: ECM93T Country: Netherlands Source:CASSS

Title: Shortsea shipping by ECMT (126 pages)

Sponsor: EUR **Status:** F

Type: Report **Language:** English

Authors: ECMT

Short Description:

F. la Saponara first focuses in his paper on qualitative and quanti-tative data concerning seaborne trade, and then adresses the EEC's main proposals on the subject of short sea shipping. In conclusion, some updated informa-tion about the situation in Italy is provided. D. Bjoernland provides information on the absolute and relative volume of European short shipping and on the sea links between the four Nordic countries and the European mainland. Furthermore, port condi-tions, environmental aspects of short sea shipping as well

as its competitive position are discussed. Finally
W. Czapski reports on legal aspects.

Code: EEI96H Country: Source:DGVII

Title: E-EIS Transport Sector

Sponsor:EUR Status: ON

Type: Research Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics	economics	economics		
			economics	
business	business	business	business	

Short Description:

A DGVII project. Development of the E-EIS
methodology for the European transport sector and
its application to the European Shipping Sector

Code: EIE96H Country: Source: ISL

Title: "EIES", European Information Exchange Service for
the Communication between Harbour Areas

Sponsor:EUR Status: ON

Type: Research Language:

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
	economics	economics		
				econonics
	business	business		business

Short Description:

A DGXIII project. Folllowing the Scope of the ACTS
program general objectives for EIES are: the
establishing of information systems for all relevant
actors in harbour areas for routine and non-routine
communication providing different layers from general
(advertisement, actor profiles, regulatory
information,...) to specialised (dangerous goods,
cargo tracking,...) the definition and implementation of a pilot
applicaltion between selected harbour areas in
Spain, France and Germany the usage of advanced networking
technology, where available (for example ATM) otherwise ISDN;
usage of Spanish, French and German national hosts
generalisation of the results for exploitation in
other European harbour areas
evaluation of costs and benefits

Code: EMM96H Country: Source:DGVII

Title: European Marine Motorways

Sponsor:EUR Status: ON

Type: Research Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics	economics	economics		
			economics	
business	business	business	business	

Short Description:

A DGVII project. Investigates the potential for transferring freight from road to high speed sea transport.

Code: ENA94H Country: France Source:WEGEMT
Title: Project MONOCOQUE

Sponsor:PCR Status: F

Type: Project Language:
Authors: Enault, J. E

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:
Development of a high-speed elongated monohull ship with lateral floats by LEROUX & LOTZ shipyard for shortsea shipping operations

Code: ENG96P Country: Germany Source:WEGEMT

Title: Inland water transport between North Spain and Duisburg

Sponsor:PCR Status: ON

Type: Project Language: German

Authors: Engelkamp

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
economics				
business				
legal				

Short Description:
State of the art of developments in cargo loading and shipbuilding technology related to the combined sea-river shipping transportation

Code: ENV94P Country: Finland Source:CASSS
Title: Environmental and safety aspects of marine traffic in the Baltic Sea

Sponsor:PCR Status: F
Type: Paper Language: English

Authors:

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
legal

Short Description:

Overview presentation

Code: EUR96S Country: Source:DGVII/D

Title: Europaeisches Entwicklungszentrum fuer die Binnenschiffahrt; feasibility study on the establishmend of sea - river transport between
Sponsor:Portugese sea and Duisburg

Type: EUR Status:

Authors: Study Language:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering	engineering	engineering	engineering	
economics business	economics business	economics	economics business	
		business		

Code: EUT93T Country: Denmark Source:CASSS

Title: EU Transport Policy

Sponsor:NCR Status: F

Type: Technical Language: English

Authors:

Short Description:

- Principle that all transport activity can be carried out freely in all membership countries irrespective of the shipper's home country and on similar conditions competitionwise

- International conditions make bigger demands for speed, flexibility, frequency and reliability of the transport systems

- The liberalization of the transport sector has started, but there are still problems concerning the liberalization internally among the membership countries

Conclusions

The increased transport frequency creates environmental problems, the individual transport sectors must pay for the damage they incur

- The Commission's strategy involves a high degree of integration between the ways of transport and consideration to the inner market and the environment

- CO2 discharge must be stabilized at the 1990 level in year 2000

Code: EVE94P Country: Source:ESSS94

Title: The Single Market and the Removal of Obstacles to the Greater Use of Shortsea Shipping

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Everard, F.M., C.P. Boyle

Code: EVE96P Country: Source:ESSS96

Title: Container Terminal of the Future

Sponsor: **Status:**

Type: **Language:**

Authors: Evers, J.

Code: FAI91A Country: Netherlands Source:CASSS

Title: Fairplay international shipping weekly: Shortsea shipping (3 pages)

Sponsor: **Status:** F

Type: **Language:** English

Authors:

Short Description:

A series of three short articles on shortsea shipping. Items: The current situation concerning the shortsea vessel newbuildings inb the UK, Germany and the Netherlands. Bilbao-based Eurobulk shows the success of creating a pool.

Code: FAI96H Country: UK Source:WEGEMT

Title: Construction of hydrodynamic lifting surfaces

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Fairlie-Clarke A.C. , Mr I E Winkle

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

This was a two year project sponsored by EPSRC, through MTD, who provided funding of £50000 and by Brown Brothers & Co Ltd who provided funding and resource for the manufacture of the prototype fin. The purpose of the research was to establish a method for the design and manufacture of hydrodynamic lifting surfaces which would achieve improved performance through the application of modern material and construction technologies, and

to evaluate the method by constructing and testing a prototype ship roll stabiliser fin with an area of 1.5m2 as a representative ship control surface. The objectives were to achieve improved geometrical accuracy and smoothness of the surface, a weight reduction of 25% and a cost reduction of 40%. The principal research activities were concerned with creating design concepts and generating information and data about material and manufacturing options to support and evaluate the conceptual work. Extensive use was made of finite element analysis to explore new conceptual approaches and a wide variety of candidate structural materials were investigated and tested in order to determine their suitability. The majority of these were polymer foams, filled resins and fibre composites. The form of construction selected as the optimum to cover a wide range of sizes of hydrodynamic lifting surfaces is a basic steel/foam composite structure comprising a strong steel torsion box that runs the length of the lofting surface and carries the main being and torsional loads back to the shaft. A steel root plate and tip plate are welded to each end of the torsion box and are connected by a nose bar, a tail bar and a tail plate and tip plate to form a rigid steel structure. Thin steel skin plates are welded to this structure to form a forward and aft void spaces which complete the steel fabrication. The shaft, which has a square taped end section, is socketed into the torsion box and adhesively bonded in place. The forward and aft void spaces are filled with high density free rise polyurethane foam which acts as a structural component to carry shear forces. The steel core structure has surface mould plates clamped against it while polyurethane foam is poured between the skin plates and the mould plates to take on the finished aerofoil shape of the fin. Finally the entire surface of the fin is spray coated with polyurethane elastomer. The prototype fin was built using this method of construction and was successfully tested under a static load of 186kN, which is nearly three times the maximum working load. This project has successfully demonstrated that very significant advantages can be realised by applying new materials and processes to the manufacture of hydrodynamic lifting surfaces. Taking a comparison between the 1.5m2 prototype fin (excluding the shaft) and the same size of fin manufactured as a conventional steel fabrication, the cost has been reduced by 34% and the weight by 56%. In addition to these advantages the new manufacturing processes give a more accurate profile for the fin and provides an attractive surface that is resistant to marine growth and the cavitation erosion. The design results in good fatigue strength and good tolerance to impact forces. The results of the work show that there is an excellent prospect for the introduction of products incorporating modern materials and manufacturing processes in a way that is competitive with traditional fabrication techniques. However the work has revealed a paucity of design data concerning the properties of the foam achieved under various process conditions. This has been overcome in this project by the use of empirical results, but in order to provide a secure design basis for extrapolation of the results further work is necessary to back up the project results with fundamental data on the performance of polyurethane foams as structural components.

Code: FAN96H Country: UK Source:WEGEMT

Title: Fluid impact loading on wedge-shaped bodies

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Fan M.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

Drop tests on two dimensional bodies have been traditionally used to give a qualitative picture of the slamming phenomena on ships. The majority of these experiments were restricted to regular-shaped bodies like wedges of different deadrise angles and cylinders. In these tests, the two dimensional bodies are dropped from different heights (corresponding to different impact velocities), on an initially calm water surface and the pressures are measured. These tests aim to obtain a relationship between the pressures and the impact velocities for a particular sectional shape. The previous experiments on wedges mainly dealt with pressure at the keel and maximum pressure which, whilst undoubtedly important, do not satisfy the designer's requirement of pressure distributions over the hull surface. The experiments carried out in this research project are directed towards achieving this aim. The tests were carried out using a drop rig fitted on top of a small towing tank. The modes used were rigid wedges having deadrise angles of 5, 10, 15 and 30 degrees, machined out of solid aluminium slabs. Holes were drilled for placement of the pressure transducers, the location of which was selected so as to obtain a complete pressure distribution over the section surface. Each model was dropped from different heights ranging from 0.1 to 0.7m. The procedure was repeated for a different configuration of the transducer locations, employing two transducers at any time. To ensure repeatability and for ease of comparison the transducer closest to the keel was fixed and the other transducer was moved to different positions along the hull. Each drop test was performed three times, and the best test was selected based on the correlation of the pressure maxima. For each drop height and a particular transducer configuration the two pressure signals and the displacement signal were recorded. The approach that was adopted allows investigation and flexible presentation of almost any aspect of impact loading on regular-shaped bodies, as well as easy comparison with other experiments and existing theories. The most significant findings are: Pressure time histories along the sections surface were obtained for the four wedges and for different drop heights which indicate that the pressure distributions are localised in space. The slamming records are characterised by sharp rise times and not so rapid fall times which decrease with increasing drop height. Over the range, the significant pressure acts at a particular location a time instant in the milliseconds. The maximum pressure occurs at some point away from the keel which is in contradiction with von Karman's momentum theory. Von Karman's and Payne's theories underestimate the pressure while Wagner's overestimates it with Payne's theory giving the closest agreement with our experimental results. There is a good correlation with Chuang's experiments but his empirical formula overestimates our experimental results. Pressure distributions, as predicted by the asymptotic theory, agree

reasonably well with our experiments in terms of maximum pressure values, but they appear to occur at different locations. Also the pressures below the instantaneous waterline are overpredictory by this theory. By integrating the pressure distributions along the side of the wedge at any time, the vertical impact force acting on the wedge was obtained. This force is fairly constant for a given entry velocity (drop height), which appears to be in opposition with asymptotic theory, that predicts a linear increase in this force - due to the fact that it overestimates the pressure below the instantaneous waterline.

Code: FAU96H1 Country: UK Source:WEGEMT

Title: Non-linear hydro-structural behaviour of fast multi-hull marine vehicles in waves

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Faulkner D., Dr A Incecik

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:

PROJECT OBJECTIVES:(1) To formulate a new mathematical technique and to develop a numerical tool based on this formulation in the time domain for predicting large amplitude motions and resulting global and local structural response including slamming response of a fast multihull vehicle advancing in waves. (2) To carry out small-scale experiments in the towing/wave tank, and large-scale drop tests. PROPOSED WORK PROGRAMME:The study will begin by deriving a new mathematical model which permits the representation of the responses of a body in six degrees of freedom to arbitrary forcing functions with excitation in all six modes. The three-dimensional potential-flow and initial value problems will be formulated in which non-linear free-surface and exact body boundary conditions are satisfied. The wave field will be represented as a train of irregular waves in the time domain which will be generated from a given sea spectrum. The body of the vessel will be represented by a Rankine source distribution over the submerged portion of its surface. The structural response of two large-scale models representing the forward part of a fast multihull vessel will be tested. The results of both small and

large-scale tests will provide physical insight for the development of the proposed prediction methods. The experimental measurements will also be used to validate the numerical tools. The theoretical structural response to slamming will include underwater impact dynamics. This is particularly important for dynamically responsive structures made of light alloys and FRP composites. CURRENT PROJECT POSITION: 16/06/94The first part of the study aims to formulate the large amplitude motion equations by means of a new mathematical model which permits the representation of the responses of a body in six degrees of freedom to arbitrary forcing functions. Currently the initial and body boundary value problems in which non-linear free surface and exact body boundary conditions are satisfied are being solved. In the new mathematical model the effect of forward speed is treated more accurately

than the three- dimensional unsteady forward motion formulation by taking into account the interaction between one wave train propagating upstream and three wave trains swept downstream generated as a result of low-frequency large motion amplitudes. Because the rigid-body motions will change the free surface wave field over a small time interval, the interaction between the free surface and the body surface is taken into account in the time domain. Parallel with the development of theoretical equations computer software based on these equations is being developed. To check the theoretical pressures which arise from slamming impacts small and large scale experiments are planned to measure entry velocity, accelerations and pressure time histories. High-performance pressure transducers

and amplifiers have been purchased with an effective frequency response greater than 10 kHz and the data acquisitions system has been upgraded. Small-scale drop tests (about 1/5 scale of large-scale model) have started, and were designed to test the instrumentation and examine the influence of "wall effects". The larger scale tests will be conducted this summer at the sea wall in Yarrow Shipbuilders Ltd. The firm's contribution is to design and manufacture the drop test rig to an agreed specification. This is now under way.

Code: FAU96H2 Country: UK Source:WEGEMT

Title: Integrated structural design of SWATH ships

Sponsor: **Status:**

Type: Research **Language:** English

Authors: FaulknerD., Mr D M Warwick, Dr A Incecik

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:

SWATH (Small water-plane area twin-hull) are renowned for superior seakeeping performance in comparison to conventional catamarans and mono-hull ships of comparable displacement. However, these benefits may not be fully realised unless the high structural weight ratio inherent in SWATH configurations is minimised. Structural design commences with an understanding of the loads and load paths through the structure. During the course of this research a three-dimensional linearised potential theory associated with the cross-flow approach for taking viscous effects into account was developed to predict motions and dynamic structural loads acting on catamarans and SWATH ships advancing in waves. The method was validated against experiments with various catamaran and SWATH ship forms. Primary structural loads were compared with current design methods. A start was made on slamming loads and response with large scale tests. Primary load effects were derived using LUSAS Finite Element modelling and applied for fatigue and ultimate strength was governed by new strength models for perforated deep transverse web frames using tension field design. Reliability based design using multi-attribute optimisation for low cost and weight showed about 30% savings as compared with a recent UK design. The work on slamming load predictions concluded that considerable uncertainty still surrounds their estimation and that the

experimental values of slamming pressures obtained from measurements with small-scale models may not be appropriate for full scale design predictions. Now the authors are engaged in further research to develop new techniques to product the slamming pressure and local response to slamming more accurately.

Code: FOR94P Country: Source:ESSS94

Title: Prerequisities for Improvements of the Shipping in South-East European Regions

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Forster, W., B. Zigic, W. Simon

Code: FOS91P Country: Source:FAST91

Title: Economy and Speed in Commercial Operations

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Foss, B.

Code: FRA92T Country: Norway Source:CASSS

Title: A Study of North Sea Trade

Sponsor: **Status:** F

Type: Technical **Language:**

Authors: Frajford J., Johnsen C., SNF

Code: FRA94P Country: Source:ESSS94

Title: Integrated Tug-Barge Systems for Shortsea Shipping in Europe

Sponsor: **Status:** OFF

Type: Paper **Language:** English

Authors: Frankel, E.G

Code: FRA95T Country: France Source:CASSS

Title: A renewed view on shortsea shipping

Sponsor: **Status:**

Type: Technical **Language:**

Short Description:

Position paper submitted by the Ministry of Transport

Code: FRE95S Country: Greece Source:CASSS

Title: SSS/ Greek Case Study

Sponsor: EUR **Status:** F

Type: Study **Language:** English

Authors: Frederic Harris BV

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		business		
			business	

Short Description:

DGVII study. This expert report examines the current situation and the prospects for the development of short sea shipping berween Grece and Italy. The study refers to the macroeconomic factors which influence trade beeween the two countries, the transport modes used, cost differnces between transport modes, the organization of the ports, etc. A number ocb conclusions are made based on the a number of interviews with users, officials, transport experts, etc. Certain proposals are made regarding transport infrastructure, labor issues, port management, transport corridors, intermodal connections, etc.

Code: FUT91T Country: Denmark Source:CASSS

Title: A future for the coaster

Sponsor: NCR **Status:** F

Type: Technical **Language:** English

Short Description:

-
The shipping industry has certain problems: Age, financing, owner structure, manning problems, international cabotage rules, weak organizations, subsidies for other ways of transport, total transport

-
The shipping industry has certain advantages: Environmentally desirable, cheap infra-structure, relieves congestion problems on land

Conclusions

-
Subsidies to other ways of transport to be abolished
-
Improve ways of financing
-
Further liberalization of cabotage
-
Consulting assistance in order to strengthen the coaster fleet

-
Development of new transport concepts, door-to-door
-
Easing of duties on Short Sea Shipping necessary

Code: FUW93P Country: Source:FAST93

Title: Fundamental Study on Safety Evaluation of Wing-In-Surface Effect Ship (WISES).

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Fuwa, T., N. Hirata, J. Hasegawa, T. Hori

Code: GAL95P Country: Source:FAST95

Title: Technically and Economically Optimised Fast Ships Propulsion Systems from 18000 to 30000 kW

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Gallin C.M., J.H. Phipps, J. Stevenson, T. van

Code: GAM95S Country: Portugal Source:CASSS

Title: OBSERVATORIO

Sponsor: NCR **Status:** F

Type: Study **Language:** English

Authors: Gama B.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		economics		

Short Description:
Study intended to analyse the market, report on the distribution of arrivals/departures of the ships along the week, evaluate the offer/demand ratio and the price/cost conditions.

Code: GAR92P Country: Source: ESSS92

Title: History of Community Networks in the United Kingdom.

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Garratt, M., S. Carston, C.G. Rabbitts, N.A. Theophilopoulos

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS

Code: GAR96P Country: Source:ESSS96

Title: Potential for network development in shortsea

shipping.

Sponsor: Status:

Type: Language:

Authors: Garratt, M.

Code: GEE91P Country: Source:FAST91

Title: The Catafoil - A Foil Assisted Catamaran for Fast Ferry and Yacht Applications

Sponsor: Status:

Type: Paper Language: English

Authors: Gee, N

Code: GEE93P Country: Source:FAST93

Title: Fast Sea Transportation - The Effect of Present and Future Technical Developments on Operating Economics

Sponsor:

Status:

Type:

Paper Language: English

Authors:

Code: GEN94S Country: Spain Source:CASSS

Title: Report from the COMINPORT to the Spanish Government on the ports functioning.

Sponsor:MOEcon Status: F

Type: Study Language: English

Authors: General Directorate for Economic Policy -

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		economics		

Short Description:

In 1993, by request of the Ministry of Public Works and Transport, the Spanish Government created a high level inter-ministerial committee on the functioning of ports, named COMINPORT, with the main objective of revising the operation of all the official departments involved, in order to while maintaining the fulfillment of their tasks and responsibilities, improving the overall efficiency of Spanish ports. This report summarizes the work made up to July 1994 and the proposals made by the COMINPORT to the Government, including a list of existing regulations to be appealed and new ones to be approved.Special atention has been given to the co-ordination of the different inspections to be carried out on the cargo and to the simplification of all the administrative procedures, including introduction of EDI technologies, etc.(See additional report summarizing advances up to September 1995)

Code: GEN95S Country: Spain Source:CASSS

Title: Update of the work of the COMINPORT to September 1995.

Sponsor:MOEcon Status: F

Type: Study Language: English

Authors:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		economics		

Short Description:
Following the first report of the COMINPORT, 4 specific regulatory measures have already been introduced in Nov-94 (veterinary checks), Feb-95 (revising the inspection procedures, including the appealing of 95 previous regulations), May-95 (quality checks on third country products), July-95 (summary declaration for maritime transport and EDI). Further measures being currently under study. A technical working group named COMPAS has been created, for the implementation of the telematic interchange of manifests and customs documents.All inspection services of the different departments and Ministries at the ports are being rearranged so that all are located at one single building.The COMINPORT has already started, as a second phase of its work, the analysis of the operation of all port private agents: shipping companies, shipping agents, steevedors, pilots, tugs, mooring, etc. in order to proposed appropriate regulatory measures to improve their efficiency.

Code: GOM95P Country: Spain Source:CASSS

Title: Impact of the SSS promotion policy on ports

Sponsor:NCR Status: F

Type: Paper Language: English

Authors: Gómez-Ferrer and R. del Moral

Short Description:

This paper starts with an overview of the European Short Sea Trades, showing some statistical data on the existing demand.It then summarizes the iniciatives and policy lines of the EU with regard to the promotion of SSS, with special attention to its influence on ports operation.The case of the port of Valencia is shown, as a example of the average "medium size European port", showing its reaction to the above policy.

Code: GOU92P Country: Source:ESSS92

Title: The Economic Structure of Greek Passenger Coastal Shipping

Sponsor: Status:

Type: Paper Language: English

Authors: Goulielmos, A.M., M. Lekakos

Code: GOU94P Country: Source:ESSS94

Title: The Economic and Social Impact on Greek Passenger

Coastal Shipping of the Free Movement of Marine Labour in European Union

Sponsor:
Status:
Type:
Paper Language: English
Authors:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
legal			legal	

Code: GPS92S Country: Greece Source: CASSS
Title: Greek Passenger Shipping Economic Analysis of its operations

Sponsor:NCR Status: F
Type: Study Language: English

Authors: GPS

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
business				

Short Description:

This study examined the overall economic and financial situation of the companies involved in ferry passenger shipping in Greece. It analyzed the cost structure of the industry, fares, ship costs, etc.

Code: GRI96H1 Country: UK Source:WEGEMT

Title: Integrated advanced propulsion and ship control for marine systems

Sponsor: Status:

Type: Research Language: English

Authors: Grimble M.J.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:
The objective of this research was to develop an Integrated Control Structure for Total Ship Optimisation using a decentralised approach. The total ship automation problem had not been previously considered and is advantageous for the following reasons. Firstly, the integrated control scheme acknowledges all of the interactions between the various ship motions by exploiting the underlying structure of the dynamic ship model. Secondly, the total ship design reduces the possibility of idiosyncrasies in the control structure, as could occur if the individual controllers were designed without regard to interactions. Finally, an integrated ship control environment provides the possibility for improved performance and safety and more cost effective operation. The research programme consisted of stages concerned with Modelling Integrated Control Structure Development and Control Design and Software Development. A comprehensive non-linear

hydrodynamic shop model has been developed incorporating the ship kinematics, ship dynamics, machinery, instrumentation and environmental disturbances. The ship model can be decomposed into three sub systems representing the surge, sway/yaw and roll dynamics. This natural decomposition arises due to, and takes into account, the dominant interactions between the ship variables. The sway/yaw and roll dynamics do depend on the surge velocity but the dependence is removed by appropriate non-dimensionalisation and gain scheduling respectively, rendering the subsystems mutually independent for control design. The heave and pitch motions have not been considered since they are largely uncontrollable. The primary ship control functions, namely the Autopilot, Track Keeping System, Roll Controller and Propulsion System, have been designed using H(infinity) optimisation taking into account the interactions with each of the other control systems. H(infinity)

control systems are particularly well suited to cope with the model uncertainty within marine systems and the H(infinity) cost function which is minimised can be directly related to real marine design requirements such as roll reduction ratio. A 2.5 degree of freedom control structure was developed incorporating feedback, feedforward and reference model for time optimal manoeuvring. A novel inverse nonlinear precompensation technique was devised and applied in the autopilot and propulsion control system to extend the operational validity of the controllers. The Track Keeping Control system embeds the Autopilot and the Roll Stabilisation system uses the fins and rudders in concert to enhance its effectiveness. Finally, a software package in the form of a Matlab toolbox has been developed incorporating the non-linear modelling, H(infinity) control design for each of the control functions and nonlinear simulation. A user friendly front-end interface renders the H(infinity) control design accessible to the use without requiring a detailed knowledge of modern optimal control techniques.

Code: GRI96H2 Country: UK Source:WEGEMT

Title: Introducing adaptation into integrated ship control

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Grimble M.J., Dr M R Katebi, Dr M A Johnson

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
business

Short Description:

PROJECT OBJECTIVES:1. Extend the integrated ship control concept to allow for adaptive features.2. Introduce compatible monitoring and fault diagnosis system.3. Include functions not currently available (ship positioning, emission control).4. Provide theoretical framework and supporting software suite.PROPOSED WORK PROGRAMME:1. To produce a second level control strategy to coordinate and optimise the control functions of the surge subsystem, sway and yaw subsystem, roll subsystem and engine subsystem. To develop the strategy to

incorporate adaptive features into the integrated system.2. To produce an integrated simulation suite for the low level and supervisory control system. This task requires the addition of new modular functions to the existing interactive simulation packages.3. To produce a supervisory control management system, which includes energy minimisation and fault monitoring.4. To introduce adaptive capabilities into the existing robust regulating loop schemes for autopilot, shaft speed controller and roll stabilisation. To produce the software to implement the adaptive features by enhancing the total ship control package.5. To design a regulator and to produce guidelines for the scope of such a system and the benefits to be gained from more effective use of information flows in both supervisory level and regulating loop levels.CURRENT PROJECT POSITION: UPDATE 16/06/94The six-degrees-of-freedom dynamic ship model was transferred to the interactive simulation package MATRIX-X. The model was verified using simulation studies. The autopilot control system was extended to include the integral wind-up and slew-rate limit controller. The autopilot software was integrated with the non-linear model. The roll stabilisation control system and the dynamic ship positioning control system are currently being studied for transfer to the non-linear model. A full suite of software was developed to incorporate the adaptive features into the ship control systems. The control design strategy for the adaptive controller is based on the H-infinity based no-linear ship dynamics. In particular, a full review of techniques for amplitude and rate saturation was carried out to find the most appropriate algorithm for ship control. The next phase of the project is to integrate the adaptive and non-linear controller with the ship non-linear model, and develop the second level control strategy.

Code: GRO92P Country: Source:ESSS92

Title: A New Inland Transport System for Containers between Rotterdam and Antwerp

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Groenveld, R., M. Adler

Code: GRO93H Country: Netherlands Source:CASSS

Title: "Groene Golf": final survey, trial shipping line

Sponsor: NCR **Status:** F

Type: Research **Language:** English

Authors: DGSM, MST, MERC, HARRIS

Short Description:

Purpose of the study is to determine which measures must be taken to improve the competi-tive position of intermodal transport by sea.

Annexes separate-ly.

Code: GRO95P Country: Source:FAST95

Title: Optimum Design of a High Speed Ferry-Passengers Catamaran Vessel taking into account Operational Criteria and Cost

Sponsor: **Status:**

Type: Paper **Language:** English

Code: GUE93P Country: Source:FAST93

Title: Up-to-date Technical Information and Potential Use for Commercial and Military Applications

Sponsor: **Status:**

Type: Paper **Language:** English

Code: GUN92P1 Country: Source:ESSS92

Title: Is Continental and Inter-Continental Cargo Waiting for Shortsea Shipping?

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Gunsteren, L.A.van., T. van Popta, R.E.G.

Code: GUN92P2 Country: Source:ESSS92

Title: Diffusion of Innovations in Coastal Shipping

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Gunsteren, L.A.van

Code: HAA94P Country: Norway Source:CASSS

Title: The Trade Effects of European Integration

Sponsor: **Status:**

Type: PublicatioLanguage:

Authors: Haaland J.

Short Description:

"The World Economy", vol 17 no 5, September

Code: HAA94T Country: Norway Source:CASSS

Title: Regional Effects of European Integration

Sponsor: **Status:**

Type: Technical **Language:**

Authors: Haaland J., Norman D., SNF

Code: HAD95S **Country:** Germany **Source:** CASSS

Title: Possibilities for the intro of new transport concepts within the SSS trafic between Scandinavia and the Weser ports

Sponsor: NCR **Status:** F

Type: Study **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering			engineering	
economics				
business			business	
		business		

Short Description:

Development of the trade- nad transport volume between Germany and Scandinavia new technological solutions in the short sea combined transport carrying/transport concepts of the industry and forwarders

Code: HAG93P **Country:** **Source:** FAST93

Title: Fast Sea Transportation System in the Aspect of Logistics

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Hagman . T.E.W., K.R. Lumsden

Code: HAL93P **Country:** **Source:** FAST93

Title: Fast Vessel Engines-Environmentally Superior Power for Highly Reliable Transportation

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Halleen, R.M., J.H. Phipps, J.R. Gladden

Code: HAN95P **Country:** Finland **Source:** CASSS

Title: Preliminary resistance prediction method for fast mono- and multi hull vessels

Sponsor:NCR Status: F

Type: Paper Language: English

Authors: Hanhirova et al
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:
Design aid for fast mono- or multihull passenger transport vessels.

Code: HAN96P Country: Source:ESSS96

Title: "CPT-Container Pallet Transfer' - an automatic high capacity ship/shore loading system.

Sponsor: Status:

Type: Language:

Authors: Hansen, B

Code: HAR91P Country: Source:FAST91

Title: Safety of Collision Avoidance Maneuver Under High Speed Navigation

Sponsor: Status:

Type: Paper Language: English

Authors: Hara, K.,

Code: HEA96H Country: UK Source:WEGEMT

Title: A theoretical and experimental investigation of the hydrodynamics of a manoeuvring ship of deep and shallow water

Sponsor:
Status:

Type:
Research Language: English

Authors:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:
PROJECT OBJECTIVES:1. Extend original developed theory for vortex effects to cover shallow water and large drift angles. 2. Develop simplified theory to allow prediction of vortex strength and path. 3. Apply theory developed with regression analysis to provide improved semi-empirical formulae. 4. Incorporate results in manoeuvring prediction program.

Code: HEI92P Country: Source:ESSS92

Title: UK Shortsea Ferry Services, a Baseline Model Approach for Policy Decision Making

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Heijveld, H., R. Gray

Code: HEI94P Country: Source:ESSS94

Title: Are Roro Ferries Subsidizing lolos?

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Heirung, E

Code: HEI96P Country: Source:ESSS96

Title: Improving Short Sea Bulk Operations

Sponsor: **Status:**

Type: **Language:**

Authors: Heimdal, S., R. Gray

Code: HEL91P Country: Source:FAST91

Title: Safety of Fast Sea Transport

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Helmersen, H., P. Werenskiod

Code: HEL95P Country: Finland Source:CASSS

Title: Resistance and seakeeping characteristics of large and fast multihulls vessels

Sponsor: NCR **Status:** F

Type: Paper **Language:** English

Authors: Helasharju et al

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

Design information for fast multihull passenger transport vessels

Code: HEN95B1 Country: Netherlands Source:WEGEMT

Title: The future of waterborne transport (De toekomst van het vervoer over water)

Sponsor: **Status:** F

Type: Book **Language:** Dutch

Authors: Hengst S.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
economics				
business				

Short Description:

The first edition of the Verolme lectures include alongside the first and the second lecture, a description of the life of Verolme. Verolme Lecture 1 (by W J ter Hart): "Has maritime Holland a glorious future behind herself?"sketches the position of the maritime branches in The Netherlands in the middle of the 1980s and the position of shipbuilding in particular. The analysis of the maritime sector is widely dealt with and gives a total view of this, for The Netherlands, so economically important sector.Verolme Lecture 2 (by L Berndsen): "The future of waterborne transport", deals with developments in container transport. The position in this of the Port of Rotterdam is not evident states Berndsen. The reply of Professor Roobeek sketches a view of a changing Rotterdam.

Code: HEN95B2 Country: Netherlands Source:WEGEMT

Title: Focus on inland waterway shipping (Binnenvaart in beeld)

Sponsor: **Status:** F

Type: Book **Language:** Dutch

Authors: Hengst S.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering		engineering	engineering	
economics		economics	economics	

Short Description:

Focus on inland waterway shipping is a reference book which gives a summary of the inland waterway shipping in The Netherlands and Europe. The possibilities of inland waterway shipping are described. The function of the inland waterway shipping of the Port of Rotterdam are illustrated with the use of figures. The book also gives technical information about waterways, ship types, the influence of constrained dimensions on the behaviour of ships and the construction thereof. In short, a reference with extensive literature references through which the reader can focus in on the different aspects of inland waterway shipping and also have the possibility to go more deeply into the matter.

Code: HEN95B3 Country: Netherlands Source:WEGEMT

Title: Total Quality Management - Theory or Practise?

Sponsor: **Status:** F

Type: Book **Language:** Dutch

Authors: Hengst S.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
economics				
business				

Short Description:

Total Quality Management contains the text of a similarly named mini symposium held in November 1994 at the Technical University of Delft. The topic quality concern is a much spoken issue which calls for interest from all parts of industry. At the same time there is much doubt about the usefulness of the introduction of a quality control system or the introduction of an administrative procedure which shows that a company works according to one of the ISO-9000 standards. On the other hand, there are also companies which have very successfully introduced quality control systems and doing so quite often even without large administrative ballast. The question is, is quality control in the maritime technical sector a meaningful matter? Some shipbuilding yards and shiprepair yards are now certified according to ISO standards and the introduction of Total Quality Management strides on.

Code: HER93P Country: Source:FAST93

Title: Fast Sea Transportation in the 21st Century

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Hercus, P.C

Code: HIM96P Country: Source:ESSS96

Title: Cooperation and Development of Ports in Eastern Baltic Shipping.

Sponsor: **Status:**

Type: **Language:**

Authors: Himanen, V., E. Mahlin, W. Segercrantz

Code: HMC91H Country: Netherlands Source:CASSS

Title: Short-sea trade confrontation of supply and

demand door Hydrographic and Marine Consultants

Sponsor:NCR Status: F

Type: Research Language: English

Authors: HMC

Short Description:

This document is a summary of the results from a study of the short-sea trade in North West Europe. Contains a review on the present functioning of the short-sea market, expectations for the future of the short-sea trade, bottlenecks ans a list of past and present systems and why these failed or did not fail, a market model

Code: HOC96H Country: UK Source:WEGEMT

Title: Human performance in highly-automated bridge systems

Sponsor: Status:

Type: Research Language: English

Authors: Hockey G R J, Dr C M Crawshaw

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

business

Short Description:

PROJECT OBJECTIVES:1. To investigate patterns of information use with different kinds of user interface, and their contribution to operational effectiveness in situation appraisal and decision-making.2. To assess the functional role of the watchkeeper's mental model in provide an active link between information requisition and situation appraisal, and to develop methods for supporting this role.3. To develop a suite of methods for use with a Human Factors Test-Bed, to facilitate the testing of new bridge designs and operational procedures.PROPOSED WORK PROGRAMME:1. Assessment of information needs of bridge operators.2. Development of laboratory operational environment.3. Development of a PC-based simulator.4. Laboratory studies of operator performance.5. Development of operational scenarios.6. Simulation studies of operator performance.7. Preparation of reports and recommendations.CURRENT PROJECT POSITION:The following tasks have been completed. (a) risk assessment; (b) literature search; (c) structured interviews; (d) task analysis; (e) accident and incident analysis; (f) generic scenario production. Short reports on these have been produced and submitted to the steering committee.The following tasks are currently being carried out. (a) situation appraisal - laboratory simulations; (b) situation appraisal - laboratory studies; (c) decision making - functional description; (d) decision making - aiding concepts; (e) simulation studies.

Code: HOL95P Country: Source:FAST95

Title: Swath International's Super 4000 Class - Its Design, Construction and Performance

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Holcomb, R.S.

Code: HOO91H **Country:** Netherlands **Source:** CASSS

Title: "Mariniseerbare lading" ("Shift of cargo from road to sea")

Sponsor: NCR **Status:** F

Type: Research **Language:** Dutch

Authors: Hoogebrets, J. Tollenaar R. L., Kraan M. M.

Short Description:
This survey is a continuation of and a supplement to a survey, published in 1990 "potentiële verschuiving vervoerstromen van weg naar zee" ("potential shift of cargo from road to sea"). The possibi-lities to move cargo from road to sea are examined. In this study transport flows to and from several coutries are more closely analy-sed.

Code: HOO92P **Country:** **Source:** ESSS92

Title: Facilitation of Shortsea Shipping: Improvement in the Sea/Land Interface (the Dutch Case).

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Hoogerbeets, J., P. Melissen
Subject Classification according to the given matrix

Code: HOO94H **Country:** France **Source:** WEGEMT

Title: Project Trimaran High Speed Ferry

Sponsor: PCR **Status:** F

Type: Research **Language:**

Authors: Hoof van, R. W
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
Development of high-speed Trimaran passenger ferry for the cross-channel service

Code: HOR96H1 **Country:** UK **Source:** WEGEMT

Title: Modelling of fires in steel ships and offshore structures

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Horsley M.E.

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS engineering

Short Description:

The general aims of the work were those of investigating and validating zone and field computational models of fires in steel ship compartment. The zone models used as a starting point were of the family derived for safety and evacuation purposes, such as FAST and EVACNET. Such models were studied to their reasonably-applicable limits in the context but, from a design and first principles investigation viewpoint, field models in general have more promise. Thus the work has concentrated latterly on field model development using the FLUENT code of Flow Simulation Ltd as the starting point. All the practical work has been conducted on a full size part model of a steel ship located in a fire test ground. The portion of this ship model used for the present first stage fundamental purposes - notably a cabin leading off a corridor - has been instrumented and now stands as a valuable experimental facility. Ship compartment fires were generated with a range of operational parameters, open and closed portholes, natural and induced ventilation, differing fire histories. This style of data gathering was used progressively to validate and improve the field model. It is a statement of fact that many computation fluid mechanics (CFD) models can be produced for many operations but relatively few have reliable validation. For the work to date with the variables noted, the investigators have confidence in the field models produced. Confidence at this stage allows further work to proceed under a new contract with an expectation of similar success. The results have been disseminated regularly by seminar and conference with three further conference contributions forthcoming. An illustrative video has been produced and has been well-received by various interested parties.

Code: HOR96H2 **Country:** UK **Source:** WEGEMT

Title: Modelling of fires in steel ships and offshore structures

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Horsley M.E.

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS engineering

Short Description:

PROJECT OBJECTIVES:1. To continue the present successful programme of developing computer models of ships' fires and validating in a full-size

module.2. To extend the current work to cargo hold fires.3. To include sprinkler systems in the model and the validation.4. To include wall materials other than steel.5. To study smoke ingress patterns.PROPOSED WORK PROGRAMME:1. Computer modelling of the cargo hold problem, with validation runs as necessary. During standby or repair times on the physical model, the water fog and spray nozzle design study will be conducted. For the sprays' number and disposition, installation in a cabin would be the first instance, because findings could be compared with current results from the present work before extending to other locations, such as the hold.2. Continuation of any outstanding cargo hold models, and the progressing of the water work towards the other locations. By this time it will be possible to programme the composite walls work, so the selection and preparation of that will begin.3. Conclusion of water work and the progressing of the composite wall investigations. A computer model will be generated, compared to practical tests and progressively refined. 4. The smoke ingress work will progress in parallel to the above.CURRENT PROJECT POSITION:The current work, CFD modelling of fire scenarios and their validation on full-scale test rigs, is in areas of cabin first, to include various ventilation effects, composite walls, fires in cargo holds and engine rooms, water spray and water for fire control. The cabin fire studies have now covered combinations of natural and fan-induced ventilation, with open and closed cabin window. The influences of variable cabin window size have proved very interesting. Cabin fires were always seen as the starting point for the modelling and validation process, with success here giving confidence for larger and/or more complex geometries. The practical work on cabin fires has been carried out on the full-scale part model of a steel ship at the Warsash site. Composite walls are being treated realistically as plane walls or deck claddings, such as flat walls of a cabin or operational space. A thorough assessment has been made of a computational program dealing with heat transfer through such structures and significant test data for the practical validation has been secured. The program can now be used with some confidence.

Code: HU,91P **Country:** **Source:**FAST91

Title: Design, Trial and Operation of "Hong Xiang" SES Ferry

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Hu, L

Code: HUL90S **Country:** Sweden **Source:**CASSS

Title: Domestic SSS-Goods flow and future outlook

Sponsor:NCR **Status:** F

Type: Study **Language:** English

Authors: Hulten, L., Lumsden K., MariTermAB
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
economics economics

business business business

Short Description:

This report summarises goods flows and goods types in Swedish domestic short sea shipping. The report highlights the problems and development possibilities facing short sea shipping in the future. Transport cost development and transport cost factors are discussed

Code: HYD95H Country: Source:DGXII

Title: HYDROSES: An integrated Theoretical/Experimental Hydrodynamic Procedure for Design of large SES

Sponsor:EUR Status: ON

Type: Research Language: English

Authors:

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:

Objectives: Assessment of hydrodynamic design of very large SES crafts aimed to enhance the theoretical/experimental predictional methodologies (resistance, seakeeping and manoeuvrability) with the final scope to improve competitiveness of European shipbuilding industries.Achievements to date: BEM methodology for steady free-surface potential flow analysis, including evaluation of wave resistance, sinkage force and time moment. BEM methodology for unsteady linear free-surface potential flow analysis in regular waves, including evaluation of added mass, damping and wave exciting forces. Methodology for the statistical analysis of motions and loads, in frequency (spectral analysis) and time domain (extreme values). Time simulation procedure for manoeuvring predictions based on PMM tests. Non-linear modelling of air cushion dynamics, including flexible seals, based on test-rig measurements. Definition of the Target Vessel, based on market analysis and parametrical studies (powering and seakeeping).Planned actions: Completion of the non-linear time-domain methodology for SES motions in waves. Completion of the time-domain methodology for slamming loads. Realisation of a software package integrating the various calculation modules and including a visualisation post-processor. Completion of powering and seakeeping model-tests. Execution of powering, seakeeping and manoeuvring seatrials on a rented SES vehicle. Definition of design guidelines based on the integrated use of calculation and experiments (model and full scale).

Code: IDT95S Country: France Source:CASSS

Title: Impact of idle time and delays due to road congestions and restrictions

Sponsor: Status: ON

Type: Research Language: English

Authors:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering	engineering			
	economics			
business	business		business	

Code: IGI94P Country: Source:ESSS94

Title: An Alternative System for Shortsea Shipment of Road Vehicles

Sponsor: Status:

Type: Paper Language: English

Authors: Igielska, J

Code: IGI96P Country: Source:ESSS96

Title: An impact of logistics on ships' technical performances

Sponsor: Status:

Type: Language:

Authors: Igielska, J.

Code: IHN95H Country: Portugal Source:CASSS

Title: IHNCS

Sponsor:NATO Status: ON

Type: Research Language: English

Authors:

Short Description:

Project for the development of a prototype of a integrated control system for the navigation control in the port of Sines, that should be flexible enough to be adopted to the remaining Portuguese ports. This project will use the recent developments of the new satellite based navigation systems, such as the GPS, together with a Geographical Information System (GIS) in order to obtain a system both economical and safe

Code: IMA95P Country: Source:FAST95

Title: The Effect of Ship's Speed on Collision Avoidance

Sponsor: Status:

Type: Paper Language: English

Authors: Imazu, H.

Code: IMP95S Country: Greece Source:CASSS

Title: Network Development for Sea transport in the Aegean Sea

Sponsor:NCR Status: F

Type: Study Language: English

Authors: IMPETUS Consultants
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
			economics	

Short Description:
This study examined different options in trying to develop an optimum routing and ship scheduling for serving the islands of the North Aegean. It took into account the current situation and the foreseen changes in the legal, operational and technological fields.

Code: IND93T Country: Denmark Source:CASSS

Title: Industrial Review 1993

Sponsor:NCR Status: F

Type: Technical Language: English

Authors:

Short Description:

The maritime complex, one of the resource areas -
Shipping, area of strength
Conclusions
-
Initiatives with regard to the areas of strength have to be made in a close dialogue with the companies, organizations and local autho-rities

-
The industrial policy must improve the frame conditions in order to strengthen the industrial development especially within the technological area

-
Important to strengthen vertical cooperation among shipping companies, shipping yards and their sub-suppliers and furthermore strengthen innovation as a parameter of competition

Code: IND94T Country: Denmark Source:CASSS

Title: Industrial Review 1994

Sponsor:NCR Status: F

Type: Technical Language: English

Authors:

Short Description:

With regard to shipping, there is a certain similarity to the review from 1993, Danish shipping still a resource area

-
It is noted that Danish shipping is included in export specialization and that Danish market shares have increased considerably since 1970. Denmark is doing well compared to their main competitors.

Conclusions

-
With respect to resource area the development and prompting to use EDE (Transport/communication and service) are included

-
Distribution Center Denmark is strengthened by supporting the Secretariat's work with transport systems and information of possible foreign investors within the transport sector.

Code: **ING92S** **Country:** **Spain** **Source:CASSS**

Title: **Spanish Island SSS. Present and future plans**

Sponsor: **Status:** **F**

Type: **Technical** **Language: English**

Authors: Ingeniería de Asistencia, S.A.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics		economics		
business environment		business environment		

Short Description:
- Concept of short sea shipping.- Applicable Spanish and Communitary legislation - Traffics and fleets: Peninsula/Balearic Islands, Peninsula/Canary Islands, Inter Canary- Crews- Commercial statistics- Estimate of fleet replacement needs and financing

Code: **INS91P** **Country:** **Source:FAST91**

Title: **Safe and Comfortable Operation of Foilcatamarans**

Sponsor: **Status:**

Type: **Paper** **Language: English**

Authors: Instanes, E., J.T. Pedersen
Subject Classification according to the given matrix

Code: **INT96H** **Country:** **Source: ISL**

Title: "INTERPORT", Intergrating Waterborne Transport in the Logistic Chain

Sponsor: EUR **Status:** ON

Type: Research **Language:**

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
	economics	economics		
				econonm
	business	business		busines

Short Description:

A DGXIII project. Facilities for automatic identification of vehicles, drivers and containers is a natural enhancement of the telematic support systems in the port in order to improve handling capacity and service. The objective of INTERPORT is to implement and test a system of automatic identification equipment integrating the physical movements of vehicles and containers in the ports with the information flow via the EDI network. INTERPORT combines existing and emerging technology for electronic identification (tags, smartcards) and remote reading into an integrated system. Standardisation is a key issue as the port has to accomodate road and rail transport as well as handle containers from all over the world. INTERPORT demonstrates how to handle different standards as well as organisational and administrative problems related to the operation and management of automatic equipment identification (AEI) systems. The end products of INTERPORT will be specifications for AEI-systems adapted to different modes, a manual for implementation and organisation of such systems, standardisation proposals, an assessment of costs and benefits resulting in a possible market development for the electronic industry.

Code: INT96S **Country:** **Source:** DGVII/D

Title: Intermodal European Logistic Center, Shortsea shipping pilot project "German North Sea - Nordic countries / Western and southern Europe"

Sponsor: EUR **Status:**

Type: **Language:**

Authors:

Code: IPS96H **Country:** **Source:** DGVII

Title: IPSI: Improved port-ship interface

Sponsor: EUR **Status:** ON

Type: Research **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering	engineering		engineering	
	economics			
economics		economics	economics	econonm

Short Description:
A DGVII project. It has the following goals:
-Develop new concepts for flexible port/ship interfaces
-Develop methods and equipment for effective transfer of cargo and information about cargo.
-Demonstrate the new concepts and verify the effectiveness of multimodal cargo exchange in a door-to-door context.

Code: ISE95H Country: Source: ISL

Title: "Innovative Seaport Technologies" with four regional projects; ISETEC (for the universal ports Bremen and Hamburg); ISAN (for the seaports in the Republic Niedersachsen); ISAS (for the seaports in the Republic Schlewsig Holstein); ISAM (for the seaports in the Republic Mecklenburg-Vorpommern).

Sponsor: German Ministry of Technology

Type: Research

Authors: Geiser, Uhlendorf, Mildner, Fehlhaber

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
	economics	economics		economics
	business	business		business

Besides some development concerning transhipment techniques most of the R & D activities have been related to telecommunication and information systems. Application areas have been container

Short Dtraffic for Bremen and Hamburg, multi purpose traffic for the ports of Niedersachsen and ferry transports for the ports in Schleswig Holstein and Mecklenburg-Vorpommern.
Regarding ISETEC the central port communication systems in Bremen and Hamburg have been improved aiming paperless information exchange, interconnecting partners from the sea- and landside via a single communication node in each port.
Besides the electronic data exchange the operating systems for the transhipment in the container terminals have been supported by EDP, including radio communications and automatic planning and control of the employment of the transhipment equipment and storage places.
In contrast to Bremen and Hamburg the communication system for the small and middle sized ports in Niedersachsen was established in a decentralized way, with individual communication interfaces on the premises of the companies and authorities involved.
This solution is especially advantageous for interconnecting SME's engaged in short the shipping and relating hinterland transhipment via EDI.
As results of the projects ISAS and ISAM the port communication systems TRADAV and SECOM have been established supporting transports via ferries in the Baltic Sea.

Code: ISE95S Country: Germany Source:WEGEMT

Title: Energy Consumption and Air Pollution - A comparison between Ships and other Transport Vehicles

Sponsor:

Status: F
Type:
Study Language: German
Authors:

Code: JOO93P Country: Source:FAST93

Title: Parametric Design Trade-Off Study and Preliminary Design of an SES Passenger Car Ferry

Sponsor: Status:

Type: Paper Language: English

Authors: Joo, Y.R., K.Y. Nho, H.S. Jang, Y.K. Choi, D.R. Lavis, B.G. Forstell

Code: JOO95P Country: Source:FAST95

Title: Development of a 1200 DWT High-Speed Container Ship

Sponsor: Status:

Type: Paper Language: English

Authors: Joo, Y.R., H.S. Jang, S.D. Park, J.H. Park, G.G.

Code: JOR95H Country: Netherlands Source:CASSS

Title: Telematics in shortsea shipping: final survey by NEI and MERC

Sponsor:NCR Status: ON

Type: Language: English

Authors: Jorna R. A. M., C.A. Verweij; MERC, H.

Short Description:
The questions that are examined in this study:
-
which information flows are suitable for the use of telema-tics;
-
which application is most suited;
-
is there need for a trial project;

Conclusions: there is need for EDI to exchange information between tussen shipper, stevedor and agent. There is also need for a trial project.

Code: JUL93P Country: Source:FAST93

Title: Performance and Behaviour of the Large Slender Monohull

Sponsor: Status:

Type: Paper Language: English

Authors: Jullmstro, E., J. Leppanen, J. Sirvio

Code: KAM95P Country: Source:FAST95

Title: Wave-Piercing Catamaran Type High-Speed Car Ferry "HAYABUSA".

Sponsor: Status:

Type: Paper Language: English

Authors: Kamoi, N., Y. Saito, S. Nishimura, S. Miyamoto,

Code: KAN94P Country: Finland Source:CASSS

Title: A revolution in RoRo shipping

Sponsor:PCR Status: F

Type: Paper Language: English

Authors: Kanerva M.
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
Overview presentation

Code: KAR93P1 Country: Finland Source:CASSS

Title: Passenger comfort and seakeeping performance of fast ferries

Sponsor:NCR Status: F

Type: Paper Language: English

Authors: Karppinen et al

Subject Classification according to the given matrix
SHIPS CARGO
PORTS NETWORKS TELEMATICS
engineering

Short Description:
Design information for fast multihull passenger transport vessels

Code: KAR93P2 Country: Finland Source:CASSS

Title: Design package to maximize pass comfort

Sponsor:NCR Status: F

Type: Paper Language: English

Authors: Karppinen et al
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:
Design information for fast multihull passenger transport vessels

Code: KAR95P Country: Finland Source:CASSS

Title: The seakeeping performance of fast single and multi hull pass ferries

Sponsor:NCR Status: F

Type: Paper Language: English

Authors: Karpinen et al

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:
Design information for fast multihull passenger transport vessels

Code: KAR95T Country: Greece Source:CASSS

Title: Greek Coastal Shipping

Sponsor: Status: F

Type: Thesis Language: Greek

Authors: Karadimitropoulos, G.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics				
			economics	
business			business	

Code: KEL94P Country: Source:ESSS94
Title: Introduction to the Corridor Study

Sponsor: Status:

Type: Paper Language: English
Authors: Kelchtermans, T.,

Code: KEN92T Country: Ireland Source:CASSS

Title: Design philosophy and operational experience

Sponsor:PCR Status: F

Type: Study Language: English

Authors: Kenny J.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering	engineering		engineering	
economics	economics			
business	business	business	business	
environment	Environment			

Short Description:
Design philosophy and operational experience of the containership "Bell Pioneer" and "Euro Power". Paper delivered at London conference.

Code: KIH93P Country: Source:FAST93

Title: Diesel Driven Fully Submerged Hydrofoil Catamaran: Mitsubishi Super-Shuttle 400 "RAINBOW"

Sponsor: Status:

Type: Paper Language: English

Authors: Kihara, K., C. Hamada, M.Miyoshi, H. Sueoka, T. Kawakami, T. Harada, N.Toki

Code: KIN96S Country: UK Source:WEGEMT

Title: Prediction modelling the visibility of small maritime targets

Sponsor: Status:

Type: Study Language: English

Authors: King A., Mr D C Keith, Prof M J Dove
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
environment				

Short Description:
The aims were to investigate the variability of small maritime targets when being monitored by merchant marine pulsed X band navigational radars and to determine the effectiveness of any new coating or constructional materials. The research was prompted by "run down" accidents after which merchant ships have claimed non-visibility of the small craft involved. Experiments were carried out on the western side of the Solent, with the radar system installed at the Hythe Sailing Club site. The radar transmission path was directly and exclusively over water. Target vessels were equipped with telemetry from which the target aspect and angle of heel could be automatically derived and tagged onto radar echo data. During two active seasons from May to September, several hundred data gathering episodes were completed on a variety of craft. A total of eight small craft were used. Included were sailing craft between 17 and 90 feet overall; power craft between 23 and 65 feet; RNLI lifeboats between 16 and 54 feet; and dinghies or rafts up to 10 feet overall. Construction materials

included wood, GRP, steel, aluminium, or rubber and coated fabric. One craft had parts of its hull internally or externally painted with metallic paints. Measurements were intended to quantify signal variance with sea induced motion, aspect angle and angle of heel. In relatively calm conditions it was found that boats would consistently fall below the threshold of visibility for between 2 and 12 aerial rotations. Also, it was shown that there was some evidence that some craft smaller than 23 feet do not clearly benefit from the employment of a standard, passive radar reflector at the ranges in question. Also, the performance of maritime radars in detecting and consistently recording small, relatively close targets was found to be relatively poor. Novel passive tried were all found to be ineffective, or have their effect masked by environmental noise. In the real world, the dynamic relative motion of small craft in the slightest of sea conditions contribute very strongly to the variance in target returns. Results of experiments have implied a less than convincing case for reflective devices at the ranges where small craft are in danger of run-down. Although the devices might be effective when craft are hull down, the craft are not usually in danger at that range. Acquisition and retention of targets in automated systems must account for prolong (20-30 second) invisibilities. The work has been extremely valuable in the "de-bunking" of subjective and intuitive opinions concerning the behaviour of small maritime targets. It was a significant contribution to provide objective and controlled experiments to actually quantify the behaviour of these targets. In cases or run down these experiments have shown that the defence offered by manual radar watchkeepers claiming invisibility can be tenable and plausible in real world sea conditions. A large amount of data has been acquired during the large scale experiments and this data is available to other researchers or interested parties.

Code: KOH94T Country: Germany Source:WEGEMT

Title: Conceptual Design of a Ro-Ro catamaran for Shortsea Shipping

Sponsor: **Status:** F

Type: Tech. Repo **Language:**

Authors: Kohnagel, J., Bertram, V., Univ. Hamburg

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
economics				

Short Description:

Conceptual Design of a Ro-Ro catamaran for Shortsea Shipping operations in Europe, the concept received the 2nd awarded prise in the framework of an international university competition announced by the Shipbuilding and Ship Machinery Exhibition SMM'94, Hamburg, September 1994

Code: KON92P Country: Source:ESSS92

Title: Generating Logistical Chains Scenarios for Maritime Policymakers.

Sponsor: Status:

Type: Paper Language: English

Authors: Kondratowicz, L

Code: KOY91P Country: Source:FAST91

Title: A State of the Arts of Fast Sea Transportation in Japan

Sponsor: Status:

Type: Paper Language: English

Code: KRA91P Country: Source:FAST91

Title: Comparison of a Cargo Catamaran with Conventional Seaborne and Airborne Transportation

Sponsor: Status:

Type: Paper Language: English

Authors: Kraus, A., A. Naujeck

Code: KRA93P Country: Source:FAST93

Title: "SUS-A"-The State of the Art of the German Research Program for Fast Catamarans.

Sponsor: Status:

Type: Paper Language: English

Authors: Kraus, A., A. Naujeck

Code: KRA95S Country: Germany Source:CASSS

Title: Possible improvements of the marketing in SSS

Sponsor: NCR Status: ON

Type: Study Language: English

Authors: Kramer H.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics				
			economics	
business			business	
environment			environment	

Short Description:

Analysis of the supply-transparency in the german

SSS-fleet
Analysis of the demand-transparency
Determinants in the transport-chain
Development potentials for an adapted
marketing-strategy
Summary

Code: KRA96S Country: Germany Source:CASSS

Title: A feasibility study for a market-supply-concept in SSS on identified relations within Northern Europe/Germany/Western Europe with the consideration of shift potentials
Sponsor: NCR Status: ON
Type: Study Language: English

Authors: Kramer H.

Code: KUB93P Country: Source:FAST93

Title: A Concept of Wing-In-Surface-Effect Craft as a Future Passenger Transport in Japan

Sponsor: Status:

Type: Paper Language: English

Authors: Kubo, S.

Code: KVA96H Country: Norway Source:CASSS

Title: Ship for the future

Sponsor:PCR Status: ON

Type: Technical Language: English

Authors: Kvaerner
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering	engineering business	engineering		
business				

Short Description:
The Ship R3D R&D programme was initiated among Kværner companies in several countries in 1994. Over a three-year period, Kværner will spend more than ECU 60 million (NOK 500 million) on developing vessels, equipment and systems geared to meet the needs of future markets.

Code: LAH91P Country: Finland Source:CASSS

Title: Resistance and seakeeping char. of fast transom stern hulls

Sponsor:NCR Status: F

Type: Paper Language: English

Authors: Lahtirharju et
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
Suitable hull forms for fast monohull passenger transport

Code: LAN94H Country: Germany Source:WEGEMT

Title: Development of a large sea-river ship for intermodal cassette transport

Sponsor: Status: ON

Type: Project Language: German

Authors: Lange W., TECNICON, Prof. Ivanov, Varna

Subject Classification according to the given matrix
SHIPS CARGO
PORTS NETWORKS TELEMATICS
engineering

Short Description:
Development of a large sea-river ship (L = 135m, B = 17.5m) for intermodal cassette transport

Code: LAN95H Country: France Source:WEGEMT

Title: Feasibility study for the route Marseilles to Barcelona by a fast marine transportation system

Sponsor:PCR Status: F

Type: Research Language: French

Authors: Lancelot, E.
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

economics

Short Description:

Feasibility study for a sea link between Marseilles and Barcelona (alternatively Genoa) by fast ships

Code: LAN95P Country: Source:FAST95
Title: Fast Displacement Ships - An Economical Option for High Speed Transportation.

Sponsor: Status:

Type: Language:
Authors: Langenberg, H.

Code: LEC95S Country: France Source:CASSS

Title: Prospective Study into the development of dry

bulk traffics to, from and within the Atlantic Arc of Europe

Sponsor:
Status:
Type:
Study Language:

Code: LEV92P Country: Source:ESSS92

Title: The Potential for Fast Ships in European Freight Transport

Sponsor: Status:

Type: Paper Language: English

Authors: Levander, K

Code: LEV93P Country: Source:FAST93

Title: Fast Slender Monohull Vessels for Cargo Transport

Sponsor: Status:

Type: Paper Language: English

Authors: Levander, K

Code: LIN88P Country: Germany Source:WEGEMT

Title: International Series of conferences on Eastern/Western co-operation and competition in Shipping

Sponsor:
Status: F
Type:
Study Language:
Authors:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
	economics			
economics		economics	economics	
business				
legal				
			legal	
		legal		

Short Description:
State of the art and future prospects of shortsea shipping in the Baltic region

Code: LIN90S Country: Germany Source:WEGEMT

Title: Analysis of the German and European shortsea shipping system

Sponsor:NCR Status: F

Type: Study Language:

Authors: Linde H., T.U. Berlin

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
economics	economics	economics	economics	
business				
legal		legal	legal	

Short Description:
State of the art and future prospects of German and European shortsea shipping

Code: LIN92P Country: Source:ESSS92
Title: Status and Perspectives of Technological Development in European Shortsea Shipping

Sponsor: Status:
Type: Paper Language: English

Authors: Linde, H

Code: LIN95S Country: Germany Source:WEGEMT

Title: Inland and combined inland/coastal shipping in the Oder river and the Baltic Sea

Sponsor:NCR Status: F

Type: Study Language:

Authors: Linde H.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
economics	economics	economics	economics	
business				
legal		legal	legal	

Code: LOC96H Country: Source: ISL
Title: "LOCALE", Low Cost Applications for Linking EDI (first phase)

Sponsor:EUR Status: ON
Type: Research Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
	economics	economics		econonm
	business	business		
				busines

Short Description:
A DGVII MARIS project. The project is aiming at R & D in low-cost EDI facilities. The result of this first phase is a feasibility study for the implementatin of low-cost EDI solution in the port

area. The second phase shall be a demonstration of the concepts of the first phase aiming at the Development of a modular and flexible low-cost EDI system. It will be demonstrated, how SME's who are less or not equipped with Electronic Data Processing, can be enabled for participating in EDI on a low-cost level.

Code: LUM93S Country: Sweden Source:CASSS

Title: System development of standardised unit load carrier for sea, road and rail transport

Sponsor:NCR Status: F

Type: Study Language: English

Authors: Lumsuden K., MariTermAB

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
	engineering		engineering	
	business		business	

Short Description:

The purpose of the work is to survey and evaluate horizontal transfer techniques for unit load carriers between rail, road and sea transports, in use today or under development. Requirements are formulated for an open standardised system. A system is proposed using cassettes as modems in the transfer between the transport modes.

Code: LUN93P Country: Source:FAST93

Title: High-Speed Monohulls in Extreme Sea Conditions. A Study of Operational Limits.

Sponsor: Status:

Type: Paper Language: English

Authors: Lundgren, J.

Code: LVC95S Country: Italy Source:CASSS

Title: Libro Verde Confitarma

Sponsor:NCR Status: F

Type: Study Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics				
business				

Short Description:

Identification of all the regular short sea services and links between the Italian ports. Figures are related to:· route· type of service (cargo /

passengers)· timetable· type / size / number of ships on each route· yearly passengers / cargo movement· operating fleet structureThe study includes also the Confitarma proposal regarding the rationalisation of the short sea services.

Code: MAE92A Country: Italy Source:WEGEMT
Title: A particular aspect of the operational safety of ships: the assessment of stability under varying conditions of service

Sponsor:
NCR Status:
Type:
Authors: Article Language: Italian
Maestro M, Marino A (University of Trieste),
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short description:
International rules require that the master of any ship should be able to assess with ease and certainty the stability of his ship in different service conditions. With the aim at giving a practical contribution to the operational safety of ships, this paper shows a procedure to check stability in a way that at the same time is simple and strictly complies with the rules. It is well known that certain standards are imposed to be met by the stability curves and so somehow tedious calculations are required. The proposed method allows one to avoid any calculation based on those curves and limits the necessary checks to the ascertainment of the vertical position of the centre of gravity of the ship. In particular the study presents analytical and graphical tools that make more feasible and time laborious the taking into account of the effect of free surfaces of liquids in tanks. Through the proposed method precise information useful for overcoming possible critical loading conditions can also be drawn.

Code: MAE93A Country: Italy Source:WEGEMT

Title: Traffic in short sea shipping and ro-ro vessels: considerations on safety.

Sponsor: Status:

Type: Article Language: Italian

Authors: Maestro M, Marino A (University of Trieste),
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
economics

legal

Short Description:
The following subjects are addressed: road transport and short sea shipping freightage in Italy, ro-ro vessels characteristics, some significant disasters of ro-ro vessels, safety on board of ro-ro vessels, some ways for improving safety on board ro-ro vessels.

Code: MAE94P Country: Source:ESSS94

Title: Competiveness of Shortsea Shipping Ports: The Case of Zeebrugge.

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Maertens, L

Code: MAI95H Country: Source:DGXII

Title: MAINCOMPSES, Improvement of main system components and ride control system for fast passenger and cargo large surface effect ship.

Sponsor:
EUR **Status:**

Type:
Research **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

A DGXII project. Objectives: Investigation of the feasibility of a large size SES cargo, overcoming the technological gaps in the development of the main system components, such as seals, high power waterjets and lifting and control systems. Evaluation of benefits (socio-economic/technical) sustainable by the adoption of innovative technologies in terms of transport efficiency with respect to traditional ship concept particularly for manoeuvring, stability, seakeeping, safety, monitoring, pay load/displacement ratio and comfort aspects. Definition of the target vessel and outline specifications of the main system components. Determination of design criteria for noise and vibration. Identification of the relevant problems for the development of an integrated control device for vertical motion reduction through trim tabs, fins, waterjets and vent valves. Definition of the ride control system modelling criteria. Assessment of the influence of seals on the air flow to the cushion. Air supply specifications and air duct conceptual design. Conceptual definition of the fan test rig device.Achievements to date: Definition of theip. target vessel and outline specifications of the main system components. Assessment of propulsive performances of the target vessel. Identification of the relevant problems for the development of an integrated control device for vertical motion reduction through trim tabs, fins, waterjets and vent valves. Definition of the ride control system modelling criteria. Assessment of the influence of seals on the air flow to the cushion. Air supply specifications and air duct conceptual design. Determination of design criteria for noise and vibration. Conceptual definition of the fan test rig device.Planned Actions: Investigation of fans characteristic curve, noise and vibration levels and ways of propagation. Dimensioning of impeller, taking into account vibration resistance and fatigue phenomena. Performance of rig tests with realistic scale and fans interaction. Definition of final fan characteristics. Determination of mathematical

models for the Ride Control System. Feasibility demonstration of proposed actuators and assessment of optimum control algorithm. Static model tests and shape investigation on traditional new-concept seals. Definition of materials and sample manufacturing. Research on different pump types suitable for large SES, optimisation of pump water intake hydrodynamics and investigation on interaction between prime mover/pumps, with determination of the possible critical power transmission phenomena. Integration of systems into the hull.

Code: MAK93P Country: Source:FAST93

Title: The Limits of Speed Displacement, Catamaran and SWATH Vessels.

Sponsor: Status:

Type: Paper Language: English

Authors: Makela, K., K. Riska

Code: MAR91S Country: Spain Source:CASSS

Title: Intra-European SS Trades and Shipping

Sponsor: PCR Status: F

Type: Study Language: English

Authors: Maritime Economic Research Centre and Dynamar, BV

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics				
business environment				

Short Description:

The study analyses the cargo flows and the operating fleets in the European Short Sea area. Main parts of the study are:-
European Seaborne Cargo Flow Analyses: dry cargo, liquid cargo, international and national trades, short sea developments.-
European Short Sea Fleet: major participating countries (Germany, Netherlands, UK, Spain, Italy, Cyprus), minor participating countries (Denmark, Norway, Greece, Russia, Sweden, Finland, Eire, France, Belgium, Portuguese, Iceland, Poland)-
Freight rate developments.-
Shipping costs and fiscal and investment environment.-
Shipping companies: structures, involvement, top 20 company ranking.Comments:
An excellent and very comprehensive work that should be updated, since most data are from 1986-88.

Code: MAR92H Country: Norway Source:CASSS

Title: High Speed Marine Vehicle

Sponsor: NCR/PCR **Status:** F

Type: Research **Language:** English

Authors: MARINTEK

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

The main objective of the programme was to develop knowledge and technology to improve the competeiveness of the Norwegian maritime industry and operators. It was a necessity to establish the future technological base as well as ensuring that factors such as safety, economics and environmental aspects receive the fullest attention

Code: MAR93H **Country:** Norway **Source:** CASSS

Title: Maritime Information Technology

Sponsor: NCR/PCR **Status:** F

Type: Research **Language:** English

Authors: MARINTEK

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
business				

Short Description:

The Norwegian maritime IT industry has been focused in this programme. The overall "driver" has been to meet and fulfill customer requirements with respect to ship operation. Joint development projects were encouraged to save duplication of effort. Open systems architecture have gained considerable success in providing adaptable systems based on integration of subsystems from independent vendors. Modern information technology have been put to proper use in existing and new products.

Code: MAR93S **Country:** Spain **Source:** CASSS

Title: Passenger Transport between the Gran Canaria and Tenerife islands

Sponsor: MOPTMA **Status:** F

Type: Study **Language:** English

Authors: Marcial Echenique y Cía, S.A.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
economics				
business				

Short Description:
The Gran Canaria-Tenerife corridor presents a very interesting case of competition between the maritime and air modes in the transport of passengers. In particular, existing fast regular maritime services provided with Jet-Foil high speed crafts are directly oriented to the competition with the air services. Nevertheless, for both the maritime and the air services, the high operating costs and relatively low demmand make virtually impossible the economic viability in absence of official support. Taking into account the need to ensure the public service, the Administration must decide whether the official support to one or both transport modes is justified.This study analyzes the problem and proposes policy alternatives.

Code: MAR93S Country: Germany Source:WEGEMT

Title: Coastal and Short-Sea Shipping - Technical Feasibility Study

Sponsor: PCR **Status:** F

Type: Study **Language:**

Authors: MARITERM AB

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
legal		legal	legal	

Short Description:
State of the art and future prospects of coastal and shortsea shipping

Code: MAR94H Country: France Source:WEGEMT

Title: Project MENTOR

Sponsor: PCR **Status:** F

Type: Research **Language:**

Authors: Marchand, P

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

Exploratory research into the implementation of high-speed transportation vehicles of SES, SWATH and monohull type with a payload capacity of 250 tons and speed of 50 knots at SS 3, range 300 nm

Code: MAR94P1 Country: Source:ESSS94

Title: Shortsea Shipping from Hinterland Ports by Sea-River Going Vessels: Study of the Influenceof a Free Cabotage Policy.

Sponsor:

Status:
Type:
Paper Language: English
Authors:

Code: MAR94P2 Country: Source:ESSS94

Title: Shortsea Shipping: Via Optima?

Sponsor: Status:

Type: Paper Language: English

Authors: Martens, R.J

Code: MAR95H Country: Norway Source:CASSS

Title: MARINOR

Sponsor:NCR/PCR Status: F

Type: Research Language: English

Authors: MARINOR
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
The main objective of this programme is to contribute to the development and implementation of methods, tools and organisation forms at some selected, Norwegian shipyards. The overall goal is to contribute to a 40 % reduction in required man-hours for building a vessel, and to a 30 % reduction in production lead time

Code: MAR96P Country: Source:ESSS96

Title: A new model for optimal sea-river shipping management

Sponsor: Status:

Type: Language:

Authors: Marchal, J., Z. Zhang

Code: MAR97H Country: Norway Source:CASSS

Title: Information Technology in Ship Operation

Sponsor:NCR/PCR Status: ON

Type: Research Language: English

Authors: MARINTEK
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
Improved competitiveness through development of new operating concepts and information systems in shipping companies, in close cooperation with equipments suppliers, classification societies and authorities. Main areas: Infomation exchange and decision support; Qualification and training; New and flexible organizational structures; Extended suppliers services and support; Strengthening of flag state regime; Extended classification services.

Code: MAR98H Country: Norway Source:CASSS

Title: ShortSea Shipping

Sponsor:NCR/PCR Status: ON

Type: Research Language: English

Authors: MARINTEK

Subject Classification according to the given matrix

SHIPS	CARGO engineering	PORTS	NETWORKS	TELEMATICS
business	business	business		

Short Description:

The programme addresses the logistics aspects of short sea shipping. The main objective is to promote short sea shipping as an alternative to land based modes, and to contribute to a shift in future european transports to waterborne solutions.

The programme is split into the following main areas: Short Sea Shipping; Inland Waterways; The port as part of the logistic chain; General projects (support projects)

Code: MAT95H Country: Source:DGXII

Title: MATSTRUTSES, Advanced materials and design procedure for large size SES structures

Sponsor:EUR Status:

Type: Research Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:
A DGXII project. Objectives: To investigate the feasibility of a large size SES cargo, overcoming the lack of knowledge in the field of structural behaviour and the technological gaps on materials and production and assembling processes. To develop new advanced production technologies for large size SES structures in composite materials. To implement structural analysis design procedures. To improve rules and regulations for structural design.Achievements: Definition of the main

characteristics and dimension of the target vessel. Assessment of the existing structural design procedures. Definition of the preliminary design hull loads. Preliminary structural design in aluminium alloy. Definition of the general philosophy of the software procedure for structural analysis and design. Conceptual design of test rig for slamming experimental investigation.Planned Actions: Construction of light alloy structural joint prototypes for mechanical tests. Selection of innovative structural solution. Selection of proper advanced composite materials. Preliminary structural design by using advanced materials. Definition of the sea-keeping tests specifications. Definition of the slamming tests specifications.

Code: MAU91S Country: Portugal Source:CASSS

Title: Study of Sea Transport for Petroleum Liquid Products in Azores Island

Sponsor:NCR Status: F

Type: Study Language: English

Authors: Mauricio E.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
business environment				

Short Description:

The study had analysed existing data of consumptions and minimum reserves in each island for liquid petroleum products and estabilished the cargo capacity limits to get a time charter for product tanker

Code: MCG91P Country: Source:FAST91

Title: On the Potential of SWATH Ships for Very High Speed Operations

Sponsor: Status:

Type: Paper Language: English

Authors: McGregor, R.C., H.H. Chun

Code: MCG96H Country: UK Source:WEGEMT

Title: SWATH SHIPS. 1. Design and evaluation of control systems; 2. Optimum geometry for resistance, sea-keeping, slamming; 3. Design and
Sponsor:evaluation.

Type: Status:

Authors: Research Language: English

Subject Classification according to the given matrix

McGregor R.C., Dr J Howell, Dr A Fairlie-Clarke

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

The principle conclusions of the study were:
When comparing SWATH and monohull designs, it is essential that the comparisons are made on the basis of mission equivalence. No other definitions of equivalence are applicable.
SWATH vessels prove superior to monohulls when performing mission dominated by seakeeping considerations.
Survivability and onboard systems operation are two other principal areas where SWATHS lead monohulls.

At present, mission equivalent SWATH ships cost approximately 5-10% more than monohulls.
SWATH ships are unlikely to exceed 15,000 tonnes displacement because monohulls possess adequate seakeeping performance above this limit.

Code: **MEM95T** **Country:** **Denmark** **Source:CASSS**

Title: **Memo on the potential for Sea Transport**

Sponsor:NCR **Status:** **F**

Type: **Technical Language: English**

Authors:

Short Description:

-
Analysis on the possibilities of transferring of cargo from land transport to transportation on sea from Denmark to the continent.

-
Traditionally sea transportation is the major mean to bulk transport-ation.

-
Sea transportation has lost market shares to land transportation during the last 10-15 years especially regarding manufactured products and foodstuffs

-
Uncertainty regarding transport time have significant importance in relation to sea transport.

-
Not possible to give door-to-door service

Conclusions

-
General conditions for sea transport must be improved.

-
Shippers must have more information about the potential for sea transport

-
EU must work for alternatives to land transport.

-
With regard to transportation from Denmark to the continent sea

Code: **MEN94T** **Country:** **Spain** **Source:CASSS**

Title: SSS development requirements

Sponsor: Status: F

Type: Report Language: English

Authors: Meneses P.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		engineering		
		economics		
		environment		

Short Description:

- Market requirements.-
Estimated cargo flows than can be transferred from the road to the SSS by main corridors.-
Commercial evolucion and ports developments.-
Requirements on port services.- Improvements in the efficiency and quality of the SSS services.-
EC policy summary. Action at the European Parliament, the Maritime Industry Forum and the Commission. -
Conclusions and recommendations.

Code: MER94H Country: Netherlands Source:CASSS

Title: Legal liability in maritime transport with particular reference to short sea shipping and the Hamburg rules : final report door EC DGVII

Sponsor:
EUR Status: F

Type:
Research Language: English

Authors:

Code: MER94S Country: Spain Source:CASSS

Title: The impact of liberalization of maritime cabotage in the EU

Sponsor:EUR Status: F

Type: Study Language: English

Authors: MERC (Rotterdam), CETEMAR (Barcelona) and other 4

Short Description:
As a result of the implementation of Reg (EEC) No 3577/92 (freedom to provide maritime transport services in national cabotage trades) the cagotage trades of EU member States are in principle accesible for all EU-flags. However, several derogations for specific trades are still in force. The main purpose of this report is to analyze what have been the effects of the Regulation during the first two years of its implementation. The main conclusion is that, altough some changes did occur (in legislation, fleet size, flag involveement), cabotage practices in most countries continued on the basis of "business as usual". The case of Spain, for several reasons is somewhat different from the other countries, and the implementation of the Regulation has accelerated the decline of the Spanish flag fleet. Further impact is expected once the present derogations will be lifted.

Code: MER95S Country: Source:DGVII/D

Title: Evaluation of the potential for a coastal cabotage service in the Mediterranean rim

Sponsor: **Status:**

Type: Study **Language:**

Authors: Mercer

Code: MIL96H Country: UK Source:WEGEMT

Title: Numerical modelling of the flow around ship hulls with special reference to high-speed hulls and shallow

Sponsor:

Status:

Type:

Reseaerch Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

The purpose of the project was to develop an improved numerical method of modelling the hydrodynamic flow around a ship hull, in particular the flow around a fast ship displacement hull with a transom stern which would be used for a small warship or patrol boat. The methods of calculating the wave resistance of a fast displacement hull were investigated and compared with experimental data for an NPL round bilge displacement hull (model 100A). The methods investigated were: 1. Neumman-Kelvin theory: a) Kelvin sources, b) Rankine sources (fixed model/free trim and heave); 2. Tulin's theory.The results showed that the Neumman-Kelvin and Rankine sources with the model fixed were substantially the same over the whole speed range and considerably lower than the experimental residual resistance. Allowing the hull to trim and heave increased the wave resistance calculated by the Rankine source method although the results were still lower than the experimental residual resistance. The results using Tulin's theory agreed closely with experimental data for Froude numbers above approximately 0.9.

Code: MIN91P Country: Source:FAST91

Title: Long-Range High-Speed Catamaran Passenger Ship Design

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Min, K.S.

Code: MIN95P Country: Source:FAST95

Title: Design of A High-Speed 300 Passenger SWATH Ship

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Min, K.-S, Y.-W. Lee

Code: MOL96H **Country:** UK **Source:** WEGEMT

Title: Enhanced ship manoeuvring performance estimates through the effective design of rudder-propeller systems

Sponsor:

Status:

Type:

Research **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

PROJECT OBJECTIVES:1. To contribute further to the understanding of ship-rudder-propeller-hull interaction through experimental and theoretical investigations.
2. To create a rudder design manual and associated software to facilitate the practical interpretation of available experimental and theoretical data.
PROPOSED WORK PROGRAMME:1. Experimental work. Experiments will be carried out in a 3.5 m x 2.5 m wind tunnel where suitably high Reynolds numbers can be achieved with low blockage. A facility will be built to allow semi-permanent use of the rudder-propeller rig in a laboratory. Total rudder forces and load distribution, propeller revs, thrust and torque, propeller side force and pressures on a simulated hull will be measured.
2. Theoretical work. The successful dual approach adopted in modelling the isolated rudder and propeller interaction will be continued. The validated general purpose surface panel code provides an excellent base for more detailed numerical modelling, while the lifting-line/blade element momentum theory allows more rapid investigation. The wind tunnel allows precise measurement of velocities, which will be used to validate theory.3. Design manual and associated software. Preparation of the manual will require interpretation of a large amount of previous and new experimental and theoretical data into a form suitable for use by a designer. The manual will first be produced as a prototype, and then as a definitive version with additional data. This will allow feedback from potential users. It will be accompanied by a program incorporating data-design relations.

Code: MOL96H1 **Country:** UK **Source:** WEGEMT

Title: The identification of the resistance components of catamarans

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Molland A.F., Dr J F Wellicome

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

The research, funded by EPSRC and administered through MTD, has entailed a programme of experimental and theoretical investigation into the resistance components of high speed displacement catamarans in calm water. The experimental work was a development of an earlier investigation in which a small series of three catamaran models had been tested. The current work has extended the parametric investigation to cover changes in hull breadth, draught ration and a wider range of length, displacement ratios. The experimental work was carried out in the 60m test tank at Southampton Institute of Higher Education. The models were 1.6m long, were of round bilge form with transom sterns and were derived from the NPL round bilge series. The model series covered demihull length, displacement ratios of 7.4, 8.5 and 9.5 and breadth fraught ratios of 1.5, 2.0 and 2.5. The models were all tested as monohulls (demihulls) and, in the catamarans configurations, with hull separation length ratios of 0.2, 0.3, 0.4 and 0.5. Calm water total resistance, running trim and sinkage and wave pattern analysis experiments were carried out for all the models. All tests were carried out where possible over a speed range up to a little over a Froude Number of unity. The results of the experimental investigation provide further into the influence of hull parameters and spacing on the resistance components of high speed displacement catamarans and offer a very useful extension to the available resistance data for this vessel type. The theoretical work involved the development and improvements of the prediction capabilities of an existing slender body wave resistance theory for catamaran hulls. A number of investigations were carried out which included investigating the methods of mathematically defining the hulls, the sensitivity of wave resistance to source panel distributions, suitable allowances for running trim and sinkage effects and improving the modelling of transom stern effects by the use of suitably placed sink distributions. Some improvements in the prediction capabilities of the theory were obtained and satisfactory agreement with experimental results were achieved in the higher speed range. Transom sterm effects did however preclude accurate predictions at lower Froude Numbers. Overall, the theory offers the ability to make very reasonable estimates of catamaran wave resistance, particularly in the higher speed range, and provides a very useful preliminary design tool for parametric studies.

Code: MOL96H2 **Country:** UK **Source:** WEGEMT

Title: The development of improved techniques for the prediction of ship rudder performance characteristics

Sponsor:

Status:

Type: Research **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short D The research has entailed a programme of experimental and theoretical investigation into the performance characteristics of a ship rudder working downstream from a propeller. The work forms part of an overall strategy that entails identifying the influence of the propeller on the rudder, the rudder on the propeller, and the rudder-propeller combination on the hull. The experimental work has been carried out in the 3.5m x 2.5m wind tunnel at the University of Southampton, where suitably high rudder Reynold's Numbers could be achieved. A propeller rig was designed and manufactured for the work. It has the capacity for propeller speeds up to 3000 rpm and the continuous monitoring of thrust and torque from the propeller dynamometer. A five-component rudder dynamometer was used to record the forces and moments acting on the rudder, and pressure tappings over the rudder provided a detailed survey of the distribution of forces. An 800mm diameter propeller, a skeg rudder and six all-movable rudders of varying aspect ratio and span were manufactured and tested in the course of the experimental investigation. Tests were carried out over a range of propeller loadings. Longitudinal, for the
prediction of ship rudder performance
lateral and vertical separation of the rudder and propeller were investigated together with the influence of propeller diameter/rudder span. The experimental results offer an insight into the physics of the flow and provide a better understanding of the isolated rudder-propeller problem. In particular, the spanwise load distributions indicate the effect of both axial and rotational inflow velocities induced by the propeller. The results also offer practical design data for a wide range of realistic rudder-propeller geometries. These include the influence of thrust loading on sideforce production in the case of manoeuvring and coursekeeping, and centre of pressure movements for the derivation of rudder stock torques and moments. The theoretical work has involved both the use of simple rudder lifting line-propeller blade element momentum theory, and the development and application of lifting surface theory to the rudder-propeller combination. These techniques give promising results, allow interpolation and extrapolation of existing data, and provide useful tools for the investigation and prediction of propeller-rudder interaction effects. Practical parametric relationships have also been developed, based on the experimental and theoretical work, that are suitable for predicting the lift and drag of various rudder-propeller combinations. Use of relationships will provide a more physically realistic approach to the generation of rudder forces in manoeuvring models.

Code: MOR93P **Country:** Spain **Source:**CASSS

Title: A reliable answer in fast ferry design

Sponsor:PCR **Status:** F

Type: Paper **Language:** English

Authors: Moret, A.P. Lucas and J.L. Tejedor
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
High speed transport of passengers and vehicles is foreseen as a very promising market in the near future.Bazán has designed the fast ferry MESTRAL as an answer to the high speed traffic between Barcelona and the Baleares islands. Two ships have already been built and new contracts are expected.The ship combines high performance, simplicity, low operational costs and high reliability. The high level of confidence that this design has received is based on the successful experience of Bazán in constructing technologically advanced naval vessels and on the extensive work accomplished in the conceptual and building design phases of the MESTRAL. A description of the ship and the most relevant studies are presented in this paper, covering significant aspects in the fast ferry design: seakeeping, structure reliability, ride control system and manoeuvrability. A family of ships based on the MESTRAL is presented, showing the great flexibility of a design that can satisfy different operator needs.

Code: MOR93P Country: Source:FAST93

Title: Development of the ABS Guide for Building and Classing High Speed Craft.

Sponsor: Status:

Type: Paper Language: English

Authors: Morlan, C.

Code: MST96S Country: Source:DGVII/D

Title: Feasibility study on the development of shortsea shipping inland waterway links between Holstbro - Struer and Duisburg

Sponsor:
Status:
Type:
Study Language:
Authors:

Code: MUE96H Country: Germany Source:WEGEMT

Title: Development of a large sea-river ships with limited draft (in German) 4 projects

Sponsor:PCR Status: ON

Type: Project Language: German

Authors: Mueller E.
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
Hull form optimization of future sea-river ships
with respect to least resistance

Code: MUL96H Country: Source: ISL

Title: "MULTITRACK" Tracking, tracing and monitoring of goods in an intermodal and open environment

Sponsor:EUR Status: ON

Type: Research Language:

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
	economics	economics	economics	econonm
	business	business	business	busines

Short Description:
A DGXIII project. The goal of the MULTITRACK project is to provide a mechanism that allows the end-user monitor the location and status of a cargo throughout the whole logistic chain in an intermodal transport system comprising sea, rail and road transportation means. The aim is to merge the existing technologies in the fields of cargo identification, fixed and mobile data communication, database handling and directory based data relaying to build a Value-Added Network that allows any user in the logistic chain to gain access to the required information in a reliable and user-friendly way.

Code: MUS94P Country: Finland Source:CASSS

Title: FG Shipping's new Baltic Combi RoRos

Sponsor:PCR Status: F

Type: Paper Language: English

Authors: Mustamaki E

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:
Overview presentation

Code: MUS95S Country: Italy Source:WEGEMT

Title: Maritime transport of people in urban areas

Sponsor:NCR Status:

Type: Study Language:

Authors: Musso E., Dr C Migliaro, University of Genoa

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS

economics economics
legal

Short Description:
The subject of the study is the estimation of the chance of a high speed maritime transport service to transfer passengers in coastal metropolitan areas. The research looks into the reduction of urban congestion and air-acoustic pollution in metropolitan areas by moving mobility from public and private road transport to maritime transport. The research stages are: the evaluation of effects of high speed in passenger transport, the comparison between different transport modes (namely regarding investment costs, overheads and efficiency of supplied service), introduction of a ??? split model in an Italian metropolitan area (Riviera Ligure - Genoa) to evaluate the probability of choice of maritime transport.

Code: NAG93P Country: Source:FAST93

Title: Assessment of High Speed Navigation in a Congested Area by the Traffic Simulation

Sponsor: Status:

Type: Paper Language: English

Authors: Nagasawa, A., K. Hara, S. Nakamura, Y. Onda

Code: NAK91P Country: Source:FAST91

Title: Feasibility Study on a High-Speed Hydrofoil Catamaran of Lesser Pitching

Sponsor: Status:

Type: Paper Language: English

Authors: Nakato, M., O. Matsumoto, Y. Osawa, H. Nobukawa,

Code: NII91P Country: Finland Source:CASSS

Title: The fourth generation of cruise ferry "Silja Serenade"

Sponsor:PCR Status: F

Type: Paper Language: English

Authors: Niini M.
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
Overview presentation

Code: NII94P Country: Finland Source:CASSS

Title: A new generation of "standart" diesel -electric

RoRo ferry

Sponsor:PCR Status: F

Type: Paper Language: English

Authors: Niini M.

Subject Classification according to the given matrix
SHIPS CARGO
PORTS NETWORKS TELEMATICS
engineering

Short Description:
Overview presentation

Code: NIT93P Country: Source:FAST93

Title: "SUS-B"-First Results of the German Research Project for SWATH-Ships-Conceptual Design of a 90m SWATH

Sponsor:
Status:
Type:
Paper Language: English

Authors:
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS

Short Description:

Code: NOR94A Country: Norway Source:CASSS

Title: Speed and Transport Economics

Sponsor: Status: F

Type: Article Language:

Authors: Norman D. V.

Short Description:

SIOS News 3/Sep/94

Code: NOR95P Country: Norway Source:CASSS

Title: International Trade, factor, mobility and trade costs

Sponsor: Status: F

Type: PublicatioLanguage:

Authors: Norman D. V., Venebles A. J.

Code: NTP93T Country: Denmark Source:CASSS

Title: National Traffic Plan

Sponsor:NCR Status: F

Type: Study Language: English

Authors:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS

Short Description:

-
No tradition for a combined transport policy planning in Denmark

-
Denmark backward in comparison with several of our coalition partners in Scandinavia and the EU

-
Reference is made to the latest reports from Sweden, Germany and Holland

-
Generally, the competition possibilities are not as strict. The increasing competition must take place on equal terms

-
A general shifting towards less polluting ways of transport

-
Shipping is not mentioned specifically

Conclusions

-
Increasing demand for a combined Danish and European transport policy. The development must be seen over a long period of time in the direction of demands for a sound and stable development

-
Suggestions for a traffic plan must be put forward and it is suggested that the traffic plan be divided into three projects

Code: NTU94S Country: Greece Source:CASSS

Title: Greek Coastal Shipping: Status, Prospects, and Investment Opportunities

Sponsor: Status: F

Type: Study Language: Greek

Authors: National Technical University of Athens,
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
economics	economics	economics	economics	
business				
legal	legal			
		legal		

Code: NUM93P Country: Source:FAST93

Title: Safety Assessment of Advanced Marine

Transportation System Including High Speed Vessels with Safety Margin as an Index

Sponsor:

Status:

Type:

Paper Language: English

Authors:

Code: OFL96H Country: UK Source:WEGEMT

Title: A sea surface estimator

Sponsor: Status:

Type: Research Language: English

Authors: OFlower J., Dr M M A Pourzanjani, Dr M R Belmont

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS engineering

environment

Short Description:

The project is a feasibility study intended to highlight and examine the key areas needing attention in order to lay the ground for a future detailed design of a Sea State Predictor. Such a device was considered to be useful if it were capable of predicting the shape of the sea surface 10 to 15 seconds in advance. The brief of this first stage study was specifically restricted to examining deep water one-dimensional "swell seas" of the sort typified by those originating during Atlantic storms. All the main aspects of the project have been considered. The necessary areas of technology have been specified and explored. Certain experimental, computational and theoretical work has been identified as being required and appropriate programmes have been set up. All these are well developed and despite the fact that the project has only been underway for 18 months it is possible to state that there are no inherent problems in moving on to a full-scale prototype design for a Sea Surface Predictor of the type specified in the project brief. It has been shown that it is possible to predict the form of the sea surface at a given point for some 30 into the future. Further investigations are necessary to establish whether this information can be used to improve the operational conditions of ships at sea. The fixed time method is inherently more difficult to implement than the fixed-point approach because it required remote sensing of the sea at some distance in front of the point of interest, which is typically moving. There are also special data interpretation requirements arising from the inherent non-uniformity of the data distribution. A theory has been developed to address these problems. Should it prove possible to make reliable measurements of the sea surface at a distance from the observation point, then it has been shown that it is possible to predict the future surface of the sea for periods of up to 30s with a useful degree of accuracy.

Code: OGA91P Country: Source:FAST91

Title: Some Concideration on Rules and Regulations for Fast Sea Transportation in Japan.

Sponsor: Status:

Type: Paper Language: English

Authors: Ogawa, K.

Code: OGI93P Country: Source:FAST93

Title: Submerged Hull and Foil Hybrid Super-High Speed Liner

Sponsor: Status:

Type: Paper Language: English

Authors: Ogiwara R., N. Yamanaka, K. Kobayashi, A.

Code: OJA92P Country: Source:ESSS92

Title: The Finnish Liner Shipping Market

Sponsor: Status:

Type: Paper Language: English

Authors: Ojala, L

Code: OJA94P Country: Source:ESSS94

Title: Baltic Bulk Shipping in the 1990's: How to Match an ageing Shortsea Fleet with Increasing Demand

Sponsor: Status:

Type: Paper Language: English

Authors: Ojala, L., S.Lall, M. Svendsen

Code: OJA96P Country: Source:ESSS96

Title: Maritime policies in the Baltic with special reference to short-sea shipping.

Sponsor: Status:

Type: Language:

Authors: Ojala, L., S. Baciauskiene

Code: OSH89T Country: Ireland Source:CASSS

Title: Technical report on Cont/ship

Sponsor:PCR Status: F

Type: Study Language: English

Authors: OShea J.
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering engineering

business business

Short Description:

The purpose of the report was to outline a new low cost containership with innovative design features in ship design, propulsion, energy and efficiency.

Code: OTT91P Country: Source:FAST91
Title: Computer Programs in the Feasibility Design of New SES-Projects

Sponsor: Status:

Type: Paper Language: English
Authors: Ottosson, P., O. Rutgersson

Code: OZA91P Country: Source:FAST91

Title: A Concept Design Study of "Techno-Superliner"

Sponsor: Status:

Type: Paper Language: English

Authors: Ozawa, H., S. Morishita, R. Oimatsu, Y. Kunitake

Code: PAC94P Country: Source:ESSS94

Title: UK Roads to Water Initiative: a Focusing Study

Sponsor: Status:

Type: Paper Language: English

Authors: Packer, J.J.L.,

Code: PAL95P Country: Source:FAST95

Title: Optimal Design of High-Speed River Catamarans

Sponsor: Status:

Type: Paper Language: English

Authors: Pal, K.P., L.J. Doctors
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS

Short Description:

Code: PAP91H Country: Greece Source:WEGEMT

Title: Hydrodynamic Analysis and Preliminary Design of a SWATH Passenger Car Ferry

Sponsor: NCR **Status:** F

Type: Research **Language:**

Authors: Papanikolaou A. D.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

The objective of the research has been to establish the foundation for the design of high-speed passenger car ferries of SWATH (Small Waterplane Area Twin Hull) type in Greece and to demonstrate the feasibility of a particular design for a ship on the route from Piraeus to Heraklion (Crete island). The research addressed a complete theoretical and experimental hydrodynamic analysis of SWATH type ships (calm water and seakeeping performance), the development of a computer-aided hull form optimization procedure, the development of a conceptual design synthesis software program for SWATH type passenger car ferries and the preliminary design of a prototype high-speed passenger car ferry ("Aegean Queen") for the route from Piraeus to Heraklion-Crete, including a technoeconomic analysis of the designed vessel. The main particulars of the designed vessel are: LOA = 50m, Displacement = 1000 tons, Draft = 5.0m, Speed = 30 knots, BHP = 20.000 HP, Capacity: 800 Passengers, 88 cars, Building cost 16 Mio $. The designed vessel, to be built completely from steel, proves to be feasible and competitive, both from the technical-construction as well as from the economic point of view, as compared with alternative conventional ship designs or other modes of transportation (airborne).

Code: PAP91P **Country:** **Source:** FAST91

Title: Hydrodynamic Optimization of High- Speed SWATH

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Papanikolaou, A., M.Androulakakis

Code: PAP94H **Country:** Greece **Source:** WEGEMT

Title: SMUCC - Development of a fast intermodal transportation system for shortsea shipping in Europe based on a SWATH Multipurpose Container Carrier design

Sponsor: PCR **Status:** F

Type: Project **Language:** English

Authors: Papanikolaou A., C. Koskinas, K. Pigounakis, N. Bouliaris

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering	engineering			

economics economics

Short Description:
The research concerns the development of a prototype fast SWATH Multipurpose Container Carrier (SMUCC) for Short Sea Shipping operations in Europe. It is based on the concept of fast sea transportation and rapid cargo transfer from road and rail to ship with minimisation of the interruption of cargo flow to the extent possible. The concept addresses besides the design of the prototype container carrier (capacity 60 TEU, speed 26 - 36 knots, two alternatives, building cost 14 - 16 Mio $), the development of an innovative port-terminal facility, enabling the rapid transfer of incoming containers from road, rail and other sea carriers to the proposed SWATH carrier. Based on the high throughr put speed of the defined cargo transportation chain and the high service speed of the vessel of about 30 knots, the concept promises a high frequency of departures and arrivals for the candidate vessel or fleet or similar vessels, at the ports of call.. The research work was presented at the International Shipbuilding and Shipping Exhibition SMM in Hamburg in September 1994, and received the 1st price among the [participating university institutions within the international competition "Futuristic Ship Designs for Short Sea Shipping - SEA 2000".

Code: PAP95H1 Country: Greece Source:WEGEMT

Title: Hydrodynamic Analysis and Feasibility Study of a fast catamaran ferry for Greece

Sponsor:NCR Status: F

Type: Research Language:

Short Description:
The objective of the research has been to establish the foundation for the design of high-speed passenger car ferries of catamaran displacement type in Greece and to demonstrate the feasibility of a particular design for a ship on the route from Rhodes to Simi island. The research addressed a complete theoretical and experimental hydrodynamic analysis of catamaran displacement type ships (calm water and seakeeping performance), the development of a computer-aided hull form optimization procedure, the development of a conceptual design synthesis software program for catamaran type passenger car ferries and the preliminary design of a prototype fast passenger catamaran ship ("SIMICAT") for the route from Rhodes island to SIMI (Dodekanese island chain). The main particulars of the designed vessel are: LOA = 41m, Displacement = 450 tons, Draft = 3.50m, Speed = 19 knots, BHP = 8.000 HP, Capacity: 600 Passengers, 6 cars. The designed vessel, to be built completely from steel, proves to be feasible and competitive, both from the technical-construction as well as from the economic point of view, as compared with alternative conventional ship designs or other modes of transportation (airborne).

Code: PAP95H2 Country: Greece Source:WEGEMT

Title: Practical Implications of the new SOLAS

regulations to the Greek Passenger Ferry Fleet

Sponsor:PCR Status: F

Type: Research Language:

Authors: Papanikolaou A.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
economics				
business				
legal				
environment				

Short Description:

The study addressed the practical implications of the new SOLAS 95 regulations to the Ro-Ro passenger ships of Greece and includes a critical review of the new regulations, both at the stage of proposal (before the IMO convention in November 1995) a s well at the stage of implementation. Among the main findings of the study the following seem most notable: 1. More than 90% of the present Greek Ro-Ro passenger ferry fleet (and possibly of the world-wide fleet in general), will be significantly affected by the new regulations, 2. The shipbuilding industry can expect significant number of orders for newbuildings and conversions, 3. The design of future Ro-Ro ships will be significantly affected by damage stability considerations, 4. The establishment of "two safety standard" ships will affect the market in Europe, 5. A critical review of the new regulations ("water on deck penalty concept") revealed significant weaknesses in the scientific documentation and proved that related decisions have been driven mainly by political reasoning.

Code: PAP95P Country: Source:FAST95

Title: SMUCC -SWATH Multipurpose Container Carrier

Sponsor: Status:

Type: Paper Language: English

Authors: Papanikolaou, A.D., N. Bouliaris, C. Koskinas, K.

Code: PAP96H Country: Greece Source:WEGEMT

Title: Development of the 80m LOA catamaran passenger car ferry SUPERCAT HAROULA

Sponsor:PCR Status: F

Type: Project Language: Greek

Authors: Papanikolaou A. (NTUA), N. Daphnias (ALPHA MARINE
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:
Development of a large steel catamaran passenger car-ferry for the route Rafina (Attica) to the Cycladic islands. The ship (SUPERCAT-HAROULA), launched in September 1995 in Perama-Piraeus, is a prototype ship and as such one of the largest catamarans ever built completely from steel. It is expected to go on service in summer 1996. The main features of the vessel, the initial design and hull form development of which was completed at the ship Design Laboratory of NTUA, are: LOA = 80m, BOA = 22.5m, Draft = 5.0m, Deadweight = 500 tons, Speed (service) = 21.0 knots, BHP = 11.000 HP, capacity: 250 cars, 1400 passengers (summer), Building cost = abt. 21.0 Mio $.

Code: PAP96P Country: Source:ESSS96

Title: Innovative fast ship designs for an integrated SSS system - IFSISS

Sponsor: Status:

Type: Language:

Authors: Papanikolaou, A., D. Vassalos, I. Ostvik
Subject Classification according to the given matrix

Code: PAR91P Country: Source:FAST91

Title: "DESTRIERO": The Realization of a Technological Challenge

Sponsor: Status:

Type: Paper Language: English

Authors: Parodi, M., L. Grossi

Code: PEE93S Country: Spain Source:CASSS

Title: The impact of the Spanish mainland cabotage liberalization on the competitive position of the Spanish shipping industry.

Sponsor:
EUR Status: F

Type:
Study Language: English

Authors:
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
business

Short Description:
On February 17th, 1993, at the request of the Spanish Goverment, the European Commission granted "an exclusion of the Spanish mainland area during 6 months from the scope of Reg. (EEC) No 3577/92" (freedom to provide maritime transport services in national cabotage trades), in application of Art. 2.5 of the Regulation (safeguard measures in case of a serious disturbance of the transport market).The main objective of this study, ordered jointly by the Commission and the Spanish Government was "to evaluate the need for a revision of the situation on

the basis of three different scenarios" in order to assess whether a prolongation of the derogation up to a total of 12 months was appropriate.The study describes the supply and demand situation and recent evolution in the market concerned and the policy developments in Spain and compares the operating costs of Spanish flag ships with those under the flags of other EC Member States concluding with several policy recommendations to the Commission and the Spanish Government.

Code: PEE94P Country: Source:ESSS94

Title: The Future of European Policies for Shortsea Shipping

Sponsor: Status:

Type: Paper Language: English

Authors: Peeters, C., A. Verbeke, E. Declercq

Code: PEE95P Country: Belgium Source:CASSS

Title: European Shortsea Shipping: Towards the 21st Century

Sponsor: Status: F

Type: PublicatioLanguage: English

Authors: Peeters C., Prof. Dr. A. Verbeke, Mr E. Declercq

Short Description:

Brief publication about the aims of the Delft and Vouliagmeni conferences and the results, (Delft) sources of sustainable Shortsea Shipping development, (Vouliagmeni) optimal government policy. Elaboration of the future development of European Shortsea shipping. Concerted action for the further developments of Shortsea shipping in Europe (identify the bottleneck's, developments of a database, EDI applications, provide the necessary infrastructure for port related Shortsea shipping activities, recommendations stimulating initiatives, promotion of pilot projects, creation of a positive external environment for shortsea shipping, port pair-concept, development of special adapted vessels) It is now the moment to prove economical viability. The management of these projects should obviously be delegated to competent "pilot project navigators" Ineffective and inefficient use of resources must be avoided.

Code: PEE95S1 Country: Belgium Source:CASSS

Title: Analysis of the competitive Position of Shortsea shipping: Development of Policy Measures

Sponsor:EUR Status: F

Type: Study Language: English

Authors: Peeters C., A. Verbeke, E. Declercq, N. Wijnolst
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics	economics	economics		

economics
business business business business

Short Description:

DGVII study of the competitive position of Shortsea Shipping in eight corridors between Baltic sea area, Black sea area, Benelux, Danubian Countries, Germany, Greece, Ireland, Italy, Nordic countries, Portugal, Spain and UK. Regulation and organization of a competitive environment. Situating the complementary position of Shortsea shipping regarding fluvio-martime transport and inland navigation. Improving Shortsea shipping activities by better equipped cargo handling facilities in the ports, multi-modal integration.
The main purposes of the study was to generate some joint and/or particular policy recommendations to the European Union to improve the competitive position of Shortsea Shipping across the eight corridors. Each study also led to a variety of other suggestions for specific routes and corridors. Requirements are translated into several key areas, which will demand particular attention when a future policy regarding Shortsea Shipping is developed. Presentation of the proposed recommendations in many individual reports.

Code: PEE95S2 Country: Belgium Source:CASSS

Title: Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Region

Sponsor:
EUR Status: F

Type:
Study Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics		economics		
			economics	

Short Description:
DGVII study. In this "white paper" outline of the futures priorities based on the need to reconcile the demand for mobility with the requirements of the environment, in line with the principe of "sustainable mobility." Examination of the potential contribution of shortsea shipping to achieve this sustainable mobility. Recommendations addressed to Member states, their regional and local authorities as well as the maritime industries. Ideas of actions that can be undertaken at EU level. Political support of the Council for these recommendations. This communication is partly based on the Corridor-study of PRC.

Code: PER94H Country: France Source:WEGEMT

Title: Project AGNES 200

Sponsor:PCR Status: F

Type: Research Language:

Authors: Perdun, P

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
Development of the prototype high-speed SES ship AGNES 200 for various applications within shortsea shipping and military missions

Code: PES92P Country: Source:ESSS92

Title: Edi Key for Shortsea Shipping Development: the Arcantel Platform.

Sponsor: Status:

Type: Paper Language: English

Authors: Pesquera, M.A., L. de la Hoz

Code: PET95P Country: Source:FAST95

Title: Introduction of Systematic and Probabilistic Safety Assesment Methods for the Classification of High Speed Crafts

Sponsor:
Status:
Type:
Paper Language: English
Authors:

Code: PIN95P Country: Source:FAST95

Title: New Rules For High Speed Craft

Sponsor: Status:

Type: Paper Language: English

Authors: Pinon, H.

Code: PLA93P Country: Source:FAST93

Title: Towards the Adoption of an IMO High Speed Craft Code

Sponsor: Status:

Type: Paper Language: English

Authors: Plaza, F., K. Sekimizu

Code: POE95S Country: Germany Source:WEGEMT

Title: Trends in the development of containerships (4 publications)

Sponsor: Status: F

Type: Study Language:

Authors: Poehls, H.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Code: POL95S Country: Belgium Source:CASSS

Title: Impact of Changing Logistics on Maritime Transport

Sponsor:EUR Status: F

Type: Study Language: English

Authors: Peeters C.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		business		
			business	

Short Description:
DGVII study. This study evaluates the potential impact of changing logistics on the competitive position of maritime transport. Its objective is to identify the necessary logistical requirements in order to improve efficiency and quality of maritime transport and to fully integrate maritime transport into the intermodal chain. The assessment of the effects on maritime transport (and SSS in particular) will allow to formulate relevant recommendations for further research under the 4th Framework research Programme, and for concerted action in the field of public policy.

Code: POL96S Country: Belgium Source:CASSS

Title: Creation of Port pairs for SSS development in Europe

Sponsor:EUR Status: ON

Type: Study Language: English

Authors: Peeters C.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		economics		
		environment	environment	

Short Description:

DGVII study. The purpose of this study is to investigate whether and how port authorities can play a more active role in establishing a link between two ports and how and to what extent they can steer a port pair creation process. The outcome of the study will be guidelines and an operational manual, crtitically describing the necessary steps to develop a port pair in the context of shortsea shipping in Europe. The ultimate purpose of the port pair will be to attract cargo and to develop shipping services between the ports.

Code: POR93H Country: Portugal Source:CASSS

Title: Portrailer - Leixoes-Zeebrugge

Sponsor:PCR Status: F

Type: Research Language: English

Authors: PORTLINE

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		environment		

Short Description:

Creation of a new combined transportation service of trailers on a RO/RO ship between the ports of Leixões (Portugal) and Zeebrugge (Belgium), with the estimated capacity of abt. 5500 trailers/year.

This project was scheduled in three stages. In the end of the first stage of the project, after 9 trips, the rate of use of this service was not enough to justify it, since the number of trailers actually transported was about 10% of quantity required to pay the costs (break even value). During this evaluation period, it was noted that the variable costs (load/unload) were very high and that the costs in the Portuguese port were approximately 60% higher than in the Belgian.

Code: POS96H Country: Source: ISL

Title: "POSEIDON"

Sponsor:EUR Status: ON

Type: Research Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics		economics		
			economics	econonm
business		business	business	busines

Short Description:

The objectives are to establish the principles, standards and architecture for the interoperability of Maritime Vessel Traffic Systems (VTS) at local, regional and European level by the integration of VTS with advanced vessel communications, information and tracking technologies in order to improve the safety and efficiency of maritime transport.
It is considered that the results anticipated will ensure the EU commands a leading position in advancing greater co-ordination and management of shipping within European waters, improve the safety and efficiency of shipping, port operations and emergency services, enhance the quality of services to all users of maritime transport and ensure that the EU remains at the forefront of this technology and commercial market sector.

Code: POU96H Country: UK Source:WEGEMT

Title: Human performance in highly-automated bridge systems

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Pourzanjani M.M.A., Capt J S Habberley, Prof M

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
business				

Short Description:

PROJECT OBJECTIVES:1. To investigate patterns of information used with different kinds of user interface, and their contribution to operational effectiveness in situation appraisal and decision-making.2. To assess the functional role of the watchkeeper's mental model in proving an active link between information acquisition and situation appraisal, and to develop methods for supporting this role.3. To develop a suite of methods for use as a human factors testbed, to facilitate the testing of new bridge designs and operational procedures.PROPOSED WORK PROGRAMME:The following tasks have been identified:1. Field studies - an assessment of information needs of bridge operators.2. Development of a laboratory operational environment.3. Development of a PC-based simulator.4. Laboratory studies of operator performance.5. Development of operational scenarios.6. Simulation studies of operator performance.7. Preparation of recommendations.

Code: PRA95S Country: Greece Source:CASSS

Title: Examination of the current situation for sea transport

Sponsor: NCR **Status:** F

Type: Study **Language:** English

Authors: PRAXIS Consultants

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
			economics	

Short Description:

This study performed an inventory analysis of the current situation in sea transport in the Aegean Sea. Papameters examined includes port dimensions and operational characteristics, characteristics of the ferries in operation in the Aegean, schedules etc.

Code: PRI96H Country: UK Source: WEGEMT

Title: Design of aluminium structures subjected to high frequency, high cycle loadings

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Price W.G., Dr R A Shenoi, Dr P Temarel

Subject Classification according to the given matrix
SHIPS CARGO PORTS NETWORKS TELEMATICS

engineering

Short Description:

PROJECT OBJECTIVES:1. To map vibration characteristics of stiffened panels subjected to local excitation 2. To understand fatigue failure and crack propagation characteristics in welded and bonded joints and stiffened panels 3. To use the design and experimental information from (1) and (2) and arrive at a set of recommendations for "good" practice in relation to design details.

Code: PSA91A Country: Greece Source:CASSS

Title: "Ports and Intermodal Transportation "

Sponsor: Status:

Type: Article Language: Greek

Authors: Psaraftis,H.N

Code: PSA92P Country: Source:ESSS92

Title: Impact of New Technologies on Shortsea Shipping in Greece

Sponsor: Status:

Type: Paper Language: English

Authors: Psaraftis, H.N., A.D. Papanikolau

Code: PSA93A Country: Greece Source:CASSS

Title: "Waiting for 2004"

Sponsor: Status:

Type: Article Language: Greek

Authors: Psaraftis, H.N., A.D. Papanikolaou

Code: PSA93P1 Country: Greece Source:CASSS

Title: "Prospects for Conventional Passenger-Car Ferries in the Aegean"

Sponsor: Status:

Type: Paper Language: English

Authors: Psaraftis, H.N.,

Code: PSA93P2 Country: Greece Source:CASSS

Title: "Prospects for Conventional Passenger-Car Ferries"

Sponsor: **Status:**

Type: Paper **Language:** English

Code: PSA94A Country: Greece Source:CASSS

Title: "Greek Coastal Shipping: 2004 at the End of the Tunnel,"

Sponsor: **Status:**

Type: Article **Language:** Greek

Authors: Psaraftis, H.N.,

Code: PSA94P1 Country: Source:ESSS94

Title: Modal Split Analysis in Greek Shortsea Passenger/Car Transport.

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Psaraftis, H.N., V.F. Magirou, G.C. Nasos, G.J.

Code: PSA94P1 Country: Greece Source:CASSS

Title: "Lifting of Cabotage by 2004"

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Psaraftis, H.N.

Code: PSA94P2 Country: Greece Source:CASSS

Title: "Greek Coastal Shipping System: Impact of New Technologies and Market Deregulation on Modal Split".

Sponsor:

Status: F

Type: Paper **Language:** English

Authors: Psaraftis, H.N., G.J. Nellas, V.F. Magirou, G.C. Nassos

Code: PSA96P Country: Source:ESSS96

Title: Research in Shortsea Shipping: the State of the Art.

Sponsor: **Status:**

Type: Language:

Authors: Psaraftis, H., O. Schinas

Code: PUS94S Country: Germany Source:WEGEMT

Title: Protection of the local conditions for the maritime industry in Germany

Sponsor:PCR Status: F

Type: Study Language:

Authors: Pusch

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
legal		legal		
			legal	

Short Description:
State of the art and future prospects of the German maritime industry

Code: PYM91S Country: Spain Source:CASSS

Title: The maritime industries in Spain

Sponsor: Status: F

Type: Technical Language: English

Authors: PYMAR

Short Description:

- The maritime medium and its importance-
The European framework: Introduction, transport, industry, fishing, environment, employment, sectorial policy.-
The situation in Spain: Introduction, transport, industry, fishing, science and technology.-
A new global approach. The need for a Maritime Forum at Spanish level.

Code: PÉR94P1 Country: Spain Source:CASSS

Title: Tip loaded propeller (CLT). Justification of their advantages over conventional propellers using the Momentum Theory.

Sponsor:

Status: F

Type:

Article Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:
Nearly 20 years after the publication of theoretical arguments justifying the higher efficiency of

propellers with non-null loads at the blade tips and a peculiar radial load distribution, this paper explains the improvements reached with the application of this type of propeller and a very originaal and very efficient procedure for designing any kind of screw propeller.To this end, Lerbs' lifting line thory was generalized, developing a new Cascades Theory (published for the first time in this paper), in order to conduct the three-dimensional corrections required by the lifting line theory. Later, the authors adopted the New Momentum Theory, which is used in this paper to describe the CLT advantages.A reference list of more than 120 CLT propellers actually built and applied to merchant ships both to fixed pitch and CPP is also included.

Code: PÉR94P2 Country: Spain Source:CASSS

Title: Contrarotating and tandem CLT propellers.

Sponsor: **Status:** F

Type: Article **Language:** English

Authors: Pérez-Gómez and J. González-Adalid

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

The generalization made by the authors to the New Momentum Theory to design CLT propellers working in a velocity field with both axial and tangential components, has allowed its application to the design of nozzle propellers, contrarotating propellers, etc.In principle, the merits of the tandem propellers are similar to those of contrarotating ones: lower Bp coefficient than the one corresponding to the alternative single screw.However, tandem propellers have the disadvantage derived from the higher hydrodynamic pitch angle of the second propeller. Both, contrarotating and tandem propellers can be designed with conventional or CLT screws.Theoretical justifications shown in the paper explain the performance of both types of propellers. A comparison among the performances of a high block coefficient ship fitted alternatively with a single propeller and a set of contrarotating and tandem propellers, both conventional and CLT versions, is also included.

Code: QSD95H Country: Portugal Source:CASSS

Title: Quick Ship Dispatch Centers

Sponsor: **Status:** ON

Type: Research **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		engineering		

Short Description:
This project, conceived in the spirit of the 1965 IMO Convention regarding the simplification of the international maritime traffic. The project was first developed in the port of Sines, and was implemented afterwards in the other ports by decision of the Council of Ministers, Resolution No. 67/93 of November, 16th. These centres, provided with a fully computerised system connected in a network with the port community through the SINAVE, concentrate on a single place all the operational and commercial activities of the port, working 24 hours per day.

Code: QUI94H Country: France Source:WEGEMT

Title: An estimate of the need for fast passenger transportation

Sponsor:PCR Status:

Type: Research Language:

Authors: Quillici, J. F

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
economics				

Code: RAD95P Country: Source:FAST95

Title: Performance Predictions and Parametric Studies for Small High Speed Displacement and Semi-Displacement Vessel with Shallow Draft.

Sponsor:

Status:

Type:
Paper Language: English

Authors:

Code: RAY94P Country: Source:ESSS94

Title: The Setting-Upof Feedering/Coastal Services, a Solution for the Medium Sized Ports of the Atlantic Arc?

Sponsor:

Status:

Type:
Paper Language: English

Authors:

Code: REC89S Country: Finland Source:CASSS

Title: Reception of wastes from Ships in the Baltic Sea area

Sponsor: Status: F

Type: Study Language: English

Authors: Baltic Marine Environment Protection Commission
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics		economics		

Code: ROB90S Country: Sweden Source:CASSS

Title: Mechanised mooring. Pre study

Sponsor:NCR Status: F

Type: Study Language: English

Authors: Robertson H., MARITERM AB

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering		engineering		

Short Description:
The report discusses the feasibility of using mechanised mooring to improve ship operation and reduce cost in port.

Code: ROB93H Country: Norway Source:CASSS

Title: ELECTONIC CHART DISPLAY & INFORMATION SYSTEM

Sponsor:NCR/PCR Status: F

Type: Project Language: English

Authors: Robertson S.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:
Development of the Robertson Disc Navigation ECDIS. The system complies with all present and future rules and regulations, and displays vessel position in real-time on seamless sea chart with common datum, displayed on a high resolution colour graphic monitor.

Code: ROB96H1 Country: UK Source:WEGEMT

Title: On-line assessment of ship stability parameters

Sponsor: Status:

Type: Research Language: English

Authors: Roberts J.B., Dr J F Dunne

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

This work focused on the development of novel methods for identifying all the parameters in a non-linear equation of motion for ship roll motion, based on the processing of the roll motion only. Thus the roll excitation was assumed to be unmeasurable, and specified only in terms of a stochastic model. A unique feature of the work was the development, implementation and validation of theoretical techniques for estimating linear and non-linear damping components, in addition to linear and non-linear stiffness components. These methods can be implemented on microcomputers and thus can be used, at modest cost, on board a ship for on-line monitoring of all parameters relevant to roll stability. All the techniques developed in the work were very thoroughly tested by applying them to simulated data, for which the true parameter values were known a-priori. Simulation algorithms were implemented for this purpose, enabling response data to be generated for both white noise and correlated noise excitations. By processing an ensemble of simulated roll responses, it was possible to obtain information on the statistical variability of the parameter estimates and the degree of correlation between them. The techniques were also validated through application to some real experimental data, obtained by measuring the rolling motion of models, in random waves, using a wave tank at the University of Sussex.

Code: ROB96H2 **Country:** UK **Source:** WEGEMT

Title: Advance control strategies for motion control of vessels

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Roberts G.N., LtCdr J Davis.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
business				

Short Description:

This study was undertaken in association with the DRA at Haslar, Gosport, and in particular making use of the Agency's motion prediction software. Because of their good seakeeping qualities SWATH vessels (Small Waterplane Area Twin Hull) present an attractive alternative to monohulled vessels for some applications. Despite this, only a few SWATH vessels have been built, since their inception in the 1970s. In the majority of cases motion control is achieved via a mix of classical single-input, single-output, (SISO) PID and LQD control schemes. However, as motion control is normally achieved by sets of hydraulically operated stabilising fins it was considered that a multi-input, multi-output (MIMO) approach would be more appropriate. Furthermore, as there was very little published hydrodynamic data for such vessels it was necessary that the control strategies developed should embrace the concept of robustness. The overall aim of the programme was therefore to investigate advanced control methodologies for motion control of SWATH vessels paying particular attention to robustness of the designed controllers to uncertainty in SWATH

vessel dynamics. The first part of the project involved the development of the mathematical model of SWATH dynamic motions and here it was established that the control problem was exacerbated further because model uncertainty also resulted from encounter frequency dependency of the coefficients in the equations of motion. These findings were verified by the motion prediction software at Haslar. The project has concentrated on the vertical plane motions, in particular have and pitch regulation against the stochastic disturbance effects of the sea. In order to facilitate robustness to parametric model uncertainty. Verification and validation of the effectiveness of the advanced robust design methods employed, for a range of operating speeds, was made by comparison of responses for compensated and uncompensated cases as well as against two benchmark multivariable simulations developed at the RNEC and the frequency domain motion prediction software at DRA Haslar. The latter being specifically modified for the project to accommodate active control of the stabilising fins. This study represents an original approach to SWATH vessel robust control design and analysis, which takes account of structured, unstructured, parametric and non-parametric uncertainty with verification in the time and frequency domains.

Code: ROT91H Country: Netherlands Source:CASSS

Title: Short Sea shipping lines and feeder services: between Rotterdam and European Ports door Port of Rotterdam

Sponsor:

Status: F

Type:

Language: English

Authors:

Code: ROU95H Country: Spain Source:WEGEMT

Title: Optimising routing system for the advanced design cruiser ship.

Sponsor: NCR **Status:**

Type: Research **Language:** Spanish

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics				
business				

Short Description:

The aim of the BUDA project is to improve the design and operation of the passenger and cruiser ships. The project is in course of development by the Spanish Shipyard Union Naval de Levante (UNL), including some subsystems like: improvement of the general design; increase of the ship efficiency and lower environmental impact; use of new structural materials (composites); improvement of safety; manoeuvrability improvement; improvement of passengers' comfort; integrated system for optimum

routing (SSOR).

Code: SAW92P Country: Source:ESSS92

Title: The Impact of Political and Economic Change on Polish Shortsea Shipping

Sponsor: Status:

Type: Paper Language: English

Authors: Sawiczewska, Z

Code: SCH94T Country: Greece Source:CASSS

Title: The transportation of goods between Greece and the rest of Europe; Status Quo, Prospects and recommendations

Sponsor:

Status: F

Type:

Thesis Language: Greek

Authors: Schinas, O.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics			economics	
business			business	
legal			legal	

Code: SCH96P Country: Source:ESSS96

Title: The intermodal link between Greece and the rest of EU countries: Status and prospects.

Sponsor: Status:

Type: Language:

Authors: Schinas, O., H. Psaraftis

Code: SEN92P Country: Spain Source:CASSS

Title: Performance improvements in the ship "Sierra de Guadarrama" with CLT propellers.

Sponsor: Status: F

Type: Article Language: English

Authors: Sendagorta, R. Uriarte, G. Pérez-Gómez and J.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

This paper summarizes the experience obtained in two tests programmes carried out in the ship "Sierra de Guadarrama" with a time lag of nearly 6 years. The first tests compared the ship performance with two alternative propellers: a conventional one and a TVF

one. The result of this comparison was very negative for the TVF screw. Six years later, the ship-owning company, Marítima del Norte, S.A., agreed to repeat the experience with a CLT propeller (an evolution of the TVF concept). The second tests programme, carried out in July 1992, with the same conventional propeller and a new CLT screw, resulted in a great success, with a power saving at the service speed of around 12%, in line with the theoretical predictions. These results demonstrate the excellent performance of the CLT propellers in comparison with conventional ones.

Code: SEN96H Country: UK Source:WEGEMT

Title: Voyage management using parallel processing

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Sen P., Dr M J Downie

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
business				

Short Description:

Voyage management is a decision making process involved with operating ships at maximum profitability because many variables are involved and several of these are difficult to quantify accurately. The process can be complex and computationally demanding. Furthermore, different vessels have different operating strategies, because of the nature of the service they are in or because of the chartering regime they are under and this further complicates matters. In this context two of the principal features of the problem are the development of methodologies relating to the choice of the optimal route, given the environmental conditions and the particular circumstances of the vessel. The choice of the best option depends on the criterion chosen (e.g. cost, time) and it can often lead to multi-criteria analyses. Attempts to solve the above in a satisfactory manner often leads to combinational problems and one way of dealing with these is to use dynamic programming to take advantage of its implicit enumeration features. The separable nature of the problem allowed parallel processing to be employed to attain substantial speedups. The aim of the project was to combine voyage management considerations, including weather routeing, with parallel algorithms to examine the advantages and limitations of the approach. The use of multi-criteria analysis in voyage management was also explored in a limited manner. The research has resulted in viable robust parallel algorithms for carrying out dynamic programming analysis of highly computer intensive combinational problems. The speedups obtained on the distributed memory machine used for the project we shown to be good providing attention is paid to load balancing of work across the processors. The work has demonstrated that voyage management can be undertaken in considerable detail within a practical time span if the potential of parallel machines is fully exploited. It has also shown that the multi-objective aspects of voyage planning can be taken into account, and there is scope of further developments in this area.

Code: SES95H Country: Source:DGXII

Title: SESLAB, Development of an experimental tool for design of large SES Fast Ships

Sponsor: EUR **Status:**

Type: Research **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS engineering

Short Description:

A DGXII project. Objectives: To overcome the uncertainty in the design of new large SESs cargo, a flexible model able to fill the gap on the actual experimental design tools is required. The objective of the project is the development of the design of a SES flexible manned model (SESLAB) that would be used for research and design of SESs with a wide range of sizes and pay loads.Achievements: SESLAB pre-feasibility study and baseline design delivered. Final specification of experimental test requirements including fan, seal, propulsion and RCS requirements established.Planned Actions: Reference design of hull and structures (MID TERM Design). Studies of flexible fan and seal systems. Conceptual design of the measurement system and laboratory facilities.

Code: SHE96H **Country:** UK **Source:**WEGEMT

Title: Fatigue design of weight-critical FRP sandwich structures

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Shenoi R.A., Prof H G Allen

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS engineering

Short Description:

PROJECT OBJECTIVES:1. To develop criteria for the fatigue design of sandwich structures
2. To investigate the effect of water on beams under fatigue loading regimes
3. To extend the range of construction materials and cover fire resistant sandwich beams
4. To explore the performance of sandwich beams under biaxial loading
5. To demonstrate application of fatigue criteria to practical cases

Code: SHE96H **Country:** UK **Source:**WEGEMT

Title: Assessment of damage tolerance levels in FRP ships' structure

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Shenoi R.A.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

PROJECT OBJECTIVES:1. To extend the model outlined in (2) below to predict growth characteristic of flaws under different repeated-load regimes. 2. To develop a suitable numerical procedure for assessing the strength and stiffness of laminated panel with (and without) flaws such as delaminations. 3. To demonstrate the application of these techniques for the assessment of damage in FRP ship structural elements. PROPOSED WORK PROGRAMME:Months 1-3 Background study Months 2-5 Modification to existing, in-house laminate mechanics codes Months 3-9 Modelling of onset and growth of delamination Months 7-15 Application validation of model of step 3 using DRA laminate fracture results Months 12- 21 Development of fatigue relationships involving delaminiation Months 16-22 Application/validation of model in step 5 to DRA laminate fatigue results Months 20-24 Static F.E. modelling of tee-joint & top-hat stiffener details Months 22-32 Combination of steps 5 & 7 analysis & comparison with DRA structure test result Months 30-33 Analysis of results of tasks 6 & 8 ref. guidelines for repair strategies CURRENT PROJECT POSITION: 11/08/94The project has been running for one year. A simple analytical technique for predicting the onset of delamination in a beam and the consequential retardation of properties has been developed. The answers from these compare favourably with test results generated at DRA, Dunfermline. This is now being extended to cover panel configurations. Use of finite element programs for this purpose is also being investigated.

Code: SHI95H **Country:** **Source:**DGXII

Title: SHIP, Ships Hull Integrity Program

Sponsor:EUR **Status:** ON

Type: Research **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

A DGXII project. Objectives: Collection of information and deep analysis of the state-of-the-art, at world-wide level, concerning the innovative tools and technologies supporting the design, manufacturing, monitoring and control in the new concept of large passenger/cargo ships. Identification of innovative experimental technique/procedure. Definition of testing

procedures which might support the adoption of the innovative technology. Thorough evaluation of benefits (socio-economic/technical) sustainable by adoption of innovative technologies in terms of safety and monitoring. Definition of collaboration with certification authorities for possible implementation of rules. Specifications of hardware and software (particularly the sensor placement and treatment of the inter-process communication protocols). Some of the software modules have been implemented, (e.g. rainflow filtering of sensor data).Achievements: At the IMO MSC meeting in Feb 94, a draft recommendation was passed calling for fitting of stress monitoring systems to bulk carriers of over 20,000 dwt, representing a large potential market for the system. This coincided with a request from the owners of the ULCC that they should reduce their role in the project. We were happy to take this opportunity to replace the ULCC by a bulk carrier of 150,000 dwt, introducing the owner as an associate contractor in the project. Apart from being more effective in targeting the bulker market, this also gave us the advantage of know fatigue history, and regular access to the ship in a European port. Despite this change, which had major effects on the instrumentation required, we have maintained the originally planned schedule. Future actions: During the next period, we will build and install the complete sensor system. Data analysis software will be connected to the new sensors, to the existing data flows (eg. engine revs, speed through water) and to the radar for sea-state monitoring. An HCI will be installed on the bridge for real time advice, and data will be logged for off-line analysis for maintenance rescheduling.

Code: SIE93P Country: Spain Source:CASSS

Title: Ferry Rápido" 92: A monohull solution.

Sponsor: PCR **Status:** F

Type: Paper **Language:** English

Authors: Sierra and A. Pérez de Lucas

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:

As an answer to the demand of the market for high speed transport of passengers and vehicles, the monohull solution "Ferry Rápido 92" has been developed by BAZAN (Spain).At the end of 1992, the first two units were ordered by Cia. Trasmediterránea, the main Spanish shipowner.In this paper, the main characteristics and performance of the vessels, together with the most relevant studies accomplished for its design, are presented.

Code: SIE95P Country: Spain Source:CASSS

Title: Fast Ferry "Alhambra": The MESTRAL Grant version

Sponsor: PCR **Status:** F

Type: Research Language: English

Authors: Sierra and J.L. Tejedor
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
				engineering

Short Description:
Two years after the world-wide presentation of the Fast Ferry MESTRAL, BAZAN presented a new Fast Ferry design, named ALHAMBRA, whose capacity (passengers and cars) is about three times the MESTRAL capacity. First ALHAMBRA unit is already under construction for BUQUEBUS to enter into operation in the Río de la Plata traffic in 1996. This new ship maintain the same design concepts of the MESTRAL, that have demonstrated an excellent performance in its two first units.This paper starts with a description of the three equipment damages, not related to the ship design and construction, that have appeared during the service of the first MESTRAL operating unit ("Albayzin") and the way in which those damages have been solved. A summary of the most relevant rel ship performance data are also presented.

Code: SIN95H Country: Portugal Source:CASSS

Title: SINAVE

Sponsor: Status: ON

Type: Research Language: English

Authors:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
				engineering

Short Description:
A computerised system was developed by the Administration of the Port of Sines, which connects all the economical agents of the port community. Through this system and using electronic mail, information concerning the type of vessels, nature and quantity of cargoes, required services, authorisations required and given, and so on. This system was already installed in the ports of Setúbal, Lisbon, Leixões and presently it is in the course of implementation in the port of Aveiro. The next step is the interconnection, already possible, of the systems of the several ports.

Code: SJO90S1 Country: Sweden Source:CASSS

Title: Coastal and SSS. Pre study

Sponsor:NCR Status: F

Type: Research Language: English

Authors: Sjoebris, A., MARITERM AB

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering engineering
economics economics
business
business

Short Description:
The report examines the economical and technical possibilities of re-establishing coastal shipping as a transport alternative for consignment and miscellaneous goods. The transfer of goods between land and ship must be substantially rationalised by mechanisation and an entirely new type of organisation is required for booking and coordinating the transports.

Code: SJO90S2 Country: Sweden Source:CASSS

Title: Integration of cargo units between railway and shipping. Pre study

Sponsor:NCR Status: F

Type: Study Language: English

Authors: Sjoebris, A., MariTerm AB
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering
engineering engineering
business

Short Description:

Intermodal technique study. Evaluation of the technical and logistical feasibility of integrating transflat cassettes in combined rail and sea transport.

Code: SJO92P Country: Source:ESSS92

Title: Coastal and Shortsea Shipping in Sweden: a Preliminary Study

Sponsor: Status:

Type: Paper Language: English

Authors: Sjoebris, A

Code: SJO93S Country: Sweden Source:CASSS

Title: Coastal and SSS. Technical feasibility study

Sponsor:NCR Status: F

Type: Study Language: English

Authors: Sjoerbis, A., MARITERM AB
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering engineering

business business business

Short Description:

The project investigates the technical feasibility to create a transport system integrating shipping as main transport mode, with truck- or trainborne distribution via a completely mechanised port. The report includes a possible design of ship and terminal handling system. A cost comparison with land transport shows the system to be competitive.

Code: SJO94P Country: Source:ESSS94
Title: Fast Selfloading and Unloading Unitload Shipsystems for Coastal and Shortsea Shipping: Potential in North-East Europe

Sponsor:
Status:
Type: Paper Language: English

Authors: Sjoebris, A., N. Wijnolst, C. Peeters

Code: SJO95H Country: Sweden Source:CASSS

Title: Coastal and ShortSea Shipping Market Study

Sponsor:NCR Status: ON

Type: Research Language: English

Authors: Sjoebris, A., et al., MARITERM AB
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering		engineering	engineering	
business		business	business	

Short Description:

Market and feasibility analysis of a port hopper sea transportation system along the Swedish East Coast to the Continental Europe.

Code: SJO96P Country: Source:ESSS96
Title: Building European shortsea networks.

Sponsor: Status:

Type: Language:
Authors: Sjoebris, A.

Code: SME96H Country: UK Source:WEGEMT

Title: A marine electronic chart system based on interactive video

Sponsor: Status:

Type: Research Language: English

Authors: Smeaton G.P., Capt W O Dineley

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
business				

Short Description:

The principle aim of the project has been the development of a fully operation Electronic chart system for marine navigation. Recent developments in laser disc technology and associated computer hardware were adopted in order to overcome the current lack of digitised data. Thus the nautical chart display was generated by retrieval of an analogue image, of frame, from a mass storage video disc; the images were produced initially by direct photography of existing nautical charts covering a variety of scales. The specification for the prototype is broadly in line with the International Hydrographic Organisation's Draft Specification for Electronic Chart Display and Information Systems (ECDIS); divergence from the draft specification which refer to a digitally generated display. The prototype supports chartwork associated with both on-line navigation and passage planning. Use of the industry standard NMEA 0183 serial interfacing protocol allows data input from a variety of sources. Thus realtime navigation mode provides for continuous display of Own Ship position along with an associated vector indicating heading and speed. Own ship data were derived from either a Radar Simulator of GPS receiver during system evaluation. However the interface allow simultaneous connection to a wide range of bridge equipment e.g. ship's log, gyro, radar and alternative position fixing systems. For passage planning, a comprehensive weaponed editor allows easy and rapid route generation and storage. The use of spatial data structuring provides system functioning in advance of current specifications. Thus, online checking of charted depth, look ahead antigrounding warnings and proposed track evaluation against charted topography were all implemented at the demonstration level. Three levels of evaluation were used throughout system development. Bench testing and discussions provided the basic test method. However, realistic simulator exercised in both passage planning and navigation, using the system without additional paper charts, provided substantial feedback as the merits of the system and the Electronic Chart approach generally. The system was also tested briefly at sea, and a ruggedised version, based on the project, has been subject to extensive demonstration and evaluation in the North Sea. The resulting prototype fulfilled the original objectives of the work. The positive responses obtained from independent evaluation also verified the Electronic chart concept as a useful and important element in future navigation technology. Real time display of Own Ship position along with the potential for rapid access to additional data were confirmed as progressive features which will contribute to safety at sea in the future.

Code: **SME96H** **Country:** **UK** **Source:WEGEMT**

Title: **Real time decision support for marine pilotage**

Sponsor: **Status:**

Type: Research Language: English

Authors: Smeaton G.P., Capt S K Watson, Dr P G Brooks
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		business		business

Short Description:
PROJECT OBJECTIVES:1. To develop a rule based decision support system for marine pilotage based on detailed task analysis and terrain modelling, and to identify generic features of the overall system.2. An ancillary aim is to develop a user interface to accommodate the stringent spatial and temporal nature of pilotage information.PROPOSED WORK PROGRAMME:The project has four stages:1. Months 1 to 6:- literature search, familiarity with existing Electronic Chart system, spatial and other data modelling methods, navigation simulator and pilotage methods will be established. Data prediction will also begin in the first phase to complement the existing Electronic Chart.2. Months 7 to 16: Establish a preliminary rule base, based on analysis of the pilotage task. Data areas will be delineated, and terrain modelling will commence in detail in this phase. Data selection strategies will be evolved and will be closely inter-related to the data modelling methods adopted. Evaluation procedures will be derived for bench and simulator testing.3. Months 17-27. Refinement and consolidation of the system.4. The concluding phase of the work will concentrate on the user interface design and evaluation. The relationship with Electronic Chart will be drawn out in terms of the presentation model. In addition, any problems associated with time dependencies and information redundancy will be addressed.CURRENT PROJECT POSITION: 16/06/94In addition to a literature review and general familiarisation, the work to date has been in two main areas. In the first instance task analysis has been undertaken by informal interviews with working pilots. Currently seven have been interviewed in the University. This has been supplemented by pilotage trips on the Humber and Mersey - five passages have been completed.The second strand of the study has been concerned with preliminary work on terrain modelling. Survey data has been obtained from both Mersey and Humber Port Authorities. This has provided a firm foundation for project collaboration between the University team and the industrial collaborators. An additional benefit to the project has been the cooperation of Genasys Ltd, suppliers of GIS software. The current status of the work is excellent, progress to date has exceeded initial expectations in all aspects of the study.

Code: SNV93S Country: Greece Source:CASSS

Title: Sealink - Improvements of transport connections across national borders

Sponsor:EUR Status: F

Type: Study Language: English

Authors: SNV, Studieengesellschaft Verkehr mbH, et. al
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS

economics economics economics

Short Description:
RECITE programme. Within the framework of international cooperation between the ports of Brindisi, Patras, Rostock, and Lubeck, the experience of ferry ports is exchanged, areas where action is required is defined and a concept for modern ferryport logistics is presented

Code: SON95S Country: Italy Source: CASSS

Title: Safety of Navigation: The hydrocarbon traffic and the environment protection

Sponsor:NCR Status: F

Type: Study Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
economics				
legal				

Short Description:
The study is made up by two parts:The first part regards mainly:· international rules on safety at sea· international rules on antipollution at seaThe second part regards mainly:· the role of crude oil on the sea transport· the ships engaged in the crude oil transport at sea· the risk of coastal pollution caused by oil· the antipollution techniques · detailed analysis of some of the main accident

Code: SPH96H Country: Source:DGVII

Title: SPHERE: Small-medium sized ports with harmonised, effective re-engineered processes.

Sponsor:EUR Status: ON

Type: Research Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
			engineering	
		economics	economics	
		business	business	
		legal	legal	

Short Description:
A DGVII project. Its main objective is to develop a generic operational and organisational framework for the efficient, reliable, and flexible operation of SMPs as service centres for transhipment and distribution. The framework will aim at the effective integration of such ports within the Trans-European Intermodal Network.

Code: SRR95S Country: France Source:CASSS
Title: Sea/River Road as an alternative and an extension to all Road or Sea/Road Transport

Sponsor: **Status:** ON
Type: Study **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering	engineering economics			
business	business		business	

Code: SSS93S1 Country: Netherlands Source:CASSS

Title: SSS in intermodal transport: start of champain by DST Educatieve Communicatie

Sponsor: **Status:** F

Type: Study **Language:** English

Authors: DGSM

Code: SSS93S2 Country: Netherlands Source:CASSS

Title: SSS in intermodal transport: final survey

Sponsor: **Status:** F

Type: Study **Language:** English

Authors: DGSM

Code: SSS96H Country: Source:DGVII

Title: SSS-CA: Concerted Action on shortsea shipping

Sponsor: EUR **Status:** ON

Type: Research **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering	engineering	engineering	engineering	enginee
economics	economics	economics	economics	econonm
business	business legal	business	business	busines
legal		legal	legal	legal
environment	Environment	environment	environment	environ

Short Description:

A DGVII project. Is expected to play an important role in the Commission's Waterborne Transport Research Programme (4th FP). It will do so by setting out the following goals:

· compiling the state of the art in this (broadly defined) area,
· synthesizing all relevant research and other related work,
· monitoring related projects,
· defining relevant pilot projects and demonstrators,
· defining criteria for interoperability and SSS logistical efficiency,
· identifying the key focal points for shortsea shipping future development, and
· providing the widest possible exposure and dissemination of the results of the action.

Representation is open to all EU countries and other countries associated with the research programme (according to the association protocol). As many as 13 meetings are envisaged for the action in the period 1995- 1998. The Technical Secretariat of the action is managed by a 4-partner consortium, with the National Technical University of Athens as Coordinator, and with the Alliance of Maritime Regional Interests in Europe (AMRIE), the Institute of Shipping Economics and Logistics (ISL Bremen) and the WEGEMT Association as partners.

Code: STO94P Country: Source:ESSS94

Title: Safety in a Modern Perspective

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Stoop, J.A

Code: STO96P Country: Source:ESSS96

Title: Integrating safety into the shortsea shipping system.

Sponsor: **Status:**

Type: **Language:**

Authors: Stoop, J.

Code: STR94P Country: Norway Source:CASSS

Title: Competition between transport modes in deregulated European markets

Sponsor: **Status:** F

Type: Paper **Language:**

Authors: Strandenes, S. P.

Code: STU94P Country: Source:ESSS94

Title: Institutional and Socio-Economic Issues in Greek Ferry Services.

Sponsor: **Status:**

Type: Paper Language: English

Authors: Sturmey, S.G., G. Panagakos, H.N. Psaraftis

Code: SUG91P Country: Source:FAST91

Title: Research and Development Program of Techno-Superliner

Sponsor: Status:

Type: Paper Language: English

Authors: Sugai, K., M. Yamaguchi
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS

Short Description:

Code: SUK88H Country: Netherlands Source:CASSS

Title: Short sea bulk shipping : an analysis of UK performance by the Department of Transport

Sponsor:NCR Status: F

Type: Research Language: English

Authors: Dept. of Transport, London, UK
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS

Short Description:

Analysis of the short sea sector in terms of performance of the UK and other major continental fleets in the light of a.o. market opportunities, safety regulations. Comprised are: European short sea dry cargo fleets; European short sea tanker trades; influences on the performance of the UK short sea fleet. Concluded is that West Germany and the Netherlands are the two countries whose short sea fleets have been least affected by the pressures for contraction

Code: SUT94P Country: Source:ESSS94

Title: Container Trafficsin Europe - Changing Patterns and Policy Options.

Sponsor: Status:

Type: Paper Language: English

Authors: Sutcliffe, P., M. Garratt

Code: SVE93P Country: Source:FAST93

Title: Design Philosophy and Design Procedures for Large High Speed Craft

Sponsor: Status:

Type: Paper Language: English

Authors: Svensen, T.E., S. Valsgard

Code: SVE96P Country: Source:ESSS96

Title: Sealynx - Presentation of a new concept of short sea bulk transport system.

Sponsor: Status:

Type: Language:

Authors: Svendsen, M., S. Lall

Code: TAK93P Country: Source:FAST93

Title: R & D of a Displacement-Type High-Speed Ship (Part 1. A Conceptual Design Study)

Sponsor: Status:

Type: Paper Language: English

Authors: Takarada, N., J. Obokata, M. Kado, M. Takai, K.

Code: TAR94H Country: Italy Source:CASSS

Title: Target Research Action: New Ship Concept on the framework of Short Sea Shipping

Sponsor:EUR Status: ON

Type: Research Language: English

Authors:
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
A DGXII project. The main scope of the programme is to give competitiveness to the marine European Industry. The research is carried out by various Partners providing different competence and it is delicated to the identification of vessels to the employed in the high speed sea traffic.The vessel identification involves:· Ship design· hydrodynamics· ship structures· propulsion· outfitting· ship components design

Code: THO96H Country: UK Source:WEGEMT

Title: Safe transient basins: a new tool for designing against capsize

Sponsor: Status:

Type: Research Language: English

Authors: Thompson M.T.
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:

A detailed study has allowed precise and logical ideas for a brief but searching test procedure for hull forms. This aims to determine a transient capsize diagram by means of an efficient, standardised ambient test. This diagram displays on a plot of wave steepness against wave frequency those sea-states that induce capsize under a short train of regular waves, and is proposed as a new and realistic way of quantifying ship stability. The validity of this capsize signature for a hull profile derives from our demonstration that in this space there is a sharp, well-defined excitation boundary, largely independent of initial conditions and the length of the wave train. It can be found economically, in computations or tank tests, by a standard test in which a stationary, upright boat in ambient conditions is subjected to a short pulse of beam waves. A laboratory test can conveniently utilise the wave-front propagating from a wave-maker that has just been switched on. The practical implications of these findings for ship stability regulations and testing are discussed in a series of articles directed towards naval architects. Our approach has already been adopted by Kan and his co-workers in the Tokyo Ship Research Institute, and applied in a number of stabilised studies. The research built on our earlier discovery of the sudden loss of the safe non-capsizing basis of attraction, in the space of the starting conditions, as the sea-state was increased. An integrity diagram was drawn showing the loss of most of the area of the safe basin at a sharp Dover cliff which was at about 70% of the sea-state that would induce capsize under steady-state conditions. When integrity diagrams are drawn for escape within 1, 2, 4, 8 and 16 forcing cycles, it is concluded that for practical purposes of a ship does not capsize in about 8 waves it will not capsize at all. This is an important result, which allows quite short transient tests to be employed. The fact that incursive fractal fingers sweep rapidly across the centre of the safe basin at the Dover cliff means that the cliff can be accurately located by using just a single ambient start. Specific results of the investigation can be listed as follows: (a) Real ship models: studies of the Gaul and Edith Terkol, whose capsizes have been discussed in the naval literature, confirm the applicability of our results to different GZ and damping functions. (b) Explanation and prediction of the Dover cliff, for a range of damping, it is shown that the steepest region of the cliff is associated with a heteroclinic connection. (c) Unpredictable jumps and worst-case capsize: this heteroclinic connection also implies an indeterminate jump to resonance which gives the lowest sea-state at which capsize can occur in an ambient test. (d) Parametric excitation: it is confirmed that our new ideas on capsize remain valid under parametric wave excitation. (e) Tests using propagating wave front: studies in which an ambient model is hit by the natural start-up wave front propagating from a wave-maker, shows this to be an efficient method of transient testing. (f) Design formula: the simple heuristic design formula for beam sea resonance, (sustainable wave slope)/(angle of vanishing stability) = 2 x (damping ratio) suggests useful non-dimensional parameter groups for comparing capsize signatures of different vessels.

Code: TIL96H Country: Source: ISL

Title: "TILEMATT"

Sponsor: EUR **Status:** ON

Type: Research **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics	economics	economics		
				econonm
business	business	business		busines

Short Description:

A DGXIII project. The idea of TILEMATT is to prepare an integrated project comprisin adequate applications that will enhance the multimodal short-sea-shipping links. These links, namely Link 1: Greece-Italy and Link 2: Calais-Dover, wil connect the TransEuropean Networks for Transport (road, rail and maritime) using advanced telematics technologies such as on-line multimedia for passengers, traveller support systems and freight management systems, thus setting the basis for a Multimodal TransEuropean Network for Transport. The feasibility of implementing telematics-based applications for ensuring the interconnection of waterborne with other transport modes (rail and road) will also be assessed on a third link, namely Rostock-Sweden.
The main outcome of the project consists of dynamic multimedia systems installed on ferries operating on both project links that offer passengers interactive telecommunication services (incl. guidance, ticketing and booking) and updated information on travel, opportunities and activities at the destination; satellite-based communications between operators, their ships and vehicles (railroads and trucks), the installation of Management Information Systems at the ports of Patra, Igoumenitsa and Ancona connected to the already existing Public Transport and Traffic Control Centers at the port hinterlands.

Code: TRA88S Country: Greece Source:CASSS

Title: The role of transport in the movement of products to/from Crete

Sponsor: NCR **Status:** F

Type: Study **Language:** English

Authors: TRADEMCO Consultants

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
business				

Short Description:

This study examined all transport parameters (i.e. ship size and availability, truck characteristics and zize, demand peaks, etc) in evaluating methods of improving transport to/from Crete.

TRA93S Greece CASSS

Code: Country: Source:

Title: Pilot Action for a Pilot Operation of RoRo ships between NAVIPE (Gr) and Italy

Sponsor: NCR **Status:** F

Type: Study **Language:** English

Authors: TRADEMCO Consultants

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS

business

Short Description:

This study examined possible actions for utilizing the port of Navipe as a transhipment port using Ro-Ro ferry vessels between Greece and Italy. It examined all other operational issues necessary for the implementation of the project.

Code: TRA93T **Country:** Denmark **Source:** CASSS

Title: Transport 2005

Sponsor: NCR **Status:** F

Type: Technical **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS

Short Description:

Mainly about development of the road system

-
Important to have a sound transport system

-
The government wants to encourage sea transport due to environmental considerations

-
State ports are to have extended scope for carrying out business

Conclusion

-
Too many ports in Denmark

Code: TRA94S **Country:** Ireland **Source:** CASSS

Title: Shipping Unitised Cargoes in Ireland

Sponsor: EUR **Status:** F

Type: Study **Language:** English

Authors: Trant.G

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS

economics economics economics
economics
business business business business

Short Description:

This DGVII study considered the interaction of primary parameters in the choice of mode and route in the transport of goods between Ireland and the rest of the European Community. A comprehensive database was built and an analysis made of the effects to changes in the transport services

Code: TRA95H1 Country: Ireland Source:CASSS
Title: Implementation of Hazmat Directive in Ireland

Sponsor:NCR Status: ON

Type: Research Language: English
Authors: Trant

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

environment

Short Description:
The project involved consulting with the relevant authorities and providing them with information on their legislative requirements regarding the monitoring of hazardous cargo movement. We also notified them of their hardware and software requirements and provided them with software specifically developed.

Code: TRA95H2 Country: Ireland Source:CASSS

Title: Casualty at Sea D-Base

Sponsor:NCR Status: ON

Type: Study Language: English

Authors: Trant G.
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
legal
legal

Short Description:

TRA95H3 Ireland CASSS
Code: Country: Source:
Title: Design of Classic Boat

Sponsor:NCR Status: ON
Type: Study Language: English

Authors: Trant G.

Subject Classification according to the given matrix
SHIPS CARGO
PORTS NETWORKS TELEMATICS

engineering

Short Description:

In this area we are amalgamating old boats with new technologies and materials. The refined designs have attempted to merge the desirable characteristics of traditional designs with modern standards of materials, building methods design and accommodation to produce optimum results while preserving the aesthetic appeal of the traditional sailing vessel

Code: TRA95T Country: Ireland Source:CASSS

Title: A Regional Traffic Service-It's relevance in Ireland

Sponsor:NCR Status: F

Type: Tech. RepoLanguage: English

Authors: Trant

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		engineering		
		business		
		environment		

Short Description:

The purpose of the system is the avoidance of accidents. However, it is also encompassed that the necessary elements to deal with emergencies and prevent or limit the resulting loss of life or damage to property or the environment.

Code: TRC93T Country: Denmark Source:CASSS

Title: Transport/Communication - Resource Area Analysis

Sponsor: Status: F

Type: Technical Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
				enginee
				busines
				legal

Short Description:

-

Establish the essential changes of external conditions which will influence the future competitiveness: Liberalization in EU, extended demand for transport, environmental demands, policy on taxation, duties and subsidies, infra-structure, technology, development of telecommunication.

Conclusions

-

For Danish shipping the harmonization of international rules are important

-
No EU special rules for EU shipowners

-
A combined strategic marketing of Denmark as a logistic centre is necessary

-
Strengthening the communication of new knowledge obtained via research

Code: TRI91P Country: Source:FAST91

Title: High Speed Over Water, Ideas from the Past, the Present and for the Future

Sponsor: Status:

Type: Paper Language: English

Authors: Trillo, R.L.,

Code: TRI94P Country: Source:ESSS94

Title: Futura - a Fast Ro-Ro Ship for Mediterranean Coastal Trade

Sponsor: Status:

Type: Paper Language: English

Authors: Trincass, G., C.Closca, R. Nabergoj, J.S.

Code: TRI95P Country: Source:FAST95

Title: Feasibility Study on a High-Speed Catamaran: Comparison with Aquastrada.

Sponsor: Status:

Type: Language:

Authors: Trincas, G., A. Biriaco, I. Grubistic, A.

Code: TRI96P Country: Source:ESSS96

Title: Forecasting the fleet to serve the South-East European shortsea transport.

Sponsor: Status:

Type: Language:

Authors: Trincas, G., R. Nabergoj, E. Curtis, V. Pistola

Code: TRU94P Country: Source:ESSS94

Title: Metro-Coastal Shipping

Sponsor: Status:

Type: Paper Language: English

Authors: Truau, J.,

Code: TRU96H Country: Belgium Source:WEGEMT

Title: Preliminary design of a low profile coaster

Sponsor:PCR Status: F

Type: Project Language:

Authors: Truijens P.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

Preliminary design of a low profile coaster with the following design specifications, as stated by the sponsor: LOA=125m; B=15m, air draught=6.5m at T=3.0 to 3.10m.Main engine min. approx 1600kW, max. 2000kW with shaft generator of 400kW.Service area: Benelux to UK and Ireland, Rhine. Range: Hamburg to LeHavre.The design has to be optimised with respect to max load and min freeboard at sea, and also with respect to the carriage of containers and swap bodies with a width of up to 2.60m. Hatch covers should be capable of carrying 2 tiers of containers.

Code: VAD96P Country: Source: ISL

Title: "VADE MECUM"

Sponsor:EUR Status: ON

Type: Research Language:

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics	economics	economics		econonm
business	business	business		busines

Short Description:

A DGXIII project. VADE MECUM is a corridor project linking towns, cities and regions across Ireland, UK and the Netherlands. The design study is justified by the need to solve challenging technical, institutional and socio-economic problems encountered within the corridor arising from user needs in Network Management, Traveller Information, and Freight Operation. Problems which are far from unique in Europe.

The passenger traveller and freight carrying scenarios are numerous. They include multiple languages, modal interchanges and interactions between rail and road corridors, ferry and road, rail and road links to airports, and land and sea frontiers. There are a large number of journeys, of wide variation in type and distance, within and between regions, and internationally between Ireland, Northern Ireland, Great Britain and the Netherlands.

Code: VAI90H Country: Finland Source:CASSS

Title: Knowledge based Methodology for Simulation of intermodal Transport terminals

Sponsor: **Status:** F

Type: Research **Language:** English

Authors: Vainio J.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		business		

Short Description:
the study presents the general methodology for modelling and simulation of seaport and inland terminals in intermodal freight transportation systems. The report documents a phase of the on-going more comprehensive effort aimed at developing a generalised modelling capability to provide strategic and tactical decision support for transportation logistics and intermodal terminals.

Code: VAI92T Country: Finland Source:CASSS

Title: Integrated transport and logistical developments in Europe

Sponsor: NCR **Status:** F

Type: Technical **Language:** English

Authors: Vainio J.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
business		business		

Code: VAI93H Country: Finland Source:CASSS

Title: MULTIMOD: the system for Simulation Modeling of Seaports and terminals as logistics centers in Intermodal freight transport/simulation in

Sponsor: logistic planning

Type: NCR **Status:** F

Authors: Research **Language:** English

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
		business		

Code: VAI93T Country: Finland Source:CASSS

Title: Baltic Sea - Mare Nostrum

Sponsor: NCR **Status:** F

Type: Technical **Language:** English

Authors: Vainio J.

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
business

Short Description:
A symposium on the following themes: Baltic ferry traffic and port competition, Shortsea and feeder transport in the Nordic trades, Legal aspects of passanger ferries, The regional impact of free maritime transport in the Baltic Sea, Baltic borders, The political and economic impacts of de-integration of the USSR on transportation in the Baltic Sea, International market and shipping policy, Shipping in Finland, Sweden and Norway - a transaction cost analysis, The trends in Polish maritime policy, The Hamburg rules?, Baltic chambers of commerce association

VAI94S Finland CASSS
Code: Country: Source:
Title: The nothern Sea route. A traffic potential study

Sponsor:NCR Status: F
Type: Study Language: English

Authors: Vainio J.

Subject Classification according to the given matrix
SHIPS CARGO
PORTS NETWORKS TELEMATICS
business

Short Description:

the aim of the study is to assist in finding possibilities to create economically feasible transit traffic on the Northern Sea Route, the sea route passing north of Siberia and thus connecting the North Atlantic and the North Pacific Oceans. The advantage of the route is the shorter navigational distance. The present trades were investigated. The potential for the route transports were then estimated to 10 million tonnes a year

Code: VAI94T Country: Finland Source:CASSS

Title: Peripherality and logistics in the New Europe

Sponsor:NCR Status: F

Type: Technical Language: English

Authors: Vainio J.
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
business
business

Short Description:
Conference on the following themes: Characteristics of regions and the location of enterprises, Logistic networks and peripheral regions in Europe, Transport operators and the logistics impact of company location

Code: VAN93A Country: Netherlands Source:CASSS
Title: International Bulk Journal: Rotterdam-Scandinavia shortsea shipping in the future

Sponsor: NCR **Status:** F
Type: Article **Language:** English

Authors: van der Burg, J.

Short Description:
In this article shortsea shipping between Rotterdam and Scancina-via is reviewed. Main conclusion: the Baltic Sea fulfils an important role for Rotterdam with respect to the import and export of bulk cargo by sea

Code: VAN93H Country: Netherlands Source:CASSS

Title: The EU and Shortsea shipping: opportunities and threats for Mainport Rotter-dam by "Kerngroep Strategische Verkenning";
Sponsor: EUR **Status:**
Type: Research **Language:** English
Authors:

Code: VAN95H Country: Netherlands Source:CASSS

Title: Shortsea shipping between Rotterdam and Bilbao

Sponsor: NCR **Status:** F

Type: Research **Language:** English

Authors: van Rheenen; Gemeentelijk Havenbedrijf Rotter-dam

Short Description:
In this survey reserach is done towards the administrative organisation of and hindrances concerning intermodal transport

Code: VAN96P Country: Source:ESSS96

Title: Hinterland Transport Management Information System.

Sponsor: **Status:**

Type: **Language:**

Authors: Van der Linden, J., S. Veldman, M. van der Flier

Code: VAR96H Country: UK Source:WEGEMT

Title: A theoretical and experimental investigation of the hydrodynamics of a manoeuvring ship in deep and shallow water
Sponsor: **Status:**
Type: Research **Language:** English
Authors:
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description: PROJECT OBJECTIVES:To carry out a series of force, moment, vorticity and pressure distribution measurements in shallow water using three different hull forms.
PROPOSED WORK PROGRAMME:Theoretical work. (1) To extend the original study of vortex effects from Phase 1 to cover a wider range of hull forms and stern shapes. (2) To develop a simplified approach to the calculation of vortex paths and circulation strengths to permit their prediction directly from hull geometry. (3) To carry out a regression analysis of available derivative data to provide improved semi-empirical formulae. (4) To deduce a correction term for vortex effects in shallow water by using a system of mirror image vortices. (5) To investigate the enhancement of the vortex impulse method to represent the non-linear effects at larger drift angles. (6) To develop manoeuvring prediction program suitable for interactive design purposes. Experimental work. This will be extended from that of the first phase to include an investigation of the manoeuvring behaviour of different hull forms as they advance with slow and service speeds, in the linear and non-linear drift angle range. The new experiments will incorporate beam and astern conditions.

Code: VAS96H1 **Country:** UK **Source:**WEGEMT

Title: Ship capsizing in severe following/quartering seas by broaching-to (Visiting Fellowship)

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Vassalos D.

Subject Classification according to the given matrix

SHIPS **CARGO** **PORTS** **NETWORKS** **TELEMATICS**
engineering

Short Description:
PROJECT OBJECTIVES:1. To enable the applicant to collaborate closely with an authority on the subject of shipstability in undertaking fundamental research to improve understanding of the problem of ship capsize by broaching-to. 2. To bring expertise in the applicant's Department in the priority research areas of highspeed craft and small craft dynamics. 3. To facilitate transfer of knowledge between UK and Japan in the fields of the visitors'expertise.

Code: VAS96H2 **Country:** UK **Source:**WEGEMT

Title: Ship capsize in severe following/quartering seas by broaching-to: a dynamical systems approach

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Vassalos D.

Subject Classification according to the given matrix

SHIPS **CARGO** **PORTS** **NETWORKS** **TELEMATICS**

engineering

Short Description:
The question of ship safety, as characterised by ship stability, has been fraught with difficulties for over a hundred years. Despite a considerable amount of research, a universally-acceptable solution for the problem has still not been achieved, mainly because of the underlying complexity. One of the major modes of ship capsize, as observed in model experiments and deducible from accident statistics, is the so-called broaching-to phenomenon. This is the most dynamic mode, resulting from loss of controllability in severe astern seas, which can lead to loss of stability and ultimately to capsize. However, in spite of the fact that most ships run the danger of this possibility, a rigorous treatment of this capsize mode is still lacking. Reasons include: 1. In a broach the ship is in a very extreme condition that makes studies of the physics, either theoretical or experimental, difficult; 2. Capsizing by broaching-to represents a single event in which are present many potentially dangerous scenarios linked in a cause-effect relationship, usually investigated separately; 3. Deriving from a non-linear system, broaching depends on initial conditions. The normally adopted approach of time domain simulations is limited in its ability to be used for a global investigation of capsizing by broaching-to and hence form acquiring a fundamental understanding of the phenomenon. Against this background, the present research, undertaken as part of this Visiting Research Fellowships, is aimed at undertaking a fundamental study of the broaching-to phenomenon for a ship running in regular astern seas through application of a dynamical systems approach. More specifically, research is focusing on the coexistence of static equilibria (corresponding to surf-riding) and non-linear periodic motions. A manoeuvring model in waves is adopted comprising surge, sway, yaw and roll with an auto pilot. The model is transformed to an averaged form over one encounter period to enable an investigation on the occurrence, local stability and outstructure of non-linear periodic motions. Of particular interest is the study of the special case of a ship running in regular astern seas at very low encounter frequency. A methodology of such an investigation did not exist as it would appear that non-linear oscillations of dynamic systems without restoring have not yet been treated. Finally, numerical results are presented using a purse seiner. Critical conditions for dangerous phenomena, identified on the basis of the above investigation, are in reasonable agreement with results obtained from free-running model experiments. Based on the research findings, useful information can be deduced for ship designers and operators to reduce the likelihood of broaching-to.

Code: **VTS95H** **Country:** **Spain** **Source:WEGEMT**

Title: **Implantation of the VTS in the Spanish coast**

Sponsor:NCR **Status:** **ON**

Type: **Project** **Language:** **Spanish**

Authors: **VTS**
Subject Classification according to the given matrix

SHIPS **CARGO** **PORTS** **NETWORKS** **TELEMATICS**

engineering
business
legal

Short Description:
The Spanish Maritime Administration is involved in a long time programme to improve the ship navigation safety by means, between other topics, of a network of Vessel Traffic Surveillance stations.The system, by its own characteristics, has a direct connection with the coastal navigation, and also with their interference with some routes of oceanic navigation.The Spanish company SAINSEL, specialists in electronic control and surveillance systems and operation simulators, has been contracted to develop an important part of the programme.

Code: WAV96H Country: Denmark Source:WEGEMT

Title: Wave-induced hydroelastic response of fast mono-hull ships

Sponsor:NCR Status: ON

Type: Research Language:

Authors:
Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
A theory is described and results presented for wave-induced ship hull vibrations in stationary and in stationary stochastic seaways. The calculations are performed within the framework of a non-linear, quadratic strip theory formulated in the frequency domain, so that the excitation of springing is caused partly by resonance and partly by non-linear excitation. The importance of springing on both extreme value predictions and fatigue damage accumulation is investigated. Besides this continuous excitation also transient loads, so called whipping vibrations due to impact slamming is considered. Special emphasis is given to the combination of the continuous wave-induced response and the high-frequency slamming induced response. The wave-induced response becomes non-Gaussian in stationary stochastic seaways because of the non-linearities. In the present approach the statistical properties of the hull girder response are described by the first four statistical moments through a Hermite series approximation to the probability density function.

Code: WEG95T Country: Norway Source:CASSS

Title: The fast Boat Market

Sponsor: Status:

Type: Technical Language:

Authors: Wegeland T., Osmundsvaag A., SNF

Code: WEL92P Country: Source:ESSS92

Title: Innovation in Multi-Modal Logistics Solutions

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Wells, S.N.A.

Code: WEL96H Country: Source: ISL

Title: "WELCOM"

Sponsor: EUR **Status:** ON

Type: Research **Language:** English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics	economics	economics		
				econonm
business	business	business		busines

Short Description:

A DGXIII project. There is an apparent need to strenghen the use of alternative modes than road (short sea shipping, inland waterways and rail) to a maximum degree. This is valid in particular for the West-East-Corridor from Ireland, via the Netherlands and Germany up to Poland where a considerable increase in road transport is expected. Information exchange between all actors involved as well as powerful freight management resource tools at each dispatching site culd support the use of multimodal transport chains and therefore need a careful and thorough investigation to detect further possibilities for improvement. The development of appropriate tools for the co-ordinated tactical planning and operation of resources will then increase considerably the transport efficiency in terms of transport quality, safety and costs and an optimised use of different modes in an existing physical infrastructure.
The main objective of the WELCOM Design Study is to create the basis for future phases demonstration and evaluation on the West-East Corridor.

Code: WEL96H Country: UK Source:WEGEMT

Title: The determination of the motions and hull loading characteristics of catamarans in waves

Sponsor: **Status:**

Type: Research **Language:** English

Authors: Wellicome J.F., Dr P Temarel, Dr A F Molland

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

PROJECT OBJECTIVES:1. To determine experimentally the motions, accelerations, added resistance and hull loadings of a series of catamaran models travelling at higher Froude numbers in waves. 2. To explore the capabilities of using 3D, 2D and hybrid theoretical approaches to predict the characteristics of catamarans at higher Froude numbers in waves.
PROPOSED WORK PROGRAMME:Experimental work. (1) Manufacture of models, including the production of moulds from existing models. (2) Preliminary investigations into potential improvements in latest testing techniques for added resistance and the trial use of pressure transducers. (3) Investigations into model launch during a run. (4) Tank testing of models, including measurements of pitch, heave, added resistance, vertical accelerations and hull pressure.Theoretical work. Existing 3D and 2D theories will be applied to the motions characteristics of catamarans, and their application at higher Froude Numbers will be investigated. Sources of significant discrepancies will be identified and proposals made for suitable extensions to the theory capable of removing these discrepancies.

Code: WER96P Country: Source:ESSS96

Title: Fast ferries in the European shortsea network - the potential and the implications.

Sponsor: **Status:**

Type: **Language:**

Authors: Wergeland, T., A. Osmundsvaag

Code: WES95H1 Country: Belgium Source:CASSS

Title: Cargo Tracing

Sponsor:PCR **Status:** F

Type: Research **Language:** English

Authors: WESTERLUND

Subject Classification according to the given matrix

SHIPS	CARGO engineering	PORTS engineering	NETWORKS	TELEMATICS
business				

Short Description:
The creation of a common and open solution for all section of the logistic chain, from factory to consumer, to transfer the information on the (location and passage of the) goods (especially general cargo and forest products, treated on unit-base [paper roles , pallets] via EDI to these different links, in order to improve the circulation of the goods through the various assessment points, seaports, inland terminals, ect

Code: WES95H2 Country: Belgium Source:CASSS

Title: Shortsea Development project

Sponsor: **Status:** F

Type: Research **Language:** English

Authors: WESTERLUND

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
business		business		
			business	

Short Description:

Set up of an integrated shortsea traffic chain between the ports of Antwerp, Rouan and Tilbury. The aim is the introduction of a regular ro-ro service, organized in a timecharter system with a twice-a-week rotation. The pre-feasibility study shows that the project contributes to a significant reduction of the road transport and as such of the transport cost. The losses suffered in the start-up period have to be reduced by convincing from the beginning onwards a large number of shipping companies to use the new roro services and in that way be able to transport high volumes of tonnages. The service will also be very advantage for the important traffic France - UK and UK- Continent. The main advantage of the shortsea project is situated in the integration through the ro-ro service instead of the use of the existing ferry-services, due to the reduction of the overland transport costs as the ports concerned are all located far inland, directly near to industrial sites and the population centres London, Paris, Belgium and Germany by the fluvial Rhine-route

Code: WES95P **Country:** **Source:**FAST95

Title: Review on German SES developments and the Government founded R+D Programme SUS C.

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Wessel J.

Code: WIE94P **Country:** **Source:**ESSS94

Title: Strategic Profiles for Transport Companies: The Case for Dutch Forest Product Carriers.

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Wierikx, A.A.C.M., J. van Riet

Code: WIE95B **Country:** Germany **Source:**WEGEMT

Title: School Notes of 21st WEGEMT Graduate School on Ships for Coastal and Inland Waters (Design, Building, Operation)

Sponsor:

Status: F

Type:
Book Language:
Authors:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering			engineering	
economics		economics		
business				
		business		

Short Description:
State of the art of shipbuilding and shipping related to inland and coastal waters transportation

Code: WIE96H Country: Germany Source:WEGEMT

Title: Colloquium in Shipbuilding and Ocean Technology

Sponsor: Status: F

Type: PublicatioLanguage:

Authors: Wietasch K.
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
			engineering	
economics		economics		

Short Description:

State of the art of shipbuilding and ocean technology, emphasis in inland waters shipping and shortsea shipping, yearly colloquium organized by the Inst. of Ship Technology Duisburg

Code: WIJ93B Country: Netherlands Source:CASSS

Title: European shortsea shipping : proceedings from the first European research roundtable conference on shortsea shipping
Sponsor:
EUR Status: F
Type:
Book Language: English
Authors:
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering	engineering	engineering	engineering	
economics	economics	economics	economics	
business	business		business	
	legal	business		
legal			legal	
environment	Environment	environment	environment	

Code: WIJ93B1 Country: Netherlands Source:WEGEMT

Title: Innovation in forest products shipping

Sponsor:NCR Status: F

Type: Book Language:

Authors: Wijnolst, Ir R van der Lugt
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering		engineering	engineering	
economics		economics	economics	
business		business	business	
legal				
		legal	legal	

Short Description:
Shipping is one of the most innovative sectors in the economy, witnessing the multitude of new transportation and ship concepts, which have been developed over the last four decades. Supertanker, bulk carriers, container ships, chemical tankers, gas ships, roll-on/roll-off ships are just a few examples of the creative energy, which is generated within the sector. Some impulses for innovation are derived from technological innovations, but the majority comes from market forces. The shipowner or operator seeks new ways to provide a better quality service at a lower cost. This search for continuous improvements will never come to an end and can be stimulated by looking for opportunities to innovate in the transport chain, for example the forest products chain. By looking at the total chain, in a holistic way, we have developed a possible revolutionary new way of transporting paper reels: the reels-on-wheels system. The innovation itself, as well as the process which led to its development are described in this book. Its purpose is therefore twofold: (1) To demonstrate the potential of the ROW-innovation to reduce costs and improve the quality in the total logistical chain of paper reels; (2) To provide an innovation guideline for those involved in developing new transport concepts, in the private sector as well as in university education.

Code: WIJ93B2 Country: Netherlands Source:WEGEMT

Title: Innovation in Shortsea Shipping

Sponsor:NCR Status:

Type: Book Language:

Authors: Wijnolst, Ir H B van der Hoeven, Ir C J Kleywegt,
Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				
		engineering	engineering	
economics		economics	economics	
business			business	
		business		
legal			legal	
		legal		

Short Description:
The acceptance of the container in the maritime industry is an unparalleled example of high speed innovation adoption by hundreds of different players in many segments of transport. The perceived attributes of the innovation corresponded and coincided with the tremendous increase in cost around the world of liner shipping and stevedoring. There was no alternative for deepsea liner shipping,

as is not the case in shortsea shipping. The alternatives of shortea shipping are foremostly road and rail transport. As the cost increases in these other modes has been very modest over the last decades, there has not been a strong incentive to change all this. "Selling" the self-loading and unloading ship concepts of unit loads, which is the central theme of this book, does not have the benefit of spiralling costs, which influence major shippers and receivers. Although this may change in the coming decade. Environmental and social costs will more and more be charged to each mode. If small ports want to become a part of a coastal/shortsea unit load system, this will not happen by itself. The authors believe that a system can be developed with similar impact as the introduction of the container thirty years ago. The technology can be developed that is not the issue. Shortsea shipping can and should compete more effectively against road and rail transport. This can be achieved by looking at the total transport chain and not only the hardware of ships and terminals but also the software of VTS, EDI etc. The book is not about the technology of a self-loading and unloading ship systems, but about the constraints and conditions under which shortsea shipping can compete against the other modes, on the level of transit time, frequency of departure, quality of service and of course, in price.

Code: WIJ94S Country: Sweden Source:CASSS

Title: Innovation in SSS: self loading and unloading unitload shipsystems

Sponsor: EUR/NCR **Status:** F

Type: Study **Language:** English

Authors: Wijnolst, N. H. B. van der Hoeven, C. J. Kleiwegt, A. Sjöbris.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering		engineering		
economics		economics		
business			business	
		business		

Short Description:

The report is a summary of the potential for a port hopper project in Northern Europe. It deals with the potential to utilise Short Sea Shipping as a component of the future inter-European transport network.

Code: WIJ94T Country: Netherlands Source:CASSS

Title: Inland shipping : Port hoppers : new developments in short sea shipping by Inland shipping (3 pages)

Sponsor: NCR **Status:** F

Type: Technical **Language:** English

Authors:

Short Description:

N. Wijnolst (TU Delft), one of the designers of a self-loading containers-hip, states that drastic improvements in short sea shipping must be made. Because of a shorter transittime, ships can call at more ports: port hop-pers.

Code: WIJ95B Country: Netherlands Source:CASSS

Title: European shortsea shipping : proceedings from the second european research roundtable conference on shortsea shipping

Sponsor: EUR **Status:** F

Type: Book **Language:** English

Authors: Wijnolst, N., C. Peeters, P. Liebman

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering	engineering	engineering	engineering	
economics	economics	economics	economics	
business	business		business	
	legal	business		
legal			legal	
environment	Environment	environment	environment	

Code: WIJ95S Country: Belgium Source:CASSS

Title: Multimodal Shortsea Transport, Coastal Superway: an indispensable link in the European transport network

Sponsor: EUR **Status:** F

Type: Study **Language:** English

Authors: Wijnolst, N., A. Sjöbris, C. Peeters, A. Verbeke, E. Declercq, T. Schmitter.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering		engineering		
business				
		business		

Short Description:
A DGVII study. The transport of unitloads by SSS could increase substantially in North-West Europe, if innovative ship-terminal concepts are developed. This book contains an assessment of the potential of new ship-terminal systems in Europe. It reflects the importance of both multimodalism and the concept of coastal superhighway in European shortsea shipping. The development of SSS in Europe needs to be guided by a clear strategic vision from entrepreneurs in the transport sector and public policymakers

Code: WIK93P Country: Source:FAST93

Title: The Future for High Speed Light Craft

Sponsor: **Status:**

Type: Paper **Language:** English

Authors: Wiklund, K.M.

Code: WIL92P Country: Source:ESSS92

Title: Coastal Shipping, Opportunities in a Changing Market

Sponsor: Status:

Type: Paper Language: English

Authors: Willigenburg, J.R.van., S. Hollander

Code: WIN93H Country: Finland Source:CASSS

Title: The regional impact of the Free Maritime Transport in the Baltic Sea

Sponsor: NCR Status: F

Type: Research Language: English

Authors: Winter N. et al

Code: WIS96H Country: Source: ISL

Title: "WISDOM" Waterborne Information System Distributed to Other Modes

Sponsor: EUR Status: ON

Type: Research Language: English

Authors:

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics	economics	economics		
				econonm
business	business	business		busines

Short Description:

A DGXIII project. The target of WISDOM is the improvement of planning and control of door to door container transport by use of modern IT. WISDOM starts with two pilots in Rotterdam and in Bremen/Hamburg, aiming a generic solution in a second phase.
WISDOM uses existing port communication systems, software technology for interconnecting users' internal EDP to EDI and low orbit satelites communications supporting tracking and tracing for mobile load units. It is the demonstration of an open service for all in transport involved parties based on interconnecting and datasharing.

Code: WRI92P Country: Source:ESSS92

Title: Self-Unloading Vessels for Intra-European Bulk Trades

Sponsor: Status:

Type: Paper Language: English

Authors: Wright, C

Code: YAM91P Country: Source:FAST91

Title: A Submerged Hull and Foil Hybrid Super-High Speed Liner

Sponsor: Status:

Type: Paper Language: English

Authors: Yamanaka, N., O. Yamamoto, R. Satoh, T.

Code: YUN93P Country: Source:FAST93

Title: Prospect of High Performance Marine Vehicles in China in the 21st Century.

Sponsor: Status:

Type: Paper Language: English

Authors: Yun, L.

Code: ZAC91S Country: Germany Source:CASSS

Title: Short Sea Shipping Study 1991 : Contribution of short sea shipping for transport-solutions in the internal market

Sponsor: NCR Status: F

Type: Study Language: English

Authors: Zachcial, M.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
economics				
business			business	
environment				

Short Description:

Significance of SSS for the european transport system
Specialities in SSS compared with deep sea shipping
Estimation of the transport volume in relevant markets for SSS under the consideration of possible shift-potentials
Analysis of the efficiency of european SSS
Analysis of the state influence in competition
Estimation of the future share of SSS in the modal-split
Summary

Code: ZAC92P Country: Source:ESSS92

Title: Assessment of Land/Sea Feeder Traffic Flows in Europe

Sponsor: Status:

Type: Paper Language: English

Authors: Zachcial, M.,

Code: ZAC96P Country: Source:ESSS96

Title: Land/Sea Transport Flows in Europe

Sponsor: **Status:**

Type: **Language:**

Authors: Zachcial, M.

Code: ZAC96S Country: Germany Source:CASSS

Title: Simulation-project with a trnasport modelling on shifting effects in SSS

Sponsor: NCR **Status:**

Type: **Language:** English

Authors: Zachial M.

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
business		business		
			business	

Code: ZAT92A Country: Spain Source:CASSS

Title: Experience with retrofitting CLT propellers.

Sponsor: **Status:** F

Type: Article **Language:** English

Authors: Zataraín

Subject Classification according to the given matrix

SHIPS	CARGO	PORTS	NETWORKS	TELEMATICS
engineering				

Short Description:

This paper describes the results obtained with the CLT propellers fitted to three 11,850 dwt sister bulk carriers, built in 1974 at the shipyard of Juliana Constructora Gijonesa, in Gijón, Spain, belonging to the fleet of the Spanish shipping company Ership, S.A..These ships were consuming IFO-40/60 fuels for propulsion, with a total fuel bill each of around 40 million Pts/year in 1990. Under these circumstances, the convenience of a "geriatric" treatment was considered with the aim of reducing the operating costs during the last stage of their active lives.The paper shows that, according to the sea trials and service experience, the new CLT propeller designed by Sistemar allowed a reduction in fuel consumption over 12% as well as a total elimination of the previously observed blade erosion, due to cavitation. The manoeuvering performance also improved significantly. The investment will be recovered in less than two years.

Code: ZIG96P Country: Source:ESSS96

Title: One new concept for container reloading on inland vessels.

Sponsor: **Status:**

Type: **Language:**

Authors: Zigic, B.

Code: ZIP95T1 **Country:** Germany **Source:** WEGEMT

Title: Development of Fast Catamarans (3 projects within the national R&D program SUS, in German)

Sponsor: PCR **Status:**

Type: Tech. Repo **Language:**

Authors: Zips J., VWS Berlin

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
Systematic analysis of various aspects of the hydrodynamic performance of fast catamarans for shortsea operations

Code: ZIP95T2 **Country:** Germany **Source:** WEGEMT

Title: Development of Surface Effect Ships - SES (4 projects within the national R&D program SUS)

Sponsor: PCR **Status:**

Type: Tech. Repo **Language:**

Authors: Zips J.

Subject Classification according to the given matrix

SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering

Short Description:
Systematic analysis of various aspects of the hydrodynamic performance of Surface Effect Ships for shortsea operations

Code: ZIP95T3 **Country:** Germany **Source:** WEGEMT

Title: Development of SWATH ships (1 projects within the national R&D program SUS)

Sponsor: PCR **Status:** F

Type: Technical **Language:**

Authors: Zips, J.

Subject Classification according to the given matrix
SHIPS CARGO PORTS NETWORKS TELEMATICS
engineering
economics
business

Short Description:
Systematic analysis of various aspects of the hydrodynamic performance of SWATH ships w/o fins for

shortsea operations

CONCERTED ACTION ON SHORTSEA SHIPPING

Contract No. WA-96-CA.95/186

Public Final Report

Volume 4: The concerted action's views on the terms of reference for SSS pilot projects

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December 1, 1996

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1. Introduction: Scope of this document

The purpose of this document is to provide information on the terms of reference for pilot projects in the area of shortsea shipping that will be launched by the European Commission, Directorate General for Transport (DGVII) as part of the 3rd call for proposals of the Transport Research Programme (4th Framework Programme)[1].

It is *not* the intent of this document to replace other Commission documents dealing with general information on the Transport Research Programme, or with more specific information on Waterborne Transport Research. Any terms of reference or other guidelines for proposal preparation, evaluation and selection (either general or specific) stipulated in such documents are assumed to be valid in all cases.

Rather, this document serves the role of providing more detailed information on possible pilot projects in the area of shortsea shipping. It was produced after extensive input and discussion from the participants of the Concerted Action on Shortsea Shipping, from invited experts, and from the Commission. The synthesis of this material was performed by the Technical Secretariat of the concerted action, in the context of Contract No. WA-96-CA.95/186.

This document could be of use to a number of parties, including (but not limited to):

- potential proposers of pilot projects
- evaluators of proposals in this area,
- Commission bodies overseeing research in this area (such as the Transport Research Committee and the Waterborne Research Support Group),
- retained projects (in their validation phase),
- evaluators of these projects (after they are completed).

It should be stressed that the intent of this document is only to provide information on the *terms of reference* of possible pilot projects. It does not purport in any way to define specific proposals or projects, let alone endorse or exclude specific project ideas.

Additional information on the concerted action on SSS can be found in:

- the State of the Art Study (two volumes) produced July 8, 1996

- NTUA Maritime Transport's web site, at http://www.maritime.deslab.naval.ntua.gr

The rest of the document is organized as follows. Section 2 describes the process that was followed for compiling this document. Section 3 describes what might be a pilot

[1] The label "demonstration project" or simply "demonstrator" is also frequently used to designate such projects. Since a pilot project is essentially a project that demonstrates a concept and includes a demonstration phase, in this document the terms "pilot project" and "demonstrator" are considered equivalent.

project by discussing issues on project size, scope, and validation criteria. Finally Section 4 (with two Annexes) presents contributions received.

2. Process for terms of reference formulation

The task of the concerted action on shortsea shipping that is related to pilot projects was defined in a simple way:

- Formulate the terms of reference for pilot projects in the area of shortsea shipping, so that these can form the basis for the DGVII's 3rd call for proposals (call: December 12, 1995; deadline: March 15, 1997).

Per the schedule of the concerted action, this task was put forward to the participants of the action just before the action meeting on February 23, 1996. The completion of the task has involved the following process:

- Input from action participants and the Commission was solicited.

- A series of discussions took place during scheduled meetings of the action.
    - First discussion: February 23, 1996 (Brussels).
    - Second: June 4, 1996 (Brussels).
    - Third: June 22, 1996 (workshop in Bergen).

- The Technical Secretariat presented to the action participants and the Commission a draft version of this document (dated August 31, 1996) that described the consensus from these discussions.

- A final discussion took place during the November 8, 1996 meeting of the action (in Brussels).

- The document has been finalized with feedback from participants and the Commission and is now made available to interested parties.

The starting point of these discussions has been the one page description of pilot projects produced by the Commission and included within the "additional information document" for Waterborne Transport Research, issued before the first call for proposals for the 4th Framework Programme in December 1994. This page has been updated in the revised version of the "additional information document" (dated September 1996) and is included here as Annex I. It page refers to Task 6.1.2/4 of the Waterborne Transport Research Programme, and provides rather general guidelines on what is meant by a pilot project in this area. In that sense, it was felt that there was a need to be somewhat more precise with the terms of reference for pilot projects in the area of shortsea shipping.

The culminating point of the discussions has been the Bergen meeting, most of the agenda of which was reserved for this subject. Held on purpose immediately after the SHORTSEA'96 conference, this meeting followed a "workshop" format in which concerted action participants and other invited experts from the research community and the industry who had attended the conference discussed possible projects as well as criteria for selection and validation. Four parallel groups discussed these subjects

and came up with recommendations and ideas outlined later in this document (see also Section 4 and Annex III).

3. What is a pilot project?

What exactly is a pilot project? Answering this question can be critical, because different people may mean very different things when talking about this same subject. This became clear when the discussions within the concerted action started. Thus, some people thought that a pilot project can be a feasibility study of a shortsea shipping concept. Other people thought that a pilot project has to have a substantial "real world" content. Some people expressed the concern that distortions to competition may occur if funding was made available to anything that could be implemented in the real world.

Given that the spectrum of possible projects ranging from the level of a feasibility study all the way to the level of full scale implementation (such as for instance opening a new SSS line) is extremely broad, it became clear that a number of issues had to be resolved before one could proceed with more thematic discussions. These issues included the following:

- Project size
- Scope/ kinds of projects
- Validation criteria

We now examine these issues in turn.

3.1. Project size

Even before the scope of possible pilot projects was discussed, the issue of project *size* was viewed by many action participants as something to be defined right at the outset, as perhaps the single significant factor that would guide the rest of the discussion. By "size" one typically means an array of project parameters, such as depth, breadth, time duration, as well as required manpower and budget. The Commission was particularly pressed by many participants to define its *budget* for pilot projects, both in terms of overall budget available and budget available per project. Thus, questions of the form "how much money is available?", "how many projects?", or "ten 500 kecu projects are different from one 5 Mecu project, so which is it?", were asked.

Although legitimate from the point of view of potential *proposers*, such an approach was viewed by the Commission as not entirely appropriate for the discussion within the concerted action, in the sense that the first priority ought to be to define the kinds of projects of potential interest, as well as their scope, and that budgetary considerations would follow as a result of these recommendations. In that sense, the Commission's view was that addressing the size issue first (before talking about project kind and scope) was equivalent to "putting the cart before the horse".

The approach suggested by the Commission was eventually adopted, and this was reflected on the pilot project ideas that were contributed (more on this in Section 4 and in Annex II).

At the same time, it was also understood that there are some very real constraints that have to be observed in all cases, and that these constraints have a direct bearing on the issue of proposed pilot project size (as well as an indirect bearing on the kinds of pilot projects to be considered). The most important of these constraints are the following:

1) Time frame of the 4th Framework Programme: Given a deadline of March 15, 1997 for proposal submission (3rd call), and given the standard process of proposal evaluation, project selection and contract negotiation, it is reasonable to expect that the starting date of pilot projects would be in late 1997 or in early 1998. Conversely, all projects within the 4th FP are expected to end at the end of 1998 or in early 1999. This means that the duration of pilot projects is expected to range from one year minimum to one and a half year maximum.

2) Available budget for Waterborne Transport Research: This constraint is less clearly defined than the first one, as no exact figures of available funding are known for the 3rd call for the Waterborne Transport Research Programme, let alone for the portion of the programme that would go into SSS pilot projects.

3.2. Scope/ kinds of projects

The general purpose of a pilot project in SSS is to demonstrate and validate a concept in SSS. In contrast to a standard research project (or a study), the results of which may only be theoretical, a pilot project by definition includes a demonstration phase by which the concepts under study are tested and validated. The demonstration phase can take up the majority (or even the entirety) of the time frame of the project. Substantial end-user involvement is an evident prerequisite for a pilot project.

Due to the kinds of constraints outlined in Section 3.1, large-scale projects such as opening a new shipping line, opening a new terminal, purchasing a ship, investing in SSS infrastructure, and so on, are outside the context of the pilot project programme. Besides, it could be argued legitimately that such large scale projects might distort competition in SSS.

Instead, pilot projects have to be set up and validated on an *existing* "SSS platform", such as a ship, a port, an intermodal line, or, in general, on a combination of SSS systems. Such a setting would minimize the need of extensive funding and would also allow proper comparisons to be made.

The use of computer simulation techniques was suggested as one of the possible approaches for the demonstration process. This would involve performing the demonstration (and its related validation) in a simulated environment, rather than in the real world. The rationale for such an approach is that under proper, carefully worked out conditions, a simulation might perform the same functions as a real-world experiment, but at a considerably lower cost.

This last point raised considerable debate among the participants of the concerted action. Some felt that pilot projects based on simulation are inherently superior (everything else being equal) and thus should explicitly get "extra points" in the proposal evaluation and selection stage. Some felt precisely the opposite, in the sense that a simulation always includes assumptions that are debatable and therefore may render the overall value of the results of a project that purports to have a real-world impact questionable.

On the basis of all the discussions among concerted action participants and the Commission about pilot projects, it is fair to say that the following general principles constitute *a minimum common basis of consensus* regarding the scope of a pilot project:

- A pilot project should have a substantial real-world content, with significant end-user participation.

- The demonstration phase is the main vehicle for testing and validating the results of a pilot project.

- Any approach that is used is expected to be technically sound and rigorous in the reflection of the assumptions, parameters, or other data used, as well as in the criteria and process for project validation.

- No specific technical approach (such as simulation or other) can be a priori encouraged or discouraged.

More on the criteria for pilot project validation can be found in section 3.3.

The following taxonomy of projects was put forward, differentiating projects according to several attributes, such as

- context
- time horizon
- commodity
- discipline
- geographical area

Context

The context of a pilot project determines the focus of the specific SSS object(s) under study by the project. The following contexts are considered important, either alone, or in combination:

- Ports & terminals
- Cargoes
- Ships & fleets

- Networks
- Telematics
- Integrated services

Time horizon

The following standard differentiation applies:

- Strategic (years)
- Tactical (days to months)
- Operational (real-time)

Given the time constraints of the pilot projects outlined earlier, it is unlikely that pilot projects of a "strategic" time horizon will be envisaged. The possible exception is if a simulation approach (in which time is compressed) is considered, provided that the assumptions surrounding the simulation are properly justified.

Commodity

Commodity-wise, the following breakdown applies (combinations of commodities may also be considered):

- Passengers
- Vehicles (cars/trucks/buses/rail)
- Cargo/bulk
- Cargo/general
- Cargo/unitized

Discipline

The list below is fairly general, and reflects the methodological disciplines that can be used (either alone, or in combination) in the context of a pilot project.

- Engineering
- Economics/ logistics
- Business/ management
- Policy/ regulatory
- Environment/safety

Geographical area

The following standard decomposition applies.

- Baltic
- North Sea
- Channel
- Irish Sea
- Atlantic Arc

- Mediterranean (East/West)
- Black Sea

3.3. Validation criteria

By “validation” one means the process of assessing the possible impact of the SSS concept under study. Validation is part of the demonstration phase and can be considered as the “capstone” of a pilot project. If the pilot project results in some benefits or other positive impact, these should be clearly demonstrated by the validation part of the project. Conversely, the lack of a sound validation may mean that the results of the project are inconclusive (in the best case) or simply invalid (in the worst case).

It is thus important to define proper criteria for the validation process. A proposal for a pilot project is expected to:

- clearly define such criteria, and
- clearly describe *the process* by which these criteria will be used in order to carry out the validation.

In turn, a pilot project that is accepted for funding is expected to carry out the process described above as part of its demonstration phase.

An important point: Although *project validation criteria* may be related to *proposal selection criteria*, these two sets of criteria are distinct and should not be confused with one another. In fact, some confusion arose in the discussion within the concerted action on this issue, as some people referred to the first set of criteria, some people referred to the second, and some people were not aware of the difference between the two. In order to avoid possible misunderstandings, the following clarification is made.

Proposal selection criteria serve the purpose of rating one proposal against another so that the best pilot projects are finally retained. By contrast, *project validation criteria* serve the purpose of demonstrating the benefits or other impact of the specific SSS pilot project under consideration. And whereas it is clear that one of the selection criteria of an SSS proposal should be the soundness of the approach in the project’s validation phase, selection criteria examine also other factors dealing with the overall rating of the proposal, such as the quality of the consortium, the cost, and other related factors. The purpose of this section is to focus on project validation criteria (some words on proposal selection criteria can be found in Section 4 and in Annex III).

The list of validation criteria is really open ended. The following is a non-exhaustive sample. Pilot projects in SSS should clearly demonstrate one or more of the following:

- compliance with the broad objectives of the Common Transport Policy

- removal of bottlenecks or other obstacles that hamper logistical efficiency

- relief of land-based networks from congestion
- promotion of European trade competitiveness
- technologies, policies and/or procedures that improve interoperability
- cost-effective scenarios by which cargoes can be shifted from land to sea
- measurable improvements in logistical efficiency (properly defined)
- enhancement of connectivity and cohesion of peripheral and less developed regions
- sustained mobility
- achievement of higher safety and/or environmental friendliness

It is up to the individual project to define *which*, among the above (or other similar) criteria will be used, as well as *how* these criteria will be used. Some examples that may shed some light on this matter are presented in the next section and in Annex II.

4. Pilot project contributions

A solicitation was made to the participants of the concerted action to submit ideas on possible pilot projects in SSS. To that effect, a "pilot project worksheet" was distributed, and a number of contributions were collected. The instructions given to potential contributors were to try to be as general as possible, so as to allow maximum flexibility and so as to avoid submitting (in this phase) a specific proposal instead of general terms of reference.

All contributions whose full text was received are listed below by contributor and title, and their full text is included in Annex II. Some of these contributions were discussed during the workshop in Bergen on June 22, 1996. Some additional contributions were received after Bergen. Since no participant of the concerted action (or the Commission or anybody else, for that matter) has had a chance to see all contributions in the same document, and since different participants may have different opinions on these contributions, this document makes no attempt to edit, revise, exclude, endorse, or in any way rank-order these contributions by way of merit or other criterion. These contributions are included here for the sake of completeness and as an illustration on what a pilot project might be.

It should be stressed once again that these contributions are only illustrative and do not in any way reflect the Commission's priorities on specific pilot project ideas. Therefore a successful proposal in the area of SSS need not necessarily be related to any of the above ideas.

For the sake of completeness we also include as Annex III the notes submitted by each of the four groups of the Bergen workshop. As stated earlier, these groups worked in parallel in an unstructured "brainstorming" format to discuss issues related to pilot projects. Since there was very limited time to discuss some of these issues in plenum, this document only attempts to include what was submitted, with minimum attempt to comment on this material.

Very brief comments on the issues discussed by each group are as follows.

<u>Group 1</u>

Group 1 discussed requirements of the pilot project setup. The inclusion of shippers, operators, and infrastructures, as well as SME involvement were recommended. Pilot projects should promote the shift from land to sea, and detailed economic and feasibility analyses should be included.

<u>Group 2</u>

Group 2 discussed a number of pilot project ideas, such as port pairing demonstrator, FAL reports, automated cargo handling, VTMIS as a means to increase efficiency in SSS, and others. Container tracking and vertical integration of transport services were proposals which some participants thought they are already state of the art.

Group 3

Group 3 discussed the issue of what is a demonstrator, and recommended that at a minimum it should be a feasibility study, and at a maximum "the real thing working". It was though however that projects should be more than feasibility and simulation. An emphasis on fast transport rather than fast ships was made. Some specific project ideas were also discussed.

Group 4

By contrast to the other groups, group 4 focused on a list of *proposal selection criteria*. Most of the criteria are conformant with existing Commission guidelines or other policy. An exception is the recommendation to treat favorably proposals which include simulation techniques. *However, due to the reasons outlined in Section 3.2, group 4's recommendation to treat favorably proposals which include simulation techniques should in no way constitute a guideline for proposal selection.*

5. ANNEX I

PAGE OF WATERBORNE TRANSPORT RESEARCH "ADDITIONAL INFORMATION DOCUMENT" RELATED TO SSS PILOT PROJECTS

6.1.2 Shortsea Shipping

6.1.2/4 Development and implementation of pilot projects to integrate existing research results. taking into account the research into human elements and vessel traffic management, and to assess new demands. The pilot project will provide a demonstration platform for the systemic integration of research results obtained under EURET, APAS and 4th FP-Transport Programme and of new technologies developed under other specific programmes.

Background/Objectives

The purpose of a pilot project in SSS is to demonstrate a SSS concept and lead the way to its full-scale implementation in the real world. In contrast to a standard research project (or a study), a pilot project includes a demonstration phase by which the concepts under study are tested and validated. This phase can take up the majority (or even the entirety) of the time frame of the project. The demonstration phase can take up the majority (or even the entirety) of the time frame of the project. A pilot project has a substantial real-world content, with significant end-user commitment and participation. It has to be set up and validated on an existing "SSS platform", such as a ship, a port, an intermodal line, or, in general, on a combination of SSS systems.

Approach

The process of assessing the possible impact of the SSS concept under study is called "validation" and is part of the demonstration phase. If the pilot project results in some benefits or other positive impact, these should be clearly demonstrated by the validation part of the project.

A proposal for a pilot project in SSS is expected to: (a) clearly define such criteria, and (b) clearly describe the process by which these criteria will be used in order to carry out the validation. In turn, a pilot project that is accepted for funding is expected to carry out the process described above as part of its demonstration phase.

Pilot projects in SSS should clearly demonstrate one or more of the following (list of criteria is not exhaustive): (1) compliance with the broad objectives of the Common Transport Policy; (2) removal of bottlenecks or other obstacles that hamper logistical efficiency; (3) relief of land-based networks from congestion; (4) promotion of European trade competitiveness; (5) technologies, policies and/or procedures that improve interoperability; or (6) cost-effective scenarios by which cargoes can be shifted from land to sea.

Deliverables:	Demonstration/Validation
Type of action envisaged:	Shared Cost Action/Pilot Project
Timing of action envisaged:	3rd call, 24 months
Links to other research tasks:	6.1.2/3, 6.1.2/4, 6.1.3/5, 6.1.3/6, 6.13/7, 6.1.4/9, 6.1.4/10, 6.1.4/11

Relevant studies or projects in this area

Results from the Concerted Action on SSS such as state of the art study.

Relevant results considered necessary for the development of the research will be made available for the successful consortium.

6. ANNEX II
PILOT PROJECT CONTRIBUTIONS

PILOT/DEMONSTRATOR PROJECT WORKSHEET

TITLE	Demonstration of Port Organisation and Logistics Management
TYPE OF USERS	Port operators, logistic operators, shipping companies
USER REQUIREMENTS	Clear explanation of functions, specification suited for calculation of cost and time for implementation.
BENEFITS TO USERS	Port interface and operations are often bottlenecks in the logistic chain. Time in port is a significant parameter for the efficiency in short sea shipping. Successful demonstration will open new possibilities for all market players in waterborne logistics.
BENEFITS TO EU	Successful demonstration will promote short sea shipping, and thus contribute to a shift in transportation to waterborne modes.
PROJECT SUMMARY	Through a combination of scenario description, simulation (among others BPR) and practical implementation, port organisation and logistics management will be demonstrated.
VALIDATION PROCESS	Validation by implementation on test sites.
VALIDATION CRITERIA	Contribution to increased efficiency in port organisations and logistics management.

PILOT/DEMONSTRATOR PROJECT WORKSHEET

TITLE	Demonstration of Cargo Handling Facilities
TYPE OF USERS	Logistic operators, shipping companies, maritime industry
USER REQUIREMENTS	Clear explanation of functions, specification suited for calculation of cost ant time implementation.
BENEFITS TO USERS	High efficiency in cargo handling is vital in short sea shipping. Much effort has been put into development of systems and technology which contribute to a reduction in time in port. Among the main objectives the development of novel technology and solutions for efficient cargo handling, which may be new product ideas to be fabricated by maritime industry.
BENEFITS TO EU	Successful demonstration will promote short sea shipping, and will thus contribute to a shift in transportation to waterborne modes.
PROJECT SUMMARY	Cargo handling facilities developed in other EU-projects will be through a combination of making prototypes of key system components, simulation, and visualisation using 3D graphics presentation technology.
VALIDATION PROCESS	Validation by simulation of loading and discharging processes of test scenarios comprising new cargo handling technologies.
VALIDATION CRITERIA	Increased efficiency in cargo handling (increased through put, reduced time in port).

PILOT/DEMONSTRATOR PROJECT WORKSHEET

TITLE	Port/Ship Interface
TYPE OF USERS	Shipping companies, logistic operators, maritime industry
USER REQUIREMENTS	Clear explanation of functions, specification suited for calculation of cost and time for implementation.
BENEFITS TO USERS	Reduced time in port. Increased efficiency in waterborne logistics. New concepts for fabrication by the maritime industry.
BENEFITS TO EU	Successful demonstration will promote short sea shipping, and will thus contribute to a shift in transportation to waterborne modes.
PROJECT SUMMARY	The port/ship interface comprises more than cargo handling itself, e.g. ship/ship cargo transfer technology concepts, ramps, terminal equipment, etc. New port/ship interface concepts will be demonstrated through simulation and other means of documentation. New ships concepts and retrofit of equipment to existing tonnage will be demonstrated.
VALIDATION PROCESS	Validation by means of simulation and documentation of test scenarios.
VALIDATION CRITERIA	The critical success factor is in which extent novel technologies developed contribute to increased efficiency in the logistic chain.

PILOT/DEMONSTRATOR PROJECT WORKSHEET

TITLE	Land/Barge Interface on Inland Waterways
TYPE OF USERS	Shipping companies, logistic operators, inland navigation operators, maritime industry
USER REQUIREMENTS	Clear explanation of functions, specification suited for calculation of cost and time implementation.
BENEFITS TO USERS	Increased efficiency in inland navigation, thus also in utilization of inland navigation as an integrated part of the transeuropean, multimodal transport network.
BENEFITS TO EU	An effort in this field will contribute to increased utilization of inland navigation, thus also to a shift in transportation from land based modes to waterborne transports.
PROJECT SUMMARY	New land/barge interface concepts on inland navigation will be demonstrated through simulation and other means of documentation. New inland navigation concepts and retrofit of equipment to existing tonnage will be illustrated.
VALIDATION PROCESS	Validation by means of simulation and documentation of test scenarios.
VALIDATION CRITERIA	The critical success factor is in which extent new land/barge interface concepts contribute to increased efficiency in the logistic chain.

PILOT/DEMONSTRATOR PROJECT WORKSHEET

TITLE	Innovative Intermodal Waterborne links in EU Short Sea Corridors
TYPE OF USERS	Shippers, receivers, port operators, shipowners, charterers
USER REQUIREMENTS	Optimum efficiency in the intermodal links of the transport chain.
BENEFITS TO USERS	Improved efficiency ashore and afloat.
BENEFITS TO EU	Sustainable system which will shift more cargo from road to sea.
PROJECT SUMMARY	To demonstrate with the help of an industry partner that an optimum designed hatch cover less container vessel will provide significant benefits for waterborne transport.
VALIDATION PROCESS	Comparative logistical research corridor analysis, design research, model test, simulation, implementation of project.
VALIDATION CRITERIA	Enhanced safety, improved inter operability, relief of port congestion, measurable improvements in logistical efficiencies.

PILOT/DEMONSTRATOR PROJECT WORKSHEET

TITLE	Promotion of short sea shipping by use of modern telematics.
TYPE OF USERS	Transport industry and their clients (producing industry and trade).
USER REQUIREMENTS	Aiming at the improvement of SSS the broking between industry/trade and forwarders/ multi modal transport operators should be supported by real-time oriented information exchange.
BENEFITS TO USERS	Potential clients of SSS gain actual information on cheep and reliable alternatives for door to door transports including SSS.
BENEFITS TO EU	Shift from road to sea, decrease of traffic bottle necks, pollution and energy consumption.
PROJECT SUMMARY	A new kind of brokerage for overcoming the gap between SSS and its clients is arising. This new kind of service will be supported by telematic procedures interconnecting procurement and distribution activities of industry and trade with the effort for enquiry and quotation of transport industry.
VALIDATION PROCESS	Performance of a demonstration project including enterprises of producing industry and trade multi transport operators and forwarders, shipping lines, port operations and road carriers.
VALIDATION CRITERIA	Evaluation of the cargo volume shifted from road to SSS and inland waterway transport during the demonstration phase.

PILOT/DEMONSTRATOR PROJECT WORKSHEET

TITLE	SSS to promote Peripheral Regions Cohesion
TYPE OF USERS	Carriers, shippers, passengers, regions.
USER REQUIREMENTS	Improve connectivity & mobility of peripheral regions while maintaining cost-effective service.
BENEFITS TO USERS	To carriers: Cost-effective operation. To shippers, passengers, citizens of regions: Higher quality of service.
BENEFITS TO EU	Savings in costs, improved cohesion and mobility.
PROJECT SUMMARY	The project will consist of a number (say, 3) of local demos in European peripheral regions that currently suffer from poor SSS service. By using a common methodology it will identify and quantify the attributes/criteria of poor service or non cost effective operation (e.g. low frequency of service, long transit times, etc.). It will suggest measures and/or alternatives for improving these services, and will calculate how much improvement can be made (or is made) using these criteria. The project will involve the active participation of all major players of the problem for data collection, and demo of the alternatives to be examined.
VALIDATION PROCESS	Validation will entail a comparison of the status quo with a number of alternative scenarios according to a number of criteria. Successful validation is defined as the identification of those alternatives that unambiguously improve upon the status quo. Quantitative criteria will be used as much as possible.
VALIDATION CRITERIA	To be defined. Generally divided between cost criteria and service quality criteria.

PILOT/DEMONSTRATOR PROJECT WORKSHEET

TITLE	Development of a Logistical Concept for the Automated Handling of Swan Timber Including the Development of a Prototype Model.
TYPE OF USERS	The project results are used by a consortium of SME's, consisting of logistic users (port operators, forwarders), builders of industrial units and automation technology specialists in Bremen and Pori intending to implement the system after successful completion of the project. They are supported by the Governments of the two regions as well as by the wood trade.
USER REQUIREMENTS	• Minimise the risk to implement and operate the automated transport system planned. • Integrate waterborne and intermodal shipping with automated in-house cargo handling.
BENEFITS TO EU	• Strengthen the coastal areas of Satakunta and Bremen building new jobs by increase of wood transport trough this regions. • Contribute to implement the Common Transport Policy providing research for application in Short Sea Shipping. • Coastal regions in Europe have gone through a decline period in the last decade. They have structural problems, their competitiveness decreases every year. Joint research and technological development in such regions will stimulate co-operation. Dissemination of the results can increase competitiveness again.
PROJECT SUMMARY	The SME's who proposed the first phase are situated in coastal regions. The proposed Pilot Project deals with the economic evaluation and the development of the technical concept of a highly automated storage and handling system for sawn timber. Implementation of the described system will have great impact within the manufacturing and multimodal transport of wood as well as for the co-operation of the mentioned European regions. It is intended to reach this with a three phase concept: • The first phase is the exploratory phase already discussed with the EU. First investigations in the technical problem area and more detailed investigation in the economic feasibility will be performed later this year. A detailed concept for the second phase is derived. • In the second phase, a Pilot Project, shortly described here, wants to investigate in long term techno-economic risks and validate the layout developed by use of simulation and model building. A further objective is to derive the necessary software concept. • In the last phase the consortium of SME's will transpose the results of the research project into practical operation. This will be done in close co-operation with the later owners of the system and the regional governments. The RTD goals of the intended research in the Pilot Project Demonstrator are: • Implementation of a simulation model evaluating the load and unload process with the help of state of the art software tools. In this way the feasibility of the mechanical solution proposed can be validated. • Development of a physical model to study the automation technology

to be used for both, the loading and the unloading system. A feasible automation concept will be the result of this process. A link to intermodal "external" cargo handling will be integrated into Short Sea Shipping concepts of the EU.

- To deceive a concept for the software managing this highly automated storage and shipping system and the data exchange with the port authorities information systems. It is intended, that the software concept will show the possibilities to enforce co-operation between all players in logistic and administration of sawn timber exchange between Satakunta and Bremen by the use of future telecommunication systems introducing computer supported co-operative work and multimedia.
- Deeper techno-economic evaluation of the future risks in the automated storage, handling and transport of sawn timber using advanced methods like cross impact analysis.
- The portability of this model to other regions will be outlined.

VALIDATION PROCESS

Validation of the overall project is done at the end of each phase. For this reason the Pilot Project will only be started if the Exploratory Phase has been successful. The second phase, the Pilot Project Demonstrator will be validated by appropriate milestones which have to be reached, by the review procedures of the EU and by quality management procedures like introduction of a project quality handbook.

VALIDATION CRITERIA

Validation criteria to start the Exploratory Phase are:

- The economic interest of later owners in such a highly automated innovative storage system.
- Evaluation of the sawn timber trade in Europe.

The economic impact of a change in the transport routes benefit waterborne facilities for sawn timber in the northern part of Europe.

- First investigations in the technical problem area.

The Pilot Phase will be validated by the following criteria:

- Investigation in long term techno-economic risks.
- Investigation in technical feasibility.
- Appropriate progress in the technical and economical research of the project controlled by state of the art project and quality management procedures.
- Contribution to shift cargo to waterborne models of transport within the intermodal approach.

PILOT/DEMONSTRATOR PROJECT WORKSHEET

TITLE	Information Exchange in Short-Sea-Shipping (SSS) on the basis of the European GSM Network.
TYPE OF USERS	Ships operating in the Short-Sea-Shipping area, and shipowners.
USER REQUIREMENTS	What users want is a continuous Europe-wide information and data transmission network.
BENEFITS TO USERS	Use of continuous Europe-wide GSM network. Establishes reliable digital transmission and reliable information exchange between an onboard computer and the computer on shore. Use of equipment that is suitable for both verbal and digital communication.
BENEFITS TO EU	Creation of on-shore technology for communication with SSS. Easier to create logistic transport chains. Improvement in economics of SSS operators.
PROJECT SUMMARY	Investigation and testing of methods and techniques for information exchange for the SSS sector, on the basis of capabilities of the GSM network in the coastal area. By way of example, this is to include ships, traffic control and information systems, and dangerous goods information in the sector of RoRo ferry traffic for the Baltic Sea.
VALIDATION CRITERIA	• Investigation of methods and techniques. • Definition of system interfaces. • System trials.

PILOT/DEMONSTRATOR PROJECT WORKSHEET

TITLE	Route log for Short-Sea-Shipping (SSS)
TYPE OF USERS	Ships operating in the Short-Sea-Shipping area and customs authorities.
USER REQUIREMENTS	The purpose of a route log is to record automatically the shipping route used. In connection with the shipping freight papers deposited, this should considerably simplify customs formalities when crossing borders, particularly in inner-European SSS operations. Simple operation, reliability of data, simple "reading" and display of the data at ports / customs authorities.
BENEFITS TO USERS	This gives the shipping operators considerable advantages, simplifying customs formalities and hence reducing the port times of SSS vessels.
BENEFITS TO EU	This facility will make it possible to achieve in SSS transport the same standards as when crossing land borders.
PROJECT SUMMARY	Development and testing of a route log, and the on-shore "reading and evaluation unit" for the SSS sector.
VALIDATION CRITERIA	• System definition. • Definition of "European" interfaces. • Development of route log and on-shore equipment. • System testing.

PILOT/DEMONSTRATOR PROJECT WORKSHEET

TITLE	Automated shipping control facilities for SSS sector in port.
TYPE OF USERS	SSS operators
USER REQUIREMENTS	Reliable guidance of SSS ships from port entry to their mooring point.
BENEFITS TO USERS	Simplification of the work of guiding the ship, increased safety, optimization of transit time in port. Improved economics.
BENEFITS TO EU	Increase in safety standards for SSS operations. Reduction in accident frequency. Wide-ranging effects on other applications in shipping.
PROJECT SUMMARY	Development and testing of an automated ship traffic control system for SSS operations, on the basis of DGPS facilities, with the support of radar signals. Inclusion in on-shore VTS systems.
VALIDATION CRITERIA	• System definition • Interface agreements • Development • Testing

PILOT/DEMONSTRATOR PROJECT WORKSHEET

TITLE	Automation facility for fast loading and unloading of ships in SSS sector.
TYPE OF USERS	SSS operators
USER REQUIREMENTS	Fast, reliable, automated loading and unloading of ships in SSS sector.
BENEFITS TO USERS	Improved economics, due to faster handling.
BENEFITS TO EU	Promotion of the SSS transportation system.
PROJECT SUMMARY	Development and testing of automation systems for fast loading and unloading of ships in the SSS sector. Highly accurate location information in ship, identification of load, transfer of these data to port and ship operator information systems.
VALIDATION CRITERIA	• System definition. • Specification of sensor system. • Sensor development. • Development of control algorithms. • System testing.

7. ANNEX III

NOTES FROM BERGEN WORKSHOP

Work-group 1, Bergen CA Workshop

Workshop in demonstrator project for Short Sea Shipping

The work-group outlined the possibilities of short sea pilot projects and concluded that from the national point of view, which they represented, there should be some additional requirements to the general requirements of a 4:th Framework project.

These requirements could be divided in three main sections:

A) The requirements regarding the set up of a pilot project

B) The requirements regarding the performance of the demonstrator

C) The requirements of deliverables

A long discussion followed the different parts and items came up especially regarding the sea transportation industries' possibility to have influence on a project.

The following requirements were finally noted:

A) **The requirements regarding the set up of a pilot project**

In a project it is essential that the user and operators should take an active part. The set up of a project should include the following parties:

- shippers
- operators
- infrastructure representatives (this includes ports, Maritime Administration, other providers of services to the shipping service).

The involvement of the **SME** industry was expressed to be significantly important and a member of the group stated the capability of the small shipyards to design well suited ships for the service. The group members stressed the importance of including "real industries" in the project.

B) **The requirements regarding the performance of the demonstrator**

The demonstrator can be either a full scale demonstration or a simulation.

The following item was noted as the general requirements of the demonstrator:

- The pilot project should be a door to door operation and include the total transport chain.

- A comparison should be made between the "old" (existing) operation and the potential SSS operation. The comparison should include:
  1. total investment
  2. flexibility
  3. costs
  4. time
  5. regularity and frequency

- A complete cost analysis should be set up for the SSS service where the costs components should be able to be identified as either payment for such activities as direct service, finance, fees, tariffs, etc. The player and the payee should be identified for each cost item.

- A finance analysis should be made for the system

- The project should promote a shift from land to sea transport
- The project should be feasible and economic viable

C) **The requirements regarding the deliverables**

The deliverables of the demonstrator were decided to include the following results:

- The project should be performed as a framework so it easily can be used for other studies
- The project should be generally applicable from Euro-wide use
- The project should include a dissemination program performed in a way that it can be conceptive and understood by the industry
- The project should include a plan for a possible implementation and state the requirements for an implementation.

Brainstorming Results of Working Group 2

PROPOSALS AGREED UPON UNANIMOUSLY:

- Port Pairing Demonstrator
  particularly smaller ports in the south have difficulties in defining their needs with respect to short sea shipping. Generally the co-operation of two ore more ports is a necessity. Such a co-operation could be established in the Atlantic Arc or other areas of interest. Objectives could be technical and/or economic co-operation with the aim to promote SSS.

- FAL Reports
  The speediness and efficiency of a vessel's operations in a port is still impaired by the need to fill in a large variety of forms (up to 18). IMO has standardised such forms, reducing the number of necessary ones at the same time. Vessel operations in ports in general and SSS in particular could be made more efficient if these forms were applied on a wider basis, possibly in electronic form also.

- Automated Cargo Handling
  SSS of certain commodities can be promoted if loading and unloading ports (and shipping lines) cooperate in making available specific cargo handling equipment to allow an efficient beginning or a rationalised continuation of existing specific trades.

- VTMIS as a Means to Increase Efficiency of SSS
  In specific ports it has been shown that after the implementation of VTS the vessel throughput has increased. This is particularly the case in areas with tidal restrictions. VTS in certain conditions reduces the need for sea pilots aboard ship, a feature with a transport cost reduction potential. In the field of logistics the transfer of certain VTS information into port community systems will increase the efficiency of port resources planning and use. The exchange of VTMIS information between neighbouring stations will help to reduce the vessels' reporting burdens.

- SSS Promotion Bureau
  The potential of SSS with respect to transport cost and pollution reduction is not yet common understanding with the majority of the transport actors. The promotion of awareness of facts, together with transport consultancy (on a model basis) would help the promotion of SSS,

- Portable Model for SSS
  Increased awareness of the benefits of SSS could be created by the application of simulation tools. This should be applicable generally, i.e. they should be applicable generally, i.e. they should be "portable" between trades of different kinds (commodities, length of legs, port types, geographical regions, etc.).

- Formal Safety Assessment
  SSS - particularly passenger traffic and transport of hazardous material - necessitates a high safety level. If costs of accidents and pollution are included in transport costs, then unsafe or polluting traffic can not be considered as being efficient. By the introduction of technical means, e.g. ECDIS, the black box, maritime radio transponders, as well as by the application of up to date management and training methods (ISM code, ISO 9000), SSS can be made more efficient.

CONTROVERSIAL PROPOSALS

(proposals, of which a part of the participants thought they were already state of the art)

- Container Tracking and Tracing
  Empty containers partly have quite a long turnaround time and sometimes even forgotten or lost. Transport of empty containers is an environmental problem. For certain containerised goods it would be interesting for security and transport time reasons to know where they are at all times. These requirements have been analysed in other user requirements sessions already, but sufficient

solutions are not yet introduced on a wider basis. The benefits would be transport cost reduction and a security gain and less pollution.

- Vertical Integration of Transport Services
  In other modes of transport, particularly in courier services, it has been shown that the vertical integration of services (i.e. house to house operation by one “visual” company) has increased the speediness and security of transport. Such an integration is already existent for quite some time in maritime container transport. It is believed, however, that improvements should still be possible, both in techniques and in management structure (e.g. strategic alliances).

WHAT IS A DEMONSTRATOR **GROUP 3**

- MIN: FEASIBILITY STUDY SIMULATION
- MAX: THE REAL THING-WORKING

MUST: DEMONSTRATE BENEFITS

CONSTRAINTS:
DISTORTION OF COMPETITION…

SHOULD WE TALK MORE ABOUT FAST TRANSPORT THAN FAST SHOPS?

SHOULD BE APPLICABLE TO SEVERAL KINDS OF PROJECTS

WIDESPREAD USE

SHOULD BE QUANTIFIABLE

PROJECTS SHOULD BE MORE THAN FEASIBILITY + SIMULATION

EURO-PALLET WIDE CONTAINERS

- more cargo in box
- increased deadweight /payload
- save lashings
- buffer safety

Can be loaded on existing vessels use some of standard space between containers

Cost problem of license
2200$→1000$

Could certainly change cargo flow from land to sea

Buy the license? (EU)

Demonstrator:

Computer simulation - show savings / achievements

RATIONAL / OPTIMAL CARGO UNIT

ISO-standard - intermodal transportation
SSS advantage
Safety (container at sea)
Cost (will not change road nor rail)
Widespread use
Compatibility

IMPORTANCE OF FAST SHIPS, WHEN

- CONTAINER STAYS 48 hrs IN PORT
- SAVING ON SLOWER CROSSING 150→ 900$

PRECISION IS IMPORTANT (QUALITY)

HOW DO WE SELL THE PILOT PROJECTS TO USERS, WHO WILL TURN THEM IN TO REALITY?

INTERMODAL BROKER↔ISL

SSS Telematics Service
SSS Interconnection Service

Demand	↔	supply
Shippers	Operators	
Mtos		- truck
Forwarders		- rail
		- vessel
		- Barge

Working Group 4: Proposal for selection criteria 4th framework third section Shortsea Shipping

First selection criterium:

The proposal has to meet at last two of the following objectives:

- Development of new potential shortsea or sea river shipping services;
- Improvement of quality and efficiency of shortsea shipping services;
- Improvement of port efficiency which is directly related to shortsea shipping activities (telematics, procedures and infrastructure);
- Improvement of shortsea shipping activities for a wider Europe (Mediterranean, Eastern Europe and Maghreb countries);
- Development of a new strategy and/or tool for the further dissemination of shortsea shipping;
- Devoting attention to safety and environmental issues.

These objectives have been chosen in response to the challenges formulated in the Commission's communication (COM (95) 317 final) to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions.

Second selection criterium:

The proposal must help to relieve the congested land corridors and reduce the external costs of European Transport (shift road to sea).

These two aspects have to be proven in the presented proposal

Third selection criterium:

The proposal has to describe how it will contribute to national strategies/policy objectives and what contribution it can make to enhance the Community's transport system (operations or strategic).

Integration to supra-national and national transport policy is a condition sine qua non.

Fourth selection criterium:

Priority has to be given to proposals which integrate shortsea shipping into intermodal chain.

Fifth selection criterium:

The technical and operational feasibility of the project has to be stated and proven in the proposal.

This means that pre-feasibility research has already been completed.

Sixth selection criteria:

a) Proposals submitted by consortia will only be accepted if these consist of not more than eight main parties, of which at least half practical experience with Shortsea shipping projects or are directly involved in the shortsea shipping operations;

b) Proposals which include simulation techniques will be treated favourably;

c) The social and economic impact has to be described.

For management and practical reasons the partnership has to be limited

CONCERTED ACTION ON SHORTSEA SHIPPING

Contract No. WA-96-CA.95/186

Public Final Report

Volume 5: Requirements as regards SSS statistical data (final)

Prepared by:
National Technical University of Athens
Coordinator, SSS-CA

In Cooperation with:
Institute of Shipping Economics and Logistics
Leader, Statistics Core Group

Prepared for:
the Commission of the European Communities
Directorate General for Transport/DGVII

April 30, 2000

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Foreword and Acknowledgments

Clearly, much work went into this document, and appropriate credit must be given to all those who contributed.

First and foremost, Professor Manfred Zachcial, nominated expert of Germany and also representing ISL Bremen, leader of the statistics core group, undertook the task of synthesizing a formidable array of input from the statistics core group and from the other national nominated experts. This report would be impossible without him. Credit must also be given to Messrs. Mike Garratt (MDS Transmodal), Philippe Tardieu (NEA), Carlo Camisetti (Cetena) and Orestis Schinas (NTUA), for their contributions to specific parts of the report.

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Pieter Oost, Ministry of Transport	Nominee of the Netherlands
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Athens, April 2000

Harilaos N. Psaraftis
SSS-CA Project Manager

1. Introduction

Under an amendment to the contract of the Concerted Action on Shortsea Shipping (EU/DGVII Contract No. WA-96-CA.95/186), three workpackages, H, I, and J, were added to the original set of workpackages of the contract. Of these, workpackage H ("Requirements as regards SSS statistical data") has the objective to monitor the developments and trends within the shortsea market and its sub-markets, in order to assess the impact (on the volume of goods carried by SSS in the EU) of certain policy measures.

Under the amended contract, implementation of this workpackage was designed to consist of the following steps:

- step 1 start of work (month 0)
- step 2 analysis of existing data and merging of data files being already processed
- step 3 establishment of country- by country trade data by mode and loading categories including transhipment considerations (interim report, month 6)
- step 4 state of regionalisation of national data according to the zoning system defined
- step 5 derivation of preliminary outcomes on a sampling basis (month 8)
- step 6 draft final report (month 10)
- step 7 final report (month 12)

The statistics workpackage started with a kick-off meeting on December 8, 1998 in Brussels, in which the plan of action was spelled out. The second meeting was held on April 22, 1999, also in Brussels. Work carried out was described and every participant explained their country-specific situation.

The Interim Report described in step 3 above was compiled and presented at the statistics group third meeting in Gothenburg, Sweden, on September 16, 1999. It reported progress up to June 30, 1999 and represented deliverable No. 9 of the amended SSS-CA contract.

The Draft Final Report specified under step 6 above and representing deliverable No. 10 of the amended SSS-CA contract was presented at the statistics group fourth and final meeting, held in Brussels on March 3, 2000. Also presented in that meeting was deliverable No. 12, in the form of a separate report entitled "Advanced technologies to better collect SSS statistical data" (workpackage I of Amended SSS-CA contract).

The present document is the Final Report specified under step 7 above and represents deliverable No. 11 of the amended SSS-CA contract. It takes on board comments on the Draft Final Report and makes some additional clarifications.

As with the Interim Report and the Draft Final Report, it is edited and submitted by the Concerted Action's Coordinator, the National Technical University of Athens (NTUA), upon input from the Institute of Shipping Economics and Logistics (ISL), which has acted as

leading subcontractor to NTUA for workpackage H and as leader of the statistics "core group".

For this work, three additional subcontracts were signed by NTUA with the following subcontractors:

- MDS Transmodal (UK)
- NEA (the Netherlands) and
- Cetena SpA (Italy).

The work of the subcontractors (collectively forming the "statistics core group", and, together with NTUA, the "statistics coordination committee") has been to synthesize the data submitted by national experts, in line with the work described in workpackage H. National experts were nominated by eleven (11) countries that have indicated interest in the statistics work. These were Belgium, Finland, Germany, Greece, Italy, Ireland, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

The following table gives an overview on the status of delivery of data from the national experts' point of view. In some cases, the study team collected data for countries, for which no national experts information could be made available.

Table 1-1 Summary of Statements and Discussions

Country	Status
Belgium	Data for the Belgian ports delivered – Benelux Zeevaart-Statistiken (CBS)
Denmark	No active participation, only data collected by ISL from other projects
Finland	Late participation of Finnish expert (September 1999/Gothenburg)
France	No active participation, only data delivered by Germany and the UK
Germany	Foreign trade, maritime transport, port statistics, land transport by mode. Case study: Germany – Portugal/Europe
Greece	Data and Case study delivered by NTUA: Greece – Black Sea
Ireland	ISL research (ports of Belfast and Cork)
Italy	Literature analysis – Ship arrivals – Case Study: Italy by regions to/from Balkan countries by CETENA
Netherlands	Data delivered by Dutch expert - CBS data stored at ISL NEA: paper on methodology delivered – Case Study Netherlands – Germany – Poland trade and transport
Portugal	Full-scale maritime statistics delivered by Portuguese expert (NSTR –2/ Portuguese ports and individual countries/ports). Foreign trade statistics (also NSTR-2 individual countries by mode of transport).
Spain	ISL data collection on trade, transport and ports. Port-related data files delivered by Spanish expert- explanation of data availability on trade and transport in Spain.
Sweden	Summary report delivered by Swedish expert, ISL data
UK	Comprehensive data delivered by UK expert; MDS Transmodal case study on unitised cargo

It should be mentioned here that raw data provided by national experts and other sources in electronic form (spreadsheets or other means) have been delivered to all members of the statistics group as companion information to this work. As with all SSS-CA reports, this

report, once accepted by the European Commission, will be made available for download at the NTUA Maritime Transport web site (www.maritime.deslab.naval.ntua.gr).

2. Methodological Remarks

During several meetings of the SSS statistics group and of the statistics coordination committee (NTUA, ISL, MDS Transmodal, NEA, Cetena) various aspects of methodological treatment of the study have been discussed.

As set out in the work proposal, the study tried to use as much as possible existing sources of information. This means that in addition to EUROSTAT data also information on a national level was used, namely:

- foreign trade data (sources: OECD, EUROSTAT, individual countries);
- transit statistics from individual countries (Netherlands, Germany, Belgium etc.) including country of origin/destination;
- international transport statistics by modes (rail, road, inland waterways) for Netherlands, Germany, Belgium, France, Italy, Spain, Portugal, Greece, and UK);
- port statistics from individual ports.

2.1 Establishment of Regional Transport Pattern with Focus on European Shipping

As discussed during the workshops and meetings, the regional pattern of selected origin/destination flows was established by using all existing traffic information on the defined regional level in combination with a selection of determinants of demand for transport (population, gross domestic product by economic sectors and/or sectoral employment). Moreover, whenever international O/D flows were not available, domestic traffic volumes were used as proxies for simulation of the generation of international flows. Several tests by using adequate computer software have been carried out to simulate origin/destination matrices.

To identify European shipping flows it was necessary to use port related information as well as data from shipping lines. These data were raised for the identification of transhipment cargo as well as for considerations regarding route choice.

2.2 Planning Parameters

Main topics with respect to planning parameters were the zoning systems, the differentiation by commodity groups and the definition of loading categories.

Zoning System

MDS Transmodal proposed a zoning system of 129 areas in 17 countries of central Europe as shown below. Alternative concepts were discussed but for consistency reasons the 129

zones concept was applied. This geographical split is more or less identical with the NUTS-2 classification.

Country	Zones
Ireland	2
Great Britain	10
France	21
Spain	16
Portugal	4
Italy	14
Switzerland	5
Austria	5
Greece	5
Germany	16
Belgium	3
Luxembourg	1
Netherlands	4
Denmark	3
Norway	5
Sweden	10
Finland	5

In addition it was agreed with the suggestion of MDS Transmodal that all the Mediterranean and Eastern Europe countries should be included individually (about 20), plus Iceland and the Faroes, while deep-sea areas should be aggregated to 10 groups.

This led to a central matrix for the totals of commodities on the regional dimension of 129 by 129 zones (minus internal movements[1]) for which the study group tried to produce full matrices plus around 32 countries or country groups for which we shall aim to produce flows from 'central' zones to individual countries have been established.

Commodity Groups and Loading Categories

It was agreed to show all commodity groups by NSTR (SITC to be converted):

- 52 NSTR-2 digits to be comprised to
- 24 commodity groups regarding EU directive and then aggregated to
- 10 NSTR-1 digit

This opens the possibility to convert NSTR commodity groups to loading categories, namely:

- dry bulk

[1] These reflect the diagonal of the 129 X 129 matrix.

- liquid bulk
- general cargo (break bulk, conventional cargo, containers, ro/ro)

2.3 Other Inputs and Activities

As discussed in detail, the question of taking trade **or** transport data as main data sources was raised. The working group stated that both trade **and** transport data should be applied to cope with transhipment data and problems involved. It was agreed to exchange **conversion keys** concerning commodity groups (SITC-NSTR) on different levels of aggregation.

As is well-known, transport statistics related to **container cargo** by commodity are not very reliable. About 90 % of container cargo is declared to be commodity group 99. The study group tried to get access to port information to specify commodity group 99 into actual commodity groups (a sample of port related statistics). However, the results achieved are quite limited.

2.4 Pilot Project (Case Studies)

It was agreed to establish country/country matrices as well as more detailed matrices based upon information about region to region. For further proceeding the work participation was defined as follows:

- MDS Transmodal: UK – Continent
- ISL : Portugal and Germany with several countries in Europe
- NEA : Netherlands-Poland
- NTUA : Greece/Black Sea/Balkan
- CETENA : Italy-Greece/Yugoslavia etc.

3. Country-specific Description of Data Sources

In the following, the data sources provided by the national experts and others (MDS Transmodal, NEA, CETENA, ISL) are described with respect to type of data, completeness, reliability and validity as far this is possible at this stage of analysis. A summary table for all data received is at the end of this section.

3.1 Belgium

The data sets for Belgium consist of a number of various sources, provided by the National Instituut voor de Statistiek (1997):

- ship arrivals and departures (number of vessels, gross tons and net tons) by national flags
- loading of goods by flag of vessel and commodity group (NSTR-1) by ports (Antwerp, Zeebrugge, Ghent, Others)
- unloading of goods by flags of vessel and commodity group (NSTR-1) by ports (Antwerp, Zeebrugge, Ghent, Others)
- loading of goods (without goods, specification) by Belgian ports and countries and coastal areas thereof.
- unloading of goods (without goods specification) by Belgian ports and countries and coastal areas thereof.
- summary tables on ship arrivals and - among others - by size classes.

In addition to these data, foreign trade data for Belgium with all individual trading partners by commodity groups are available.[2] The following tables contain examples on the commodity structure by ports and the trading areas, respectively.[3] Files are not sufficient to establish origin/destination flows even on a pure country/port to country basis for individual commodity groups. This is indicated in the following table.

2 This is true for all EU-countries and will not be repeated for the other ones.

3 Finally, also statistics on container and ro/ro traffic by Belgian ports and countries could be collected and stored in the comprehensive data file.

Table 3-1 Commodity Structure of Belgian Ports (Example Loaded 1997 – 1,000 tons)

No. NST-R-1	Commodity Sections	Antwerp*	Zeebrugge	Ghent**	Others	Total
0	Agricultural Products	570	91	143	9	813
1	Foodstuff	1,821	139	606	151	2,717
2	Solid Fuels	140	656	222	5	1,023
3	Oil & Oil Products	6,362	4	228	11	6,605
4	Ores	1,166	0	206	117	1,489
5	Iron/Steel	2,009	62	1,010	346	3,427
6	Building Materials	1,241	24	355	157	1,777
7	Fertilisers	3,209	0	66	209	3,484
8	Chemicals	2,530	28	283	65	2,006
9	Manufact. Goods	26,275	9,526	612	1,202	37,615
Σ	**Total**	**45,323**	**10,530**	**3,731**	**2,272**	**61,856**

* including Maashaven ** including Zelzate
Source: National Instituut voor de Statistiek: Statistiek van de Zeevaart 1997, Brussels, May 1998

The other data file, which allows a split of total cargo, loaded (unloaded) in Belgian ports by partner country and regions thereof is of the following type:

Table 3-2 Selection of Origin/Destination Flows (Example Loaded in Belgian Ports 1997 – 1,000 Tons)

Country/Area	Antwerp	Zeebrugge	Ghent	Others	Total
France	1,521	18	127	29	1,695
• Channel	1,118	18	103	5	1,244
• Atlantic	370	0	23	24	417
• Mediterranean	29	0	1	0	30
• Unknown	4	0	0	0	4
Netherlands	184	109	27	4	324
Germany	799	97	32	6	934
• North Sea	764	13	10	3	790
• Baltic Sea	35	0	22	2	59
• Rhine	0	84	0	1	85
Italy	1,657	0	21	31	1,709
UK	2,356	8,429	689	1,527	13,001
• Channel	593	16	65	12	686
• North Sea	157	2,403	83	170	2,813
• Atlantic	1,416	6,004	440	1,319	9,179
• Unknown	190	6	101	16	323
Ireland	704	24	77	33	838
Denmark	227	2	107	40	376
• North Sea	76	2	47	33	158
• Baltic Sea	145	0	48	3	196
• Unknown	6	0	12	4	22
Greece	489	0	12	15	516
Portugal	749	21	21	70	861
Spain	1,104	7	166	175	1,452
• Atlantic	449	6	155	129	739
• Mediterranean	655	1	11	46	713

Source: National Instituut voor de Statistiel: Statistiek van de Zeevart 1997, Brussels, May 1998

3.2 Denmark

Denmark was not actively involved in the SSS statistics group. However, there are several data files available on Denmark's shipping and trade statistics.

Among other sources, there are import and export statistics by 20 commodity groups on a country-by-country basis available specified into the following modes for 1997.

- Ship/ferry
- Rail on ship
- Lorry on ship
- Trailer on ship
- Rail + lorry on train
- Lorry
- Others
- Unknown

There is an additional information of origin and destination specified by Jutland and by the rest of Denmark. In the course of a further ISL-Study, the information was allocated to a port/port-matrix. The following table shows an example:

Table 3-3 Example of Danish Maritime Transport via the North Continent by Port – Grain unloaded 1997

	Copenhagen	Koge	Arhus	Fredericia	Others	Denmark
Netherlands	0.4	0.0	0.3	0.4	0.0	1.1
Amsterdam	0.0	0.0	0.0	0.0	0.0	0.0
Rotterdam	0.4	0.0	0.3	0.4	0.0	1.1
Belgium	0.5	0.0	0.0	0.0	0.5	1.0
Antwerp	0.5	0.0	0.0	0.0	0.5	1.0
Zeebrugge/Others	0.0	0.0	0.0	0.0	0.0	0.0
Germany	33.7	2.4	0.0	18.8	11.0	65.9
Wilhelmshaven	0.0	0.0	0.0	0.0	0.0	0.0
Emden	0.0	0.0	0.0	0.0	0.0	0.0
Bremen Ports	0.0	0.0	0.0	0.0	0.0	0.0
Cuxhaven	0.0	0.0	0.0	0.0	0.0	0.0
Hamburg	0.5	0.0	0.0	0.5	0.0	1.0
Other North Sea	0.0	0.0	0.0	0.0	0.0	0.0
Baltic Sea	33.2	2.4	0.0	18.3	11.0	64.9
Total	34.6	2.4	0.3	19.2	11.5	68.0
Foreign Trade						64.7

Source: ISL 1999

There is another data base available as result of the simulation of cargo flows being possibly relevant for the Fehmarnbelt fixed link project. The zonal structure consists of 50 zones in Denmark, 73 zones in Germany, 10 zones in Benelux, 6 zones in France, etc. A summary of the interregional commodity flows by mode from Denmark to the Continent is shown below.

Table 3-4 Summary Table of O/D Data from Denmark over all Commodity Classes and all Border Sections 1994 (1,000 Tons)

	Sea incl. Ro-Ro	Road	Rail Convent.	Rail Combined	Total
Germany	2,986.4	4,481.5	260.5	432.1	8,160.5
Italy	415.1	347.2	29.4	410.8	1,202.5
Austria	5.6	73.2	6.3	9.8	94.9
Switzerland	17.8	102.5	11.5	13.8	145.6
Hungary	0.0	22.3	1.4	0.0	23.7
Czech Rep. Slovakia	0.8	40.3	1.1	0.0	42.2
Netherlands	1,021.0	446.1	0.5	4.4	1,472.0
France	334.9	417.4	22.7	1.0	776.0
Belgium/ Luxembourg	106.9	182.9	1.2	6.2	297.2
Spain/Portugal	278.2	159.2	0.0	0.0	437.4
Others	...	...	15.1	0.0	15.1
Total	**5,166.7**	**6,272.7**	**349.7**	**878.1**	**12,667.2**

Source: ISL 1999

3.3 Finland

Quite late, a Finnish expert has been nominated as member to the SSS-CA statistics group. There are statistics published by the Finnish Maritime Administration containing the following data:

- maritime exports and imports by individual ports (44);
- maritime total exports and imports by partner country;
- maritime exports and imports by ports and by commodity groups;
- maritime exports and imports by country and respective ports and by commodity groups.

In order to illustrate the possibilities for collecting the desired data, the following tables show examples on Finnish seagoing freight transport:

- commodity groups by Finnish ports;
- commodity groups of Finnish seaborne trade by Danish ports.

Based upon these basic possibilities, the study team tried to get full information on:

- commodity groups by Finnish ports and corresponding ports in other countries.

The Finnish representative stated that there is hardly a possibility to show origin/destination flows between several zones in Finland and other countries.

The following two tables (having been compiled from statistical work within another study by ISL) relate to the trade between Finland and Denmark and show that official data sources allow to:

- identify port traffic by individual Finnish port and commodity group per country
- identify port traffic by individual foreign port and commodity group for Finland as a whole.

Based upon the general availability of such data, in-depth research in Finland should be carried out in order to find out to what disaggregation level data might be generated from official statistical sources.

Tab. 3-5: Finnish Seagoing Freight Transport by Commodity Groups and Ports in Finland 1997 (1,000 tons)

		Loaded / Exports							Unloaded / Imports						
No.	**Commodities**	**Helsinki**	**Turku**	**Rauma**	**Hango**	**Kotka/ Hamina**	**Others**	**Total**	**Helsinki**	**Turku**	**Rauma**	**Hango**	**Kotka/ Hamina**	**Others**	**Total**
01	Timber	3.1	1.5	5.4	1.5	60.1	335.7	407.3	1.9	0.1	16.9	2.6	360.5	611.2	993.2
02	Sawn Wood	11.2	57.8	17.5	--	673.6	3,004.3	3,764.4	3.4	0.1	--	--	18.9	14.5	36.9
03	Wood Pulp	1.6	--	210.6	0.0	282.0	1,169.0	1,663.2	0.1	1.0	4.4	--	23.6	11.3	40.4
04	Paper and Paperboard	469.0	63.5	2,336.8	372.2	4,510.0	1,623.9	9,375.4	4.7	1.1	9.8	1.0	8.9	13.0	38.5
05	Plywood	43.6	17.6	4.9	--	353.7	86.5	506.3	3.2	2.0	0.4	--	2.2	13.6	21.4
06	Ore and Concentrates	0.8	0.4	8.3	--	288.7	656.4	954.6	0.5	0.1	2.4	0.7	21.1	4,387.8	4,412.6
07	Metal + M.Manufactures	67.8	56.9	33.9	5.1	38.6	1,920.4	2,122.7	229.8	139.6	26.7	114.2	57.0	423.0	990.3
08	Crude Oil	--	--	--	--	--	--	--	--	--	--	--	--	5,872.0	5,872.0
09	Oil Products	1.5	--	3.4	--	615.7	3,722.9	4,343.5	226.9	93.5	85.9	--	130.9	3,053.1	3,590.3
10	Coal and Coke	--	--	0.8	--	2.8	9.6	13.2	1,488.8	49.6	12.8	--	303.2	5,675.7	7,530.1
11	Fertilisers	--	--	37.4	--	740.0	572.1	1,349.5	--	--	5.1	--	2.5	82.3	89.9
12	Chemicals	7.3	3.6	78.5	0.0	1,308.5	1,082.9	2.480.8	21.0	37.0	96.4	4.5	347.9	1,532.2	2,039.0
13	Crude Minerals, Cement	3.1	44.9	1.5	--	161.9	812.9	1,024.3	23.8	24.4	556.7	--	674.1	3,152.3	4,431.3
14	Cereals	0.0	6.0	152.0	--	57.0	415.7	630.7	0.1	3.2	27.9	--	27.0	205.2	263.4
15	General Cargo	3,654.6	1,183.6	426.5	934.6	188.8	850.9	7,239,0	3,677.8	1,290.6	147.5	655.3	1,271.4	906.2	7,948.8
16	Others	59.5	7.4	14.8	1.0	77.9	128.6	289.2	80.5	30.0	27.1	1.9	29.2	555.7	720.0
	Total	4,323.1	1,443.2	3,332.3	1,314.4	9,359.3	16.391.8	36,164.1	5,762.5	1,672.3	1,009.6	780.2	3,278.4	26,515.1	39,018.1

Source: Own Compilations based upon: Finnish Maritime Administration: Shipping between Finland and Foreign Countries (1997), Helsinki 1998, p.42-45

Tab. 3-6: Finnish Seagoing Freight Transport by Commodity Groups and Ports in Denmark 1997 (1,000 tons)

		Loaded / Exports						Unloaded / Imports					
No.	**Commodities**	**Copen-hagen**	**Köge**	**Arhus**	**Fredericia**	**Others**	**Total**	**Copen hagen**	**Köge**	**Arhus**	**Fredericia**	**Others**	**Total**
01	Timber	0.1	--	--	--	4.2	4.3	--	--	--	--	--	--
02	Sawn Wood	6.5	--	48.9	140.8	116.8	313.0	--	--	--	--	--	--
03	Wood Pulp	--	--	0.0	--	--	0.0	--	5.8	--	--	--	5.8
04	Paper and Paperboard	106.8	--	98.2	--	--	205.0	0.1	--	--	--	--	0.1
05	Plywood	7.1	--	15.3	1.2	5.8	29.4	--	--	0.0	--	2.8	2.8
06	Ore and Concentrates	--	--	--	--	6.8	6.8	0.7	1.0	--	0.3	10.9	12.9
07	Metal + M.Manufactures	58.4	--	0.9	0.0	155.2	214.5	0.6	--	1.7	0.1	--	2.4
08	Crude Oil	--	--	--	--	--	--	--	--	--	622.7	--	622.7
09	Oil Products	3.0	3.6	0.8	12.9	4.5	24.8	--	--	0.0	445.4	53.8	499.2
10	Coal and Coke	--	--	--	--	3.4	3.4	--	--	--	--	16.5	16.5
11	Fertilisers	--	--	--	10.8	3.3	14.1	--	--	--	--	--	--
12	Chemicals	0.1	0.5	1.1	56.1	22.9	80.7	0.4	3.0	0.1	22.0	--	25.5
13	Crude Minerals, Cement	--	--	--	--	--	--	0.0	115.5	1.3	0.3	120.9	238.0
14	Cereals	--	--	--	--	16.8	16.8	2.2	4.3	--	--	38.2	44.7
15	General Cargo	10.5	--	130.9	--	1.5	142.9	35.7	0.0	124.2	--	--	159.8
16	Others	0.1	--	0.3	6.5	8.1	15.0	1.1	--	0.6	23.5	26.0	51.2
	Total	192.6	4.1	296.4	228.3	349.3	1,070.7	40.8	129.6	127.9	1,114.3	269.0	1,681.6

Source: Own Compilations based upon: Finnish Maritime Administration: Shipping between Finland and Foreign Countries (1997), Helsinki 1998, p. 48 and 58

3.4 France

No expert from this important maritime country was sent to the SSS statistics group. Therefore, several other sources had to be used. MDS Transmodal possesses a data file for France structured by 21 French regions x all other countries (grouped into deep-sea) x NSTR for ALL tonnes and an estimate of UNITISED tonnes. The structure of this file is shown by means of an outprint of the first 15 SITC-2 codes as follows (unitised cargo only).[4]

Table 3-7 Example for the Regional French Data File 1997 (Unitised Cargo)

No.	Direction	Region	Country Code	Name	SITC-2	Tonnes
1	Exp	R 210	2	Belgium/Lux	0	398
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
15	Exp	R210	2	Belgium/Lux	23	201

Source: MDS Transmodal, April 15, 1999

Total tons of unitised cargo moved between France and the other EU-countries amounted to 81.5 million tons in 1997, thereof 52 % imports and 48 % exports. The most important trading partners are Germany and Belgium/Luxembourg, followed by the Netherlands, Italy and UK. The data file stored at MDS Transmodal shows commodity flows by French regions with some concentrations such as Ile de France as well as coastal areas along the Atlantic and Mediterranean coast.

3.5 Germany

Based upon data acquired from the Federal Statistical Office in Wiesbaden (STABU), ISL has processed 1997 data files in the disaggregation required/desired.

(1) Foreign trade 1997 (imports and exports shown separately) by 24 commodity groups and 16 regions (Laender) in Germany, this country-by country (tons).

(2) Foreign Trade by 16 German laender, by countries, by 24 commodity groups and by border section 1994 and 1997.

(3) Transit trade 1997 by land, by land/sea and by sea only.

4 The file contains a number of 119,409 data sets (=observations)

(4) Seaborne shipping 1997 (discharged and loaded shown separately) by 24 commodity groups and individual ports, this country-by-country (tons) and port-to-port for major ports.

(5) International land transport flows of Germany 1997 (discharged and loaded shown separately) by 24 commodity groups and 16 regions (Laender), this country-by-country (tons):

- rail
- road
- inland waterways
- pipeline

(6) Hinterland transport of the German seaports by mode of transport and 16 zones in Germany as well as countries in Europe.

Data quality has been tested by the evaluation of German/French trade and traffic flows. The analysis of exports and imports between Germany and France, this by 24 commodity groups and by 16 German regions, indicates severe problems of data quality. On the export side (from German point of view) the quantity of 4.88 million tons (most of it mineral oil products) from others/unknown makes up 17 % of total German exports to France. This means that since 1992 not only the data quality concerning flows by border sections became worse but also the regional information on zone of origin in Germany. On the import side, the percentage of "others/unknown" is only 1 % of total.

Freight transport by mode, 24 commodity groups and 16 German Laender with respect to goods movement from/to France are contained in the project files. All these data can be allocated to the 16 German regions. The totals are summarised in the following table:

Table 3-8: Summary of Freight Transport between Germany and France 1997 (1,000 Tons)

	Long-Distance Transport					
Direction	Road	Rail	Inland Waterways	Sea	Total	Total Trade
From Germany to France	12,587	3,477	1,614	1,866	19,614	28,734
From France to Germany	12,242	2,725	7,481	1,355	23,803	28,361
Total	24,829	6,202	9,165	3,221	43,417	57,095

Source: Federal Statistical Office (STABU), 1999

The various data files being available allow matching procedures in order to create an as reliable as possible origin/destination system for Germany and its regions by commodity groups and countries/port areas.

In addition to the regional disaggregation of German countries, the data files allow the identification of maritime transport flows between individual German ports and European countries. For France, Belgium, the Netherlands, and Italy also regional disaggregation is available (France: 9 zones, Belgium: 2 zones, Netherlands: 3 zones, Italy: 15 zones).

For the main German ports Hamburg and Bremen/Bremerhaven also commodity–specific information by European countries and their regions are available. This means that there is no problem to identify cargo loaded at Hamburg destined for Ancona in Italy.

3.6 Greece

For Greece a Report entitled "Short Sea Shipping Statistics in Greece" has been prepared. Among other aspects such as a **general description** of the project and related aspects from the Greek point of view, **cabotage** in Greece, the **94/64 directive**, this Report deals with the sources of statistical information, namely the cargo manifests with data on main characteristics of the **ship** and the **goods** transported. The Report describes specifically more detailed external trade statistics and port statistics in more detail.

External trade statistics are collected from customs declarations which are transmitted to the National Statistical Service of Greece. They include

- quantity of cargo imported and exported (tons);
- value of cargo imported/exported in Greek currency;
- country of origin and destination, respectively;
- kind of commodity (SITC).

For **Intra-Community trade**, INTRASTAT declaration is used. **Port Statistics** and their sources/treatment are described in the Report for

- port of Piraeus
- port of Thessaloniki
- other ports in Greece.

Foreign Trade Statistics
For Greece foreign trade data 1997 by country of origin and destination and SITC classification (tons) have been stored in the data file of the study group.[5]

[5] According to the Report of February 1999, at least for 1992 the modes of transport are shown for imports and exports (without further disaggregation such as commodity, loading categories or regions/countries.)

Port Statistics

The Statistics Department of the Port Authority of Piraeus collects data from ships' manifests via shipping agents. However, two important information are not available:

- import/export cargo by NSTR and
- origin/destination (ports).

The following type of tables can be produced by the Port Authority of Piraeus:[6]

- imported/exported cargo by countries **and** loading categories (unitised cargo, conventional general cargo, dry bulk, liquid bulk (tons);
- same differentiation for transhipment cargo;
- cargo loaded/unloaded by loading categories and selected commodities (tons) without further differentiation.

The port of **Thessaloniki** provides data based upon the 95/64 EC directive from 1998 onwards. However, NST/R good classification is not available (and will obviously also not be).[7] The data contains only a Summary Table for Thessaloniki (loaded/unloaded), split into loading categories (liquid bulk, dry bulk, containers, ro/ro, conventional general cargo) with some commodity-specific disaggregations.

For **other ports** in Greece, the National Statistical Service of Greece collects and possesses all information with regard to maritime statistics based upon questionnaires 5A and 6A from harbour masters on basis of shipping agents' messages. These questionnaires are adapted to the 95/64 EC directive and are to be applied as from January 1, 1999.[8] At present, the following information is missing:

- ports of loading/unloading;
- NSTR classification (especially in container and ro/ro traffic).

For the other Greek ports the following information are available for each of them (tons):

- goods from abroad (solid, liquid, total);
- goods for abroad (solid, liquid, total);
- coastal traffic (loaded, discharged);
- coastal traffic by SITC classification.

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6 The Port Authority completes the questionnaire on behalf of ESPO/CPWG-Sub Group on Statistics (Annex-Tables in the February Report).

7 The Port Authority completes the questionnaire on behalf of ESPO/CPWG – Sub Group on Statistics (Annex-Tables in the February Report).

8 INTRA-Greece flows are planned to be collected based upon questionnaire 6B and 15A for cargo and passenger ro/ro ships.

According to the consultations having been made during several meetings, the Greek expert prepared a case study concerning trade flows between Greece and the countries around the Black Sea. This study is attached as Section 8.

3.7 Ireland

According to a statement given by the Irish expert, there are two data bases with relevance for the project

- external trade flows by country (value)
- ports traffic including transhipment (quantity)

Commodity-specific information might be questionable (advice of the expert to restrict loading categories).

According to CSO information (Central Statistics Office) total tons moved in Irish ports amounted to about 40 million tons, thereof 38 % with UK (and Northern Ireland) and 25 % with other EU countries. Data are available by ports and loading categories, namely ro/ro, lo/lo, liquid bulk, dry bulk and break bulk/others.

3.8 Italy

For Italy, subcontractor CETENA prepared seven studies, namely:

- State of the Art of Italian Publications Available to be Relevant for Maritime Traffic Flows;
- Container Traffic Throughput of Italian Ports in 1997;
- Tanker and Chemical Traffic Throughput in Italian Ports 1997.
- Ro/Ro Traffic in Italian Ports with Greece, Yugoslavia, Croatia and Albania 1996-1998;
- O/D Matrices of Italian Trades with Greece, Yugoslavia, Croatia, Slovenia, FYROM and Bosnia-Herzegovina 1997

Report No. 1 indicates the sources of data collection and provision, namely:

- 14 ports
- Ministry of Transport
- ISTAT (Italian Institute of Statistics)
- CONFITARMA (Italian Shipowners Association)
- Camera di Commercio
- Newspapers/periodicals

Report No. 2 gives details on container traffic, structured as follows:

- loaded and unloaded TEU (full and empty);
- loaded and unloaded quantities of net tons in containers;
- split of TEU handled by Lo/Lo and Ro/Ro;
- same for loaded and unloaded quantities of net tons;
- calculation of market shares for 16 ports regarding Italian SSS, Mediterranean SSS/EU, EU shipping outside the Mediterranean, deep-sea shipping.

The most important for this SSS-CA study is that on O/D matrices of Italian trades with Balkan countries. This study is presented as a Case Study (Section 7). Data are presented by 20 Italian regions down to the level of NSTR-2.

3.9 Netherlands

There are several data files available for the Netherlands having been provided by CBS (Central Bureau of Statistics) and by the Dutch Ministry of Transport. Recently, CBS submitted a paper entitled: “Some Information about the Statistics on Imports, Exports and Transit Trade in the Netherlands in 1997”. Three major topics were discussed:

- procedures on collecting transit and trade data;
- problems in the observation of international goods transport;
- development of an alternative system compared to that having been in function so far.

The Statistical Office mentioned a number of problems arising because of new regulations/deregulations as consequence of the 1992 common European policy concerning internal trade. In principle, these problems are similar in other countries such as Germany. Therefore, the statements of CBS are cited in some detail:

- When the borders within the EU were opened, customs formalities for transport between EU countries were abolished. This means that for transport between two member countries via the Netherlands (intra EU transit), no information reaches the department of transport and traffic statistics. For the imports and exports between EU countries (intra trade) this problem has been solved by EU directives prescribing that the information on this trade be supplied directly to the national statistical offices (Intrastat).

- For transport via the Netherlands involving one or more non-EU countries (extra EU transit) more and more customs authorities and transport companies are drawing up individual agreements to reduce the administrative burden. In many cases this means that no customs declarations are completed and this in turn leads to gaps ('white spots') in the observation of extra EU transit. Moreover, Statistics Netherlands has the impression that the statistical copies of customs declarations are no longer always sent to the bureau, and that those are sent are not always complete. As there is thus no overall framework the accurate observation of transit trade, it is hardly possible to compile reliable statistics on this branch. Imports and exports of goods with non-EU countries (extra trade) is observed via Sagitta, and does not involve problems.
- A number of agreements have been reached in a European context to abolish the obligation of reporting variables which are important for transport statistics: mode of transport and traffic area, for instance. This information is lacking in an increasing number of declarations for international trade. The same is true of the tonnage transported, which is reported in trade transactions only if the volume of goods may be expressed in kilos.

Among other data files the following information have been collected:

- Foreign trade in 1997 (imports and exports shown separately) by 24 commodity groups and 8 regions in the Netherlands, this country by country;
- Transit trade in 1997 (discharged and loaded shown separately) by 24 commodity groups and 8 regions (most of Rotterdam), this country by country (tons);
- Seaborne shipping in 1997 (discharged and loaded shown separately) by 24 commodity groups and individual ports (Rotterdam, Amsterdam, Terneuzen, Vlissingen, others), this country by country (tons).

The Dutch expert provided the working group with two other data files:

- Maritime freight transport by commodity groups (NSTR-1) and by country for the port groups of Ijmond and Rijnmond 1996 (split into loaded and unloaded).
- Maritime freight transport by loading categories (dry bulk, liquid bulk, containers, general cargo/breakbulk) and by country for the port groups of Ijmond and Rijnmond 1996 (split into loaded and unloaded).

In June 1999, NEA delivered a paper on “Freight Transport Data Availability and Bottlenecks in the Netherlands”. The paper deals with the description of data availability. Moreover, specific problems with respect to trade and transport statistics are discussed (see also case study: Netherlands- Poland).

3.10 Norway

There was no Norwegian expert member of the SSS Statistics group. Therefore, similar as for Denmark, several files on trade and shipping have been provided by ISL from other research activities. Among other sources, there are import and export statistics by 20 commodity groups on a country-by-country basis available, specified by modes and special loading types including intermodal transport. According to information given by the Norwegian Statistical Office SITC-2 trade data are available by individual Norwegian ports.

3.11 Portugal

The most comprehensive contribution to this study has been delivered by Portugal. Among other information, the study contains statistics on a port-to-port basis by commodity groups.

In addition to port-to-port data, also foreign trade statistics between Portugal and European countries by mode of transport and NSTR have been delivered. In order to set-up full-scale O/D matrices, also land transport information have been collected. The method of matching the various sources and the results are presented in the Case Study Portugal (Section 4).

3.12 Spain

The data delivered by Spain refer to the following topics:

- Port throughput for 27 ports by commodity groups and other information without further disaggregation by countries.
- Origin/destination of cargo throughput of all Spanish ports (total) with individual countries.
- Origin/destination flows between individual Spanish ports and individual countries (without goods classification).
- Other information such as container and ro/ro traffic by individual Spanish ports.

3.13 Sweden

The Shipping Analysis Institute (SAI), Gothenburg, provided data disaggregated into 15 regions in Sweden. The files contain the following information:

- cargo carrying vessels entering and leaving ports by coastal areas (15) and type of vessel (number of calls and gross tons per month);
- cargo discharged by type of commodity (15) and coastal area (15) in tons per month;
- cargo loaded by type of commodity (15) and coastal area (15) in tons per month.

In addition, a summary of the data collection situation in Sweden has been sent to ISL describing problems and possibilities of collecting foreign trade and maritime transport.

3.14 United Kingdom

The British representatives (member of DETR, Department of the Environment, Transport and the Regions) provided information regarding the following aspects:

- **O/D flows**: sample (0.3 %) of non-fuel trade for 1995/96
- **Port traffic survey**: port traffic survey at all UK ports (> 2 million tons)
- **Deep-sea trade/European Trade**: as is well-known, intra-EU trade statistics are less detailed[9].
- Continuous International Road Haulage Survey (CIRHS): survey of international road freight to/from UK.

As stated in the methodological part of the paper handed over by DETR, the loss of the detailed customs documentation that was available as a sampling frame for carrying our previous surveys has made it considerably more difficult to carry out UK international origin and destination surveys. In the circumstances, the new methodology adopted was the best available. However, although considerable resources were devoted to obtaining a sample of shipments, it proved difficult to obtain a sample, representative enough to produce reliable results.

A number of information given in the DETR paper[10] are helpful for further compilation and estimates and should be carefully checked against UK related data provided by other countries. Main remarks and concerns are:

- Tables separately showing freight carried on ro/ro and on Channel through trains are reliable. For the other tables a certain warning has to be applied.

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9 As stated by the UK expert, transport data that are available are from marketing agents for Customs data and it is important to recognize that the throughput related fields are not actively validated by TSO.

10 DETR: Transport Statistics Report. Origin and Destination Survey of UK International Trade 1996, London, Dec. 1998

- Typical bulk commodities, especially iron ore, coal, crude oil, petroleum products and some minor bulks were excluded (same as in previous surveys).

- Reliability of hinterland transport data questionable (over-estimation of some rail flows).

In addition to the delivery of the set of valuable data given by DETR, MDS Transmodal handed over a large-scale data file of foreign trade flows in unitised cargo for UK, France, and Germany.

Table 3-9 summarises the various statistics obtained by all countries.

Table 3-9: Summary Table of Statistics having been delivered to the Statistics Core Group of SSS-CA

Country	Sources	Port Statistics	Trade Statistics	Transport Statistics	O/D Matrices	Case Study	Method/Model
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Belgium	Nat. Instituut voor de Statistiek	by countries/ coastal areas/NSTR	by countries		port/country-coastal areas		
2. Denmark*	(Danish Statistical Office)	by countries NSTR	by countries	modes/intermodal	port/port (model)		ISL-Model (3)
3. Finland	Finnish Maritime Administration	by countries NSTR	by countries		port/port (model)		ISL-Model (3)
4. France*	(INRETS)	port traffic	21 regions x countries		F – UK (model)		MDST-Model
5. Germany	Statistical Office STABU	by countries/main ports/regions NSTR	16 regions x countries	border sector/ mode/countries	port/port region/country/ zone (model)	Germany-Portugal/ North Europe	ISL-Model
6. Greece	94/64 directive/ Statistical Office	by countries NSTR	by countries	modes	port/country	Greece-Balkan/Black Sea	NTUA
7. Ireland	CSO	port traffic	by countries (value)	seaborne traffic			
8. Italy	ISTAT, 14 ports, MOT	port traffic NSTR/Ro-Ro	20 regions x countries		region/country	Italy-Balkan	CETENA
9. Netherlands	CBS, MOT	port traffic NSTR	8 regions x countries	region/country (region)	port/port (model) region/region	Netherlands-Poland	NEA-Model
10. Norway*	(Norw. Statistical Office)	port traffic (ISL)	by countries	modes/intermodal			
11. Portugal	Inst. Marítimo-Portuário/INE	by ports NSTR	by countries	by modes	port/port region/region	Portugal-Germany/Netherl.	ISL-Model
12. Spain	INE, 27 ports, own surveys	port traffic	by countries	region/country	port/country		ISL-Model MDST-Model
13. Sweden	SAI	port traffic (coastal areas)	by countries		port/country		Inst. of Shipping Analysis (SAI)
14. United Kingdom	DETR, MDS-T	port traffic SITC/NSTR	by countries	road haulage	region/region (model)	United Kingdom O/D methodology	MDST-Model

* no national expert involved

The next five sections (4 to 8) present five (5) case studies. Their content is summarised in the following table.

Table 3-10: Summary Table of the Content of the Various Case Studies

Case Study	Topics/Partners	Working Steps
I. Portugal	**Germany/ISL**	(1) Methodology concerning seaborne traffic, trade and transport (2) Portuguese ports/German ports by NSTR (3) Trade by German regions (16) and Portugal by NSTR (4) Transport by German zones (upto 100) and Portugal (5) Transport by Portuguese regions (5) and Germany (6) Region/region model
	EU-Countries	Consistency checks on trade and transport by country and NSTR
	Netherlands	Port/port-matrices by NSTR
II. MDS-T Modelling (UK)	**Methodology**	(1) Definition of the problem (2) Pilot cases (France, Spain, UK, later Germany (3) Towards region/region matrices (4) Modelling approach (5) Parameters, results, application
III. NEA Modelling (NL)	**Methodology**	(1) Description of data sources and problems (2) Estimation procedures
	NL-Poland	(1) Direct trade and transport (2) Transhipment/transit (3) Regional disaggregation
IV. Italy- Balkan Countries	**Cetena**	(1) Provision of data sources (2) Italy by regions/country data by NSTR-1 (3) Ro/Ro traffic: Italy/Balkans = port/port
V. Greece- Balkans/Black Sea	**NTUA**	(1) Methodology (2) Trade & transport by country and mode by SITC-2

4. Case Study I: Portugal

4.1 Introduction

As agreed on the statistics core group meeting of May 25, 1999, one of the case studies should be the establishment of origin/destination matrices for Portugal and its zones with all other European countries and finally with respect to their zones. Before splitting the country-by-country data available into zone-by-zone data, several consistency checks on a country level from Portugal's point of view have been carried out. Portugal has been selected because the maritime data base for this country is probably the best one within the EU.

4.2 Consistency Checks by Using Trade and Transport Flows between Portugal and Germany

Even in this reliable case there exists the basic problem of differing definitions, measurements and inconsistent coverage of trade, transport, transit, port and ferry statistics. In the case of Portugal/Germany seaborne cargo from Portugal to Germany may be based on the following concepts:

- exports from Portugal to Germany by sea
  - via German ports
  - via other ports (especially Benelux)
- maritime transport from Portugal's ports to German ports
  - German imports
  - transit/transhipment to other countries
- imports of Germany from Portugal by mode (sea from Portugal's point of view)
  - sea transport via German ports
  - sea/land transport via Benelux ports (land: Benelux ports --> Germany)
- other aspects and particularities
  - change of statistics system
  - errors and omissions
  - other

4.2.1 Stepwise Identification of Gaps and Inconsistencies

As shown in the following summary table about data for 1992-1997, the situation is even in this rather clear case not free from substantial problems.

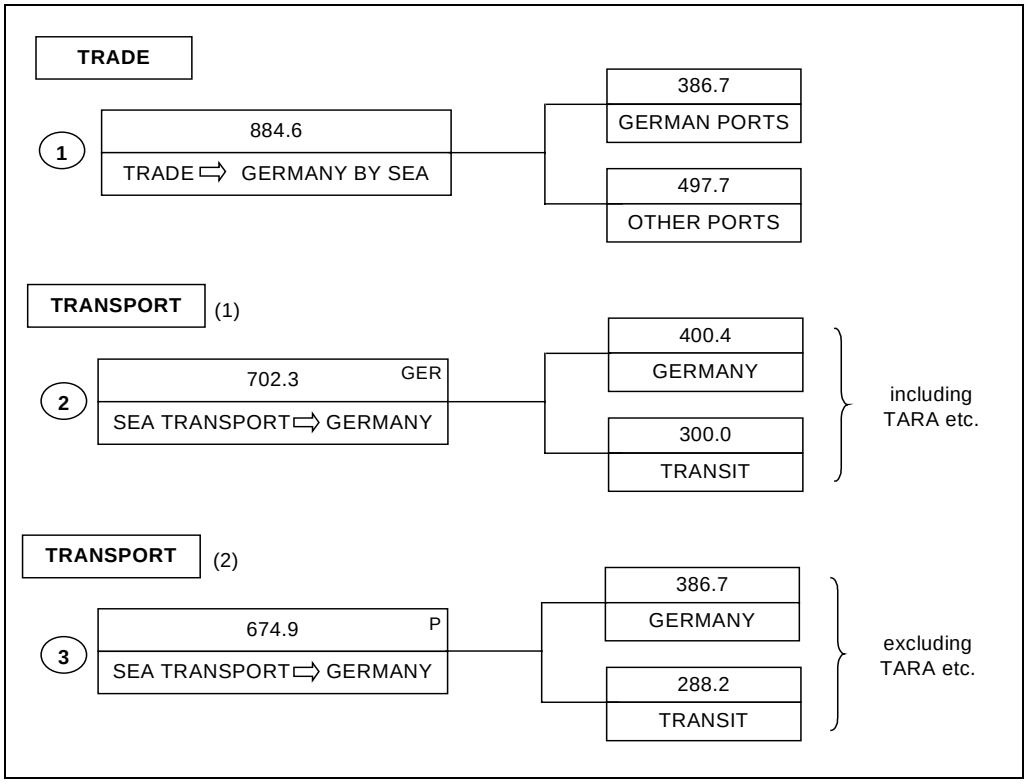
Table 4-1: Comparison of Cargo Movements according to different Statistical Sources 1992, 1995, 1997 (1,000 tons)

Year	Unloading in German ports	Loaded in Portuguese ports*	German imports by sea	German imports by land	Portuguese exports by sea*	Portugal --> Germany exports via Benelux	Transit via German ports
1992	584.0		547.0				
1995	606.3		450.8				
1997	702.3	674.9	386.7	750.4	884.6	497.9	315.6

* Portugal's point of view

The following graph indicates the basic structure of trade and transport between Germany and Portugal and shows also the discrepancy between the quantity of tons moved from the Portugal and the German point of view, respectively.

Graph 4-1: Seaborne Trade and Transport Flows between Portugal and Germany 1997 (1,000 Tons)



Total **exports** from Portugal to Germany by sea (Portugal's point of view) amounted to 884,600 tons. German imports by sea via German ports from Portugal amounted to 386,700 tons in 1997, too. The difference between both quantities are obviously Portugal's exports to Germany by sea through **Benelux/French ports** resulting in 497,700 tons.

The **direct German imports** via **German seaports** have decreased clearly between 1992 and 1997 from 547,000 tons by about 30 %.

Contrary to this, Portugal's volumes loaded in the country's ports destined for German ports amounted to 674,900 tons in 1997[11] whilst German ports declared 702,300 tons related to seaborne cargo from Portuguese ports, a deviation of 4 % which seems to be acceptable and can obviously be explained by differing definitions of cargoes (net/gross) and perhaps by differences in time regarding departures/arrivals.[12]

The shipments between Portuguese and German ports may be split into German domestic and German transit/transhipment flows, especially as transhipments destined for Scandinavia/Finland/Russia/Baltic Republics and transit via land to Austria, Hungary, Czech Republic, Poland etc. Out of the amount of 702,300 tons mentioned about 300,000 tons should be considered as transit/transhipment and the remaining just over 400,000 tons as German domestic transports. These considerations are illustrated in the following graph which also indicates a split of the smaller quantity of 674,900 tons into domestic and transit traffic.

4.2.2 Commodity-specific Comparison of Data Sources

Similar to Table 4-1, on which several data sources are shown in the context described, now a commodity-specific analysis is presented and this on the level of NST-R-1 classification (only for the year 1997).

11 This, however, needs more detailed analysis.

12 This quantity is 20 % higher than that of 1992 and indicates the rising importance of German seaports for transit and transhipment. This is a controverse trend compared to German domestic seaborne trade from Portugal via German seaports (see above).

Table 4-2: Comparison of Cargo Movements according to Different Statistical Sources 1997 - Commodity Sections - (1,000 tons)

No. NST-R-1	Commodity Sections	Unloaded in German Ports	Loaded in Portuguese Ports	German Imports by Sea	German Imports by Land	Portuguese Exports by Sea
0	Agricultural Products	0.6	4.1	0.1	17.7	1.6
1	Foodstuff	18.8	21.6	4.2	21.5	13.5
2	Solid Fuels	0.0	0.5	0.0	0.0	0.0
3	Oil & Oil Products	38.7	35.7	2.7	2.7	2.7
4	Ores	158.6	154.1	111.5	12.9	135.4
5	Iron/Steel	1.6	0.2	0.0	9.3	0.1
6	Building Materials	183.2	146.2	39.4	246.4	309.0
7	Fertilisers	29.2	40.2	25.7	4.0	40.2
8	Chemicals	170.5	180.9	126.1	143.7	228.2
9	Manufactured Goods	101.1	91.4	77.0	308.2	153.9
Σ	**Total**	**702.3**	**674.9**	**386.7**	**750.4**	**884.6**

Source: Instituto Maritimo-Portuario- German Federal Statistics Office 1998

The numerical results of this Summary Table by commodity sections allow the following conclusions:

- Despite the total of unloaded goods in German ports is 4 % higher than the total loaded in Portuguese ports, some commodity sections show higher volumes within the smaller total than those contained in the higher total (agricultural products and foodstuff: 6,300 tons; fertilisers: 11,000 tons; chemicals: 10,400 tons). On the other hand, there are 37,000 tons more declared to have been unloaded in German ports than loaded in Portuguese ports. There might be a biased declaration concerning the complex of the commodity sections 6, 7, 8, while the missing 6,300 tons of agricultural products and foodstuff should be contained in section 9.
- The German imports by sea of net 386,700 tons are lower in all commodity sections than cargo unloaded in German ports.
- The Portuguese exports by sea of 884,600 tons are always higher within all commodity sections compared to German imports by sea.

As a conclusion, the Portugal/Germany trade and transport/transit information and data system seem to be consistent and acceptable within quite a small error margin down to the level of commodity sections. When later aggregating to loading categories, these slight biases and errors could be balanced out.

4.2.3 Port-specific Split of Maritime Flows from Portugal to Hamburg

As shown before, total tons moved from Portuguese ports to Germany amounted to 674,900 tons (declared by Portugal). This quantity is now split by individual ports differentiated into commodity sections.

Table 4-3: Maritime Transport between Portugal and Germany – Loaded – 1997 in 1,000 tons

No. NSTR-1	Sines	Leixoes	Lisbon	Setubal	Aveiro	Fig. de Fos	Viana de Castelo	Total
0	0.0	2.3	1.8	0.0	0.0	0.0	0.0	4.1
1	0.0	7.0	14.6	0.0	0.0	0.0	0.0	21.6
2	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.5
3	33.0	2.7	0.0	0.0	0.0	0.0	0.0	35.7
4	0.0	0.0	0.0	154.1	0.0	0.0	0.0	154.1
5	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.2
6	0.0	137.4	0.9	0.1	7.8	0.0	0.0	146.2
7	0.0	0.0	40.2	0.0	0.0	0.0	0.0	40.2
8	0.0	0.1	1.6	41.8	22.1	113.8	1.5	180.9
9	0.0	3.0	7.1	81.3	0.0	0.0	0.0	91.4
Σ	**33.0**	**152.5**	**66.8**	**277.3**	**30.0**	**113.8**	**1.5**	**674.9**

Source: Instituto Maritimo Portuario/ISL 1999

This table shows the commodity section X port matrix for Portugal regarding German seaborne transport. There is a clear work participation among the ports within this specific trade:

Sines	:	exclusively mineral oil and oil products
Leixoes	:	building materials
Lisbon	:	fertilisers and foodstuff
Setubal	:	iron ore, chemicals and manufactured goods
Aveiro	:	chemicals
Fig. de Fos	:	chemicals

Table 4-4: Maritime Transport between Portugal and Germany – Loaded/Unloaded – 1997 in 1,000 tons

Port / Port	Sines	Leixoes	Lisbon	Setubal	Aveiro	Fig. de Fos	Viana de Castelo	Total
Hamburg	0.0	35.7	30.6	157.9	3.1	0.0	1.5	228.8
Brake	0.0	0.0	0.0	21.1	20.1	111.8	0.0	153.1
Emden	0.0	0.0	8.4	93.8	0.0	0.0	0.0	102.2
Bremen	0.0	41.4	4.6	3.7	5.8	0.0	0.0	55.5
Papenburg	0.0	29.7	5.6	0.0	0.9	0.0	0.0	36.2
Stade	33.0	0.0	0.0	0.0	0.0	0.0	0.0	33.0
Oldenburg	0.0	16.0	0.0	0.0	0.0	0.0	0.0	16.0
Wismar	0.0	15.0	0.0	0.0	0.0	0.0	0.0	15.0
Rendsburg	0.0	4.4	5.4	0.0	0.0	0.0	0.0	9.8
Leer	0.0	6.6	2.3	0.0	0.0	0.0	0.0	8.9
Glückstadt	0.0	1.3	5.8	0.0	0.0	0.0	0.0	7.1
Bremerhaven	0.0	0.1	4.0	0.7	0.0	0.0	0.0	4.8
Husum	0.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0
Kiel	0.0	1.8	0.0	0.0	0.0	0.0	0.0	1.8
Büsum	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.4
Nordenham	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3
Duisburg	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Total	**33.0**	**152.5**	**66.8**	**277.3**	**30.0**	**113.8**	**1.5**	**674.9**

Source: Instituto Maritimo Portuario/ISL, 1999

To decrease the number of individual flows between the ports for the sake of deriving the matrices down to the level of commodity sections, it seems to be advisable to compile the subtotals according to the zoning system of the whole approach. This means for Germany in this case (Portugal).

Hamburg	:	Hamburg
Bremen	:	Bremen, Bremerhaven
Niedersachsen	:	Brake, Emden, Papenburg, Stade, Oldenburg, Leer, Nordenham
Schleswig-Holstein	:	Rendsburg, Glückstadt, Husum, Kiel, Büsum
Mecklenburg-Vorpommern	:	Wismar
Others (Nordrhein-Westf.)	:	Duisburg

With respect to other trading areas relating to German ports, other important harbours must be considered. This is especially true for Rostock, Sassnitz and Stralsund in Mecklenburg-Vorpommern, Lübeck/Travemünde, Puttgarden in Schleswig-Holstein, Cuxhaven and Wilhelmshaven in Niedersachsen.

Regarding Portugal, the ports of Sines, Setubal, Lisbon and Leixoes should be shown separately, while the other industrial ports north of Lisbon should be summarised as other ports north of Lisbon. For other trades with Germany also the port of Faro in the south (Algarve) should be shown separately. If doing so, the matrix of commodity totals is reduced to a 6 x 5 regional matrix with respect to the port information.

Table 4-5: Proposal for a Reduced Matrix of Port/Port Origin/Destination Flows between Portugal and Germany 1997 (1,000 tons)

Port Group / Port Group	Sines	Setubal	Lisbon	Leixoes	Others N. of Lisbon	Total
Hamburg	0.0	157.9	30.6	35.7	4.6	228.8
Bremen	0.0	4.4	8.6	41.5	5.8	60.3
Niedersachsen	33.0	115.0	16.4	52.4	132.8	349.6
Schleswig-H.	0.0	0.0	11.2	7.9	2.0	21.1
Mecklenburg-Vorp.	0.0	0.0	0.0	15.0	0.0	15.0
Others	0.0	0.0	0.0	0.0	0.1	0.1
Total	**33.0**	**277.3**	**66.8**	**152.5**	**145.3**	**674.9**

Source: compiled from Table 4-4

There are four major types of trade flows between Portugal and Germany by sea via German ports:

- industrial trades between Niedersachsen and Portugal;
- cars and parts between Niedersachsen and Portugal (especially: between Emden and Setubal);
- containers and other mixed cargo between Hamburg and Portugal (especially Setubal, but also Lisbon and Leixoes);
- industrial trades between Bremen (city) and Leixoes.

All other flows are of minor relevance.

4.2.4 Commodity-specific Split of Maritime Transport from Portuguese Ports to Germany

Next to this, the commodity structure of goods loaded in Portugal and destined for German ports is derived.

Table 4-6: Commodity Structure by Port Groups in Portugal 1997 (1,000 tons)

No. NSTR-1	Commodity Section	Sines	Setubal	Lisbon	Leixoes	Others	Total
0	Agricultural products	0.0	0.0	1.8	2.3	0.0	4.1
1	Foodstuff	0.0	0.0	14.6	7.0	0.0	21.6
2	Solid fuels	0.0	0.0	0.5	0.0	0.0	0.5
3	Oil & oil products	33.0	0.0	0.0	2.7	0.0	35.7
4	Ores	0.0	154.1	0.0	0.0	0.0	154.1
5	Iron/steel	0.0	0.0	0.1	0.0	0.1	0.2
6	Building Materials	0.0	0.0	0.9	137.4	7.9	146.2
7	Fertilisers	0.0	0.0	40.2	0.0	0.0	40.2
8	Chemicals	0.0	41.7	1.6	0.1	137.3	180.7
9	Manufactured Goods	0.0	81.5	7.1	3.0	0.0	91.6
	Total	**33.0**	**277.3**	**66.8**	**152.5**	**145.3**	**674.9**

Source: Instituto Maritimo Portuario/ISL 1999

Table 4-6 shows that the total of 674,900 tons loaded in Portugal and unloaded in German ports is determined by a few major trade flows:

- ores from Setubal
- building material from Leixoes
- chemicals from other ports in northern Portugal
- manufactured goods from Setubal
- chemicals from Setubal
- fertilisers from Lisbon
- mineral oil products from Sines

4.3 Consistency Checks on the European Origin/Destination Level

Next to finish the working steps within the Portugal/Germany example, all other trades and transport flows between Portugal and individual countries in Europe will have to be analysed and harmonised to get consistent matrices. In a first working step trade and transport flows by sea have been compared as shown in the following table. The differences are plausible (transhipment etc.).

Table 4-7: Consistency Checks on the European Origin/Destination Level

	Exports/Loaded by Sea			Imports/Unloaded by Sea		
Country	**Trade**	**Transport**	**Δ**	**Trade**	**Transport**	**Δ**
France	371	403	32	1,915	1,711	-204
Belgium/Lux.	219	285	66	371	712	341
Netherlands	558	1,104	546	721	1,154	433
Germany	885	675	-210	720	536	-184
Italy	290	389	99	483	654	171
UK	1,013	1,245	232	2,527	2,868	341
Ireland	18	30	12	50	46	-4
Denmark	74	71	-3	48	146	98
Greece	75	71	-4	25	177	152
Spain	296	529	233	1,104	1,353	249
Sweden	150	175	25	128	137	9
Finland	193	207	14	161	148	-13
Austria	46	0	-46	5	0	-5
	4,188	**5,184**	**996**	**8,258**	**9,642**	**1,384**

Source: EUROSTAT/Instituto Maritimo Portuario/ISL 1999

Other consistency checks for this pilot project have been carried out for commodity groups, mode of transport, this with respect to statements of partners.

There exists a full data set for trade and transport flows between Portugal and all European countries, specified by 52 commodity groups and individual ports in Portugal and in the corresponding countries. One example for the relationships between Portugal and the Netherlands is attached.

Total cargo loaded in Portugal with destination Netherlands amounted to 1.1 million tons in 1997. Most of that was loaded in Leixoes with 33 %, followed by Sines with 18 %, Aveiro with 16 %, etc. The table attached indicates also individual commodities on the level of NSTR-1-digit.

Table 4-8: Port-to-port matrices between Portugal and the Netherlands by NSTR-1 (examples)

Total

	Loaded						Viana do			
Unloaded	Sines	Leixoes	Lisboa	Setubal	Aveiro	Figueira	Castelo	Faro	others	Total
Rotterdam	158.7	345.5	128.4	16.9	38.3	107.5	1.2	-	-	796.6
Terneuzen	1.4	1.2	-	-	46.4	16.3	26.6	-	-	91.9
Delfzijl	-	-	-	-	64.0	-	-	-	-	64.0
Nijmegen	-	-	-	-	26.4	27.4	-	-	-	53.8
Amsterdam	25.5	0.6	0.0	0.0	-	-	-	-	-	26.1
Moerdijk	11.0	11.7	-	-	-	-	-	-	-	22.7
Velsen	-	-	-	15.7	5.8	-	-	-	-	21.5
Vlissingen/Flushing	-	-	0.4	15.0	0.2	-	-	-	-	15.6
Ijmuiden	-	-	-	5.3	-	-	-	-	-	5.3
Hansweert	-	3.0	-	-	-	-	-	-	-	3.0
Dordrecht	-	-	2.9	-	-	-	-	-	-	2.9
Vlaardingen	-	-	-	-	0.4	-	-	-	-	0.4
Total	196.6	362.0	131.7	52.9	181.4	151.3	27.8	-	-	1103.7

NSTR-Commodity Group 0: Live Animals

	Loaded						Viana do			
Unloaded	Sines	Leixoes	Lisboa	Setubal	Aveiro	Figueira	Castelo	Faro	others	Total
Rotterdam	-	3.7	5.0	-	-	-	-	-	-	8.7
Terneuzen	-	-	-	-	-	-	-	-	-	-
Delfzijl	-	-	-	-	-	-	-	-	-	-
Nijmegen	-	-	-	-	-	-	-	-	-	-
Amsterdam	-	-	-	-	-	-	-	-	-	-
Moerdijk	-	-	-	-	-	-	-	-	-	-
Velsen	-	-	-	-	-	-	-	-	-	-
Vlissingen/Flushing	-	-	-	-	-	-	-	-	-	-
Ijmuiden	-	-	-	-	-	-	-	-	-	-
Hansweert	-	-	-	-	-	-	-	-	-	-
Dordrecht	-	-	-	-	-	-	-	-	-	-
Vlaardingen	-	-	-	-	-	-	-	-	-	-
Total	-	3.7	5.0	-	-	-	-	-	-	8.7

NSTR-Commodity Group 1: Foodstuffs and Animal Fodder

	Loaded						Viana do			
Unloaded	Sines	Leixoes	Lisboa	Setubal	Aveiro	Figueira	Castelo	Faro	others	Total
Rotterdam	-	39.1	41.2	-	-	-	-	-	-	80.4
Terneuzen	-	-	-	-	-	-	-	-	-	-
Delfzijl	-	-	-	-	-	-	-	-	-	-
Nijmegen	-	-	-	-	-	-	-	-	-	-
Amsterdam	-	0.6	-	-	-	-	-	-	-	0.6
Moerdijk	-	-	-	-	-	-	-	-	-	-
Velsen	-	-	-	-	-	-	-	-	-	-
Vlissingen/Flushing	-	-	-	-	-	-	-	-	-	-
Ijmuiden	-	-	-	-	-	-	-	-	-	-
Hansweert	-	-	-	-	-	-	-	-	-	-
Dordrecht	-	-	-	-	-	-	-	-	-	-
Vlaardingen	-	-	-	-	-	-	-	-	-	-
Total	-	39.7	41.2	-	-	-	-	-	-	81.0

Source: Instituto Maritimo - Portuario

5. Case Study II: MDS Transmodal Data Modelling

5.1 Introduction

MDS-Transmodal were retained as subcontractors within the Concerted Action on Shortsea Shipping contract to collect and process statistics that would form part of a detailed regional traffic matrix for freight flows among EU members and between EU member states and the rest of the world. Recent studies have highlighted the importance of accurate OD matrices within transport modelling and transport policy applications, and the absence of a single reliable source that takes advantage of the regional statistics that are compiled at national levels.

The over-riding objectives of this work were therefore to:

- Obtain national sources of regional traffic,
- Process them into a common format, and to
- Combine them to create region-region flows.

5.2 Scope

There is no ideal set of definitions for a project of this nature, so an attempt has been made to balance the need for detail with the need for robustness.

The geographical coverage has been designed to address the needs of projects related to short sea shipping. This includes trade between EU and EFTA member countries, and also flows between other nearby countries such as Eastern Europe, and the non-European Mediterranean.

Within member states, it has been necessary to design the zone structures so that they follow existing regional boundaries used by the national governments. In general, it has been possible to follow the NUTS (Nomenclature of Territorial Units for Statistics) system designed by the Statistical Office of the European Communities. However, different levels of precision have been applied in different countries.

This amounts to a "central" matrix of 129 European (EU, Norway and Switzerland) zones, surrounded by external zones defined either as countries or groups of countries.

As far as commodity detail is concerned, the SITC (Standard International Trade Classification) system has been used, as this provides a hierarchical framework that works well at the national level (where there is a detailed record of the commodity split) and regional levels (where the use of sample data may require a more aggregated approach to commodity detail).

One particular advantage of the SITC system is that at the 2-digit level (65 different commodity definitions) there is enough detail to be able to identify the main handling

characteristics of specific goods, particularly manufactures, without the need for several hundred definitions.

The alternative NST system is commonly used in Europe, but it has proved possible to convert from NST to SITC wherever the need has arisen.

5.3 Sub-Division of Work

To take advantage of the different areas of specialisation between the team members, the work has been sub-divided. MDS-Transmodal were responsible for obtaining and processing data from:

- France,
- Spain, and
- the United Kingdom

In addition, MDS-Transmodal were required to produce a database of country-country-commodity totals based on the Eurostat Comext (Trade Statistics) database. The database was enhanced by the estimation of the unitised/non-unitised split for each trade flow. This is fundamental for understanding the demand for specific types of transport e.g. trailers, containers, general cargo, liquid bulk, dry bulk etc.

Finally, MDS-Transmodal were supplied with a German regional database, which was combined with the regional data from the other listed countries to produce a region-region matrix covering France, Spain, the UK and Germany.

5.4 Data Collection

The success of this project depends to large extent on the type of data readily available from the member states. Although it is technically possible to construct synthetic matrices purely on the basis of measures of economic activity within specific regions, the probability of error is severe. It is therefore critical to be able to analyse trip end totals at a regional level. This provides the necessary input for understanding which industries are located where, and their relative importance.

For all three countries within the MDS-Transmodal remit, regional data has been successfully obtained.

France

The French source is the DNSCE (Customs and Excise) database of external trade. This conveniently classifies trade movements by country of origin/destination, commodity (NST), French Department (NUTS3), and volume (weight and value). The data used within this study is for 1997 full year, and is essentially a complete record of regional imports and exports.

The data was processed to remove superfluous data fields, and to compress the commodity definition from NST-4 Digit to SITC-2Digit, using a standard correlation table. The country codes were the EC standard Comext codes.

The main addition was therefore to convert the total tonnes (as given) into unitised and non-unitised tonnes, using look-up tables detailed for each partner country and commodity, derived from MDS-Transmodal's trade data archive. The main problem was to deal with country and commodity combinations that did not match with any records in the MDS-Transmodal look-up tables. For these, an iterative process was developed so that mode factors could be obtained from similar countries or similar commodities or both.

Problems also arise from the inclusion of "Departements d'outre-mer" or "DOM", i.e. the West Indies as regions of France. Users of the database need to be aware that flows into these departements do not represent short sea shipping.

The NUTS3 Departements were aggregated to NUTS2 Regions, reducing the total number of sub-national zones from 100 (96 excluding DOM) to 21 mainland regions plus Corse, Guadeloupe, Martinique, Guyane, and Reunion.

Spain

The situation regarding Spain is somewhat similar to France. Again, the source was a Customs & Excise database, containing regional detail for 50 zones in Spain ("Provincias"). This is equivalent to NUTS3. The database was dispatched on seven magnetic tapes, and amounted to over 700 megabytes of data.

A database program was developed by MDS-Transmodal to read the files extracted from the tapes, and to compress the data by lifting out the key fields of data. The commodity classification system used was the standard 8 digit Harmonised System, as used within Comext as well as the majority of countries world-wide. Again, correlation tables were used to convert this to 2 digit SITC.

Country codes were again based on the standard Eurostat practice.

As before, the estimated unitised/non-unitised split was introduced, using the factors already calculated by MDS-Transmodal at the national level.

The main problem has been the need to compress vast quantities of data to a few megabytes, and the relative unreliability of using tapes as a storage media. As with the French database, offshore regions such as the Canarias, Baleares, Ceuta and Melilla have required special treatment.

The 52 NUTS3 Provincias (including Ceuta and Melilla) have been aggregated to 15 mainland NUTS2 Communidades Autonomas plus Baleares, Canarias, and Ceuta-y- Melilla.

The UK

The UK experience is somewhat different to Spain and France. UK trade statistics have never recorded regional data such as UK country of origin or destination. The main source of regional data has been the Origin and Destination of International Transport (ODIT) survey, carried out by the UK's Department of the Environment, Transport and the Regions (DETR). This is based upon a sampling technique, and is only carried out every five years (1986, 1991, 1996).

Ideally, it would have been possible to use just the 1996 survey, which was partly funded by the STEMM project (DGVII), but experience has shown that this survey contains deficiencies. In order to complete the freight modelling work within the STEMM project, the survey data was enhanced by contributing data from other sources such as the 1996 International Road Haulage Survey (IRHS) and the Railfreight Distribution database. Finally it was grossed up using UK trade data for 1996, and given greater regional strength by incorporating parts of the 1991 ODIT, which had a stronger methodology. (See STEMM Report).

The ODIT source is essentially a record of unitised trade flows only as the consolidation of bulks in port silos and tanks makes it very difficult to match origins to destinations using a questionnaire approach. It was not considered sensible to estimate the inland origins and destinations of such commodities.

Regional data is collected at the county level (NUTS3). Problems have been encountered in mixing basic data from different years, as a series of changes have occurred in the definition of county boundaries. However, in aggregating to ten NUTS1 standard regions, (excluding Northern Ireland) these inconsistencies have been removed.

5.5 Building Region-Region Matrices: The Problem

The final stage has been to tackle one of the classic transport problems which is how to convert data of the form:

Region R1 (belonging to Country C1) to Country C2: T1 tonnes.

Region R2 (belonging to Country C2) to Country C1: T2 tonnes.

Into:

Region R1(in C1) to Region R2 (in C2) : T3 tonnes.

The problem can be observed as an origin-destination matrix where the row and column totals are known, but the individual cells are unknown.

For example:

Orig/ Dest	Dest1	Dest2	Dest3	Total
Orig1				100
Orig2				200
Orig3				300
Total	150	250	200	600

For this study, the problem can be seen as a series of large matrices, one for each commodity. The origins and destinations are a mixture of countries and regions. Country to/from country and country to/from region flows will be known, but subsets of the matrices will appear as above, e.g. France to/from Spain.

For example, Iron and Steel Trade,

Orig/ Dest	Champagne	Picardie	Hte Normandie	Total
Galicia				100
Asturias				200
Cantabria				300
Total	150	250	200	600

There are various iterative procedures for finding "solutions" to these problems, but these are essentially computer algorithms that have too many degrees of freedom to reach conclusive results. They fit but they are not necessarily right.

It is possible to "seed" the matrix by filling it with particular values before the iteration solves it. The seeding biases the results, so if the seeding is performed according to a valid theory of what the matrix represents, it should improve the result.

One possibility is the so-called "Gravity Model" which takes into account the distance between any two regions in the matrix. By introducing seeded values inversely proportional to the distance (interpreted as the attraction between cells) between the regions it ought to be possible to improve accuracy. Further accuracy might be achieved by extending the analysis to using Generalised Cost instead of pure distance, and other factors such as language compatibility, common currency, joint membership of trade bloc, and so on.

Many sophisticated procedures can be hypothetical, but without any base matrices to test the results against, it is difficult to judge their validity. In these circumstances, if the base matrix were known, there would be no practical reason for trying to estimate it. This is the problem.

5.6 Building Region-Region Matrices: A Solution

The solution employed by MDS-Transmodal has been to build a Gravity model for seeding the unknown cells in the matrix, and to optimise this for each commodity, using an optimisation algorithm known as an "amoeba". The optimisation was conducted on a country-country matrix where all the genuine values for the cells were known in advance. The parameters were stored, and then re-used when the national data was broken down into regions.

Thus, the problem was explored at a national level, and then an optimum solution was transplanted to a regional level. Naturally, the regional results produced could not be tested, but at least the matrix could be seeded with values known to produce vastly improved results at a more aggregated level. Furthermore, the pattern of parameter values for the gravity model used to implement the seeding, could be used to categorise specific commodities in terms of their propensity to be widely or narrowly distributed.

Step 1: Selecting the Seeding Model

The selection process was driven mainly by practicality. It was decided that for simplicity, just 3 parameters would be considered:

1. A measure of the cost in terms of distance between the 2 regions
2. The total exports of the exporting region
3. The total imports of the importing region

Volume indicators such as population and GDP tended to be highly correlated with the total exports/imports.

A simple formula based on physical common sense could be:

$$T = d^{n}e^{-md}\,EI$$

where T= trade, d= measure of cost in terms of distance, E= total exports of exporting region, I= total imports of importing region. The n and m are variables.

Step 2: Optimising the Parameters

After running this formula, a furnessing algorithm is run to 'massage' these 'seed' values to the known totals. The furnessing algorithm finds the existing total of one column and compares this to the required column total. All values in this column are then scaled up accordingly such that the new column total equals the required column total. This is done separately for all columns. This process is then repeated for the rows. If this combined column and row process is repeated several times, gradually the cell values become stable and converge.

It was noted that the column totals (E) are redundant because the furness scaling cancels them out immediately but for the formula to have a sensible physical representation, they were still included. The objective of this program is to find the optimum values of the variables so as to create a formula that will predict the main body of the trade table as accurately as possible.

There has to be a method of evaluating the accuracy of the formula. There is some existing real trade data where the body of the table is already known. By comparing the calculated cell values to the known values in this data-set and adding up all the absolute differences between calculated and known values, an overall measure of the error is obtained.

The variables 'n' and 'm' have to be varied so as to minimise this total error. This is done using the "amoeba" function. This final error can then be compared to the error if there had been no initial seeding (only the furnessing) and a percent improvement found.

There is data for many different commodities so this process can be run for all of them, obtaining different variable values depending on the pattern of trade for each particular commodity. The optimised values for 'm' and 'n' for each SITC commodity are:

Results

SITC no. and name	n	m	Error After Seeding	Error Before Seeding	%better
00 Animals	4.72864	0.030949	663,155	850,538	22
01 Meat	-0.429564	0.001106	2,287,460	3,214,260	29
02 Dairy	-0.55379	0.003387	4,077,450	8,069,130	49
03 Fish	-1.04392	0.000825	1,381,200	2,204,350	37
04 Cereals	-2.86474	-0.000378	2,567,290	4,326,630	41
05 Fruit/Veg	-0.738579	0.000339	8,730,710	12,457,600	30
06 Sugar	-0.637274	0.002179	2,196,140	3,458,890	37
07 Coffee/Tea	-1.6522	0.000228	829,043	1,126,480	26
08 Animal Feed	-2.0288	0.000598	2,582,060	4,520,360	43
09 Misc Edibles	-1.07391	0.000701	1,057,500	1,742,980	39
11 Beverage	-0.110612	0.055329	10,267,100	20,839,500	51
12 Tobacco	-1.637	-0.001496	274,518	291,650	6
21 Hides Raw	-1.6443	0.000575	365,381	450,471	19
22 Oil Seed	-1.54893	0.005966	16,746	28,214	41
23 Cr Rubber	-0.364645	0.001242	517,973	660,432	22
24 Wood	-4.25486	0.001628	332,351	1,076,000	69
25 Pulp	-0.337764	0.005893	785,465	2,029,800	61
26 Textiles	-1.3155	7.51E-05	716,393	1,049,480	32
27 Crude Ferts	-4.05698	-0.001776	6,818,050	10,439,800	35
28 Ore/Scrap	-0.752897	0.001408	1,170,690	1,813,910	35
29 Oth Crude Mats	-0.878426	0.001608	1,899,030	2,592,650	27
32 Coal/Coke	-2.8805	0.000712	783,348	1,871,700	58
33 Petroleum	-4.18336	-0.000854	335,128	551,877	39
41 Animal Fats	-1.6663	0.001616	245,791	389,645	37
42 Veg Fats	-0.180219	0.004108	948,911	1,621,800	41
43 Other Oils	-1.33137	0.000556	378,736	506,854	25
51 Organic Chem	-0.176975	0.000949	3,615,750	4,391,430	18
52 Inorganic Chem	-0.545743	0.001132	8,905,440	12,919,100	31
53 Dyes	-1.3526	0.000245	1,692,210	2,630,380	36
54 Pharmaceuticals	-0.04056	0.000915	332,371	438,903	24
55 Essential Oils	-1.18802	0.000254	1,714,550	2,565,630	33
56 Other Fertilisers	-0.298037	0.001676	3,261,300	4,948,300	34
57 Prim Plastics	-0.370048	0.000889	5,892,760	9,592,560	39
58 Other Plastics	-1.01699	0.000331	1,333,080	1,886,520	29
59 Chemical Materials	-1.78155	-0.000152	4,747,050	7,263,560	35
61 Leather	-2.85753	-0.001231	82,734	108,033	23
62 Rubber Manuf.	-0.759114	0.000127	977,820	1,174,680	17
63 Wood Manuf.	-2.09861	-6.79E-05	2,266,900	4,268,710	47
64 Paper	-1.15295	0.000397	5,180,710	7,184,460	28
65 Textiles	-0.749137	0.000149	1,657,590	2,222,400	25
66 Non Metallic Manuf	-2.57571	-0.000317	11,136,100	22,532,500	51
67 Steel	-1.14903	0.000178	3,901,870	5,928,690	34
68 Non Ferrous Metals	-1.15747	0.000115	3,705,220	5,077,670	27
69 Other Metal Manuf.	-2.44048	-0.000498	2,992,420	5,806,260	48
71 Power Machinery	0.531799	0.001082	1,149,270	1,236,270	7
72 Specialise Machinery	-1.11267	-4.78E-06	866,170	1,284,450	33
73 Metal Machinery	-1.22889	-0.000244	197,304	236,321	17
74 General Industrial Mc	-0.668388	0.000239	1,867,980	2,319,570	19

75 Office Machinery	-0.064217	0.000876	330,987	391,512	15
76 Telecom	-0.566591	0.000382	532,228	614,457	13
77 Electrical Mc	-0.72881	0.000168	2,315,210	2,639,640	12
78 Road Vehicles	0.089321	0.000762	4,156,750	4,607,230	10
79 Oth Transport Equip	-1.17526	0.000567	98,373	130,445	25
81 Prefabs	-2.88769	-0.00085	772,798	1,202,500	36
82 Furniture	-1.89748	-0.000158	1,397,840	2,228,640	37
83 Travel Goods	-1.5887	-0.000142	60,105	69,651	14
84 Clothes	-1.3858	-0.00024	431,867	521,253	17
85 Footwear	-0.456656	0.000104	184,464	196,684	6
87 Scientific Machinery	-0.274025	0.000514	161,173	181,466	11
88 Photographic Mc.	-0.421964	0.000564	136,003	165,466	18
89 Miscellaneous Manuf	-1.31818	0.00017	2,686,140	4,202,180	36
90 Others	27.7121	0.021775	52,801	68,881	23
Total	-1.22196	9.08E-05	101,163,000	179,847,000	44

Step 3: Appraising the Results

This data is represented below in graphical form: m versus n.

The more negative n is, the quicker the function goes to zero because of the d to the power of n term. The more positive m is the quicker the function goes to zero because of the exponential term. The difference is in the shape of the curve:

- An exponential curve behaves sensibly near zero - starting at 1 and gradually decreasing. Then at high distance it becomes very small.
- A power-n (n negative) curve starts at infinity (at distance = zero) and quickly comes down but is less active than the exponential term at higher distances.

If it is positive, the seeding graph of trade vs. distance initially goes up from zero (for small d - while the exponential term is negligible). As the exponential term catches up and becomes dominant at larger d, trade falls back down again to approach zero at high distances.

A large positive n keeps the exponential term negligible until higher distance so the graph continues to rise for longer. A large positive m allows the exponential term to quickly dominate, keeping the peak close to zero distance.

The variable m should not be negative. Where it is, n should always be negative and the exponential term does not become dominant until beyond the fitted points. Although this may fit the data for the distances fitted, it is unrealistic for larger distances. Negative m should only result where the data is very sparse.

Most commodities fit into the n negative, m positive position in mn space. The actual position depends on the shape of the trade vs. distance curve. A highly negative n shows that the graph quickly descends within relatively small distances without giving much information as to trade at large distances. A large m shows that there is very little trade at large distances without giving much information about the small distance trade.

So on the graphs below, negative n is a measure of the speed of descent of the curve at short distances. Positive m is a measure of the speed of descent of the curve at larger distances. The apparently anomalous value for '90 Others' is not necessarily wrong - it is just based on very sparse data and is the best estimate.

11 Beverage has a high value of m. As it's n is not very negative, this shows that at small distances, there is little dependence of trade on distance but at high distances, the trade quickly decreases.

00 Animals again suffers from sparse data. This point suggests that the trade has a non-zero-distance peak before descending rapidly at high distance.

Step 4: Application

New software was created to apply the results of this gravity model to the actual trade databases, at the regional level. The software used the basic country-country-commodity database which originated from Eurostat. Where regions for neither country were known, the Eurostat record was passed straight into the output database.

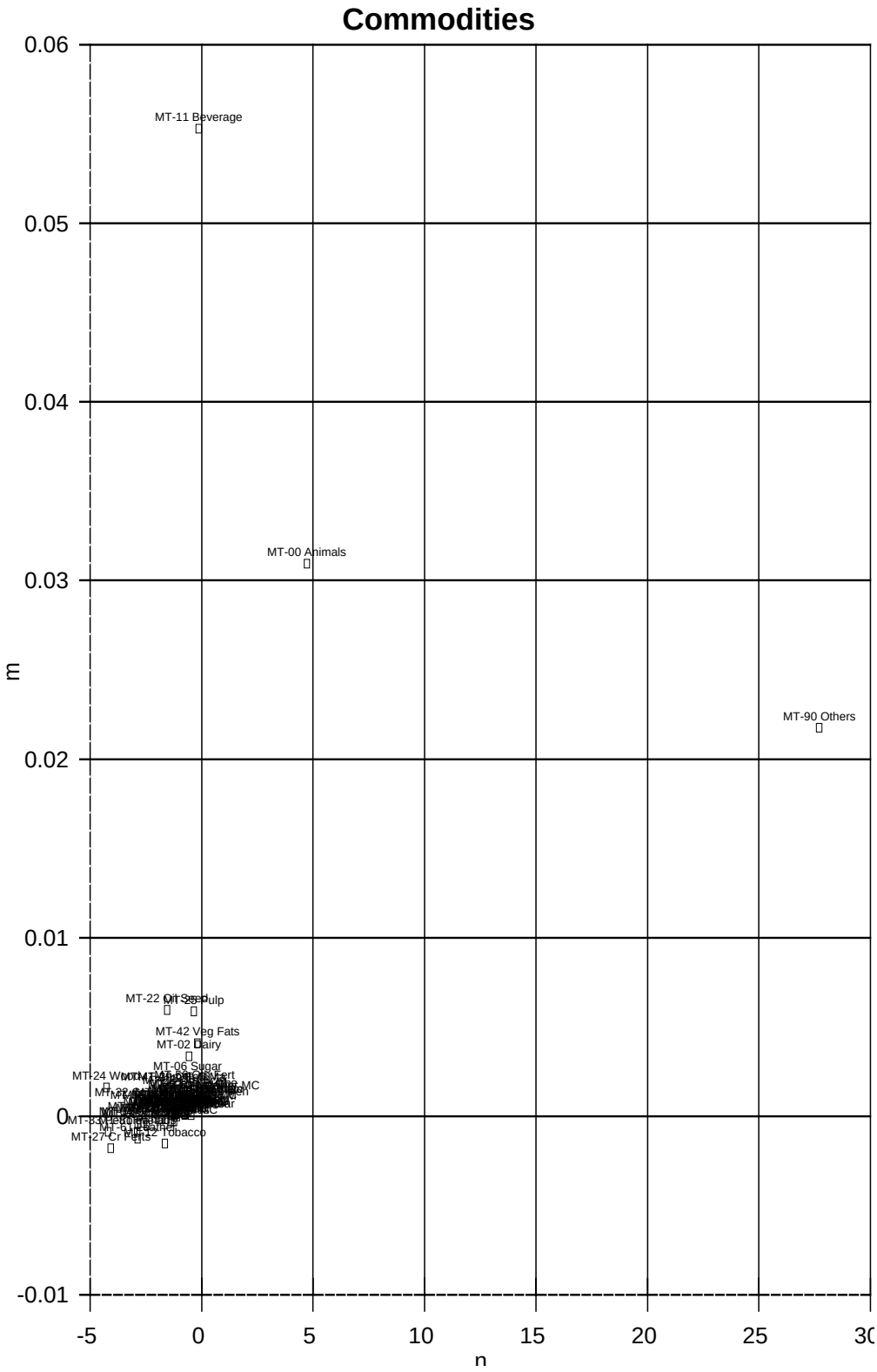
Where regions for one country were known (France, Spain, UK and Germany) the national totals were split according to the proportions recorded in the regional databases, and grossed up to the Eurostat figure for consistency.

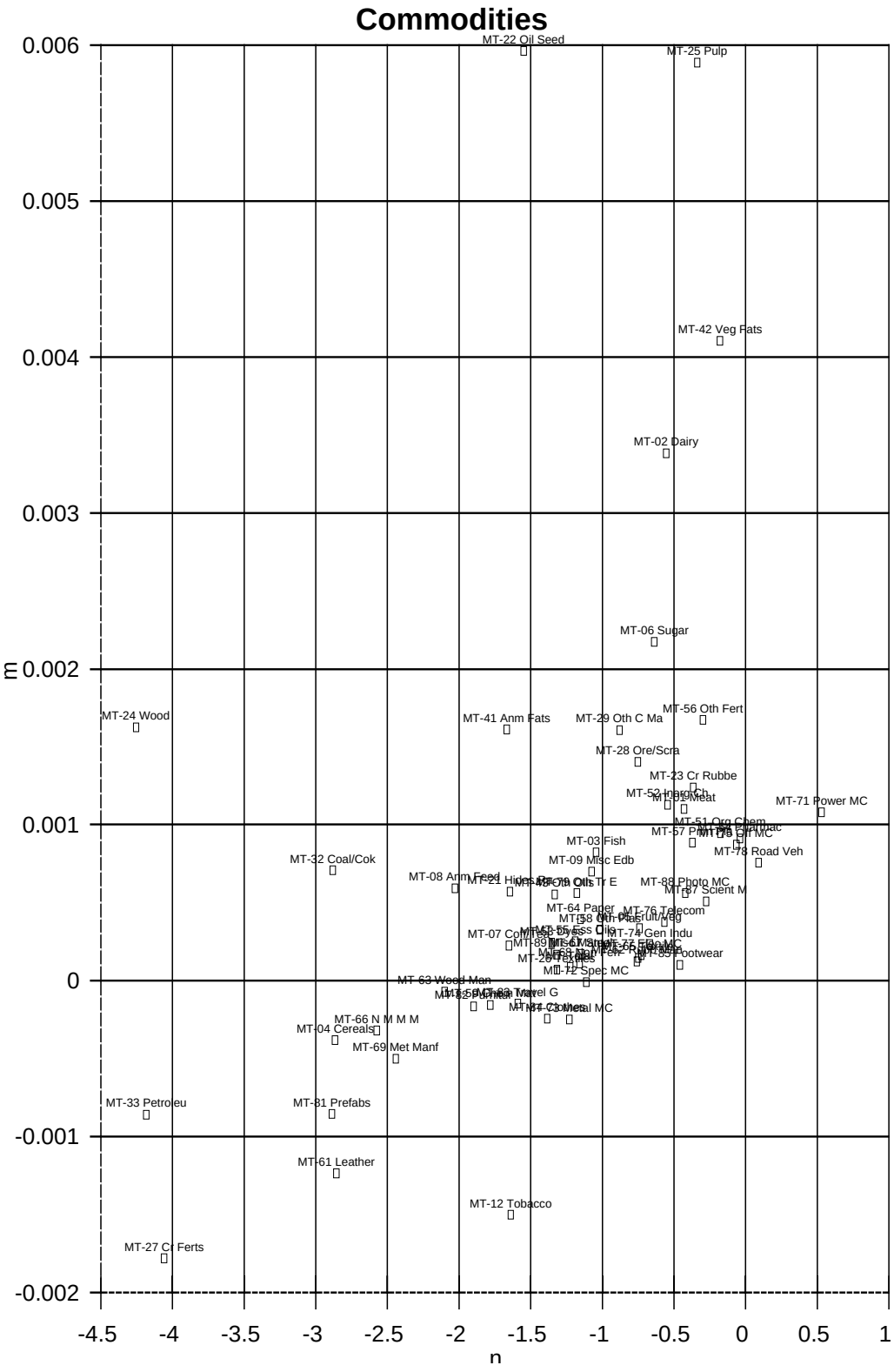
Where regions were known in both reporting and partner countries. The matrix was seeded with values from the optimisation process and the furnessing technique was applied.

5.7 Results

The modelling approach applied by MDS Transmodal in consistant with procedures applied by the other partners of this project. The matrices, however, do not refer to commodity groups but to unitised/non-unitised cargo. The results are a very valuable regionale split model for France, Spain and the United Kingdom. All files are available and can be used for specific corridor studies after consultation with NTUA.

Figure 5-1: Plotted Values for ‘n’ and ‘m’




Commodities
MT-22 Oil Seed
MT-25 Pulp
MT-42 Veg Fats
MT-02 Dairy
MT-06 Sugar
MT-24 Wood
MT-41 Anm Fats
MT-29 Oth C Ma
MT-56 Oth Fert
MT-28 Ore/Scra
MT-23 Cr Rubbe
MT-71 Power MC
MT-03 Fish
MT-09 Misc Edb
MT-78 Road Veh
MT-32 Coal/Cok
MT-08 Anm Feed
MT-88 Photo MC
MT-64 Paper
MT-76 Telecom
MT-07 Coffee/Tea
MT-74 Gen Indu
MT-63 Wood Man
MT-66 N M M M
MT-04 Cereals
MT-69 Met Manf
MT-33 Petroleu
MT-81 Prefabs
MT-61 Leather
MT-12 Tobacco
MT-27 Cr Ferts
m
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0.005
0.004
0.003
0.002
0.001
0
-0.001
-0.002
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
0.5
1

Table 5- 1: Sample Output Database

Type 1: No Regional Data

Direction	Rep	RepName	RepReg	Par	ParName	ParReg	Sitc2	UTonne
Imp	39	SWITZERLAND	DKReg	804	NEW	DKReg	84	6
Imp	39	SWITZERLAND	DKReg	804	NEW	DKReg	85	1
Imp	39	SWITZERLAND	DKReg	804	NEW	DKReg	87	5
Imp	39	SWITZERLAND	DKReg	804	NEW	DKReg	89	33
Imp	39	SWITZERLAND	DKReg	807	TUVALU	DKReg	3	1
Imp	39	SWITZERLAND	DKReg	810	US OCEANIA	DKReg	3	1
Imp	39	SWITZERLAND	DKReg	810	US OCEANIA	DKReg	5	6
Imp	39	SWITZERLAND	DKReg	813	PITCAIRN	DKReg	5	11
Imp	39	SWITZERLAND	DKReg	813	PITCAIRN	DKReg	58	9
Imp	39	SWITZERLAND	DKReg	815	FIJI	DKReg	82	4

Type 2: Regional Data at One End

Direction	Rep	RepName	RepReg	Par	ParName	ParReg	Sitc2	UTonne
Exp	1	FRANCE	R210	2	BELGIUM/LU	DKReg	0	446
Exp	1	FRANCE	R221	2	BELGIUM/LU	DKReg	0	3735
Exp	1	FRANCE	R222	2	BELGIUM/LU	DKReg	0	7428
Exp	1	FRANCE	R223	2	BELGIUM/LU	DKReg	0	904
Exp	1	FRANCE	R224	2	BELGIUM/LU	DKReg	0	332
Exp	1	FRANCE	R225	2	BELGIUM/LU	DKReg	0	99
Exp	1	FRANCE	R226	2	BELGIUM/LU	DKReg	0	628
Exp	1	FRANCE	R230	2	BELGIUM/LU	DKReg	0	39441
Exp	1	FRANCE	R241	2	BELGIUM/LU	DKReg	0	2058
Exp	1	FRANCE	R242	2	BELGIUM/LU	DKReg	0	48

Type 3: Regional Data at Both Ends

Direction	Rep	RepName	RepReg	Par	ParName	ParReg	Sitc2	UTonne
Exp	1	FRANCE	R241	4	GERMANY	R17	4	3558
Exp	1	FRANCE	R241	4	GERMANY	R15	4	61619
Exp	1	FRANCE	R241	4	GERMANY	R16	4	2736
Exp	1	FRANCE	R241	4	GERMANY	R1D	4	70
Exp	1	FRANCE	R241	4	GERMANY	R1E	4	115
Exp	1	FRANCE	R241	4	GERMANY	R18	4	5043
Exp	1	FRANCE	R242	4	GERMANY	R11	4	3318
Exp	1	FRANCE	R242	4	GERMANY	R19	4	14768

6. Case Study III: Maritime Transport Data Availability and Bottlenecks in the Netherlands

6.1 Introduction

An attempt was made to get a better insight in the bottlenecks, which were observed in the various statistics for international goods transport, and the possible solutions in the Netherlands. In the next paragraphs these bottlenecks and solutions are described in detail. The various parts of the trade statistics and the transport statistics will be dealt with[13].

6.2 Trade statistics

The goods flows, which are registered in trade statistics, can be divided in import and export, entrepot transport and transit. By 1-1-1993 the registration has changed extensively, namely because observation of trade with other EU-member states (intra trade) is no longer registered by means of declaration at customs but by means of direct report to CBS. Trade with third countries (extra trade) is registered the way it used to but changes have taken place in the definitions of the variables, which should be registered.

These import and export data are processed, checked and if necessary extra estimated by Sector International Trade (HIH) of CBS. In the HIH production process it is checked whether the value of (relevant) variables are within the range of possibilities (smoothen up). Then the aggregation level of about 55 country groups and 1250 goods type groups are checked on completeness (non-response) and plausibility of the items. So at this so-called "macro-editing" not all individual records are checked, but at a higher aggregation level the "deviations" are analysed. Only when deviations in relation to the "imputation value" (determined on the basis of historical observations) are detected at "macro" level the underlying observations are checked.

In a separate document a description is given of the output files supplied to Eurostat (amongst other things to accommodate the TREX-database and the publication "Trade by Mode of Transport") and the Sector Traffic and Transport (HVV) (to accommodate the statistics of the import, transit and transport). The following items can be distinguished:

- The *detailed items* of the registration of the "clean" import and export in the Netherlands.
- The *detailed items* of the registration of the so-called "disguised" transit, which is import and export for the EU registered in the Netherlands (respectively entry and clearance in the Netherlands) not destined for the Netherlands or originating from the Netherlands but going to or from another EU member state.

13 This section draws from results of EU project INFREDAT.

- The data of the extra estimation which is made because of non-response from smaller companies and the threshold values for intra trade, for which figures are compared with VAT-statements and composition of population.
- The data of the imputations, which are made for incomplete statements of larger companies at intra, trade.

From these descriptions it is concluded that much more “transport variables” are registered than used by sector HVV at the moment. By means of an analysis of the data in Sagitta, which are supplied by Customs to CBS it is examined to what extent, these additional variables can be used for the statistics of international goods transport.

6.2.1 Problems Registration Import and Export

For direct reports from companies to CBS of trade with other EU-member states for the benefit of INTRASTAT a threshold of ƒ 500,000 per year exists. This threshold is for import (ICV) and export (ICL) separately. Apart from the missing trade data as a result of this threshold value it is also a matter of non-response. The registered import and export are increased for non-response by the sector HIH and extra estimated for companies, which remain under the threshold. For these estimations VAT-information of import and export with other EU member states is used amongst other things. In table 2 an overview is given of the size (in value) of the estimates from HIH concerned. In recent years more than 10 % of the total value of Dutch international trade is extra estimated. The largest part of these estimations are concerned with the intra trade, but extra trade is being extra estimated recently as well.

Until recently the estimations were determined for aggregated data for the 1000 most important goods types or the 50 most important country groups. Lately an improved calculation methodology is established which contains a recalculation of import and export starting from January 1996. As of the statistical year 1997 registration data as well as extra estimations (and imputations) are delivered by HIH to HVV on behalf of the import, export and transit statistics. In earlier years only registrations were supplied.
This resulted in a structural underestimation of import and export sizes in import, export and transit statistics in the period 1993-1996. In theory the import of extra estimation to HIH has solved this problem. The imputation and extra estimations though are only delivered at a high aggregation level, which obliges HVV to perform additional calculations in which the “macro-weight factors” are utilised on all underlying detailed data.

In a separate document a comparison has been made between the weight of the import and export as shown in 3 different sources, these are:
1. the statistics of the international trade (HIH, net weight);
2. the TREX-database or the publication “Trade by Mode of Transport” (Eurostat, net weight);
3. the statistics of import, export and transit (HVV, gross weight).

Table 6-1 Registered and extra estimated import and export, 1993-1997

	EU member states				**Other countries**				**All countries**	
	Registration	extra estimation		total	registration	extra estimation		total	total	share
	Value Billion Gld	value billion gld	share %	value billion gld	value billion gld	value billion gld	share %	value billion gld	value billion gld	extra estimation %
Import										
1993	125,5	16,5	11,6%	142,0	-	-		89,7	231,7	7,1%
1994	143,1	13,6	8,7%	156,7	-	-		99,7	256,4	5,3%
1995	163,1	25,3	13,4%	188,4	-	-		96,8	285,2	8,9%
1996	165,0	32,5	16,5%	197,5	108,9	1,9	1,7%	110,8	308,3	10,5%
1997	180,5	35,3	16,4%	215,8	128,0	3,1	2,4%	131,1	346,9	10,2%
Export										
1993	179,3	11,5	6,0%	190,8	-	-		67,5	258,3	4,5%
1994	201,4	14,4	6,7%	215,8	-	-		71,7	287,5	5,0%
1995	227,8	22,9	9,1%	250,7	-	-		65,5	316,2	7,2%
1996	232,9	35,5	13,2%	268,4	69,0	1,5	2,1%	70,5	338,9	10,5%
1997	257,9	36,6	12,4%	294,5	81,0	2,3	2,8%	83,3	377,8	9,7%

From the table it can be concluded that the extra trade of TREX (Trade by Mode, Eurostat) is considerably higher than the HIH registration and that especially the import of HVV in the AAD is lower than of HIH, despite the difference in gross/net definition.
These deviations can be related to different definitions handled in the sources:

- HIH delivers data on the extra trade to Eurostat, complying with the Eurostat definition in which everything that enters or clears in the Netherlands for the complete EU is recorded. The so-called “disguised transport” is thus also given to Eurostat, but is not part of what is entered or cleared for the Netherlands itself and is therefore not counted in figures of HIH.
- The difference in import between HIH and HVV can be explained by the fact that HIH records the entrepot output under imports whereas HVV calls it entrepot storage.

The AAD uses a gross weight as a starting point, because only gross weights are available for transit and entrepot transport. The net weights of the import and export are increased to gross weight with very outdated factors. These factors have to be revised, those (historical) declarations in which net as well as gross weight are recorded could possibly be used. Such “conversion factors” are also used in Belgium[14].

Maybe the phenomenon of the disguised transit needs further clarification. For goods from and to third countries which are not destined for or origin from the Netherlands, but which can enter or leave the EU through the Dutch sea or sky borders, can be cleared in the Netherlands.

14 Statistieken van de Buitenlandse Handel, Algemene Handel 1996 (bijzonder nummer), Instituut voor de Nationale Rekeningen, Brussel, januari 1998.

Furthermore registration will take place from export to and import from the Netherlands through INTRASTAT. At the moment this so-called “disguised transit” can still be distinguished from the “clean” import and export in the Netherlands. On the long run this facility will disappear, because there is no obligation anymore to state the so-called “statistical system” in INTRASTAT. On the other hand, in other EU member states goods are cleared which are destined for or origin from the Netherlands.

HIH supplies data from disguised transit to Eurostat and HVV. The goods flow codes 1,8 and 9, which are concerned with disguised transit are deleted from the HIH output files by HVV. In principle the volumes of flows 8 on the one hand and 9 + 1 on the other hand should be equal. Differences in value can occur, because the value of the goods, which are cleared in the Netherlands for the EU, can in case of transit to other EU member states be added to the import taxes. The goods which are stored in entrepot in the Netherlands and transported after clearance in the Netherlands to another EU member state, can hardly be distinguished at the moment. Recognition of this flow (8-1) takes place through system “03” and after consultation with the correspondents.

A large part of the “disguised transit” (flow 8-9, import, export) will be recorded on the basis of a specific population of companies which have a permit as “limited fiscal representative”. These companies do not have to pay VAT over goods that are cleared in the Netherlands for the EU, but they can transfer this tax obligation to the shipper in the EU- member state concerned.

The disguised transit is also of importance for the determination of the net contribution to the EU by the Netherlands. This phenomenon is known as the “Rotterdam-effect”. The precise dimensions of the Rotterdam-effect are unclear. Results of the various calculations[15] of the import taxes part for goods that are cleared in the Netherlands for other EU-member states were between 18% and 48%. This difference in percentages results in a difference of more than ƒ 1mld. in the net contribution to the EU. After further research at CBS the final percentage is determined at 27%.

6.2.2 Registration and Checks “Transport Variables”

Transport variables are variables which are not of direct importance to the international trade but they are important for description of physical goods flows. In the various primary sources for international trade a large number of transport variables are recorded. Of these only three are recorded in the HIH output file, these are:

- the active means of transportation at crossing the Dutch border;
- the manifestation;
- the traffic area of loading or unloading.

These transport variables, which are delivered to Eurostat and HVV, are checked by HIH only on whether the value of the data is within the range of possibilities. Checks on plausibility are not performed by HIH, because it is not important for data on international trade. Therefore

[15] see a.o. “Het Rotterdam-effect”, A.W. Veenstra en H.A. Klink, ESB no. 4161, 17-7-1998; “Europees geld, lokaal gewogen”, NYFER Kwartaalbericht 98-2, SDU, 1998

HVV applies a large number of standard corrections at a later stage without additional analysis of the data. These corrections are aimed at preventing illogical combinations, such as:

- combination manifestation and means of transportation: no containers per pipe or by air;
- combination traffic area and means of transportation: transport by sea and air only in a region with a seaport or airport.
- combination type of goods and means of transportation: certain goods are not transported by air but by road.

It has become clear that after reconsideration and reorganisation at HIH there is no room to take these transport variables into account (means of transportation, manifestation and region of loading/unloading) in the macro-editing process. The system concerned is slow as it is and adding of extra variables would probably make it crash. Moreover, the monthly finalising processing would take several days which cannot be fitted into the production scheme. In the long run (years) in a next reconsideration or adjustment of the production process it might be possible to include a separate module for transport variables for international trade. On short term it is possible to have the HIH monthly registration data checked by HVV on plausibility of the transport variables. HIH can process improvement on the problematic cases after feedback or adjust by means of a recall from correspondents. Herewith a historical file can also be established which can be used for imputations/extra estimations, which include transport variables.

For the moment it is impossible to add variables that are registered in Sagitta, but not used in current output files. The output file, which HIH delivers to Eurostat, does not include all variables or they are not defined the way the EU regulations prescribe. This is a deliberate choice, because HIH does not benefit from these variables. For example: the definition of the international means of transportation, which in the Netherlands is always (intra and extra trade), connected with registration at Dutch border crossings. According to regulations in the case of extra trade at least the (active) means of transportation has to be registered at entrance in or departure from the statistic registration area of the Community. Furthermore the means of transportation in the Community can also be registered. Along with the (obligatory?) registration by the member state where import or export formalities take place, the registration contains the following goods flow chain:

country of origin → means of transportation at entry in the EU → country of clearance in the EU → means of transportation within the EU → member state (and region) of destination.

It is known from France that other transport variables are also available for international trade and in Germany also transport variables were known in the past, which were not published in the Netherlands. Inquires at Eurostat have to give an insight in the type of data that the various member states import on the basis of the regulations concerned and whether the data concerned can be used within the framework of TRANSITIE or MESUDEMO (4th framework). Possibly certain variables, like the (air) port of transhipment or member states of import/export or origin/destination are useful for the construction of (transit) chains.

In the Intrastat system only the loading or unloading region has to be recorded for transport by sea, air or inland navigation. The manifestation does not have to be registered for intra trade.

In the long term further reductions in registration of transport variables are expected. It is not clear, if and when this simplification will take place. For Intrastat, in the scope of the SLIM-project, proposals for simplification are prepared as well. These include amongst other things removal of the region of loading and unloading, the statistical system and the means of transportation of border crossing.

Beginning in statistical year 1997 weight is no longer recorded for some good types in international trade, only a "measurement unit". The measurement unit can be regarded as litres, number of items, pairs, etc. The used measurement unit is defined per individual goods type of the harmonised system (GN). Therefore sector HIH no longer publishes weight, next to the value of import and export since 1997. In theory HVV can easily solve this problem by utilising a weight/value or weight/measurement unit relation by goods type on the basis of historical data.

6.3 Production Process Transit

The production process of the transit statistics has been described by HVV in a voluminous document that cannot be summarised. The great variety of sources and often very specified regulations for exceptions for specific companies make it all very complex. One of the important aspects are primary sources on the basis of which registration takes place.

6.3.1 No registration anymore from transit between EU member states through the Netherlands

In 1992 it is attempted to fill the gap with a special regulation of the European Commission at the urgent request of the Netherlands and Belgium. In reality it was not possible to find the right persons to give information[16] who have access to information about the complete chain. Therefore this regulation was withdrawn.

In principle intra-transit through the Netherlands could be estimated by means of the INTRASTAT data from other EU-member states. An analysis of the transit data between EU-member states through the Netherlands for 1992 is largely consistent with data recorded in the Eurostat statistic "Trade by mode". Unfortunately, these data become available with a two-year delay and data on region of transhipment cannot be derived from the publication and the database. The basic regulation for registration of intra trade leaves a possibility for registration of the possible seaport or airport in another member state in the member state of origin or the member state of destination in case these member states draw up transit statistics. Whether this registration is executed in reality has to be further examined. Since this variable is at least not registered in the Netherlands in the Intrastat system there is a small chance that other member states do take care of this registration.

[16] see "Revision of the Intrastat collecting system Lot 1: Study on transit statistics and storage statistics", van Holst & Koppies, Capelle a/d Ijssel, July 1996

6.3.2 Transit third countries incomplete

The quality of information about transit with third countries through the Netherlands has deteriorated excessively in the last few years. Especially in the case of sea transport and rail transport less data are given to CBS. Moreover, due to lack of capacity only one month per quarter is processed. A frame of reference for upgrading these monthly data to yearly data is missing. Further cutbacks at the Ministry of Economic Affairs in general and CBS in particular have put the pressure on the very labour-intensive processing of the transit documents.

The same problems are experienced in Belgium and the German Laender Hamburg and Bremen where transit statistics are recorded as well. In Belgium the registration of transit by the National Institute of Statistics has even been cancelled for a number of years. Because of the great importance that is attached to policy information that is based on data for transit, import and export, the National Bank of Belgium has resumed the registration of maritime transit. Because the new approach in Belgium might offer leads for a supposedly better and more efficient registration of transit in the Netherlands the Belgian approach is explained. The registration in Belgium is limited to incoming and outgoing transit by sea. Transit chains, which do not include sea transport, are not recorded. To limit the costs not all transactions (1,5 million per year) are processed completely, but a stratified sample survey is carried out, divided by source and gross weight. Sources for registration of this maritime transit in Belgium are:

1. The original copies 1,2 and 7 of the SAD, which are sent by customs offices.
2. Like 1, which are delivered electronically be means of the SADBEL customs system.
3. A carbon copy of copy 3 of the SAD of goods leaving the other member states through the port of Antwerp. The NBB receives these copies 24 hours from customs to make carbon copies. As soon as these export goods have crossed the EU border the original copy 3 is returned to the exporter in the member state of origin by Belgian customs as prove of export.
4. A remainder of the copies of the third copy SAD from other Belgian ports, road transport documents and copy invoices.

This last group is processed as a whole. By stratification of the sample survey by weight group 60% of the gross weight is in fact registered by recording only 10% of the transactions. All this is shown in table 6 with the observed and extrapolated mass for 1996.

Recent reference material for Dutch transit is not directly available. The total number of relevant transit document added up to about 3.2 million in 1992. Of this 62% was Dutch SAD ex. 1, 25% foreign SAD ex. 7 and 9% a copy of a foreign SAD ex. 3. The remaining 4% forms was mainly sea transport-(D51) and rail transport documents (D51 resp. ISV).

Table 6-2 Observed and extrapolated mass in Belgian transit (1996)

document-type	SAD (ex. 1,2 and 7)	SAD (ex.3) in Antwerp	Sadbel	Other	Total
Observed mass (in ton)	8.046.776	5.499.088	5.239.359	685.933	19.471.156
Extrapolated mass (in ton)	11.848.818	10.523.500	8.806.977	685.933	31.865.228
% weight in sample study	67,9%	52,3%	59,5%	100,0%	61,1%
Number of observations	31.673	50.307	36.626	37.649	156.255
Theoretical number of observations	494.133	625.767	360.296	37.649	1.517.845
% observation in sample study	6,4%	8,0%	10,2%	100,0%	10,3%
% of all observations	32,6%	41,2%	23,7%	2,5%	100,0%

The question is whether improvement in efficiency is possible in case the Netherlands chooses the same approach as in Belgium. It is not clear whether this Belgian approach is as deviant from the stratified sample survey, which was applied by CBS in the period 1988-1994. The following was concluded:

- Because of limitation to the registration of maritime transit less documents can be processed. This means a loss of quality of information. In 1992 99% of the total transit weight was maritime transit. Only transport by air is almost completely not-maritime transit, but that has problems of its own. Therefore a specific solution is better to dig up the real transit figures. In the case of road transport only 5% of transit weight concerns not-maritime transit. This is mainly road <-> road and road <-> air transit.
- In Belgium an important part of the transit data are supplied by Sadbel. These registrations are similar to the SAD copies 1,2 and 7, which are possibly delivered to customs by correspondents directly or punched by customs. Whether this also happens in the Netherlands is unclear. Maybe part of these data involves the “disguised” transit for which clearance for EU takes place in Belgium for some other EU-member state.
- The number of foreign SAD copies 3 (export other member states) is in relation a lot higher in Belgium (41% in 1996) than in the Netherlands (9% in 1992). Maybe the share of the Netherlands has increased after 1-1-1993. A possible explanation is also the fact that maritime transit in the Netherlands consists of incoming transit by sea and only for a small part concerns outgoing transit by sea with an EU member state as original country.

To enable making acceptable (maritime) transit statistics in the Netherlands with declining measures it is advisable to further investigate whether the Belgian approach really leads to an improvement in efficiency. A first step in this direction is a further analysis of the size of the various kinds of documents that are processed at CBS as well as an estimation of the necessary processing capacity.

6.4 Transport Statistics

The description of the transport statistics has been restricted. Also in transport statistics the quality of the data is not always optimal. Below the problems are indicated point by point.

6.4.1 Sea transport

- Limited division in type of goods.
- Domestic transport is not registered (yet).
- International port or loading of unloading region has not been standardised.
- Beginning in statistical year 1998 there is no complete processing of forms.
- Custom documents often form the basis for registration, which can simplify possible linking.
- Sea transport statistics of goods with a communal character are registered, which might enable a link with intra-EU transit.

6.4.2 Inland navigation

- Registration is not always complete and therefore it has shown a lot of fluctuation in recent years.
- By means of BICS and IVS90 the registration of inland navigation has to become watertight in the long term.
- On the basis of ship numbers a good linking between data about means of transportation, trip and loading is possible. With IVS-information it could be extended to course.

6.4.3 Rail transport

- Liberalisation of goods transport by rail results in more difficulties to get sufficiently detailed data from the various rail transporters, among whom foreign ones.
- Legal obligation to deliver statistical data by all operators and/or Railned functioning as correspondent?
- In future EU-regulations probably no or only limited regional detail.
- Unclear description of the observation unit (wagon, shipment, charter?).
- No information on used means of transportation.
- Uncertainty on registration container shuttles, empty wagons and special transport?

- No goods types are known of combined transport loads.

6.4.4 Road transport

- Reliability of detailed data is under discussion considering the limited sample study.
- Because of the limited sample study it is advisable to have two sample studies in one year with additional questions to enable a link with the goods chain. Most important argument against is the pressure of the interview, but maybe such a double observation might lead to lower pressure by using a more efficient sample study?
- Road transport data from/to the Netherlands by transporters from other EU member states only become available through Eurostat after long delay and only contain a limited details of goods types and no regions of loading/unloading (yet). The new EU regulation for statistic registration of goods transport by road has solved this last problem. Also some new variables have been introduced, like the transit countries and a link between vehicle, travel and loading data. The problems which will remain in existence with data becoming available very late and even though this regulation has been applied since 1999 there is still a possibility to deliver these new variable to Eurostat only after a number of years. Preceding the use of this new regulation an exchange was planned in phase 1 of CBS road transport data with statistical bureaus of Belgium, France, Germany and the United Kingdom. CBS has sent a test file following the specifications of the new Eurostat regulation to the countries concerned. The aim is to check whether technical obstacles exist at the exchange between statistical bureaus in the Netherlands, Belgium, France, Germany and the United Kingdom. There is no certainty about when data can be exchanged in reality. Road transport figures can be bought at the statistical bureaus, but because of a pledge of secrecy and reliability the required details can often not be supplied. Moreover it remains to be seen whether such an approach fits in a CBS standard production process.

6.4.5 Pipeline

- Only a limited registration, no domestic transport, only transport of petroleum products, no region of origin and destination. Cooperation in the collection of data with for example VELIN, because they have an interest in better information about pipeline transport.

6.4.6 Aviation

- Only limited registration, no region of origin or destination, no goods type. Since the transit data for air freight are also incomplete CBS is having talks with several parties about direct delivery of data to CBS.

6.5 Summary of Freight Transport Data Availability in the Netherlands

The summary on freight data availability in The Netherlands is presented in tabular form and is built based on the information contained in the available Dutch sources:

- CBS transhipment;
- CBS trade;
- CBS national transport.

Table 6-3 Availability of trade data – IMPORT/EXPORT

Source	Origin	Destination	Commodity Group	Mode	Weight	Value	Container	Other loading units	Transhipment	
									Sea	Other
CBS	Y	Y	NSTR/4	Y	Y	-	Y	-	-	-

Table 6-4 Availability of transit data

Source	Origin	Destination	Border crossing transhipment	Border crossing transhipment	Mode origin	Mode destination	Commodity group	Weight
The Netherlands								
CBS	Y	Y	Y	Y	Y	Y	NSTR/4	Y

Table 6-5 Availability of transhipment data

Source	Origin	Destination	Commodity group	Mode IN	Mode OUT	Weight	Value	Container	Other loading units
The Netherlands: transhipment data could be derived from Table 1.1									

Table 6-6 Availability of (national and international) transport data

Source	Origin	Destination	Commodity Group	Mode	Weight	Value	Container	Other loading units	Transhipment
The Netherlands									
Sea BENELUX custom union	Y	Y	NSTR/4	Y	Y	-	Y	-	-
CBS – road transport (own account)	Y	Y	NSTR/2	Y	Y	-	Y	-	-
CBS – road transport (professional)	Y	Y	NSTR/2	Y	Y	-	Y	-	-
CBS – domestic water transport	Y	Y	NSTR/2	Y	Y	-	Y	-	-
CBS – domestic transport	Y	Y	NSTR/2	Y	Y	-	Y	-	-
CBS – Sea transport	Y	Y	NSTR/2	Y	Y	-	Y	-	-
CBS – container transport	Y	Y	-	Y	Y	-	Y	-	-
CBS – LASH transport	Y	Y	-	Y	Y	-	Y	-	-
CBS : Ro - Ro transport	Y	Y	-	Y	Y	-	Y	-	-

6.6 Corridor Analysis Poland - Netherlands

When analysing a corridor many different transport flow types should be distinguished. Often only the flow type is selected for such an analysis with origin at one side of the corridor and the destination at the other side, i.e. the trade or the transport between the two end points. The reason for this is often the limitations of the budget that does not allow extensive data collection and database construction.

The corridor Netherlands-Poland comprises, besides transport (chains) with origin and destination The Netherlands and Poland, also transport chains passing the Polish territory and transport chains that pass through The Netherlands, Belgium and Germany with origin or destination Poland. Many more flow types using at least part of the corridor can be distinguished.

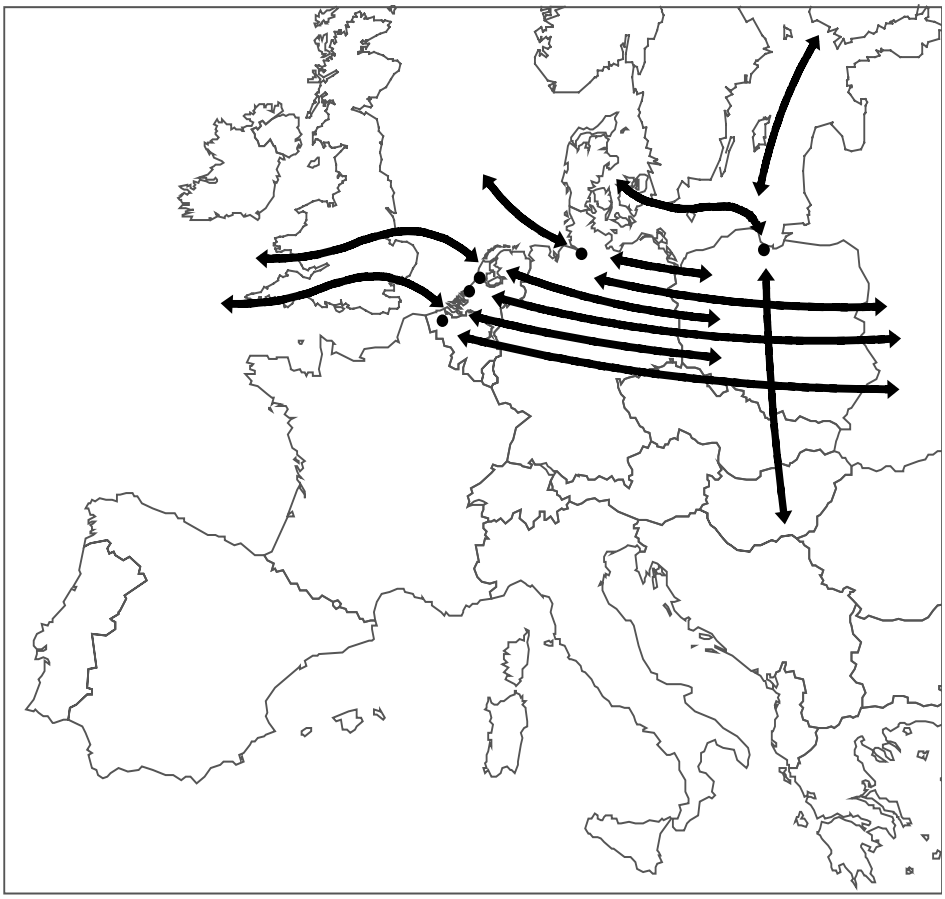
Some examples of trade flows that can be distinguished are:

1. trade between Poland and The Netherlands;
2. transit through The Netherlands, Belgium and Germany with origin or destination Poland; or through Poland, or trade with The Netherlands, Belgium and Germany;
3. East-west transit flows on the corridor Poland -The Netherlands or trade between third countries.

In addition to the east west flows through Poland (for example flows with origin Lithuania and destination The Netherlands), when doing for instance a potential analysis, one could for instance also add the fraction that is bypassing Poland and takes a route via the Czech and Slovak Republic. On the basis of geographical characteristics the latter flow could, with the right service characteristics for instance at the Polish border, better be accommodated via Poland. In figure 7.1 some possible flows types are shown on the corridor Poland - The Netherlands.

Concluding it can be stated that when doing a thorough corridor analysis many different data sources are needed. To be able to work with all these different sources in a consistent and convenient way they should be combined into one single database. All trade, transhipment and other route information should be combined into a database with a transport chain structure.

Figure 6-1. Some possible routes in relation with the corridor Poland - The Netherlands



6.6.1 Relevant source data

Data sources are identified, evaluated and collected for so far they are relevant for building a transport chain database for the corridor Netherlands - Poland. The data sources that are relevant for the construction of the transport database are:

An extensive list of files with Polish data was gathered for road, rail and maritime transport. For road only information on inland import and export was found while for rail also the movements to and from the ports belonging to international maritime transport chains were collected. Furthermore transit movements, maritime and inland, by rail were collected. Additional maritime information registering only the partner countries was found to fill the gaps for the maritime import and export.

6.6.2 Construction of the Transport flow database

Once all the information has been gathered all data sources need to be linked together resulting in a consistent database. The philosophy of the transport chain principle that has been used is that the transport flows are determined by the trade flows; we preserve the trade relation and follow the route of the goods transported. This means that besides the origin and

destination we will also have a place of transhipment and the modes before and after transhipment. To do this we use a **top-down approach**, which means that we take the rough country to country trade information and refine this step by step using the various national data sources. Using this approach it is possible to introduce the most desegregated level permitted by the data sources available in each individual country without being limited by the lack of data in other countries.

Applied to the flows covered by the study, the methodology of construction can be considered as four steps:

- NEAC
- Polish Database
- Combine NEAC and Polish database to the Corridor Database
- Estimate the container flows

6.6.3 Results

The study team has full-scale information on original/destination flows between the Netherlands and Poland by modes and routes, specified into region of origin and destination. An example of Polish imports is shown on the following graph:

Figure 6-2: Imports of Poland transhipped in NL, B and D, 1997 (tonnes x 1000)

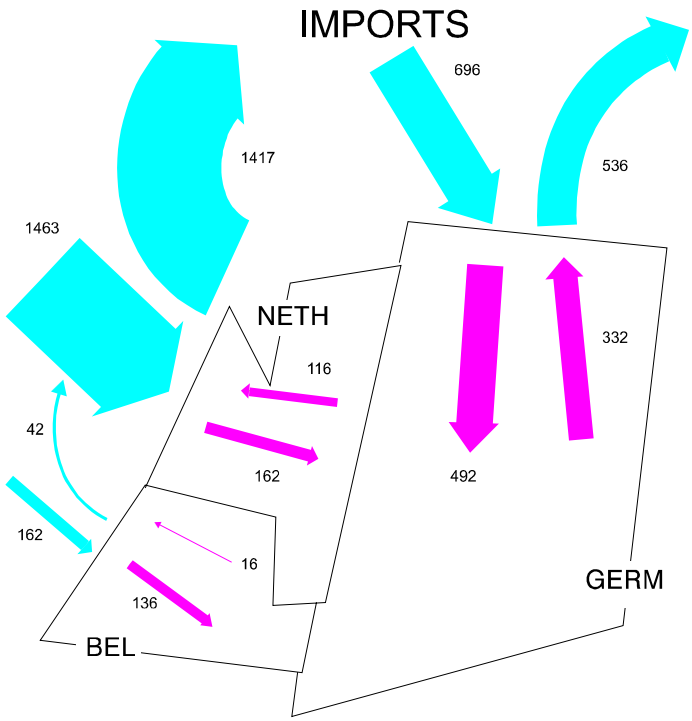
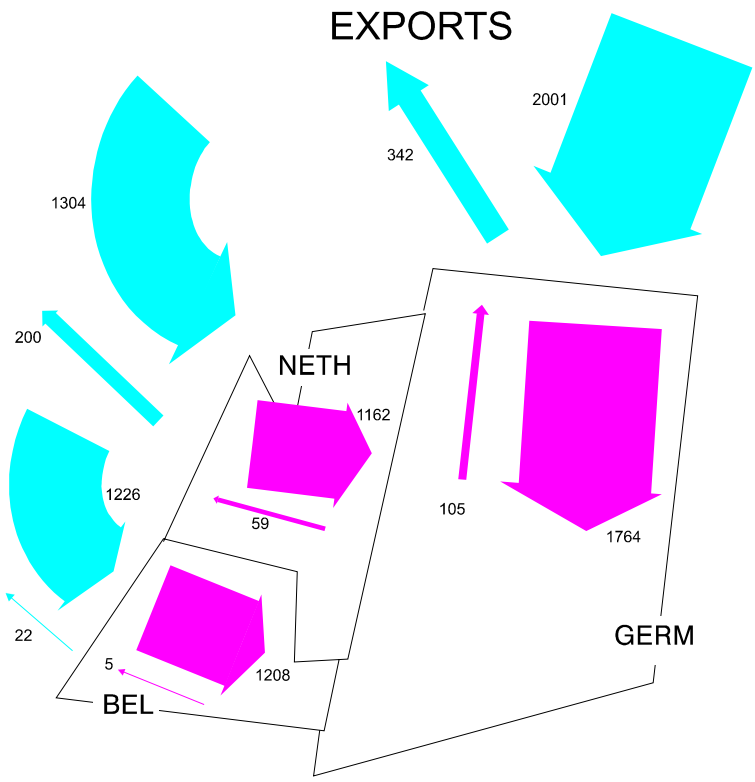
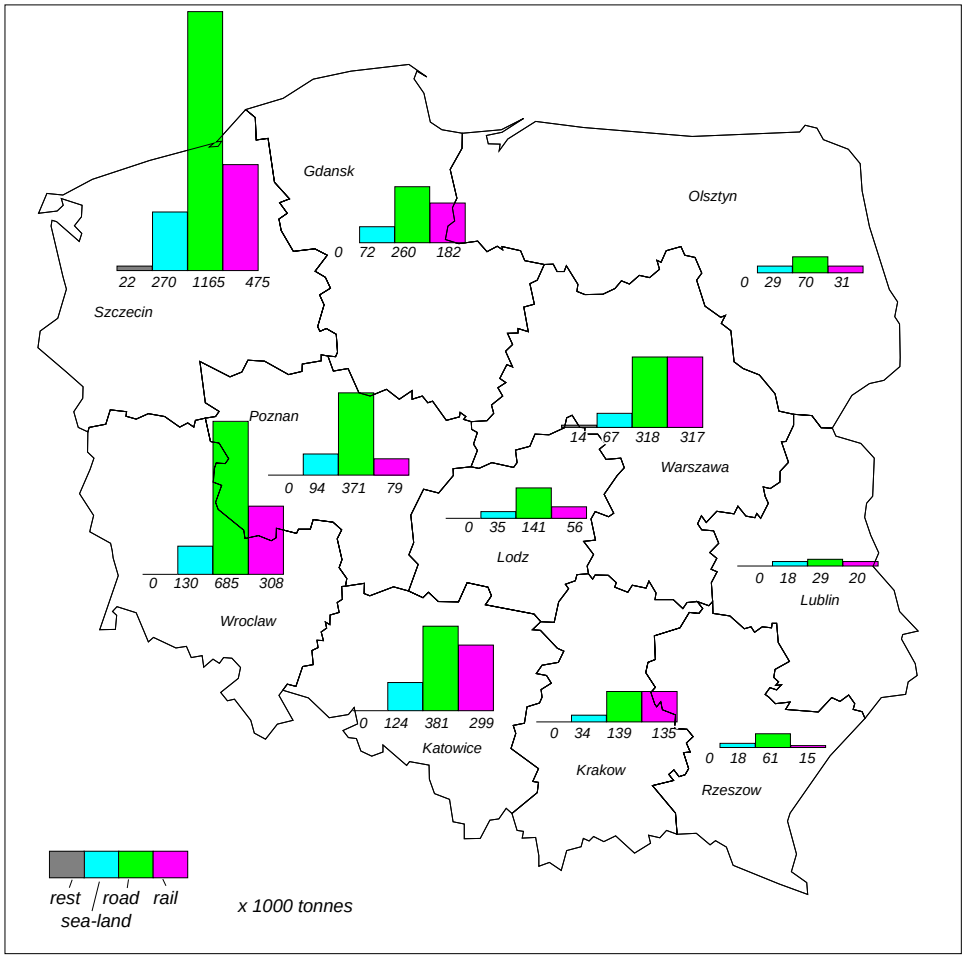


Figure 6-3: Exports of Poland transhipped in NL, B and D, 1997 (tonnes x 1000)



In figure 6-4 the routes followed on the Polish side can be found for the trade in relation with the Netherlands, Belgium and Germany. In the figures we can see the modes used at the ports, the Western Border and the South-eastern border. For the Polish imports we see that the land route is most used and the mode road has the largest share. In the other direction for the Polish exports we see that not only the volumes traded are much bigger, but also that rail transport is now the most heavily used mode. This is due to the large amount of minerals and coal that are produced in the South of Poland. As could be expected the South-eastern border is hardly used.

Figure 6-4: Imports of Poland from NL, B and D by direction (border), 1997 (tonnes x 1000)



In the other direction for the Polish exports we see that not only the volumes traded are much bigger, but also that rail transport is now the most heavily used mode. This is due to the large amount of minerals and coal that are produced in the South of Poland. As could be expected the South-eastern border is hardly used.

7. Case Study IV: Italian Seaborne Trade with Balkan Countries

7.1 Introduction

CETENA as one of four subcontractors delivered several data sources with respect to trade and traffic from/to Italy and corresponding countries located on the Balkans (Greece, Yugoslavia, Croatia, Slovenia, FYROM and Bosnia Herzegovina). The year of reference was 1997.

The data issued by ISTAT (Italian Institute of Statistics) relevant in this case are related to imports/exports to/from 20 administrative regions, split into 10 commodity groups (NSTR-1 digits).[17]

The O/D tables handed over refer to

- Italian regions
- foreign countries
- imports (quantity in tons and value)
- exports (quantity in tons and value)
- commodity groups

In addition to O/D tables, also ro/ro traffic for the years 1996-1998 have been provided. Finally, tanker and dry bulk cargo data have been handed over to the study team.

7.2 Pattern of Trade and Traffic Flows between Italy and the Balkans

7.2.1 Foreign Trade Flows

According to the TOR and the discussion held at Brussels and Gothenburg, CETENA delivered origin/destination flows by Italian regions (20) and the six Balkan countries by NSTR-2 classification and trade direction for the year 1997 in metric tons. For the sake of an easier reading the NSTR-2 classification (52) was condensed to NSTR-1 (10). Summary tables for totals of provinces by commodity groups and totals of commodity groups by provinces are shown in the following.

7.2.2 Italian Imports from Balkan Countries

The first summary table refers to total commodity flows by Italian provinces. There was a total of 7.18 million tons which have been imported from the six Balkan countries to Italy

[17] This indicates that in principle respective O/D data are available for trade matrices related to other European countries.

in1997. The share for Croatia amounts to 38 %, that for Greece to 35 %, followed by Slovenia with 16 %, the rest of Yugoslavia to 8 %, FYROM with 2.5 % and Bosnia/Herzegovina with 1 %.

Table 7-1 Imports of Italian Provinces from Balkan Countries 1997 (1,000 tons)

	Greece	Croatia	Slovenia	Yugos-lavia	Bosnia-Herzegov.	FYROM	Total
Abruzzi	58.5	59.1	7.0	25.7	0.2	2.1	152.6
Basilicata	0.8	0.1	0.1	0.1	0.0	0.0	1.1
Calabria	63.4	0.8	3.1	0.7	0.0	0.1	68.1
Campania	104.7	13.0	7.6	12.1	2.5	4.3	144.2
Emilia Romagna	169.9	845.8	64.6	27.4	3.4	3.1	1,114.2
Friuli-Venezia	42.6	453.6	521.0	35.5	21.9	11.7	1,086.3
Lazio	126.7	9.6	38.5	21.4	0.1	0.4	196.7
Liguria	149.3	0.3	1.8	18.7	0.1	4.9	175.1
Lombardia	a232.4	183.4	188.4	231.6	14.2	44.4	894.4
Marche	72.4	144.9	22.7	9.9	3.2	0.7	253.8
Molise	3.2	5.3	0.6	0.0	0.0	0.0	9.1
Piemonte	46.4	30.4	22.4	12.7	1.5	2.8	116.2
Puglia	380.8	22.7	2.8	8.6	4.8	1.3	421.0
Sardegna	148.4	7.6	0.7	3.9	0.0	0.0	160.6
Sicilia	235.1	15.0	3.0	7.5	0.0	1.0	261.6
Toscana	133.4	57.3	34.7	34.1	0.7	6.5	266.7
Trentino Alto	4.5	8.8	39.3	0.8	0.2	0.1	53.7
Umbria	31.1	2.2	2.5	2.8	0.1	2.1	40.8
Valle d´Aosta	0.0	0.0	0.0	0.0	0.0	0.5	0.5
Veneto	522.7	865.0	219.5	96.3	27.4	28.4	1.759.3
Italy	2,526.3	2,724.9	1,180.3	549.8	80.2	114.4	7,176.0

Source: CETENA / ISTAT

The most important Italian province on the import side is Veneto with 25 %, followed by Emilia Romagna, Friuli-Venezia with 15 %, Lombardia with 12 % and Puglia with 6 %. The most important individual province/country flows are:

- Croatia- Veneto (12 %)
- Croatia – Emilia Romagna (12 %)
- Greece – Veneto (7 %)
- Slovenia – Friuli-Venezia (7 %)
- Croatia – Friuli-Venezia (6%)
- Greece – Puglia (5 %)

The export flows from Greece to Italy are regionally more disaggregated than those from Croatia and Slovenia, whose exports are concentrated on Veneto, Friuli-Venezia, Emilia Romagna and Lombardia (Northern part of Italy).

The following table contains a split of total Italian imports from the six Balkan countries by commodity sections (NSTR-1). Total trade flows from there to Italy is dominated by commodity section 6 (building materials) with 36 %, followed by section 0 (agricultural products) with 20 %. The remaining 44 % are quite evenly distributed over the various commodity sections (except for 2 – solid fuels – with only 0.4 % of total).

Table 7-2 Imports of Italy by Commodity Groups from Balkan Countries 1997 (1,000 tons)

NSTR-1		Greece	Croatia	Slovenia	Yugoslavia	Bosnia Herzegov.	FYROM	Total
0	Agricultural products and live animals	476.6	418.9	399.2	66.9	34.3	18.8	1,414.8
1	Foodstuffs and animal fodder Solid mineral fuels	314.7	51.5	46.9	15.4	1.7	0.8	431.0
2	Petroleum products	0.1	27.6	0.0	0.1	0.0	0.0	27.8
3	Ores and metal waste	242.2	204.2	0.1	0.0	0.0	0.0	446.5
4	Metal products	56.2	101.7	106.4	0.7	32.7	0.1	297.8
5	Crude and manufactured	209.9	27.9	104.9	339.4	5.4	77.5	765.0
6	minerals, building materials Fertilisers	1,004.4	1,409.6	151.6	12.9	0.4	5.4	2584.3
7	Chemicals	19.3	205.8	0.1	0.0	0.0	0.0	225.2
8	Machinery, transport equip-	157.5	137.1	126.3	86.1	0.8	4.0	511.8
9	ment, manufactured articles and misc. articles	45.4	140.6	244.8	28.3	4.9	7.8	471.8
Total		2,526.3	2,724.9	1,180.3	549.8	80.2	114.4	7,176.0

Source: CETENA/ISTAT

7.2.3 Italian Exports to Balkan Countries

Similar as for Italian imports, also exports from the 20 Italian provinces to the Balkan countries are available by 52 commodity groups and have been condensed to 10 commodity sections. Out of a total of 6.92 million tons, 45 % are destined for Greece, 25 % for Slovenia, 22 % for Croatia, 4 % for Yugoslavia, 2 % for Bosnia-Herzegovina and 1 % for FYROM.

Table 7-3 Exports of Italian Provinces to Balkan Countries 1997 (1,000 tons)

	Greece	Croatia	Slovenia	Yugos-lavia	Bosnia-Herzegov.	FYROM	Total
Abruzzi	40.4	8.3	8.4	1.3	5.2	1.0	64.6
Basilicata	4.2	0.2	0.3	0.1	0.0	0.0	4.8
Calabria	7.0	0.4	3.3	0.0	0.2	0.1	11.0
Campania	77.0	9.5	5.8	2.2	10.5	0.9	105.9
Emilia Romagna	438.7	142.3	92.5	18.2	23.0	9.2	723.9
Friuli-Venezia	144.5	274.1	386.5	20.3	22.8	6.5	854.7
Lazio	77.4	9.0	9.4	3.0	1.2	1.2	101.2
Liguria	52.6	22.2	4.1	1.7	0.5	8.7	89.8
Lombardia	471.2	123.2	237.5	34.2	15.4	10.4	891.9
Marche	54.8	35.7	117.9	12.2	8.9	4.8	234.3
Molise	14.2	5.7	0.1	0.0	0.0	0.0	20.0
Piemonte	162.2	36.8	87.9	13.7	3.2	12.5	316.3
Puglia	559.8	269.3	24.4	8.9	10.2	1.7	874.3
Sardegna	185.3	51.2	362.5	22.9	0.1	4.7	626.7
Sicilia	313.3	169.4	90.7	66.5	1.7	2.4	644.0
Toscana	169.7	38.8	38.7	13.6	3.8	3.2	267.8
Trentino Alto	24.6	7.4	11.7	0.6	1.6	0.6	46.5
Umbria	22.5	10.8	4.0	2.4	2.9	0.3	42.9
Valle d´Aosta	0.2	0.0	0.0	0.0	0.0	0.0	0.2
Veneto	330.7	323.6	261.4	23.2	53.3	11.3	1,003.5
Italy	3,150.3	1,537.9	1,747.1	245.0	164.5	79.5	6,924.3

Source: CETENA / ISTAT

- Main exporting provinces from Italy to the Balkan countries are Veneto with 15 $, Lombardia with 13 %, Puglia with 13 %, Friuli-Venezia with 12 % and Sardegna with 9 %.

-

Table 7-4 Exports of Italy by Commodity Groups from Balkan Countries 1997 (1,000 tons)

NSTR-1		Greece	Croatia	Slovenia	Yugos lavia	Bosnia Herzegov.	FYROM	Total
0	Agricultural products and live animals	274.1	86.9	108.9	14.3	23.9	2.7	510.8
1	Foodstuffs and animal fodder Solid mineral fuels	210.9	128.7	66.7	26.6	60.4	6.4	499.7
2	Petroleum products	26.7	14.7	27.9	1.3	0.2	0.2	71.0
3	Ores and metal waste	392.2	144.0	497.0	79.2	1.3	9.3	1,123.0
4	Metal products	0.6	0.3	7.2	5.2	0.2	4.7	18.2
5	Crude and manufactured	910.8	416.4	211.1	10.5	11.2	2.0	1,562.0
6	minerals, building materials Fertilisers	358.4	259.7	265.0	14.9	19.5	14.3	931.8
7	Chemicals	76.5	1.7	6.3	0.0	0.0	0.1	84.6
8	Machinery, transport equip-	387.6	265.7	316.6	44.2	12.4	11.5	1,038.0
9	ment, manufactured articles and misc. articles	512.1	219.9	240.5	48.8	35.3	28.2	1,084.8
Total		3,149.9	1,538.0	1,747.2	245.0	164.4	79.4	6,924.0

Source: CETENA/ISTAT

7.2.4 Ro/Ro Traffic between Italy and the Balkans

CETENA has provided ferry and ro/ro statistics about traffic between Italian ports and ports in Greece, Albania, Yugoslavia and Croatia which are in principle for the years 1996-1998. However, quite complete data are only available for the year 1997 as shown in the following table.

Table 7-5 Ro/Ro Traffic through Italian Ports with Greece, Yugoslavia, Croatia and Albania 1997

	Passengers	Cars	Trailers	Trips
Italy-Albania*	**177,232**	**25,494**	**17,171**	
• Durres-Bari	100,132	13,181	5,055	151
• Durres-Ancona	26,888	4,705	5,055	91
• Durres-Triest	21,217	3,379	4,865	93
• Durres-Brindisi	28,995	4,229	2,196	...
Italy-Croatia	**291,718**	**49,812**		
• Dubrovnik-Bari	34,361	5,940	567	...
• Split-Ancona*	210,178	32,606	33,610	...
• Split-Pescara	3,209	600	4	...
• V.Luka-Stari Grad-Vis-Ancona	5,827	1,800	90	...
• Zadar-Ancona	27,343	5,866	1,096	...
• Zadar-Pula/Lusiny-Venice	10,800	3,000	100**	72
Italy-Yugoslavia	**95,471**	**21,512**	6,600**	
• Bari-Bar	92,227	20,442	6,200**	...
• Ancona-Bar	3,244	1,070	400**	52
Italy-Greece	**2,283,804**	**460,549**	**320,123**	**9,237**
• Patras-Igoumenitsa-Corfu-Brindisi	943,153	160,329	91,471	4,633
• Patras-Igoumenitsa-Corfu-Ancona	619,978	147,772	118,861	1,832
• Patras-Igoumenitsa-Corfu-Bari	282,550	51,705	68,358	1,774
• Patras-Igoumenitsa-Corfu-Trieste	135,019	39,537	10,988	281
• Patras-Igoumenitsa-Corfu-Venice	303,104	61,206	30,445	717

*Only Adriatica Lines ** estimates

Source: CETENA: rapporto no. 6920: Ro-Ro Traffic with Greece, Yugoslavia, Croatia and Albania – Years 1996-1998, Genova 1999.

In addition to this Summary Table also time series of 1996-1998 are presented for those routes for which full information is at present available. The information is differentiated into passengers, cars and trailers.

Table 7-6 Passenger, Ferry and Ro/Ro Traffic between Italy and the Balkans 1996-1998 in 1,000 Persons

Routes	1996	1997	1998
Italy-Albania*	**198.6**	**177.2**	**202.1**
• Durres-Bari	125.2	100.1	112.4
• Durres-Ancona	32.3	26.9	38.8
• Durres-Triest	25.9	21.2	28.2
• Durres-Brindisi	15.3	29.0	22.7
Italy-Croatia	**161.1**	**291.7**	**325.3**
• Dubrovnik-Bari	17.2	34.4	11.2
• Split-Ancona*	11.6	210.2	250.2
• Zadar-Ancona	19.5	27.3	33.9
• Others	12.8	19.8	30.0
Italy-Yugoslavia	**114.0**	**95.9**	**77.7**
• Bari-Bar	109.0	92.7	75.7
• Ancona-Bar	5.0	3.2	2.0
Italy-Greece	**2,255.0**	**2,283.8**	**2,422.0**
• Patras-Brindisi	976.9	943.1	865.0
• Patras-Ancona	632.4	620.0	699.9
• Patras-Bari	340.7	282.6	372.2
• Patras-Trieste	106.4	135.0	136.4
• Patras-Venice	198.6	303.1	348.7
Total	**2,548.7**	**2,848.6**	**3,027.1**

Source: CETENA [1999] and ISL estimates

The passenger traffic table indicates growth rates of about 11 % and 6 % in 1997 and 1998. The market is dominated by the route Italy-Greece with about 80 % of total passengers moved. The table contains some estimates for minor routes. Their impact on the totals can be neglected.

Similar to passenger movements, the shipments of trailers are dominated by the route Italy-Greece with a share of about 84 % (average over the period 1996-1998).

Table 7-7 Trailer Ferry and Ro/Ro Traffic between Italy and the Balkans 1996-1998 in 1.000 Units

Routes	1996	1997	1998
Italy-Albania*	**22.3**	**17.2**	**17.2**
• Durres-Bari	9.6	5.1	6.0
• Durres-Ancona	5.6	5.0	4.2
• Durres-Triest	5.8	4.9	4.8
• Durres-Brindisi	1.3	2.2	2.2
Italy-Croatia	**14.8**	**35.5**	**52.5**
• Dubrovnik-Bari	1.0	0.6	0.4
• Split-Ancona*	12.3	33.6	42.0
• Zadar-Ancona	1.4	1.1	9.9
• Others	0.1	0.2	0.2
Italy-Yugoslavia	**7.8**	**6.6**	**5.4**
• Bari-Bar	7.3	6.2	5.1
• Ancona-Bar	0.5	0.4	0.3
Italy-Greece	**296.6**	**320.2**	**344.5**
• Patras-Brindisi	92.8	91.5	80.7
• Patras-Ancona	117.9	118.9	139.2
• Patras-Bari	61.4	68.4	68.6
• Patras-Trieste	7.4	11.0	12.7
• Patras-Venice	17.1	30.4	43.4
Total	**341.5**	**379.5**	**419.6**

Source: CETENA [1999] and ISL estimates

The overall growth rate of trailer shipments was 11.5% and 10 % in 1997 and 1998. Also in this table a possible error margin because of some estimates is small because of their small market shares (< 2 % of total).

More detailed analysis of car and bus transfer by ferries and ro/ro vessels is not carried out because of the prevalence of interregional freight movements as main research objective of this study.

7.3 Critical Assessment and Evaluation of Data Provided

It could be shown that for Italy regional foreign trade data can be established, this even for such countries as Yugoslavia, Bosnia-Herzegovina etc. In addition to trade data also Ro/Ro traffic figures are available. This opens good opportunities to establish European-wide origin/destination flows by commodity groups from the Italian point of view.

8. Case Study V: Greece - Balkans - Black Sea Countries

8.1 Introduction

The objective of this case study is to present an estimation on the flows of goods between Greece and the rest of Balkan countries as well as the countries of the Black Sea region, with special respect to the SSS trade. As a year of reference, 1997 has been selected, as it is the last year with officially checked and published trade and traffic data between these destinations.

Two major difficulties were encountered:

- the only data available are provided by the National Statistical Service of Greece (NSSG), and
- the aggregated form of presentation hampers the extraction of accurate and unbiased results

Nevertheless, these officially provided data were cross-checked and consistent as far as the combination of trade and transport statistics is concerned.

The presentation consists of three major sections:

- methodology
- analysis of the flows, and
- recommendations for further actions and activities

8.2 Methodology

The applied methodology is not very complex, since it is limited in some consistency checks and mainly data presentations.

Inherent problems of the administration and public sector in Greece hamper the proper flow data collection and therefore the extraction of valuable relevant information. Unfortunately this is the case for almost every single aspect of the transport statistic services. However, these services are offered by the public sector, and there is a totally different focus on this aspect, due to different needs. This is obvious in the case of ship calls and truck movements statistics.

Consequently, the only sound approach for this study is the one described below, where the presented data are checked and focused on sea movements, where possible. In addition, a naïve calculation provides an idea of the road transit movements and merely reveals some potential for shifting cargoes from land to the sea.

The applied approach is the following:

1. Selection of the countries and the ports involved in the analysis

2. Establishment of trade statistics between Greece and these countries (external trade - economic flows) per mode and SITC-2 in metric tones (or kilograms where noted)
3. Consistency checks of the seaborne movements with the available port statistics
4. Qualitative analysis of the flows per mode
5. Estimation of transit road movements
6. Shaping of a flow diagram or map

Except for figures provided by the main ports, it should be noted that there are no official transit statistics available on unitised cargoes on a national basis. There are some figures provided by ports, but there are no official statistics reflecting the trends, as well as forming origin-destination tables.

Since there are no foreign data available, it is not possible to evaluate the Greek data as well as to estimate the transit flows. In addition, the complexity of the region and of the trade pattern due to the common European trade practices makes the scene more fuzzy and the information more vague. The Turkish trade relationships with specific partners in the Balkans, the flow of cargoes and people in the new states of the former Soviet Union, and especially in the Caucasian area and the role of Greece as the only EU-Member State in the Balkan peninsula are just few of the parameters confusing and perplexing the transport pattern.

A major difficulty of the data collection system in Greece is the targeting of **countries** as origin-destination points, instead of regions, ports, major cities or major industrial sites and areas. This approach becomes a real obstacle, when dealing with major trade partner-countries with many ports and borders lying in several regions. Turkey, for example, has many ports in the Black Sea region, in the Mediterranean and the Aegean Sea, for which there is no breakdown available by the NSSG. Dealing with such a large country as a sole entity entails many statistical dangers: The majority of the Turkish trade and flows is served in the ports of Ismir, Mersin and Antalya, all located in the western and southern part of the country, a region of little interest for this case study. In addition, a logical assumption isolating the northern ports from the others may lead to ambiguous results; an assumption based on the total volume may not apply on the transit movements. So, the focus of the NSSG on countries may serve other goals or may originate from specific needs and limitations, but it is not an efficient tool to shape origin-destination matrices for the need of SSS movements.

The case of Russia is similar to that of Turkey: Movements from Greece may reach Russia through the port of Novorossisjk in the Black Sea, but also through the port of Saint Petersburg, which has nothing to do with the Black Sea. Yet, it is possible for cargoes to travel from Greece around the Continent to a northern port and then Saint Petersburg.

In the past major discrepancies have been encountered, when comparing or checking data from the ports and other gateways with official national data. Ports and other gateways collect data for a different purposes and therefore the breakdowns and the taxonomies are different, resulting to discrepancies in figures under the same tag or field. These problems are still faced in ports, but the implementation of new Port-MIS networks, is supposed to eliminate them.

The reference year for the analysis below is 1997, but statistics based on 1996 or even earlier may be used.

8.2.1 Selection of the Countries

This case study focuses on the movements between Greece and the Balkan countries as well as the countries of the Black Sea region. Therefore the following countries, and respectively ports have been selected for further analysis:

Table 8-1 Country/Ports

Country	Port(s)
Albania	Durres
Armenia	
Bosnia-Herzegovina	
Serbia-Montenegro	Bar
FYROM	
Croatia	Rijeka, Split, Dubrovnik, Zadar
Slovenia	Kopper
Bulgaria	Varna. Burgas
Romania	Costanta
Moldova	Kishinev
Ukraine	Odessa, Illychevsk
Russia	Novorossisjk, Soci
Georgia	Suchumi, Batumi
Turkey	Istanbul, Samsun

Some of these ports may be excluded due to limited importance in a more detailed analysis. Soci for example in Russia serves the Caucasian territory while Novorossisjk serves the rest of the country. However, cargoes to Russia are also transported as transit via Ukraine. As mentioned earlier, the Greek statistics target countries and not ports, therefore information on foreign origin or destination ports is either unavailable or incomplete.

8.2.2 Assumptions

For the purposes of the analysis several assumptions were made.

1. Russia is fully served by Novorossisjk.
2. Bosnia's sea trade is considered transit movement through Croatia and Serbia
3. Armenia's sea trade is considered as a transit movement through Turkey or Georgia.
4. FYROM's sea trade is transit via Thessaloniki.

8.3 Analysis of the flows

As mentioned before, there are no different trade and traffic statistics presented in this study. The following aggregated form is directly produced out of the data provided by the NSSG. NSSG provides tables with a breakdown per country, mode and SITC-2. No aggregate table is officially published, but these data are open to the public. Nevertheless, there is a fee for further services, and the user may form a specific query and the electronic system will reply.

The database system is based on ORACLE. Only a user with special permission can access the data.

Intra-European statistics are published quarterly and do not contain breakdowns per mode, or in many cases per country. Yet this data is available and is updated online from the tax-collection system. Usually, official annual statistics are available a couple of months after the final collection (early January) and published after a period of 6 to 8 months. This is the case for trade statistics, yet there is no information on the mode used.

The real gap in the Greek data collection system lies in the measurement of the number, type and cargo information of trucks and ships. The collected data is usually the nationality of the vehicle and there is no concern about its origin, its destination and the loaded cargo. The same applies to ships, which call mostly at the two major ports of Thessaloniki and Piraeus.

Trade and Transport Statistics

The following table presents the imports and exports flows in kilograms, broken down per mode.

Table 8-2: Import and Export Flows

	COUNTRY	SEA	RAIL	ROAD	AIR	REST	TOTAL
IMP	ALBANIA	4,578,040	44,003	25,403,884	36,103	13,287	**30,075,317**
EXP	ALBANIA	374,094,648	30,015	476,800,031	1,284,431	1,057,992	**853,267,117**
	ALBANIA Total	378,672,688	74,018	502,203,915	1,320,534	1,071,279	**883,342,434**
IMP	ARMENIA	48,500	25	95,250	1,807	0	**145,582**
EXP	ARMENIA	2,124,785	18,554	748,836	48,213	1,950	**2,942,338**
	ARMENIA Total	2,173,285	18,579	844,086	50,020	1,950	**3,087,920**
IMP	BULGARIA	423,028,776	224,851,074	600,429,007	52,289	463,871	**1,248,825,017**
EXP	BULGARIA	111,164,755	35,118,819	263,317,129	87,944	459,608	**410,148,255**
	BULGARIA Total	534,193,531	259,969,893	863,746,136	140,233	923,479	**1,658,973,272**
IMP	FYROM	6,486,132	830,218	80,841,505	174	1	**88,158,030**
EXP	FYROM	1,193,425	439,195,246	680,860,559	1,697,741	133,943	**1,123,080,914**
	FYROM Total	7,679,557	440,025,464	761,702,064	1,697,915	133,944	**1,211,238,944**
IMP	GEORGIA	14,297,430	2	67,945	220	18,012	**14,383,609**
EXP	GEORGIA	82,483,733	0	7,598,605	32,151	21,916	**90,136,405**
	GEORGIA Total	96,781,163	2	7,666,550	32,371	39,928	**104,520,014**
IMP	CROATIA	11,749,581	560,405	2,081,319	5,017	0	**14,396,322**
EXP	CROATIA	136,104,936	0	13,493,622	12,586	89,528	**149,700,672**
	CROATIA Total	147,854,517	560,405	15,574,941	17,603	89,528	**164,096,994**
IMP	MOLDOVA	2,944,625	0	1,826,657	351	0	**4,771,633**
EXP	MOLDOVA	3,804,358	16,000	3,675,659	4,591	2,248	**7,502,856**
	MOLDOVA Total	6,748,983	16,000	5,502,316	4,942	2,248	**12,274,489**
IMP	ROMANIA	381,311,653	4,123,138	96,544,844	32,486	146,840	**482,158,961**
EXP	ROMANIA	291,946,481	4,370,219	98,001,170	353,117	473,554	**395,144,541**
	ROMANIA Total	673,258,134	8,493,357	194,546,014	385,603	620,394	**877,303,502**
IMP	RUSSIA	2,901,659,826	328,929	131,911,623	75,068	102,738,997	**3,136,714,443**
EXP	RUSSIA	286,923,857	4,399,142	43,955,839	2,534,699	135,644	**337,949,181**
	RUSSIA Total	3,188,583,683	4,728,071	175,867,462	2,609,767	102,874,641	**3,474,663,624**
IMP	SERBIA-MON	60,328,482	10,405,479	70,640,059	848,468	25,940	**142,248,428**
EXP	SERBIA-MON	87,636,287	91,364,241	131,489,905	5,237,081	607,096	**316,334,610**
	SERBIA-MON Total	147,964,769	101,769,720	202,129,964	6,085,549	633,036	**458,583,038**
IMP	SLOVENIA	11,396,489	437,445	2,620,200	4,737	624	**14,459,495**
EXP	SLOVENIA	49,837,514	194,273	3,279,975	34,249	1,924	**53,347,935**
	SLOVENIA Total	61,234,003	631,718	5,900,175	38,986	2,548	**67,807,430**
IMP	TURKEY	419,032,872	300,165	84,827,886	186,959	161,383	**504,509,265**
EXP	TURKEY	730,856,000	365,770	87,847,293	6,517,219	12,919	**825,599,201**
	TURKEY Total	1,149,888,872	665,935	172,675,179	6,704,178	174,302	**1,330,108,466**
IMP	UKRAINE	396,869,631	17,000	19,912,418	4,640	13,457	**416,817,146**
EXP	UKRAINE	296,671,343	736,678	12,411,821	146,210	1,123	**309,967,175**
	UKRAINE Total	693,540,974	753,678	32,324,239	150,850	14,580	**726,784,321**
IMP	BOSNIA	61,924	25,000	1,818,952	1,632	0	**1,907,508**
EXP	BOSNIA	485,835	0	3,215,514	65,924	78,030	**3,845,303**
	BOSNIA Total	547,759	25,000	5,034,466	67,556	78,030	**5,752,811**
	Grand Total	**7,089,121,918**	**817,731,840**	**2,945,717,507**	**19,306,107**	**106,659,887**	**10,978,537,259**

In the following pages three tables present the breakdown of seaborne trade per SITC-2 in consolidated form, one focusing on the Balkans and the other on the Black Sea region.

It is very important to notice that seaborne trade represents 64.5% of the whole trade, and there is also a small percentage, which is considered as intermodal by the Greek authorities. Road movements represent 26.8% of the whole, while railways get and 7.44% and air transport 0.17%. It is interesting to note that most of the trade with the important partners is in bulk form, i.e. large commodities of low price product. It is almost sure that road movements represent higher values. The lack of sufficient rail connections in the Greek territory is also a factor for the negligible niche of this mode. The economic turmoil in most of these countries does not favour rapid air shipments.

The next tables show a breakdown per SITC-2 of the sea movements. It is not certain that all these movements correspond to shortsea shipping vessels, because there are no relevant data to verify. However, as these flows do not involve overseas destinations, it can be safely assumed that they fall into the SSS category.

Table 8-3: DISTRIBUTION OF SHORT SEA SHIPPING CARGO BY CATEGORY OF SITC AND ORIGIN AND DESTINATION COUNTRY (IN METRIC TONNES)

COUNTRIES	CATEGORY OF SITC																					
	0		1		2		3		4		5		6		7		8		9		TOTAL	
	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST
ALBANIA	36	23,008	0	1,982	1,339	605	0	33,697	0	86	1,925	561	759	310,807	32	1,019	433	430	0	5	4,524	372,200
ARMENIA	0	474	0	590	0	0	0	427	0	0	0	141	0	234	49	159	0	98	0	2	49	2,125
BULGARIA	299	1,553	46,033	121	61,814	7,287	78,483	92,310	0	0	93,399	336	141,968	8,470	1,185	1	339	206	45,496	0	469,016	110,284
FYROM	3	641	0	40	467	2	0	23	0	0	1,339	224	4,648	189	1	50	29	24	0	0	6,487	1,193
GEORGIA	40	8,299	0	252	2,970	20	5,519	64,234	0	1	2,841	2,016	2,920	7,532	7	60	0	60	0	6	14,297	82,480
CROATIA	13	9,430	0	527	421	72,546	0	10,628	0	0	3,266	4,758	7,934	38,198	94	17	23	1	0	0	11,751	136,105
MOLDOVA	159	2,909	2	629	0	3	0	0	0	0	0	3	2,778	229	2	11	4	3	0	2	2,945	3,789
ROMANIA	1,889	18,077	0	1,049	30,176	116,280	120,525	154,684	0	48	60,474	432	150,223	794	1,569	529	189	47	10,765	0	375,810	291,940
RUSSIA	31	104,390	1,288	15,399	510,870	68,311	1,901,262	36,195	8	1,217	165,292	37,312	310,482	21,779	1,809	1,527	10	640	9,580	105	2,900,632	286,875
SERBIA-MON.	2,620	861	0	1,368	21,190	2,560	0	63,407	0	0	1,456	16,173	34,840	525	62	60	29	3	1	2,680	60,198	87,637
SLOVENIA	0	2,285	36	365	3,013	37,858	0	75	0	43	309	9,126	5,747	44	2,189	28	80	4	0	10	11,374	49,838
TURKEY	13,365	30,882	1,775	3,277	40,343	172,534	38,013	421,102	31	1,204	58,472	36,700	251,753	62,805	3,294	2,153	1,992	85	6,753	9	415,791	730,751
UKRAINE	2,178	16,695	17	11,364	197,486	2,541	11,689	254,605	0	677	152,065	5,327	23,244	3,997	298	821	66	428	2,520	8	389,563	296,463
BOSNIA	0	378	0	0	61	0	0	14	0	8	0	24	0	62	1	0	0	1	0	0	62	487
TOTAL	20,633	219,882	49,151	36,963	870,150	480,547	2,155,491	1,131,401	39	3,284	540,838	113,133	937,296	455,665	10,592	6,435	3,194	2,030	75,115	2,827	4,662,499	2,452,167

Table 8-4: FLOWS to/from BALKAN STATES

COUNTRIES	CATEGORY OF SITC																					
	0		1		2		3		4		5		6		7		8		9		TOTAL	
	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST
ALBANIA	36	23,008	0	1,982	1,339	605	0	33,697	0	86	1,925	561	759	310,807	32	1,019	433	430	0	5	4,524	372,200
BULGARIA	299	1,553	46,033	121	61,814	7,287	78,483	92,310	0	0	93,399	336	141,968	8,470	1,185	1	339	206	45,496	0	469,016	110,284
FYROM	3	641	0	40	467	2	0	23	0	0	1,339	224	4,648	189	1	50	29	24	0	0	6,487	1,193
CROATIA	13	9,430	0	527	421	72,546	0	10,628	0	0	3,266	4,758	7,934	38,198	94	17	23	1	0	0	11,751	136,105
MOLDOVA	159	2,909	2	629	1,721	3	0	0	0	0	0	3	2,778	229	2	11	4	3	0	2	4,666	3,789
ROMANIA	1,889	18,077	0	1,049	30,176	116,280	120,525	154,684	0	48	60,474	432	150,223	794	1,569	529	189	47	10,765	0	375,810	291,940
SERBIA-MON.	2,620	861	0	1,368	21,190	2,560	0	63,407	0	0	1,456	16,173	34,840	525	62	60	29	3	1	2,680	60,198	87,637
SLOVENIA	0	2,285	36	365	3,013	37,858	0	75	0	43	309	9,126	5,747	44	2,189	28	80	4	0	10	11,374	49,838
TURKEY	13,365	30,882	1,775	3,277	40,343	172,534	38,013	421,102	31	1,204	58,472	36,700	251,753	62,805	3,294	2,153	1,992	85	6,753	9	415,791	730,751
BOSNIA	0	378	0	0	61	0	0	14	0	8	0	24	0	62	1	0	0	1	0	0	62	487
TOTAL	18,384	90,024	47,846	9,358	160,545	409,675	237,021	775,940	31	1,389	220,640	68,337	600,650	422,123	8,429	3,868	3,118	804	63,015	2,706	1,359,679	1,784,224

Table 8-5: BLACK SEA FLOWS

COUNTRIES	CATEGORY OF SITC																					
	0		1		2		3		4		5		6		7		8		9		TOTAL	
	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST	ORIG	DEST
ARMENIA	0	474	0	590	0	0	0	427	0	0	0	141	0	234	49	159	0	98	0	2	49	2,125
BULGARIA	299	1,553	46,033	121	61,814	7,287	78,483	92,310	0	0	93,399	336	141,968	8,470	1,185	1	339	206	45,496	0	469,016	110,284
GEORGIA	40	8,299	0	252	2,970	20	5,519	64,234	0	1	2,841	2,016	2,920	7,532	7	60	0	60	0	6	14,297	82,480
MOLDOVA	159	2,909	2	629	0	3	0	0	0	0	0	3	2,778	229	2	11	4	3	0	2	2,945	3,789
ROMANIA	1,889	18,077	0	1,049	30,176	116,280	120,525	154,684	0	48	60,474	432	150,223	794	1,569	529	189	47	10,765	0	375,810	291,940
RUSSIA	31	104,390	1,288	15,399	510,870	68,311	1,901,262	36,195	8	1,217	165,292	37,312	310,482	21,779	1,809	1,527	10	640	9,580	105	2,900,632	286,875
TURKEY	13,365	30,882	1,775	3,277	40,343	172,534	38,013	421,102	31	1,204	58,472	36,700	251,753	62,805	3,294	2,153	1,992	85	6,753	9	415,791	730,751
UKRAINE	2,178	16,695	17	11,364	197,486	2,541	11,689	254,605	0	677	152,065	5,327	23,244	3,997	298	821	66	428	2,520	8	389,563	296,463
TOTAL	17,961	183,279	49,115	32,681	843,659	366,976	2,155,491	1,023,557	39	3,147	532,543	82,267	883,368	105,840	8,213	5,261	2,600	1,567	75,114	132	4,568,103	1,804,707

8.4 Commodity specific analysis

Turkey, Russia, Bulgaria, Ukraine and Romania are the main origin and destination points for shipping. Albania is also an important destination region, yet there are no important exports to that country.

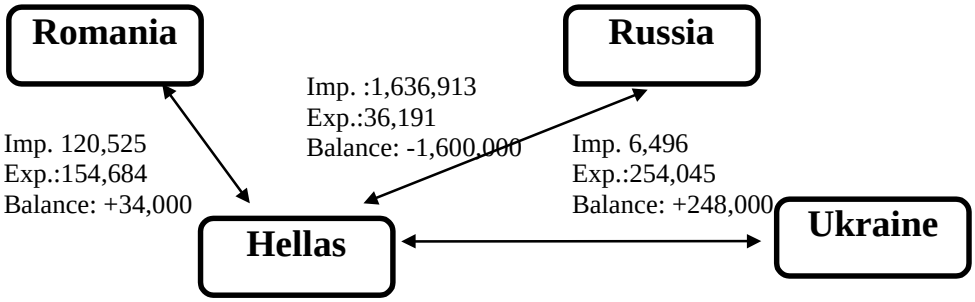
Russia exports to Greece mainly wood, paper-pulp, fertilisers, ore, natural gas, coal, oil, inorganic chemicals, industrial fertilisers and steel. Almost all of these cargoes are usually transported by break-bulk ships. Greece exports to Russia vegetables and fruits, ore, oil and several chemical products and materials.

Romania exports to Greece paper-pulp, ore, coal, industrial fertilisers, raw plastic materials and steel, while Romania imports ore and oil.

Ukraine's exports to Greece are fertilisers, ore, non-organic chemicals, industrial fertilisers and ore. Greece exports fruits and vegetables, alcohol and spirits, tobacco and its products, oil chemical materials and products of non-metallic materials.

Romania, Ukraine and Russia also export crude oil and Greece refines part of it for the coverage of their local needs. The trade with Romania seems to be balanced, while this is not the case with Russia and Ukraine. Ukraine imports oil from Greece and Greece imports oil from Russia. There is a total annual imbalance of almost 1,300,000 tons, and some this covers needs of the local Greek market.

Figure 8-1: Oil flows



Taking a closer look at the trade with the Balkan States, things are not really different. Turkey, the most important trade partner, imports from Greece olive oil and relevant products, textiles, ore, oil and steel, while exporting fruits and vegetables, fertilisers, oil, inorganic chemicals and steel. However there is a strong feeling, which cannot be proven by figures, that most of this trade is between the East and West coast of the Aegean Sea, and there is only a negligible quantity to or from the Black Sea. In the case of Bulgaria, sea trade seems to be strongly focused on oil and steel. Greece imports 78,469 tons and exports back 92,310. The volume is rather insignificant, but it is the only important trade along with the export of 135,923 tons of steel. It should be noted that it is considerably easier to move goods by road, because there are many vehicles crossing Bulgaria and there are always problems to cross the straits. Nevertheless, even

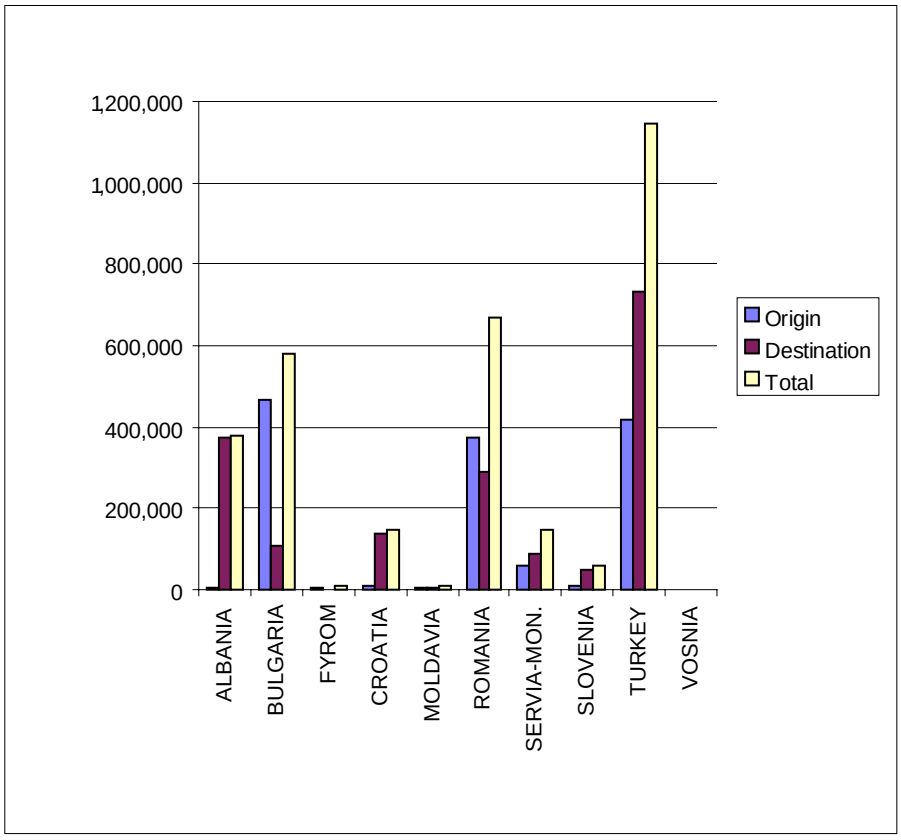
if there was no sea traffic problem in the straits, distance, transit time and cost favour road movements. A stronger rail link may eradicate sea movements altogether.

In the case of Albania, the statistics reflect a different situation, because Greece is one of its two basic trade partners (Italy being the other). Albania exports to Greece negligible quantities (4,524 tons) of wood, ore, plastic materials and some products related to clothing. On the other hand, Albania imports cereals, tobacco, oil, ore and non-metallic products.

The cases of Bulgaria and Albania are rather peculiar. The movements to and from Bulgaria by road are 3.33 times larger than those by sea. The real problem is the lack of infrastructure in these countries, the poor connections with the Greek land networks and the dispersal of consuming centres. In addition, it is more rational to send cargoes from the major Greek cities of the North to these countries by road, so there is no real potential to shift mode.

Summarising the data, it is interesting to present the aggregate picture of the Greek trade and movements with these group of countries respectively.

Figure 8-2: Trade with Balkan countries



The most important partner in the Balkan region seems to be Turkey, but as mentioned earlier, most of the trade is with the West Aegean coast rather than with any other region. Consequently, Romania becomes the most important partner with the trade of steel and oil, while road movements represent 30% of the seaborne ones. Since most of

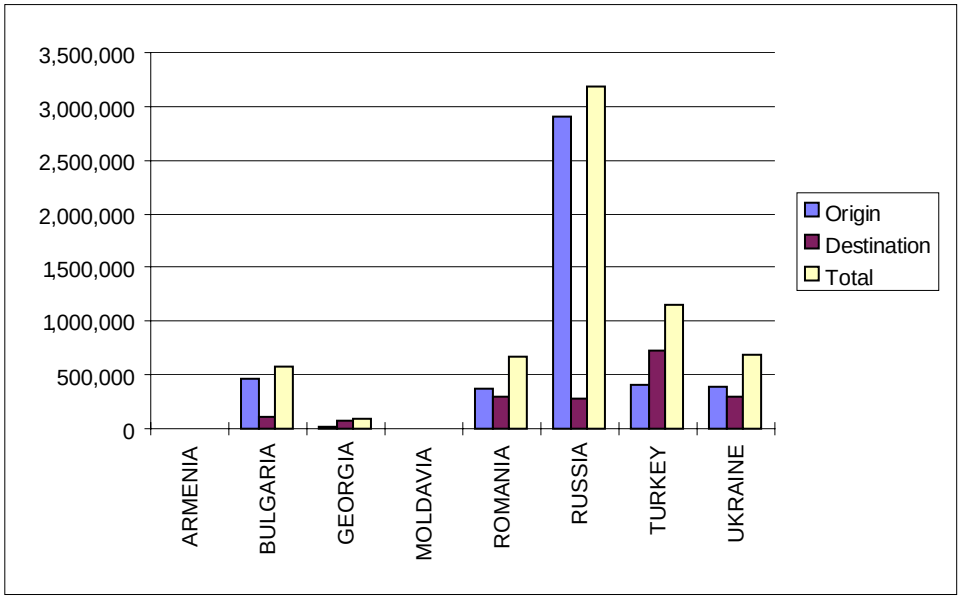
the trade is carried out with bulk carriers, it seems rather difficult to get more cargo off the road.

For the rest of the Balkans, there is no real interest for further analysis, but some points are worthy of note:

- FYROM imports and exports almost everything by road, but there is also an important rail corridor with the port of Thessaloniki.
- Croatia imports fertilisers and non-metallic products by sea and this trade represents 90% of the total.
- Serbia and Montenegro are mainly served by road and rail. Sea movements are limited to 32% of the total, and this is rather reasonable since the large consuming centres of Serbia are on the North-South axis, while the port of Bar is isolated in the west and serves for oil imports and some ore.
- Slovenia has very weak trade ties with Greece, and 90% of the trade is moved by sea and consists of imports of fertilisers and ore. The quantities moved by the other modes are insignificant.

The figure regarding the trade in the Black Sea shows the importance of Russia, Romania, Turkey and Ukraine. Moldova, Georgia and Armenia are actually insignificant partners.

Figure 8-3: Trade with Black Sea countries



It should be noted that:

- trade with Armenia is almost nil.
- there is some oil export to Georgia, representing 65% of the whole seaborne trade, while the road movements are negligible.

- trade with Moldova is also almost nil, and there is almost a 60/40 balance between sea and the road flows.

In conclusion, most of the trade with the Black Sea is carried out by ships, due to the bulk character of the cargoes. The Balkan States are served mainly by trucks and this is considered as expected. It would be more rational if there was a higher niche for the railways, but the limited capacity of the Greek rail network is hampering any real increase. What is left in the Balkans for sea-vessels are bulk commodities, which are bound to the seaborne trade due to the lower unit cost.

This is also the case with countries of the Black Sea region. Apart from several energy-related commodities there is no trade of high-value, low-volume items and this can also be extracted out of the low percentages of the road movements (less than 5%) and the negligible ones of rail. Only in the case of Turkey there is niche of 13% for road movements. Most of these trucks serve the FYROM and Istanbul trades, where in many cases cargo is collected from many northern Greek cities.

Both figures of transit and remaining cargo for other truckers than the national ones are quite interesting. First of all, out of the rough estimation there is some traffic of about 27% of the total figure for exports and imports, which is not negligible. In addition these remaining 600,000tons for other truckers is an interesting target for the short sea shipping market, because it can also be interpreted as 120 shipments of 5,000 tons cargo lots. This reveals a real potential, in a market which is totally different than the traditional break bulk one. Such figures are expected to increase along with the development of consumption in the Balkan as well as in the countries of the Black Sea region.

This case study proved and highlighted some major difficulties faced in achieving the final goal of shifting cargoes from land to the sea, in a pan-European level.

1. There is no adequate tool to measure flows and to assist policy makers, as well as the market decision makers. The whole picture is very unclear and there is no sign of improvement towards a region to region approach.
2. The national census offices and departments are not adjusted yet to the new realities of the border-less EU and the opening of the former eastern markets. They still ask for data, relevant to the needs of the past decades.
3. There inherent local discrepancies in nodal points, such as national gates and ports, which hamper the collection of statistical data, as well as the extraction of useful information. A tool towards a solution is a network of modern technology based collection system.

Taking a closer look at the trade between Greece, Balkan States and the Black Sea region, the following results are considered as the most important ones:

1. It is not possible to discuss about region to region trade, when the statistics focus on a country level.
2. There are no transit data, even at this layer, and it is a risky, if not difficult or impossible task to correlate trade and vehicle data in order to extract any information.

3. The collection system is not capable to support any real decision.
4. It is not possible to check the consistency of the local data, unless they are cross-checked with those of the partner-States. However, it is questionable if such data exist, during this period of economic turmoil experienced by these countries.
5. There is some potential cargo for shifting to the sea, but it is rather low now and it will increase along with the development of the economies of these States.

As a final proposal and outcome, it is strongly suggested to further research the flows between these countries and the Member States and to clarify any special needs as well as to highlight special needs. At the very beginning Russia, Turkey and Ukraine shall be of specific interest and then the rest of the Balkan States. The creation of links or the improvement of rail connection will affect the trade of these countries drastically.

9. Conclusions and directions for further work

It is absolutely clear that no effort to shift cargo from land to sea will be meaningful if one does not have a clear picture of cargo flows to start with. Unless this picture is clear, any means to move toward more use of SSS is bound to fail, whatever these means may be. Also, any policy toward the same end runs the risk of being questioned if based on an unclear understanding of the flow situation. The very purpose of the task of the SSS statistics group was to make such a picture clearer on a European level. To this end, the work of the group has shown that in principle the approach adopted is feasible. However, there are substantial deficiencies regarding data availability and reliability. For some countries, only port related data, for some others only trade data are available. Since only in a few cases a combination of various sources is given, a substantial modelling of data and full understanding of statistics systems, sampling procedures and in-depth analysis of transhipment and intermodal transport/trade was necessary.

The analysis presented in this document can be considered as a pilot study that was set-up to identify possibilities, but also gaps and deficiencies. We think that the spectrum of cases presented in this report has fulfilled such a purpose. As such, it may pave the way toward a possible extension of the approach, from a limited number of case studies towards a full scale European-wide origin/destination model by modes, regions and commodity groups. The empirical instruments have been tested and they seem to be reliable. Of course, a full-scale model for Europe including transhipment will require substantially more time effort. The benefit of such a comprehensive approach is an input as good as possible for several shortsea shipping and intermodal projects.

The SSS statistics group (and, by extension, the membership of the Concerted Action on Shortsea Shipping as a whole) possesses now a number of case studies and respective data, backed by EUROSTAT origin/destination flows of countries, not of regions. Some important port-by-port and region-by-region data files exist. However, the linkage of port-to-port **and** at the same time region-to-region information is only realised to a certain extent. There remains a lot to be done to be able to close this gap.

There was a general view of all statistics group participants that:

- it is necessary to have complete O/D matrices of cargo flows in Europe, including the Baltic and Mediterranean area- a breakdown to mode of transport- a further breakdown to commodity and cargo flows (containers, ro/ro, etc).
- potential maritime transport flows can and should be identified (especially road haulage).

In the final plenary workshop of SSS-CA, held in Brussels on March 30-31, 2000, the work of the SSS statistics workpackage within SSS-CA was summarised before a wider audience. In response, it was stated by top maritime policy and industry officials that this work has been useful in terms of both what is the present picture in SSS and as a

basis of what can be done in the future. As maritime R&D should go hand-in-hand with maritime policy-making, the forthcoming Thematic Network on SSS (an action within the 5th Framework Programme) is planned to address (among a variety of other issues) statistical issues which originate from clear policy needs.

In this context, it is hoped that this report, as one of the most important deliverables of the work of Concerted Action on Shortsea Shipping, will get further exposure within European shipping industry and government circles, so as to stimulate further action in this important area.

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Volume 6: Use of advanced technologies to better collect SSS data

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1. Introduction and Methodological Approach

This document is deliverable No. 12 of the SSS-CA project, corresponding to Workpackage I of the amended workplan of the project ("Use of advanced technologies to better collect SSS data"). As such, the objective of this document is to recommend advanced technologies that would aid in the collection of Shortsea Shipping (SSS) data. In addition, according to the task description, the document will take a critical look at the systems and technologies that are currently available or are under development so as to better collect, standardize, classify and store SSS data.

We should clarify right from the outset that whereas the content of this general area is enormous both in breadth and in depth, the scope of this document has been limited by the resources allocated to it within the SSS-CA amended project. As such, it should be considered more as a companion document to the reports of the "SSS Statistics Group", rather than an encyclopedic reference on this subject.

In order to fulfill these tasks, as described in the Technical Annex, we follow a technical approach. The reason for this is that the whole transport community undergoes a radical change and shift, mainly due to the use of the Internet and related technologies.

Europe undergoes another change too: From a group of many national states expressing territoriality through different legislative and commercial systems, Europe shifts to a new harmonized environment, one of the common market and free movement of goods and people.

Both changes are very important for the SSS data collection procedure. The dismantling of national borders eliminates the check points for customs control and no real statistical data are available anymore. In addition, new technology mixes small companies, carriers and terminals in new and very complicated flows. Last but not least, the new commercial environment creates new links not existent in the past.

Consequently, the approach to this problem starts with an identification of the problem. What are the components, the forces and the reasoning hidden in such a system? What is the European dimension of these parameters? All these are dealt in the Section 2 of this report. A major tool for accessing the current situation was the published results of COST 330 action ("Teleinformatics Links Between Ports and Their Partners"). As it is recently published and covers also non-EU States, a pan-European dimension is provided. Many of these countries may enter the European family in the future but in any case they are important commercial partners.

Section 3 is devoted to available technology. Much of the discussion is on the use and effects of the Internet and is based on experience, market trends, as well as the results of EU-supported project, such as PROSIT, BOPCom, COREM, INTERPORT and EUROBORDER, all of which have been projects monitored by SSS-CA. PROSIT, as the latest one provides many examples and market responses to new technologies. The general idea presented in this section is of the technology used by transport service providers as well as the trend in the business, especially in the maritime market. As SSS is a segment of the maritime business, these trends are very important. There is no

special mentioning on vessel-focused technology as this is rather irrelevant, and the market absorbs influences of other regulatory bodies, such as the IMO, ILO etc.

The document ends with subjective recommendations. These are only of qualitative nature, as such a problem should be further addressed in a specialized local environment and to a pan-European one.

2. Analysis of the need

Urgent transport issues such as modal imbalances, the competitiveness of the European shipping in general, environmental pollution, infrastructure upgrading and expansion, as well as many other issues of high importance too, impel national and European policymakers to increase planning activity in the field of freight and passenger transportation planning. Because freight transportation and in particular SSS is a relatively new focus, state administrations are not familiar with the kinds of freight data needed for such planning. Little is known about currently available data or about their reliability, their compatibility among different sources, their continuity and their cost. Knowledge of data sources is indispensable to sound planning.

There is a great diversity of problems and issues of possible state roles in a pan-European freight planning and geographical or jurisdictional levels at which problems may occur. As a result there is a diversity of actual and potential planning responses.

As intermodal transport and SSS demand efficient nodal and terminal points, the greatest data need was physical and operating data, especially information on facility location, operation characteristics, use and capacity. In the case of SSS, it is not enough to know that a port has some specific attributes, but it is also necessary to know exactly if this capacity is available for this kind of trade. In addition there is a strong need for information on vessels flow as well as their unit costs, both capital and operating. Finally data supporting impact estimations are not of moderate importance.

Four kinds if planning activities are basically supporting any decision of policymakers or the industry:

i. Demand forecasting

ii. Modal choice analysis

iii. Network analysis

iv. Economic evaluation

v. Impact evaluation

The interdependency of freight or commodity flow and microeconomic data in forecasting-that freight demand forecasts can be no better than estimates of economic growth and change. Trend extensions and correlations of traffic flow with macroeconomic variables are usually the tools for the forecasting, yet not always adequate due to regional and technological characteristics.

In addition to the above points, planners have to encounter also the difficulty of estimating the niche of every available mode in the system; no theoretic tool is capable to assist the planners adequately yet, but estimations are necessary. In a higher level of more sophisticated analysis, the system can also be expressed as a network, were simulations and scenarios can be easily facilitated for further support of any decisions. Nevertheless all methods and decisions boil down to cost and investment

needs; rates, tariffs, schedules and other parameters for capitals and time are finally merged into the single line of the YES or NO decision.

Last but not least for the policymakers is the estimation of the impact. Every single policy has a different impact on the society, the region, the environment, safety and employment and more refined estimations are expressed. With respect to data availability every stage or phase of the planning can produce a scientifically sound result and promote the policy goals set.

It is however very interesting to note that freight data are not only valuable resources for policymakers. Contemporary enterprises are also based on information and market advantages are gained from those, who can accurately predict the developments. So commercial projects undergo usually the stages of demand forecasting, modal choice analysis and economic evaluation. In extreme cases, companies support arguments against courts or state bodies originating from impact estimations. Consequently the collection of sound data is not addressed to policymakers as an internal need, i.e. for their benefit, but it is also a process reflecting the commitment to free enterprises and open markets. In addition recent experiences show that statistics are also tradable commodities and they are sold in the market at a high price, especially in shipping.

The most important freight data for studies, reports, estimations and evaluations are categorized as:

i. Commodity and traffic flow data

ii. Routing data

iii. Rates/tariffs data

iv. Transport level-of-service data

v. Unit cost data (capital and operating)

It is very important to notice that SSS is in direct competition with trucking and railroads so there is a strong need for European coverage and regional breakdown.

Strategies to reduce deficiencies and generally to improve the quality of data available to the States differ as a function of the data category and the criticality of the deficiency. Five basic strategies for improving the quality a quantity of available data are identified:

i. Assembling similar data sets

ii. Publishing and disseminating data

iii. Establishing close working relationships with carriers and terminals

iv. Expanding the regional sample data to a European-wide data sets

v. Creating a common communication link for data exchange

In this report emphasis will be given on the available technology to collect and disseminate data rather than the pointing the necessary data sets.

2.1 Obtaining Data

Data collection is usually considered when there is a lack of available data or there are deficiencies in the existing data. The practicality or necessity of data collection increases with:

i. the specialized nature of the data being sought,

ii. the amount of the detail or depth of information required, and

iii. the degree to which the information sought can be limited to a particular geographic area or category of shippers or market niche

On the other hand the practicality of detailed data collection for the State varies on the scope of the project or action; in general States do not conduct shippers surveys, but they may conduct such a survey in case of building new rail links or terminals. It is a matter of interest. In many cases, States did not have any relevant sound information, and based their choices in weak results of estimations. Collection of detailed data has several other advantages for the policymaker; an exact focus on necessary information is possible, both in content and detail. In addition, in the case of regional or national governments, census or sampling techniques can be merged with other necessary data collection procedures and reduce costs or increase focus or retrieve the data in a desired way. The major disadvantage of data collection was always the cost. Sampling is actually personal interviews and these cost a lot. Phone interviews are also costly. In addition all these data have to be compiled, maintained and stored and this means extra costs in equipment and personnel. Another disadvantage is the management and design of all these samplings and finally the transport community is not always willing to co-operate. Even when the Law protects data and identities many companies are reluctant to provide any data.

In general five major types of data are identified and these are:

i. Traffic data flow

ii. Carrier data

iii. Shipper/consignee attributes

iv. Physical and operating data

v. Direct and indirect impacts

Of these, carrier as well as operating and physical data can normally be obtained from records maintained by the carriers or submitted to regulatory bodies. Sometimes authorities find it necessary to measure direct and indirect impacts, although much of it will inevitably be based on other data or assumptions. However the limited availability of traffic flow data often forces States to collect these data directly. The ‘shipper survey’ is a typical response to this need. Occasionally a state may be

interested enough to shipper/consignee characteristics to undertake a survey solely for this purpose. A major concern in the European pattern is however the issue of transit flows and of transshipments. In the intermodal flows and practices cargoes are usually consolidated at terminal and then are loaded to the next mean. In some cases containers are also getting unloaded and the LCL cargoes are stuffed to another box or container. Such necessities are making things even more difficult for measuring the actual flows. Additionally trade from third countries is also moving as transit or handled as transshipment in the EU ports altering the statistical image.

The 'shipper's survey' was a widespread practice in the previous decades and nowadays is becoming also popular, as there are no border crossing checks. The main goal of such a survey was the sampling and then the indirect extraction of results. The survey usually led to conclusions on:

i. Basic traffic flow information, either for stock taking or predictive purpose

ii. Extend existing transport flow data sets to provide information on local origins and destinations

iii. Provide research data on shipper/consignee attributes

iv. Provide impacts on potential modal shifts

v. Give shippers/consignees the opportunity to identify impacts of transportation system investment and effect their volumes

These surveys had also some characteristics of their own:

i. Some of them were mode-specific and some not

ii. Some were in depth and some generalized

iii. Sampling or census

iv. National or regional or market specific character

However shipper's surveys are not the only way for states to get data. Ports, terminals, customs and other public entities had their own census offices, departments and bureaus collecting data on specific purposes, such as the type of traffic, functions, growth etc.

2.2 Data Management and Handling

There is a great difference between the actual and real conditions with the ideal and prescribed ones. The origin of the evil was always the huge volume of paperwork and the manual handling of all or part of the data. In many cases, questionnaires were keyed in the system manually with many mistakes. In cases where OCR technology is used, there is always a question of reliability of the interviewers. In general the freight data management system should have the following characteristics:

- A uniform level of quality and sufficient detail provided to be used in analyzing the problems or issues identified from the policymakers

- All files and sources shall periodically be updated

- Control maintained over confidential information

- Indexes, guides, and other references provided to the data contained in the system based on consistent definitions and uniform or compatible coding systems.

By developing a formal freight data management system the office, organization, or department can coordinate the collection and study of the sources as well as to eliminate a great deal of redundant effort among system users. In addition better information can be provided with reduced error possibilities for misinterpretation.

During the design of the data management system, certain standards should be set for its operation as a whole and for each of its components. These standards should be developed based on a set of goals similar to the following:

Flexibility: The system must be developed so that it can adapt to data changes, equipment and processing changes, or changes in user needs. New and expanded sources of freight data are being published frequently and the system must be able to incorporate these data.

Capacity: The mechanical processing system and storage facilities should be adequate to provide sufficient capacity for the data. If existing computer facilities within a Ministry or other relevant office, department or bureau, are utilized, the additional burden on equipment and staff should be small, except perhaps for programming services. Careful control must be maintained over the data files created, even though stored in a centralized tape library or other magnetic means.

Quality: Definitions of each data item and descriptions of the variance and general reliability of each data item should be maintained. Users must be aware of the limitations of the data to avoid making invalid conclusions.

Compatibility: A set of bridging codes or applications should be developed permitting the use of all data sources that pertain to a data item.

Timeliness: Information sources used in the system should be updated and reviewed on a periodical basis.

Cost-effectiveness: One of the primary functions of the information system will be to reduce the cost of data collection.

Three very important technical issues were mentioned above: the data processing, the data transfer and the maintenance of informative and physical integrity of the data. These issues are really very important and used to give headaches to the responsible staff. Modern technology has come up with solutions minimizing the necessary efforts but demanding a thorough and detailed initial planning.

3. Status Quo and Current Trends

The contemporary concept of transport demands efficient telematics and information flow from the very first point of the logistic chain up to the final destination. Modern logistics are a process not only of physical flow but also of an information transfer. This dual demand, of proper physical handling and movement of cargo as well as of accurate information transmission to all interested parties origins from the necessities imposed by the modern production and consumption pattern. SSS as part of the logistic chain is not excepted from this norm and demand.

In Europe, the decision of the single market has torn down any barriers, legal, institutional and physical, and removed any border-controls. This drastic and radical shift to a new common commercial space has eliminated the sense of national gates and therefore there are no customs or border officers, assigned with the task to control the flow of goods. In this sense, checkpoints in the hinterland do not offer any real information anymore and only gates, such as ports and air terminals collect data, of ambiguous interest and value.

Ports are usually national gates from an administrative point of view but they are also enterprises, public or private ones. As a goal they have of course profit making, but also the promotion of specific national or European policy goals. At this point the controversy is revealed and the main problem in maritime data collection. The port as an enterprise is investing effort, time, money and other resources in collecting data, which assist and support the decisions of the upper management. Even if the port is public and serves only the local community or its region solely, the goal is to increase the volume of cargo flows by attracting more or specific customers. This is a strict micro-economic approach. On the other hand the State is interested in totally different data: usually aggregated and in a different format. The goal is macroeconomic and the security of the social interests. Consequently the port has to collect data covering both aspects.

The controversy in the character of ports is not the only problem in the collection of maritime data. The maritime community is not really interested in the quality and quantity of cargo as such, but in the characteristics of shipments; mean volumes, weights, number of units, mean characteristics of the approached vessels, cargo-pendulums and balanced trades. The port or the State usually ignores these demands, just because it is either to difficult and complicated to collect these data or because it is out of scope for their core-business and interest.

As a matter of fact, every single transport entity has a different interest in cargo-data collection. Truckers, freight forwarders, rail companies, shipping companies, ports, terminals, customs authorities, insurance companies, etc. seek for a different information out of the everyday cargo flows. Hence it is very difficult to cover all these needs from a single origin or data-library. Nevertheless modern technology and standardization can dramatically improve the whole data-collection system allowing every single interested party to retrieve the data to a desired outcome.

Before proceeding to any further analysis it is very interesting to note the followings point regarding SSS and modern logistics:

1. Small and medium sized enterprises (SMEs) are integrating in the multi-company networks through modern logistics.

2. SSS can potentially offer value-added services and partnerships.

3. Technological advances in the IT field provide solution and psychological hints, promoting intermodality.

These points are very important for the analysis of the needs and requirements for any system relative to data-collection, because these are the major changes in recent logistics along with the developments in the global economic pattern.

SMEs are usually covering their transport needs with a unimodal approach, i.e. by consigning cargoes with only a specific mode of transport, usually truck due its flexibility. It is a very complicated procedure for an SME to book or to estimate or to invest time and effort in order to combine a couple of transport means, say the truck and the ship. In addition there are not so many resources for this effort and the cost of using the services of a freight forwarder can be finally higher than booking space in the truck. In addition most of them are located in the hinterland and they do not own or exploit terminal facilities, so there is a natural bias to trucking, as the truck offers services at the premises of the consignor or the consignee too. Their LTL or LCL shipments are easily combined, the truckers utilize the majority of the available space, the trade is balanced, and the prices fall making this unimodal approach even more attractive.

Larger or big companies are not really facing the same problem; they seek better prices for higher volumes, since they envisage needs for bulk movements, consisting of many FCL units or even rail blocks or ship cargo holds. Accuracy and reliability are crucial as well as the final cost of transport, because the figures are large and a single reduction in the unitized cost is translated in big figures. As a result they negotiate the shipments with the carriers at a higher level of hierarchy and establish frequent links if not networks.

As the European market melts to a single common economic and trade space, the transport demand increases and therefore trucking is not a really good solution for the SMEs, as the distances increase and bottlenecks are faced in several nodal points. The increased cost leads to intermodal solutions sacrificing flexibility and adjusting dates, shipments and terms according to those of the long-haul carrier, i.e. of the sea-going vessel or the rail-block. On the other hand the larger companies reserving the majority of the available space of the long-haul carrier, restrict the availability of the carriers, yet they create networks and links, which could never be financially viable without their shipments. So the big companies create links and the SMEs strive for the remaining space.

From a policy point of view this is a major handicap for shifting cargoes from land to sea, or more accurately to reduce tracking and benefiting rail and sea modes, but by promoting intermodality market forces have found their way. Freight forwarders ‘sell’ intermodal links and SMEs are also creating their networks by consolidating cargoes and making intermodal movements possible and viable. However these are not easy steps and this is just the beginning, in countries and regions were infrastructure cannot

cope with the load any more, such as in the Netherlands, Belgium, Rheinland and northern Italy. What is the real effect of this fact in SSS data-collection is the variety and increase of involved shippers and consignees, not statistically counted in the case of intra-European trade, as well as the increase of complexity of the movements, not faced in the previous decades, when the existing data collection systems were designed and originally implemented.

The other point is that SSS can potentially offer value-added services and create value-added partnerships. There is no need to analyze thoroughly this fact as SSS assists in the distribution procedure and can offer JIT services. However this is translated as a need for completing tasks at the terminals and the several sites within the necessary time framework. The cargo cannot be delayed at any site and sometimes has to leave the terminal immediately so time constrains are also affecting the data-collection system. These restrains create also partnerships, commercial or strategic ones.

Finally the technological advances in information and communication techniques has increased the capabilities of computer systems to exchange data and decreased also the relevant cost. This results to a more open inter-organizational approach, removes fears over the reliability of technical solutions and shifts some decisions to lower levels of the hierarchy. In addition cargo monitoring and tracing systems provide some evidence or demonstrate the relative progress of the transport process, making the whole system less impersonal as it is conceived.

Last but not least in this the implementation of INTRASTAT system (Reg. EC 3330/91) for the intra-European trade. As a result of the directive, there was a shifting of data collection procedure from the customs declaration system to the normal tax collection one, within the VAT collection procedures. Consequently every single tax-office of the country becomes also a collection point as the national gates or the ports. However the tax-officers do not collect transport data but only trade – commercial ones. This directive is valid for the intra-European trade, but affects also the trade with third countries.

Before closing this paragraph it is very important to highlight also adversities and pitfalls of national collection systems; in several Member-States the system had some flaws hampering the extraction of useful results on transport issues. Specialized focus on trade or the transport means was misleading the efforts to sound results and in many cases no details or breakdown were available. A typical example is the focus on countries and not regions, ports or industrial – consumption areas as well as the nationality of the calling ship and not the nationality of the ship manager or of the actual beneficiary.

3.1 Current technical concepts and trends

Experience shows that the markets and the public authorities have well understood and already implemented new software, computing and networking technologies in their everyday activities. The installed systems are basically the same technically as they are based on a specific set of software packages and hardware configurations, yet they are more or less incapable to communicate data with each other. This

characteristic is partly a design flaw, as companies and other entities avoid communicating data, especially in the maritime market. In addition the connection cost with other mainframes and systems is rather high, though it depends strongly on the provider of the service. A very first effort to describe and present the systems used by transport partners in Europe was the COST 330 action.

The results of COST 330 are very important and interesting as they express the current trends in telematics of all involved parties in the transport chain. The analysis is not limited in the strict EU-space but expands also to other acceding European States. However, a major pre-assumption for the implementation of any data-collection system is the elimination of barriers or the bridging of gaps in the European-wide telecommunication infrastructure. The data-collection system consists of administrative procedures as well as of the application of telematics techniques and formation of networks. Some only problems of general nature faced on the higher level of policy-making and some empirical approaches and ideas are here presented:

- The different level of development in acceding countries or even EU-regions is translated as imbalances and technical incompatibilities between different systems. The cost of investment on new equipment, software or methods shall be remunerated by the benefits of the innovation or the keep-up with the modern technologies. Financing is in many cases scarce and different priorities may influence the assignment of funds.

- The monopolistic character of the Public Telephone Operators (PTOs) in many countries has been a major parameter for the high telecommunication costs. This situation has already changed or is under continuous transition to a more liberal and open trade regime, yet the connection costs are still comparatively higher than those in the USA, Japan and S.E. Asia. Within the framework of the EU-funded project PROSIT, users have mentioned shifts to modern telematics systems not because of any special innovative feature but because of radical reduction of the connection cost (PROSIT, 1999).

- It is especially important for regional initiatives to take into account the great variety of local conditions when planning such project. Uniform implementations are unlikely to be effective in Europe, where conditions vary so much from region to region even in the same country. As a result project planners must spend more time assessing the local environment and be prepared to use a variety of technologies and institutional structures. To provide the necessary information for appropriate planning it will be necessary to conduct a thorough survey of existing conditions and initiatives in the region. The gathering and dissemination of this information should be made by a single agency.

- The necessity of ensuring the long-term sustainability of a telematics initiative is self-evident, however the methods for doing this are not as obvious. Many projects set up systems which have substantial running costs from the start (such as the rental on a leased line), but an active user base takes time to establish and any hitches along the way can turn in to large cost overruns. A carefully planned and phased approach is therefore necessary so that any problems can be worked out before high operating costs are incurred and sufficient numbers of users are available to share the ongoing costs. In this specific case of SS data collection, as

users are considered not only public agencies but also private interests. As there is a policy goal to promote SSS as a modal choice, such data shall captive interest of carriers. In addition special formats or small statistical market presentations can be provided with a specific price. Careful planning in the allocation of sufficient resources is also essential. Once a telematics project gets off the ground and is operating reliably, the user base can grow very quickly due to the popularity of the services provided. If this growth is not anticipated, problems can occur with the availability of user support staff, and with rocketing traffic costs on dial-up systems or clogged leased lines as more experienced users learn how to make use of international information servers. EUROSTAT may transfer experiences, techniques and practices in this venture. Nevertheless, the service providers have to operate in a business-like fashion even though their facility may be a non-profit one. However business administration skills and the culture of service provision are often not present in the organization providing the service. This can hinder cost recovery and disappoint users. Therefore project developers should include the transfer of marketing, management and legal skills in their initiatives.

- Incoming dial-up lines or web-requests can saturate the capacity of the system, so new lines or web-resources shall be allocated to cope with the demand, otherwise substantial user frustration can occur. It is almost impossible to be accurate with estimates of growth in telematics traffic in such innovative service but it is best to over-estimate needs -history has shown that growth in data communications has continually been greater than expectations. A reasonable assessment is especially important in planning hardware purchasing decisions and training requirements. Inadequate estimates in these areas can result in higher upgrade costs later. If these cannot be met by the available budget, users can become unproductive when equipment slows down through overload or when software is changed. However, a short planning horizon - about two years maximum - is necessary because changes in technology in this field are so rapid that networking decisions must be continually revised.
- Project and system planners also need to be aware that many of the recipients of their assistance may be reticent about using computers. They may not yet be comfortable with the technology or they may view computers simply as tools for typing letters and reports, which would normally be the job of their secretaries. To address these concerns project leaders should emphasize the use of computers as a general purpose communication tool like the telephone and demonstrate the ways in which telematics technology can improve the user's ability to carry out their jobs. In Europe unfortunately there is still no culture for business-to-business usage of the Internet, yet there is a shift in the market. The culture of using specialized networks is introduced and developed in large organisations, such as banks and major manufacturers, but not in the transport market, where SMEs dominate the market.
- High cost is probably the largest single barrier to the effective use of new telematics and data collection technology. There are a number of ways in which the costs of network traffic, installation and support can be reduced, but local conditions and markets are the major parameters:
    - Increasing the number of users by offering attractive information for the market and other public agencies.

- Using off-peak times and other tariff reduction regimes when initiating connections with devices and other collection points. There is really no need for real-time update; an update every day, week or even month can be adequate enough and can reduce the transmission costs sharply.
- Using the most appropriate protocols for high cost or low quality links. The efficiency of the communications protocol effects the volume of data that can be passed through the link. Some protocols are intrinsically far more efficient at using bandwidth and coping with line noise, connection interruptions or satellite delays. Their use can substantially reduce the costs of traffic and improve the capacity of scarce lines to service a greater number of connections.

- Improving and ensuring the reliability of services is vital to the long term sustainability of any telematics project. Users will not be inclined to pay for services that are erratic and undependable. This becomes increasingly important when users switch from other forms of communication (such as fax and courier), and the telematics service becomes part of their day-to-day operations.
- Any data-collection system, and in general every relevant project, has to take into consideration the needs of the user. It is very important to orient the system to the needs of the public users as well as of the private ones, since they will also support any venture by paying for the services.
- Although telematics equipment has reduced in cost dramatically over the last ten years, and continues to fall, costs are still relatively high for many users. The initial design of the system has to make provisos for the future expansion and upgrade of the equipment, otherwise these costs may boom after a couple of years or after achieving an adequate number of users.
- The success of telematics development projects is very often dependant on the presence of users who are especially committed to the project's goals. If these 'champions' are in top levels of the organizations participating in the project then it has a far better chance of success. Champions need not necessarily be the organization's executives, in many cases enthusiastic users who have mastered the technology can play a key role in encouraging the involvement of others. Outsourcing can also be a good solution in many cases.

3.2 Conclusions out of the COST 330 research action

The results of the COST 330 action provide an indispensable statistical basis for further research. The IT infrastructure and dynamic of all involved parties across Europe has been thoroughly analyzed and presented. Here only some results are to be presented, in order to support the coming recommendations of a next section. As a parenthesis, networks and means of communications in port communities described in the final document of COST are mainly considered the following:

VAN	Value Added Network.
Other Networks	A network supplier, local PTT companies. It includes als telephone lines, LAN (Local Area Network) in office and in po area.

PCS	Port Community System.
Mobile	GSM and other types of mobile communications.
Satellite	LEO (Low Earth Orbit satellites), Inmarsat and other types

3.2.1 Ports

Most ports have a relatively large IT department. Almost all ports have specialized software for invoicing, statistics and hazardous material management. Half of this software is tailor-made and many applications are developed by the port's IT staff. There is no norm for the operating system, yet most of them use client-server solutions. Many ports have already report also problems with their old and new software. What is really interesting is the fact that the majority of the ports are using other communication networks than their own, including mobile ones, and some of them complain about the available infrastructure and the final cost. In addition half of the sea-ports consider Internet/Intranet as promotion means and make some use of e-mail.

As the ports are relatively large organizations these results were really expected. The interesting point is that ports are interested in statistical data collection and they use their own software and hardware solutions. In other words the communication of data will be possible with other networks, if only a common communication link is available. Since the available telecommunication infrastructure is not always adequate or the cost is relatively high, Internet/Intranet applications become very attractive.

3.2.2 Port operators/Stevedoring companies

The activities of port operators do not include any statistics, yet invoicing consists an indirect way for data-acquisition. Some other indirect sources are export/import clearances and other side activities. Nevertheless they also use IT solutions for the dangerous goods handling.

Although their IT departments are relatively small they develop their own applications too on client server operating systems. They use other networks than their own and face problems with obsolete technologies. But the main problem they also face, is the cost of telecommunication, and there is no real shift to the cheap e-mail application yet.

3.2.3 Forwarding Companies

The forwarding companies employee many people in their IT departments and they use their own software for invoicing and import/export clearance. What is really interesting, is that their own people and staff do not develop this software, but specific vendors provide it. As these companies are small enough the investment cost for the in-house development is high; in addition there are relatively many forwarding companies shaping a small but demanding market, so there are triggers for the software house to put time and efforts.

The forwarding companies use also client/server technologies and other networks than their own, including those of mobile communication. They also face the high cost of telecommunication, as well as they also complain about the inadequate infrastructure, yet they do not use Internet more than promotion or some e-mail functions.

3.2.4 Trucking companies

The majority of trucking companies have an IT department, mainly occupied in invoicing and cargo tracing services. They use stand alone PCs and some client/server technology on many types of networks including mobile systems. They encounter also problems of obsolete technology and expensive telecommunication services. No real use of Internet/Intranet application is reported.

3.2.5 Shipping Agents

The information in COST 330 on IT used by shipping agents is rather limited. Some of them report lack of telecommunication infrastructure and expensive connection or communication costs. However there is a shift to Internet/Intranet applications and services.

3.2.6 Railway Companies

Railway companies employee some people in the IT department, yet not so many as expected. The main applications are invoicing and wagon tracing. They use mainframes and some client/server technology. Lack of adequate infrastructure and expensive telecommunication services are also reported and there is no real use of Internet/Intranet technology.

3.2.7 Customs Authorities

Finally, customs authorities are reported as less advanced and into IT concept. Some of them are using IT applications for invoicing, manifests and declarations. Most of them are operating on mainframes and various networks. The use of Internet/Intranet is still restricted to ‘yellow pages’ applications.

3.2.8 Some Other Summarized Remarks

In the final document of COST 330, a list with specified applications is presented:

	Application	Port Authorit	Port Operator Stevedore	Forwarding Company	Trucking Company	Railway Company	Customs Authority
1	**B/L, Freight Waybill**						
2	**Berth Allocation**						
3	**Cargo Tracing**						
4	**Container Yard Man.**						
5	**Customs Invoicing**						
6	**Damage Follow-up**						
7	**Dangerous goods**						
8	**Exp/Imp Clearance**						
9	**Freight Terminal**						
10	**Invoicing**						
11	**Manifest**						
12	**Notice of Arr/Dept**						

13	**Production Planning**						
14	**Statistics**						
15	**Wagon Tracing**						
16	**Vessel Declaration**						
17	**VTS**						
	Total 26 applications	**5**	**7**	**4**	**3**	**3**	**4**

It is interesting to note that ports use IT for statistic purposes and since almost all involved parties use invoicing this task becomes even easier.

Another interesting side-conclusion of COST action was the use of EDI in ports; port authorities are mainly using EDI for cargo manifests and some invoicing. Cargo manifests are the actual raw material for sound statistics. Even if the port authorities decide that keeping a track of all cargoes is not economic feasible, adequate statistical sampling possible, as well as the dissemination of the results is standardized and harmonized. This is also merely the current situation as 36% of all EDI messages deal with cargo manifests and 16% with the dangerous materials. Shipping Agents are also using 27% of the total EDI messages for cargo manifests and 10% for dangerous goods. The percentages of freight waybill issued by railways is close to 50% and 58% of the total EDI messages at customs authorities concern cargo declarations.

Most of the port community partners are willing to use EDIFACT or non-EDIFACT messages, yet there is a trend to standardization and the non-EDIFACT messages are continuously decreasing. The main reason for the use of non-EDIFACT messages is that the messages originating or linked to major manufacturers' systems. These messages pre-exist and it is relatively difficult to abandon successful systems when there are still operating. The same is the case for many shipping agencies and stevedoring companies.

However the main problem in message exchange for all partners using EDI in the sea port communities is the application interface and the lack of many partners. These are also the main problems identified initially in the rational of PROSIT project. Other partners mentioned also that the necessary investments for EDI are considerably higher than those for other systems, therefore only big organizations, such as ports, railways etc. can afford the expenses. Other legal and cost issues are also important in general but there is no specific interest in the case of SSS data-collection

The results on the management of dangerous goods are partially important for this scope. Nevertheless, as SSS can facilitate in future higher volumes of dangerous goods it is wise to take under consideration the current situation in many ports. Most of the handling is still manual and concerns stock keeping and manifestation. The trend for the future is to shift to a more computerized system.

In COST 330, as future developments of the applied IT solutions are reported the following:

Outsourcing: Maintenance and support of the systems are planned to be outsourced by some users in order to minimize fixed costs. Some other operations such as invoicing is also planned to subcontracted to external experts and consultants in some cases, but this is not the case.

Further Development: All partners agreed that more efforts, capitals and time would be invested in developing new applications and services. In addition the networking will be increased and more parties will be linked in the near future. This will also bring a trend in expanding the network by bilateral contacts rather than other intermediates or communication rings.

3.3 The PROSIT project

PROSIT is one of the latest projects launched in the field of transport telematics, funded and supported by CEC/DG-VII. What is really interesting in this project is its actual focus on organizational and human aspects, when applying modern techniques. Within the framework of the project new telematics applications have been designed as well as new supportive software has been developed. The aim of these applications is to enable communication between the involved parties regardless the operating platform of their software systems. In addition, the basic idea of PROSIT promotes the cheap communication channel of Internet.

The project was designed for the achievement of the ambitious goal of eradicating many intermediates and sometimes brokers. The initial geographical spread, as well as some managerial needs, forced the development of four scenarios covering trade links in the Baltic, Northern and the Mediterranean Sea.

Apart from any other interesting technical result, some of them also presented in this document, PROSIT revealed many hidden aspects of organizational preferences and behavior.

3.3.1 Technical Applications

In comparison to other telematics projects PROSIT is concentrated on the improvement of the quality of waterborne transport embedded in intermodal chains and on the co-operation between the demand (industry and trade) and supply (transport industry) sides.

As stated in the PROSIT technical description, the project is focusing on a chance for achieving the goal of shifting cargoes from land to sea. This chance is the willingness for a short termed planning of transport demand in accordance with short termed (actual) employment of partial empty transport capacity. According to the proposal, there is a high potential for reducing traffic by decreasing movements of empty transport equipment and by improving the use of its full capacity. Merely this is right; nevertheless people and their organizations fail or are reluctant to short-plan due to habitual or organizational practices. In order to achieve its goals, PROSIT demonstrates the use of modern telematics in the real scenarios by:

- supporting an "intermodal brokerage" for linking and tuning the demand and supply side in transport including short sea shipping and inland waterway transport,

- focusing on organisational aspects in order to improve the quality and reliability of short sea shipping/inland waterway transport and its integration into intermodal transport chains,

- establishing an after sales service for monitoring the transport, reporting deviations, activating fallback solutions etc., that means

- ensuring quality and reliability required for the acceptance of short sea shipping and inland waterway transport.

Some of the means towards the achievement of these goals are:

1. the successful operating of procedures and software (on logical, technical and organisational level) supporting

   ❖ co-operative planning and control along the transport chain, aiming at improving efficiency and quality of SSS and inland waterway transport in intermodal chains (using the Interconnectivity Manager Software)

   ❖ brokerage between demand and supply sides (using the Brokerage and Control Software)

2. improvement of planning and control of freight transport and employment of resources

3. improvement of co-operation between partners in transport (including waterborne transport) for planning and control of freight transport and employment of resources

4. improvement of brokerage between industry/trade on the one side and transport providers (including SSS and inland waterway transport) on the other side

According to the above, what PROSIT had to achieve initially was the setup of a communication channel between the software systems of each partner or interested party and then to establish a common software interface. This was achieved through an application developed within the framework of the BOPCom (Basic Open Port Communication) project: this software device is called Interconnectivity Manager (IM) establishes electronic data flow between partners in the PROSIT scenarios. IM assists PROSIT's innovative ProShip software module to interconnect different partners of the transport chain, regardless of their individual systems.

As the first goal of the common communication channel was reached, the next step was to establish also the common network. For obvious reasons and simplicity, Internet is used to connect partners. Then an application developed by the PROSIT team, ProShip, was launched in order to undertake the logistic interconnection of the partners.

There is no real reason to present PROSIT achievements in depth, but the interesting conclusion for this report, is that almost any system can exchange data with other systems through the Internet and there is available software to cover the logistic needs. In other words the technical problems are solved. What is left is the organisational change.

3.3.2 Conclusions on organizational issues

As the technical solutions were applied in several cases-scenarios, it became obvious that technological changes are not always capable to change habits, prospects and the market practices. This blatant fact is the very first lesson taken by the application of PROSIT ideas. On the other hand, cost and level of responsibility (managerial level) are the most important reasons for shifting to new practices.

A big company in Germany, equipped with closed architecture system, implemented the PROSIT ideas, because the communication cost with the carrier was extremely high and time was wasted by typing the same information or data for two or three times more. However, a carrier was disappointed because the system was installed for almost a couple of months long and no business have been commenced. No technical problem was reported and this fact was attributed to the managerial level of the employees booking space in trucks or rail-blocks.

In the case of SSS data collection PROSIT can indirectly contribute to the discussion. Two German ports have also been involved in the project as partners: the port of Lübeck and the port of Cuxhaven. In both ports the applied idea was basically different as Lübeck is port with a rather strong commercial community around and Cuxhaven is only a port facilitating some movements per week. In addition, there is a great difference in the traded volume and type of cargo. The experience out of these ports is leading to the same conclusions:

- Both ports experience a radical increase of the offered quality of service, as no errors are involved and document circulation is rapid and accurate.

- The increase of the offered quality leads to an increase of the volumes, as more customers are attracted to the port.

- Top-down rationalization techniques can easily be applied as the human resources of the port can be allocated to more productive positions and effort, money and time can be spared.

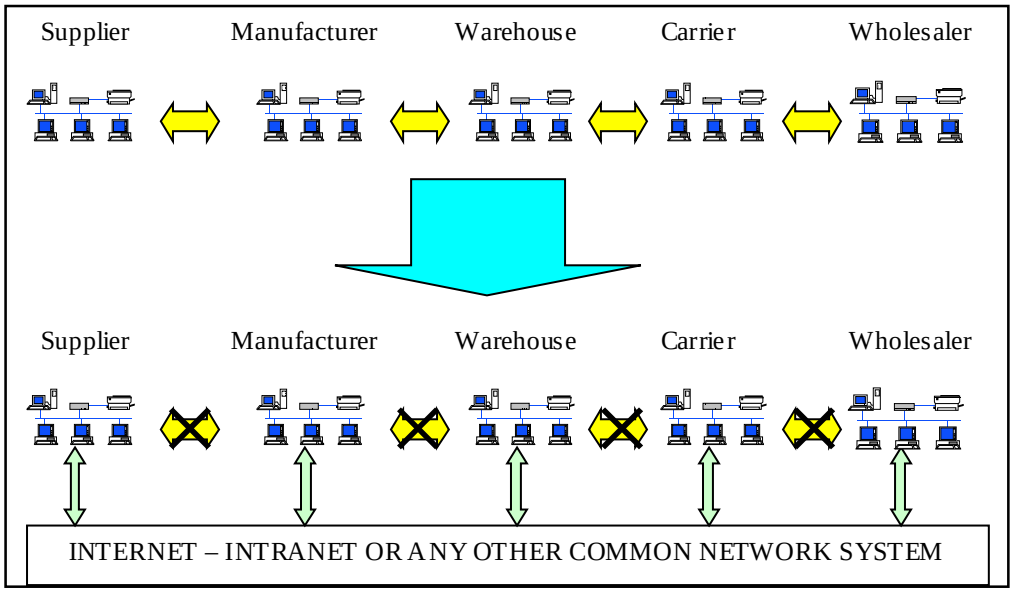
Examining these results from a critical point of view, it is very interesting to note that PROSIT has actually achieved its overall goal to attract customers to sea transport services. Furthermore and for the needs of this report, PROSIT software systems can be slightly modified and create additional statistical databases, acting as SSS data collection points.

Finally a hidden aspect not mentioned before, but a very important one, is the willingness or the availability of all parties involved offering some time for planning and procurement of the service-request and reply. Shippers shall be ‘patient’ waiting the carriers to fill up their vessels while carriers shall deviate from usual practices accommodating the special needs of every customer.

4. Available Technologies

It becomes clear that the quest for an efficient and adequate data-collection system leads to the addition of a new specialized network or new features in existing networks. As the collection of the data becomes day by day more sophisticated it melts down to the reading, compiling and transmitting of digital data from the collection points to a network. These collection points are normally located in the terminals. As a result the problem of collecting data is shifted from public services and authorities to the administration of terminals or the carriers.

As stated at the beginning, the collection of SSS data has a pan-European character, therefore local and individual networks shall communicate with other networks in the continent. For this reason a common communication link is essential and nowadays Internet is offering this connection adequately and freely. The problem in connecting network with other networks of different systems lies in the demand a high level of investment to build bridges for communication. Apart from any physical connection, which is usually a phone line, shared files, common formats and applications as well as common communication protocols are about to be set up and specialized personnel shall support the system. The initial investment cost is high, the organizational changes for creating the link with other companies or entities may be laborious and strenuous and in many cases the necessary outsourcing makes the company vulnerable to external consultants and contractors.



From the above figure it is easy to see the necessary shift to a common channel of communication. The connections between the networks or systems of interested parties are replaced by a common link, which in the majority of the applications can

be Internet or Intranet. The substitution of partial links to a common one, is a very important step, as all links can be normalized and use the same protocols for data exchange. Even more, Internet serves a greater niche in the market, as not all parties are familiar with advanced computing, networking and electronic business environment, and many messages are still exchanged by fax or telex. Especially in the shipping sector telex and fax are the common means of data exchange and almost remote business negotiations are commenced through such messages. Internet, Intranet and Extranet can become the information chain, used to form multi-organisational enterprises.

4.1 The Internet and the communication of information

4.1.1 The Internet as a logistical revolution

The distribution of goods was greatly facilitated by the arrival of computers for the more efficient processing of orders, dispatch and delivery. As a result, the product life cycle was reduced, time in the market became shorter and the customization of products according to customer requirements the norm. In fact, from a production-centered activity, distribution evolved into a customer-centered activity, not only meeting customers' expectations but also surpassing them. The emergence of Internet happened at a time when the transportation industry was already developing rapidly due to satellite communications, which permitted the use of fax, modems and EDI. Internet has sped up this process even more. The global possibility of consignment tracking provides a single vision on organizational matters and management. Searching by consignee, B/L number, customer number or any other options, an individual item can be tracked throughout the complete supply chain from order placement to delivery. Moreover, an extra advantage is achieved considering the lower cost and flexibility provided by web-based technology.

The example of leading companies is paving the way: large companies like UPS and FedEx, originally considered couriers, are now logistic providers. The web based tracking systems used by them can be considered models of how distribution has been dramatically changed by the Internet. UPS customers have access to its website to find out where their package is and when it is scheduled for delivery. Within the pattern of PROSIT such services have also been experimentally launched on the web, and are really very well received by the shipping community. As a direct result of such an application, the cost for the improved customer information has decreased. Another result is that smaller companies within the supply chain are going to be forced to follow the initiatives of the big companies, offering these extra services, rather sooner than later. This is also the case in PROSIT, where shippers or carriers can see the position of the sea-vessel in a real time application on the web.

The Gartner Group, a consultancy firm, carried out a survey on the effect of the Internet on logistics and business. They stated that 70% of the companies, which do not incorporate logistics content, and applications (e.g. delivery date and inventory status) into their Internet management strategies, will fail to win a competitive differentiation. *(Mottley, 1998, page 28).* In other words, they will be stuck in the middle.

The Internet is a universal standard that as such allows companies to extend distribution networks keeping the level of costs to a minimum. The challenge for the shipping industry is to take full advantage of new technology positioning itself more effectively in the supply chain and focusing on the opportunities that the new medium can bring. Tracking industry has already exposed a dynamic in the field.

An ambiguous and doubtful issue is the contribution of Intranet in the logistic pattern. Basically the Intranet is a network that uses the same technology as the global Internet, but was designed primarily for use within a single organization. As stated above, in today's customer-centred business environment where customer satisfaction is a priority, information processing has changed from being a means of improving internal processes to the critical component of business success. Intranet provides a valuable platform for improving communications; by posting information in an internal web server, instead of printing it, there can be important savings for a large organization. The Intranet allows companies to make information more accessible to employees and as such is the right vehicle for developing internal databases and distributing them. This improved information flow creates higher productivity through a highly informed workforce. This could be cost-effective for a large shipping company with offices in different locations, which has to adequately inform its employees about freight and business policies, for example.

Table 2: Today and tomorrow: Marine communications handling.

Topics	**Today**	**Tomorrow**
ATTITUDE	• Driven by Costs and Technique	• Driven by needs of Information exchange
INFRASTRUCTURE	• Separate networks for shore and ship	• Integrated Corporate Communication
COMMUNICATION	• Mostly Voice telex fax Only little data traffic	• Plus E-mail, Internet, Databases, Partners
REQUIREMENTS	• Low speed and volume Mostly one direction	• High Speed Data bi-directional
SOLUTIONS	• Standards with commodity products	• Tailor made with proven portfolio

Source: *Goeij, 1998*

Nowadays, regardless of the position of the ship, the chain of communication cannot be broken. With this consideration as their business proposal, BT, (BT) a market leader in the communication industry has recently introduced a new service for the shipping industry. Called "Webtrack", it enables shipping companies to maintain track on a global scale, of their ships, cargoes and crew. It also has various levels of access for staff and customers, suppliers or agents, depending on the instructions given by the owner. Companies with own tracking systems can switch to the new service, which, as BT point out, is cheaper and more accessible. At the very beginning of this new era of information, only mega-carriers have given their customers the possibility of tracking cargo. This is mainly because of the large investment in infrastructure required in order to make this kind of service feasible. Now, due to Internet, the door is open for small and medium sized ship operators to track their fleets on a 24 hour, year-round basis. In the computer age, the accessibility to shore-to-ship and ship-to-

shore communications has evolved from quite recent times, when a computer terminal in an office was connected to a modem, which dialed the INMARSAT satellite, which then transferred data to the ship's terminal.

Although the system is fundamentally the same now, the point-to-point link uses the increasing number of "**hubs**" (low cost message switching systems), either public or private, bringing a number of advantages with it. The hub is basically a computer that places and keeps information in mailboxes and distributes those messages to different addresses, regardless of their form. The main advantage of this system for small and medium sized companies, with corresponding IT infrastructures, is that it avoids the large investment required to set up and operate such networks themselves.

Various companies are suppliers of the ship-shore **communications software**, among them Spectec, Rydex, Marine Management Systems, Marinet and Monitor. The current trend is to develop the programs using a Windows NT basis, which will permit the much required standardization and compatibility of the products with other interfaces of shipping companies IT platforms. The latter, due to their international nature, require service providers with a global strategic vision, but with a local presence to support their requirements. The following table is a summary of the main characteristics of the communications software on the market.

Table 3: Principal Marine Communication Software Suppliers.

	GN Comtex	**IMC**	**MMS**	**Marinet**	**Marinor**	**Rydex**	**Sait Radio-Holland**	**Spectec (Amos Mail)**	**Spectec (Amos Link)**
Country	UK	UK	USA	UK	Norway	Canada	Belgium	Norway	Norway
Product Category									
Private domain	•	•	•	•	•	•	=	•	•
Public access	•	•	•	•	•	•	•	•	=
Integrated software	=	=	•	=	•	=	=	•	•
Operating System									
Windows	•	•	•	•	•	•	•	•	=
Dos	=	•	•	•	•	=	=	=	•
Novell	=	=	=	=	=	=	=	=	=
Ship-shore transport									
INMARSAT-A	•	•	•	•	•	•	•	•	•
INMARSAT-B 9.6kbit/sec	•	•	•	•	•	•	•	•	•
INMARSAT-B 64 kbit/sec	=	•	=	•	•	•	=	•	=
Other satellite	=	•	=	•	=	•	=	•	=
Cellular	=	•	=	•	=	•	=	=	=
Gateways to:									
Telex	•	•	•	•	•	•	•	•	•
Fax	•	•	•	•	•	•	•	•	•
Internet	•	•	•	•	•	•	•	•	•
ISDN	=	•	•	•	•	•	=	=	•
Main Features									
Account codes	•	•	=	•	•	•	•	=	•
Address by keyword	•	•	•	•	•	•	•	=	•

Auto data compression	•	•	•	•	•	•	•	•	•
Automatic virus checking	=	•	•	=	=	=	=	•	=
Full duplex operation	•	•	=	•	=	•	=	•	•
Message Status indicator	•	•	•	•	=	•	•	=	•
Multi-language version	=	•	=	•	=	•	=	•	•
Muti-user shipboard syste	•	•	•	•	•	•	=	•	•
Cost 10 ships, 1 off. Installation									
less than US$10,000							•		
US$10,000-25,000	•	•			•	•			
US$25,000-50.000			•	•				•	•

Source: *Compuship February/March 1998, page 25 (modified).*

4.1.2 E-mail vs. fax and telex: an ongoing battle

The majority of shipbrokers use telex for around 70% of their communications, with fax at around 20% and e-mail a mere 10%. *(Hanson, 1997).* Even in 1995, shipping infrastructure developed by software providers tended to favour the use of fax for shore-to-ship communications. Comsat promoted a so-called fax mail service, which was able to save up to 40% in communications costs. *(LSM, 1995, page 73).* However, although telex, followed by fax, is still widely used by the maritime community as a whole, its days are numbered.

One of the pioneers in the use of e-mails for linking shore with ship was the off shore specialist Oceaneering. Due to the nature of their operations (offshore supply specialist), they thought it necessary to provide access via electronic mail to the fleet - in order to have a proper response to critical situations and also because of the remoteness and distance of their operations. *(Ocean Voice, July 1996).*

E-mail has now become *de rigueur* for business, academic and personal communication. In fact, in 1996 there were around 62 million active e-mail accounts, but by 1997 that figure had jumped to 93.5 million *(Molitor, 1998, page 55).* Not only is it faster than telex and fax, it is also cheaper. This is an important factor in the shipping industry, where cost-saving is a permanent concern, and communications costs are a significant slice of all shipping company expenses. With e-mail, whether you send the same message to 1 or 100 recipients, the cost is the same, unlike traditional media, which are also very expensive for high volumes of data.

The following table highlights the dramatic difference in the amount of information that can be transmitted for US$1 using different mediums. E-mail shows a clear lead.

Table 4: E-mail compared to other mediums

MEDIUM	CHARACTERS
Telex	10
Fax	50
E-mail (2.4000 bps*)	300
E-mail (9.600 bps)	1200

* bps stands for bits per second

Source: *Ocean Voice, October 1997, page 21.*

Another approach for this critical issue of costs and printed documents is the case of a typical container ship. A company or its agent shall read, interpret and process the documents for 1,000 TEUs say, which is almost 8,000 documents and about 1,300 customs clearance transactions. Printed material can produce a higher number of mistakes – sometimes as much as 30% of the information being transmitted – and add up to 40% more to the cycle time. (PROSIT, 1999) On a direct cost basis, the error factor could amount to about 0.5% of the freight rate (e.g. $50,000 on a $10m freight budget), whereas if the documentation were done electronically, the cost would be $5. It has also been estimated that it costs about $1.75 to book cargo by EDI (Muller, 1995?). These EDI messages can also be facilitated through e-mail and Internet protocols.

This trend towards the use of e-mails in higher volumes is further illustrated by the compliance with the GMDSS starting in February 1999. INMARSAT C, the vehicle for sending distress messages, also enables the transmission of e-mails. Approximately 90% of all available equipment is capable of e-mail messaging and does not require additional components *(Ocean Voice, January 1998, page 28).*

E-mail also enables the sending of videos and graphics. Another factor that should speed up the acceptance of electronic mail among the business community is the improvement in the security element of this form of data. The most common security measure is the so-called encryption key system, which gives the receiver access to messages only if he/she knows the correct key to decode the information. However, it is only once e-mail has the same legal validation as telex that it will become the *de facto* standard in communications for the maritime industry.

This legal consideration, along with the fact that the shipping industry is highly traditional and not as pro-active towards technological change, explains why telex is still the medium for the bulk of maritime communications. Unfortunately, the pace of both the business world and technological progress sometimes moves faster than the legal framework created to regulate them. However, it is only a matter of time before they catch up. *(Naidu, June 1998).*

4.1.3 Electronic Commerce: From EDI to Internet

The days when Electronic Data Interchange (EDI) was regarded as the “ultimate” model for business to business electronic transactions between computers on agreed standard are not so long past. Since the early days when EDI was introduced, as a paperless solution for company transactions over a proprietary network, many technological developments have changed the commercial world, challenging this now mature technology. The most defiant of all has been the Internet. EDI required expensive hardware and needed a unique solution for each pair of trading partners. Despite this, it did find a niche in larger companies such as car manufacturers, big retailers and multinationals, where it improved efficiency and cost saving via the exchange of purchase orders, invoices and payments. A recent United Nations report estimates that there are 100.000 EDI users worldwide (*Slesinger, 1998).* By comparison, the current number of Internet users is about 60 million. The expense of

EDI's tailor made solutions, however, has kept it out of the reach of small and medium sized businesses.

Ever since the word 'Internet' became part of business vocabulary in the mid 90's, technology experts have been forecasting that e-commerce would represent a very profitable opportunity for those companies with the vision and business know-how to make it happen. Their predictions appear to be very encouraging for companies still outside the e-commerce area. During 1998 about US$20 billion of business was estimated to be done on the Internet. By the end of 2000, the total could be five or even ten times as much again.

Internet arrives when a vast network of personal computers, corporate local area networks and a global digital telephone network are well established. With this infrastructure in place, the Internet i.e. e-commerce has become a new driving force in business. If companies are not already computerized on a large scale, running everything from their supply chain to their sales operations electronically, they will not to be able to connect to the Internet to reach and form part of a global network, which makes all companies equally easy to reach.

The question now is what does all this "techno-hype" mean for the shipping business? The important point is that this new technology, connecting producers of goods and buyers, will lead to the more efficient use of shipping companies' services and probably, the author hopes, an extra buzz for the world economy.

There are a number of innovative companies in the shipping community searching for new ways to make the most of the changing market scenario:

- **Intermarine,** established in September 1995, and Seapages (www.seapages.com) are companies aiming to serve as an Internet platform for the buying and selling of ships and marine equipment. They do not consider themselves brokers - simply mediums for the exchange of information in a cheaper, faster and broader way.

- Another early initiative of e-commerce for the shipping industry was created at the beginning of 1997 by the Norwegian telecommunications company Marlink, with its product "**Marlink Quote Saver**", which has Infonet as network provider. In essence, the company is trying to become an administrator of the complete purchasing chain, with the buying shipping company, for example, requesting a quotation. The suppliers are informed via e-mail that there is a request in the server and can allocate their quotations by return. The buyer then analyses the offers and asks the chosen company (via e-mail) to deliver its product. This service has been tested by Stolt Tankers and they report that the purchasing process became cheaper, more efficient and faster as a result.*(Seatrade Review, July 1997, page 53)*

- The Bolero Project, now **Bolero Ltd**, started as a joint venture between the TT club and S.W.I.F.T, the international bank-owned co-operative and EDI provider. Its aim was to give security to electronic trade documentation on a global basis. In essence, that aim remains the same but it is now a fully operative company with new partners *(www. boleroltd.com).* The benefits of such initiative include reductions in communication costs, transmission errors and fraud as well as the

better use of transport equipment. The company is in the process of implementing an EDI-Internet version of its software. The benefits to transportation services are part of a cross-industry solution between an exporter, his bank, customers in the export country, a carrier, customs, the receiver and his bank.

- The most ambitious project for shipping to date, in the current "infant" e-commerce market, is one that has vast potential and could cause a radical transformation in the supply chain. Sponsored by the International Marine Purchasing Association (IMPA), as reported by The Baltic *(July, 1997)*, the standard has been called **IMPA Electronic Standard Form**. This commercial initiative is supported by an advisory panel, which includes large shipping companies, shipping managers and major suppliers. IMPA affirms that EDIFACT, a standard created by the United Nations, is too complex and unsuitable for shipping companies. The IMPA standard will facilitate the process of buying and selling. Not only will it eliminate the tedious paperwork process but also overall, it will speed up quotations and the purchasing process thus enabling the payment of invoices and improving the control of stock *(www.spectec.u-net.com).* Internet purchasing is a flexible and cost effective development. It enables the buyer to analyze and compare different quotations. Eventually, the latter will form part of an electronic database or achieve, thus further facilitating the analysis of market trends and historical data. Consequently Internet purchasing represents a quantum leap over traditional solution EDI because it provides access to the global market place through a single interface.

- Shipping lines, as reported by American Shipper, August 1998, participating in the **Information Systems Agreement** (ISA) - APL, Crowley, "K" Line. Maersk and P&O Nedlloyd among others - are jointly working with software developers. Their aim is to standardize electronic communication for ISO (International Standards Organization) country codes/currency tables, ISO container size/type codes, rate basis codes, schedule locations codes, package type codes, vessel names, Lloyd's codes and other data. Originally the project embraced EDI as a platform of communication and is developing an Internet version of the software *(Gillis, 1998, page 36).*

The recurrent issue of Internet security is at the center of the analysis and discussion regarding e-commerce issues. Clearly security, if properly provided, enables companies to migrate business applications. On the other hand, security breaks can cause major troubles to businesses such as losing information, damaging credibility and reputation. Commercial rivals in the financial sector, Visa and Mastercard, have launched a jointly developed method for assuring security of credit card transactions on the Internet. The new system, called SET (Secure Electronic Transaction), has benefited from easier encryption advances, reassuring users that their transactions are both secure and verified. These sorts of initiatives are not isolated. Other large developers and technology providers are introducing new systems to protect computer data, thereby guaranteeing confidentiality in commercial dealings on the Internet.

Another and very successful initiative in this field was the Secure Sockets Layer, developed by Netscape Communications. SSL is a specialized layer that resides

beneath the application level and above the network level. It safeguards the security as an intermediate, a gate between the TCP/IP and SMTP protocols.

To sum up, now more than ever firms have the flexibility to integrate their capabilities to reach customers, suppliers, products and information from anywhere in the world at any time. However, for the time being, both systems, EDI and e-commerce through the Internet, are going to share the market for these kinds of transactions. This is basically because major corporations have invested large amounts in EDI infrastructures to link their network with customers and suppliers. They cannot and will not change to the new technology overnight. However, we may see their systems evolve into EDI buying on the Internet, but the two will coexist and remain complementary *(Gillis, 1998, page 34).* Lastly, the speed at which Internet e-commerce takes off will be based on business confidence in technology and security. Now, firms actively promote transactions via this new platform of communication and customers already feel that e-commerce offers an advantage in terms of convenience, value added services and price.

4.2 Advanced IT applications focused on cargoes

As intermodalism is based on the physical flow of the cargo and the continuous exchange of data and information, the companies and providers of modal services have came up with special devices, software and application for the monitoring of the operation as well as of the tracing of the cargoes.

4.2.1 Satellite Communications

Carriers have identified the need of their customers to have real time information. The modern production and storage techniques apart from any JIT concept are demanding punctual delivery or pick-up time. In addition carriers lease, sub-contract and exchange vehicles and transport means, having also the same need. The rail industry led the way in EDI use because so much of the traffic is handled by more than one railroad, and the industry needed to keep a track of equipment, asset utilization and in many cases hazardous cargoes.

As a result railroads and other carriers are using EDI in many cargo related applications including bills of lading, shipment status, weights, equipment and yard management, waybill retrieval, freight claim submissions, interline tracing, rate requests and many other modules. EDI allows rail carriers to sharply improve performance, enabling seamless service and integration into the intermodal chain. Waterborne transport is far more simplified and but as in rail operations drayage is also involved and in many cases, and it consists the weak point of the chain as not all terminals are fully computerized.

Satellite communications were applied as solution in the trucking and rail industry. Marine applications are also very wide-spread. In the first case the exchange messages refer to assets and cargoes yet the marine messages refer mainly to the ship management. In extreme cases, real-time applications, such as on-line cameras support maintenance decisions from ashore. Still there is no connection of cargo

information with shore management via satellite communications. The main reason is the high cost.

Truckers have installed a satellite based, two-way message, low-cost system on every vehicle. The system does not only increase the productivity of the driver and safety, but provides also real time information to the customer, usually through the net. Such systems are also combined with GPS tracking of trucks, shipments and equipment and assist in indirect identification of weak points along the logistic chains.

However such technology has not been focused on shipments.

4.2.2 Cellular and Wireless Data Technology

Leading parcel companies such as UPS has developed this technology and then it was 'transplanted' to other logistic systems, such as ports. The aim was to reduce paperwork and the provision of real-time information. This technology is strongly focused on the shipments. In ports, rail terminals and elsewhere wireless technology is under experimental use and is expected to provide positive results.

4.2.3 Automatic Equipment Identification (AEI)

The wireless technology is either combined or confronted with the application of radio technology. Handheld devices read barcodes and communicate with the host-computer over radio frequencies. This type of technology has been fully used in terminals and warehouses. COREM applications were of this type. The radio technology assists also the further transmission to other devices, such as the monitor of the forklift or the positioning system of the straddle-carrier.

This technology started in the early 70s and expanded over the 80s. There is always a 'tag' for the vehicle-equipment and the shipment. The device reads the tag and the information is transmitted. Nowadays, two-way communication capabilities provide also the option of routing, say, of the equipment, yet there are not so many technically advanced terminals in operations. These tags contain data in a coded form, so apart from any normal system component, such as antennas and transmitters, there are also some decoders. The decoders are mainly used for compacting the data in a simple array and minimizing the errors. It is however remarkable, that the transponders are extremely rugged in variations of temperatures, noise and other external factors, as they are also used along the rail-lines under the wagons (Muller, 1995). Another advantage of this technology is the flexibility of the radio equipment and the ability to form a uniform frequency network despite the national regulations.

It is obvious that this technology has a real effect on railways and in terminals. However containers have also entered this technology; Matson International, APL and others have already installed tags on over 125,000 boxes for container identification, chassis management, handling, weighting, gate access and lately shipment information. Tests conducted prove the reliability and cost-effectiveness of the system; terminals are achieving 100% accurate data entry and 75% faster gate transaction time.

This technology is also very close to the highway systems used for automatic vehicle identification (AVI). The concept is the same, yet there are several types combing radio frequencies and satellite technologies.

4.2.4 Revolutionary Barcodes

The essence of any systems presented above is a ‘tag’ or a barcode. The barcode usually holds 40 to 80 characters. Manual keying or handling of the barcode engulfs errors, which is normally expected as one error every 100 to 300 keystrokes. Automatic reading and handling of the barcode takes only 2 seconds versus to 5-6 seconds for the manual entry.

The barcode usually contains information on the customer’s invoice number or other attribute so all other information is stored in a main computer. Currently there is a trend of creating two-dimensional barcodes, expanding the information storage capabilities of the code and therefore the transmitted data. On the other hand such technology is very well matched with radio, cellular and satellite systems for network communication. The two-dimensional barcodes allow the compressing of bills of lading or waybills into only one tag and as electronic signature becomes more popular and legally accepted, the whole import/export procedures becomes paperless and automated.

4.2.5 Internet based EDI

The Internet technology is not only e-mail and WWW browsing; it includes also the very attractive FTP protocol and the JAVA applications. JAVA is comes out of the philosophy introduced by the Internet and the millions of users. The JAVA applications are standalone programs and give the opportunity to remote user to enjoy the services of program located, installed and configured in another place, platform or simply device.

The main problem of EDI for the time being is the effective matching of this message system and Internet. Another idea is to send EDI messages as simple e-mails; specialized ‘recipients’ receive and interpret the message accordingly and specialized applications transform the linguistic message to the properly encoded one. Nevertheless there are some issues on the support of X.400 network attributes, of security and cryptography.

The opinion of the authors is that these problems can technically be solved in short period, though there are serious incompatibilities of protocols and other basic software infrastructure. However JAVA applications can provide such an interface for the solutions of such incompatibilities as in the case of BOPCom and PROSIT.

5. Recommendations

As mentioned in the beginning of this document the goal was to recommend advanced technologies that would aid in the collection of SSS data by looking at current techniques and practices.

It is obvious that there are several levels for approaching the problem. The first layer is the higher and more abstract one of combining national and regional services. The next layer is a local one, involving the terminal, the port and the relevant partners. The third and last layer is the applied technology involving the carrier mainly.

Regardless of the type of the technology to be used there is a strong need for a common communication link, which shall provide adequate bandwidth, ensure reliability and cost-effectiveness as well as common interface for everybody. This common link is considered to be Internet. The PROSIT project proved that existing technologies can be merged efficiently through simple software applications into a web tool. It is not necessary for any company or administration to invest in new technologies, as long as there is a gateway to the Internet. EDI messages can easily be transmitted via an FTP protocol and JAVA applications can offer services of other systems locally. Internet is not only for promotion as it is currently used nor for data searching. Internet connects the computers over a widespread network, which anybody can access. This is also partially the solution for the decrease of the communication expenses; by increasing the bandwidth PTOs attract more Internet users and provide such services with simple local calls. No extra cost for additional infrastructure is also required. Issues such as security are not anymore a real problem. However it is also rather weird for somebody to hack statistical data, which will come up free in the near future.

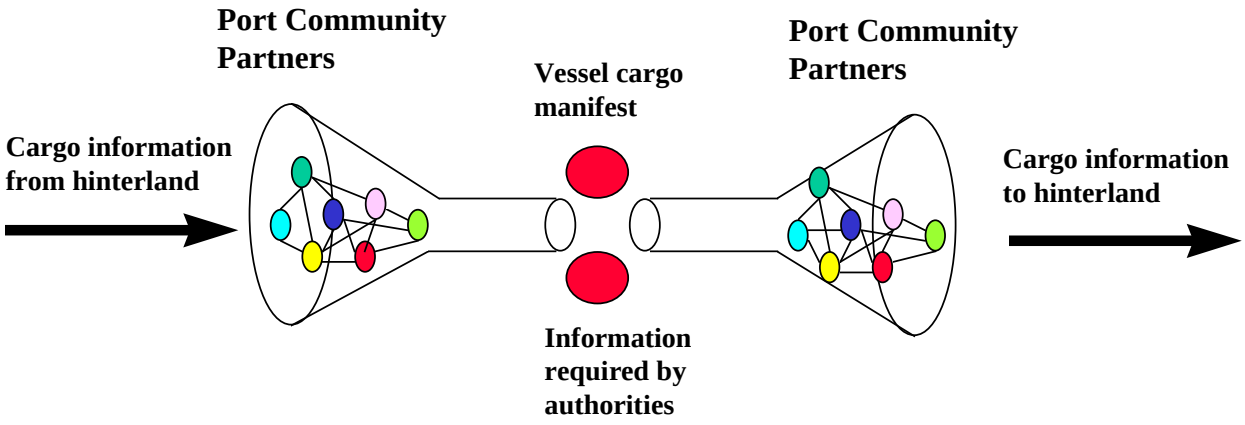
The next layer of the local networks will also find a way to a merge through Internet. Shipping agents, freight-forwarders, ports etc. will create a local Internet system, exchanging information. Every entity may offer access up to a specific level to other users or a central, hub-device, may collect and handle all information as in the case of Luebeck (Scenario 4, PROSIT). The existence of a hub-device is also an issue of local mentality.

Finally the data on cargoes are about to be collected in two ways: the shipping agents or the carriers or the freight forwarders send the necessary information over the web to ports and therefore to authorities too. It is not necessary for the authorities to collect all attributes, but those interesting for the SSS statistics. In a more advanced case, cargoes are also bearing a unique barcode accompanying them along the transport chain. The information or the barcode is then confirmed and check in the loading-unloading port as well as at the gates of the terminal. By combining this system with rail and truck companies intermodal statistics tables can also be formed. Yet the cost of implementing all carriers into a common level of technology is high. Even though, different technologies can also use Internet as a common link. The data on shipments shall be confirmed in the terminals. Usually shipments stay for a while in the ports and there is no rush to shift cargoes to another mean and leave the gate at once. This time is usually enough for the information of the terminal, port authorities, stevedores, import/exports clearances etc. and therefore detailed statistical information can also be stored.

The pitfall of the above ideas is not really cost but the organizational shift to a more sophisticated system. The necessary investment is a barrier at the beginning but experience shows that there is rapid capital recovery. In addition legal gaps can create difficulties in harmonizing the system.

The very first step towards the necessary harmonization and networking of all these data is the adequate re-engineering of ports as collecting points. In COST 330, a scheme was presented to highlight the role of ports in the logistic chain:

Port Community Telematics
Role in cargo logistics



It is very important to notice that ports require more or less the same information from the shippers, consignees and carriers. These data are usually found in several documents and forms, yet every single of them carry also different liabilities, rights and obligations. Therefore in several advanced terminals the data was not collected from legal documents, such as the bills of lading, but from waybills. Waybills are issued by shipping lines, freight forwarders, rail and truck carriers to a shipper, and serve as a receipt for the goods and evidence of the contract of carriage. It resembles to a normal bill of lading, but it is not a document of title. Its main purpose is to avoid delays when bills of lading are late in arriving at the dispatch port. In the case of multimodal transport, where usually a freight forwarder is issuing the waybill, the consignee or the consignor do not know anything about the modes used, timetables etc. This information is critical for the establishment of statistical tables.

In order to solve this problem, there are two ways: either the cargo or shipment gets a unique barcode, which is then read and retrieved along the chain, or the waybill contains this information and the port collects it.

In both cases there is a shift to a new concept. Where technology fits into the picture is in three specific cases:

1. when communicating data

2. when collecting data in terminals

3. when tracing shipments

In all these three cases there are available technologies, but they are fragmented either within the pattern of a single company or community or technically isolated.

Since transport is actually an international business no barriers, limitations and norms can easily be applied without decreasing the productivity of the sector. So every single carrier, port and partner can crate its own system for better service offering. Internet technology creates a momentum for an unofficial norm, as everybody has a cheap access and can use the advanced software applications remotely through JAVA applets. Therefore carriers cannot imply their own system or network easily. There is also no real need to do so, even if problems still exist. It is very close the time, when shipper will book space through the web, and the intermediates will also transmit this information on the web. What really doesn't matter if this is going to happen through e-mail, ftp or other protocols facilitating more advanced and specialized forms, such as EDIFACT. The information is circulated and finally is collected at terminals. There the shipment data can either be consolidated or send to another specialized agency compiling them with other messages before proceeding to data-entry and storage.

In the terminals data are also to be collected through the actual flows. As shipments are recognized electronically these data are also compiled with the messages received some time ago, concerning these shipments. This checkpoint serves many scopes and the most important one is the identification of transit and transshipment points, as ports communicate to each other. The technology used in the ports shall only have the capability of identifying the shipment, as it is not enough to discuss only about the container or the unit. However, the context of the unit is always known to the terminal, so even though, a matching of this information is possible locally.

Finally what really matters, SSS is the transport leg in the hinterland prior and after the port call. As carriers use tracing equipment for their own benefit, it is easy to enforce the communication of these data with a network. Waybills are maybe the most flexible tools for such a matching.

Before closing, the vital issue of data security and handling shall be addressed. The transport data are important not only for the transport community but also for every single new commercial activity in the local market. As the European Union allows the free flow of people and goods, local advantages or disadvantages can be eliminated and vanished from other remote markets. In addition questions of competitiveness are also raised. Therefore these data shall be finally found for third parties in public agencies or other bodies protecting the sources and covering some of the investment and network costs. These costs are considered to be higher at the beginning, but as the network increases they will fall to negligible expenses as in the case of the US. Policymakers have also a unique chance to monitor the market and set relevant goals for the future.

Summing up, it is strongly recommended to set ports as network hubs, where information is gathered through the Internet from the local community of carriers, shippers, customs and any other involved entity. The technology used in the terminal does not affect the final result, as the port collects and compiles for internal use these

data. These data shall be communicated with public regional or national authorities and be also available to third parties under data-protection agreements. It is also necessary to assist and encourage the use of equipment and shipment tracing and tracking in land carriage so the whole chain can be identified. The extra cost for such services shall be assigned to the cost envisaged by the shipper, as new vale added services are included improving JIT and distribution procedures, and to the dissemination process, where the agency or the port can sell interesting information on the local market. In order to achieve all these a mental re-engineering is necessary as ports and terminals shall include in their core-business information handling too, as they do for cargoes and other physical quantities.

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