4.4 Dangerous Goods Information Management - Hazmat Directive

The main objective of this section is to describe how the port authorities are managing dangerous goods information: the different ways of handling this information currently and what is expected in two years. Information was collected on whether this information was managed manually or with a software application.

Some countries recommend in the Hazmat Directive (national implementation) use of modern IT solutions for managing the dangerous goods information. It is to be foreseen that the Hazmat Directive will stipulate new European rules for port authorities, national competence centres, and other authorities for managing the dangerous goods information systematically.

Six specified functions of the dangerous goods information management were asked of the port authorities.

- *Dangerous goods declaration, receiving* (The shippers or consignees of dangerous goods ask for permission from the port authorities to bring dangerous goods to the port.)
- *Dangerous goods permission, sending* (The port authorities' reply to the shippers or consignees to bring or not to bring dangerous goods to the port.)
- *Dangerous goods manifest, receiving* (The port authorities receive the dangerous goods manifest from the shipping agent.)
- *Dangerous goods, stock keeping* (The port authorities need stock keeping for storing dangerous goods in the port area.)
- *Dangerous goods rescue information centre* (Dangerous goods rescue infocenter where the port authorities can find instructions how to save persons or the environment in case of an emergency.)
- *Information to national competence centre* (National competence centre = national authority supervising the dangerous goods movement at sea. Hazmat directive stipulates that dangerous goods on vessels should be reported to the National Competence Centre.)

The results were analysed on the following 4 items, both for the current and future situation.

Item 1 ***Management of the dangerous goods information***
How dangerous goods are managed currently?

Item 2 ***Dangerous goods management software applications***
Software applications used for the dangerous goods management.

Item 3 ***Dangerous goods management by data communication networks***
Data communication networks used for dangerous goods management: Two value added network suppliers by name, PTT networks, LAN, mobile, Internet, PCS and satellite.

Item 4 ***Dangerous goods messages for dangerous goods management***
Currently used and planned messages for dangerous goods management.

Note:	The information of this section is not comparable with the information of dangerous goods information management in section 4.2.3.1. The information of this section is more focused in applications with regard to Hazmat Directive.

4.4.1 Management of the dangerous goods information

The chart below shows the current situation of the dangerous goods information management. The answer 'no' means either no dangerous goods in the port or probably no software available for managing the dangerous goods. The existing applications are reported in section 4.4.2.

The analysis and the findings of the charts below are reported at the end of this section, Hazmat Profile Findings 4.4.5.

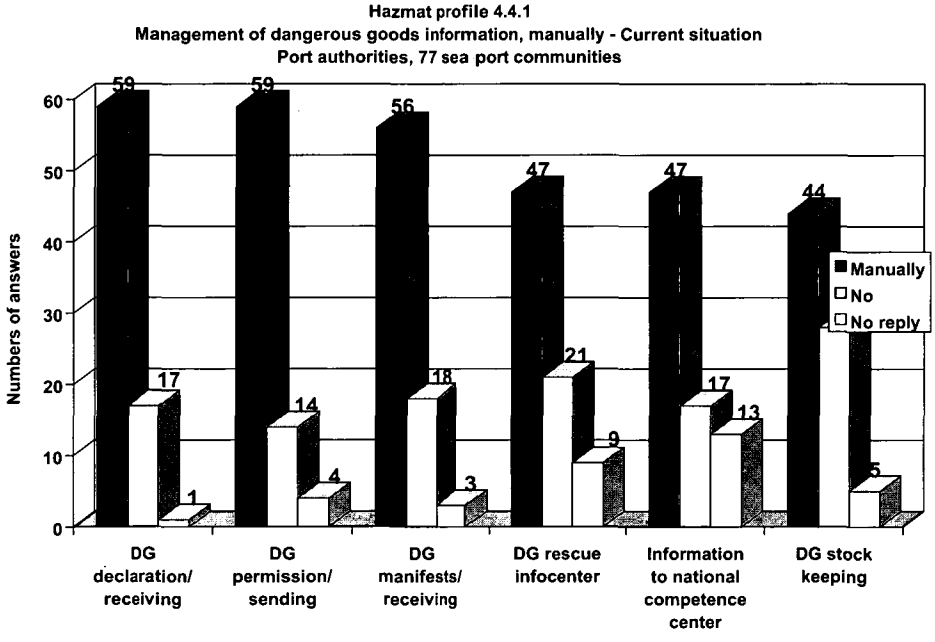


Chart 4.4. 1 - Manual management of the dangerous goods information, Current situation, Port authorities, 77 sea port communities

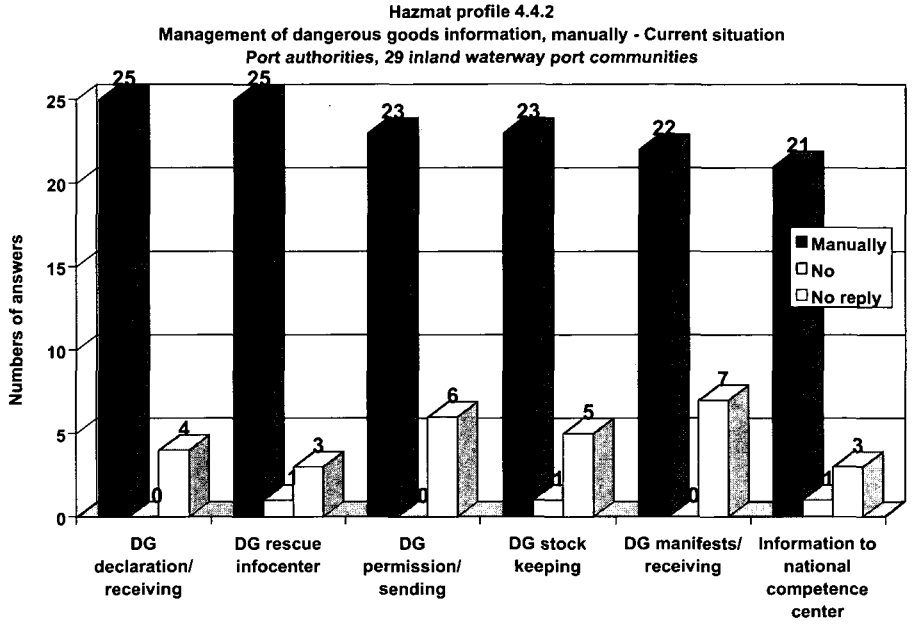


Chart 4.4. 2 - Manual management of the dangerous goods information, Current situation, Port authorities, 29 inland waterway port communities

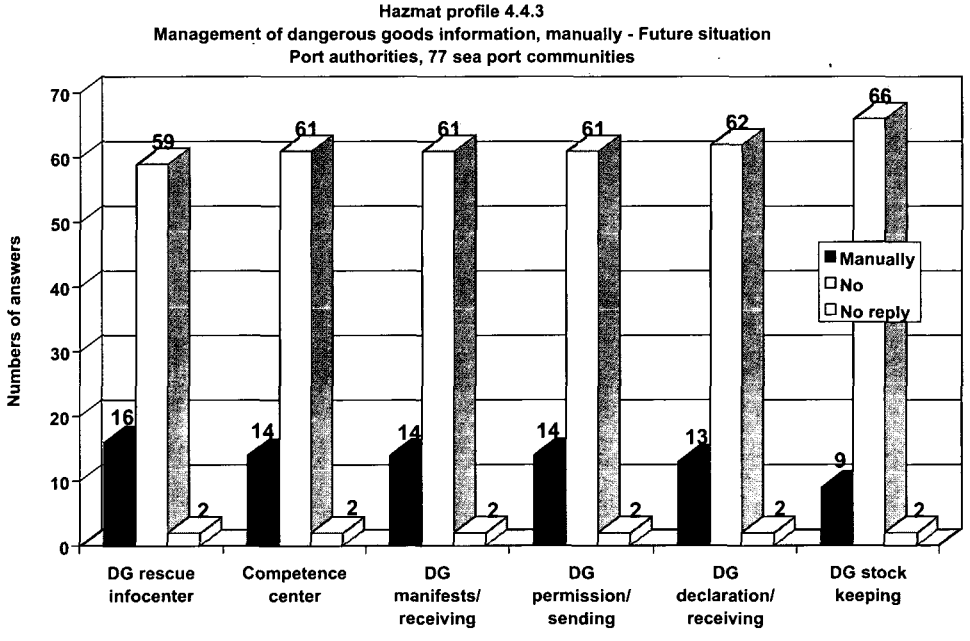


Chart 4.4. 3 - Manual management of the dangerous goods information, Future situation, Port authorities, 77 sea port communities

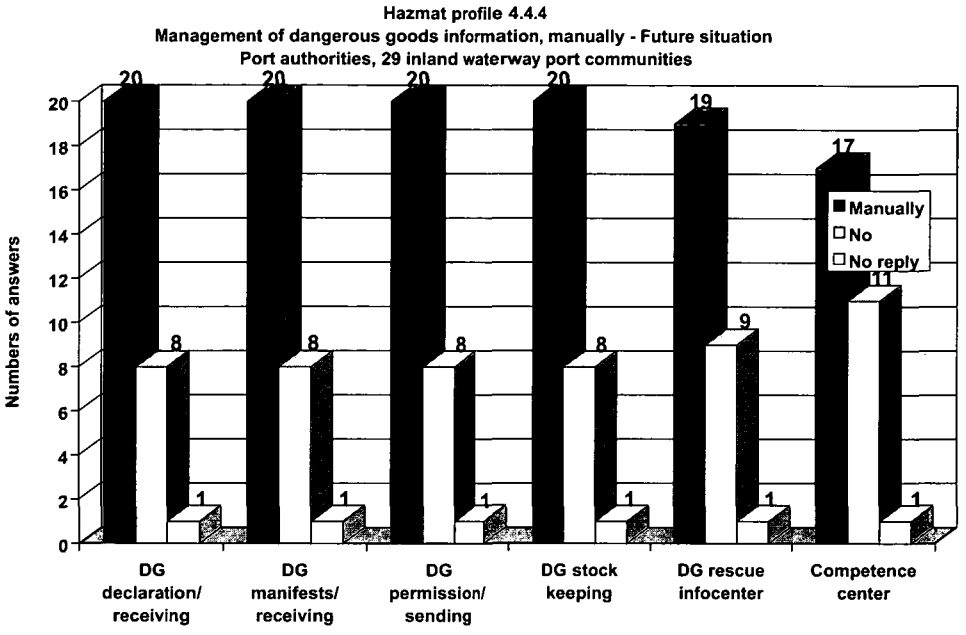


Chart 4.4. 4 - Manual management of the dangerous goods information, Future situation, Port authorities, 29 inland waterway port communities

4.4.2 Dangerous goods information management, software applications

It was found that 32 port authorities in sea and 7 in inland port communities use dangerous goods management software.

The analysis and the findings of the charts below are reported at the end of this section, Hazmat Profile Findings 4.4.5.

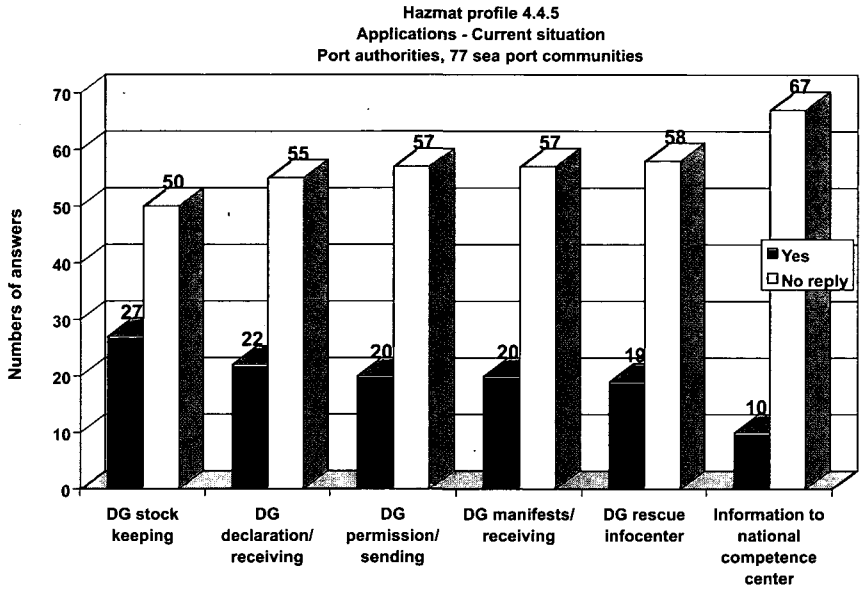


Chart 4.4. 5 - Dangerous goods information management applications, Current situation, Port authorities, 77 sea port communities

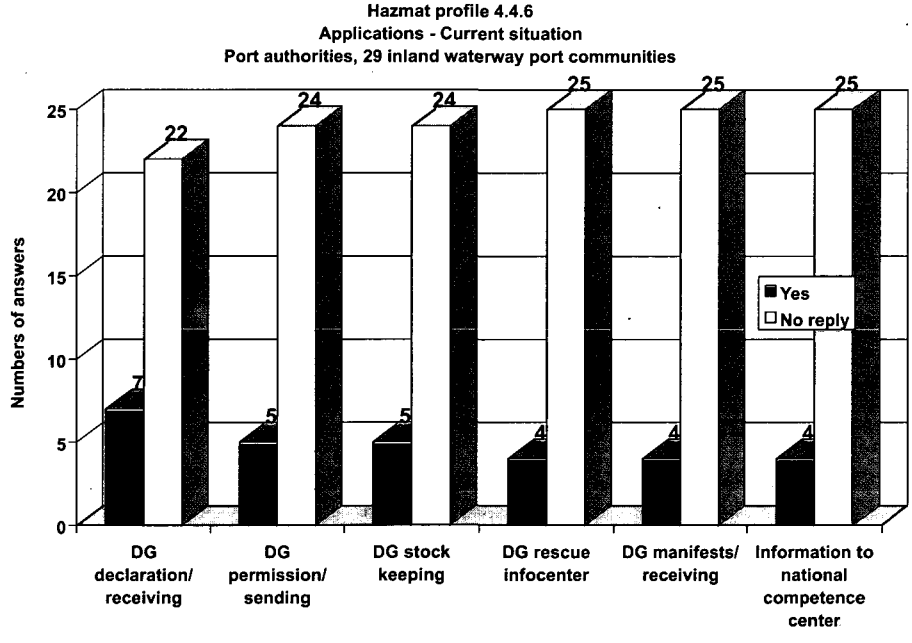


Chart 4.4. 6 - Dangerous goods information management applications, Current situation, Port authorities, 29 inland waterway port communities

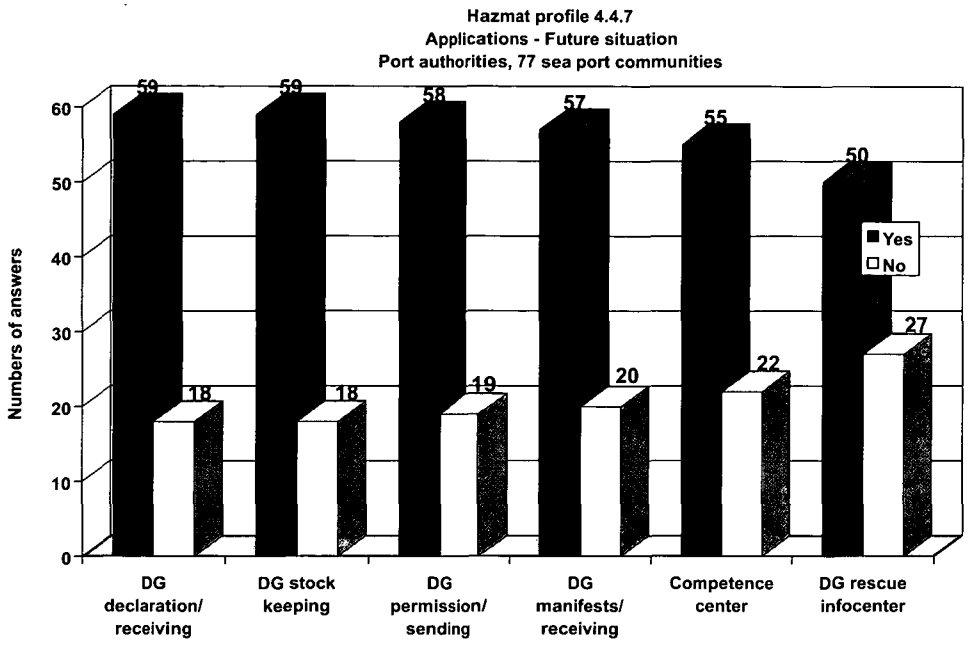


Chart 4.4. 7 - Dangerous goods information management applications, Future situation, Port authorities, 77 sea port communities

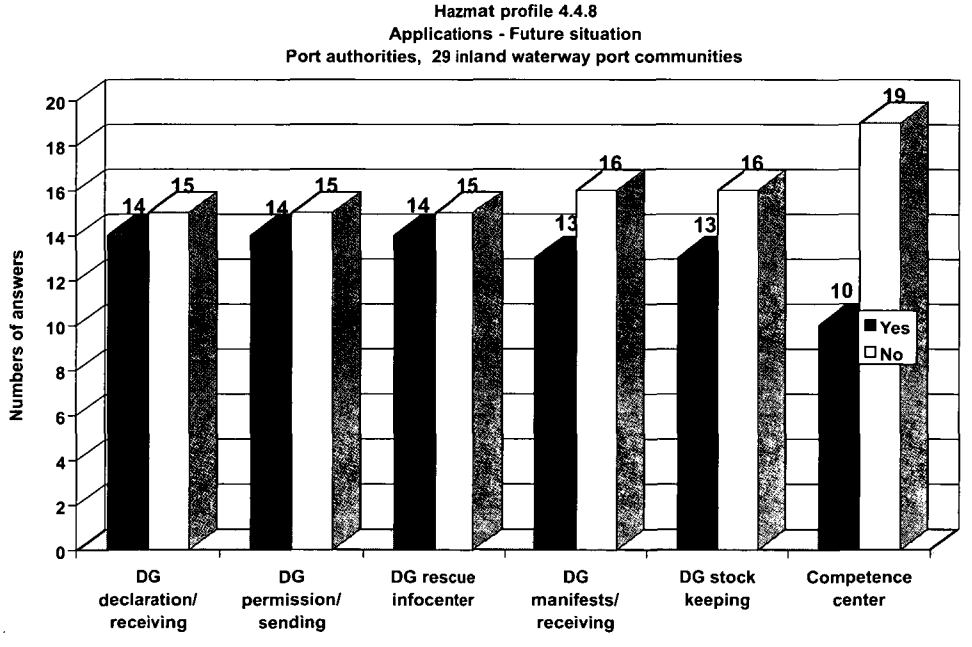


Chart 4.4. 8 - Dangerous goods information management applications, Future situation, Port authorities, 29 inland waterway port communities

4.4.3 Use of data communication networks for dangerous goods information management

The use of different types of data communication networks for dangerous goods management currently used and planned to be used were requested of the port authorities.

The analysis and the findings of the charts below are reported at the end of this section, Hazmat Profile Findings 4.4.5.

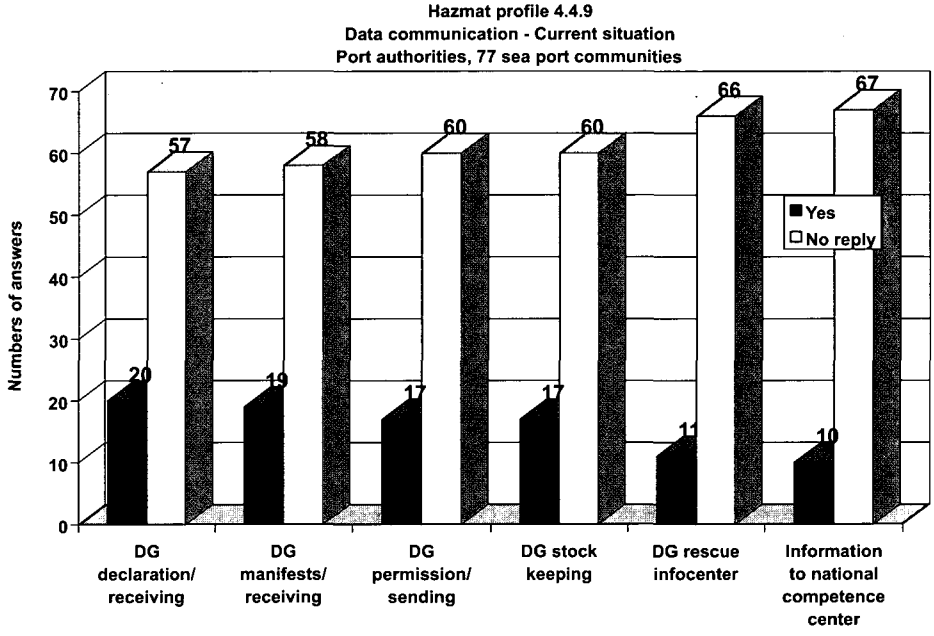


Chart 4.4. 9 - Use of data communication networks for dangerous goods information management, Current situation, Port authorities, 77 sea port communities

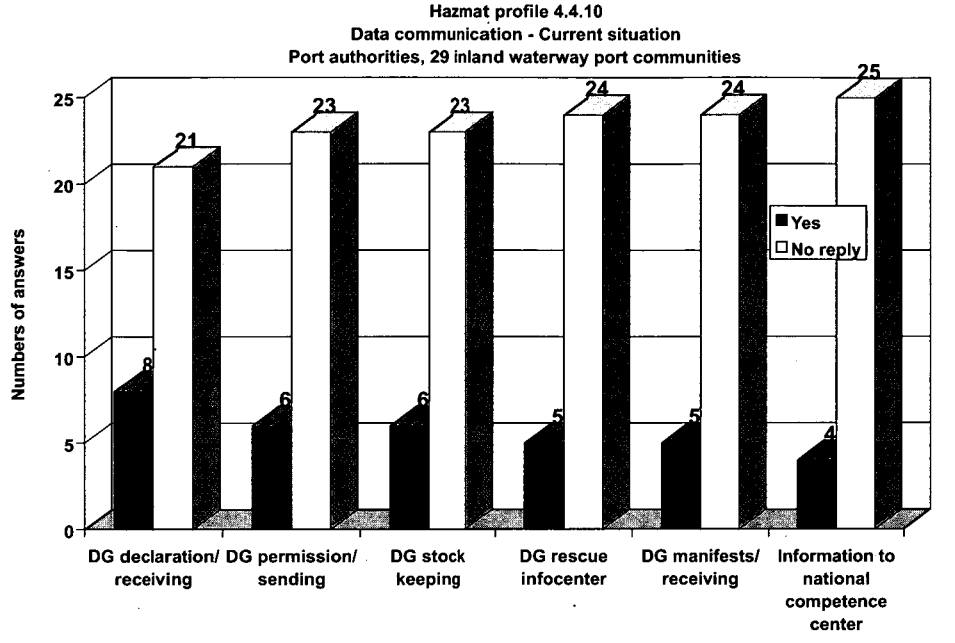


Chart 4.4. 10 - Use of data communication networks for dangerous goods information management, Current situation, Port authorities, 29 inland waterway port communities

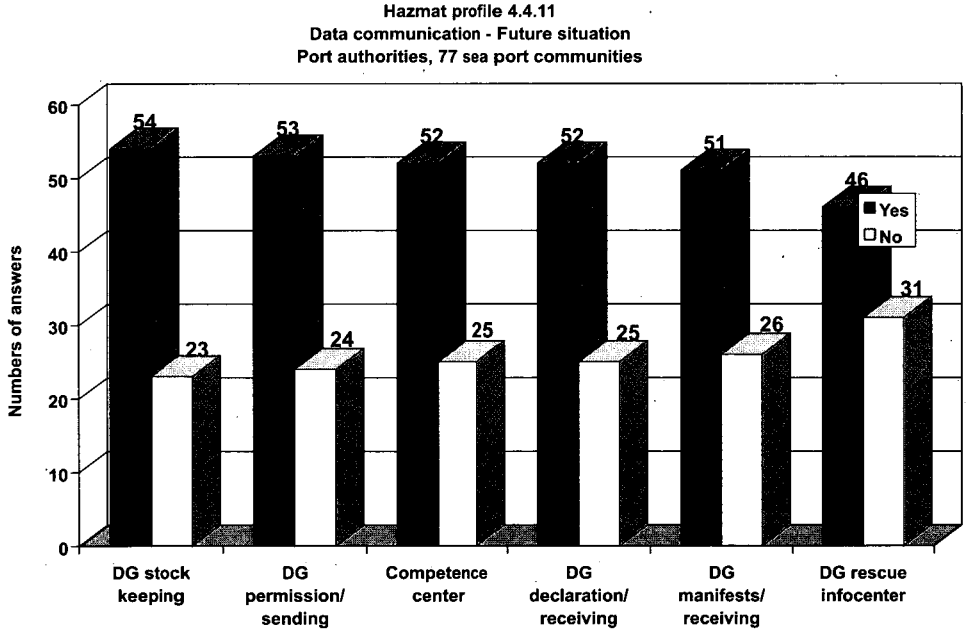


Chart 4.4. 11 - Use of data communication networks for dangerous goods information management, Future situation, Port authorities, 77 sea port communities

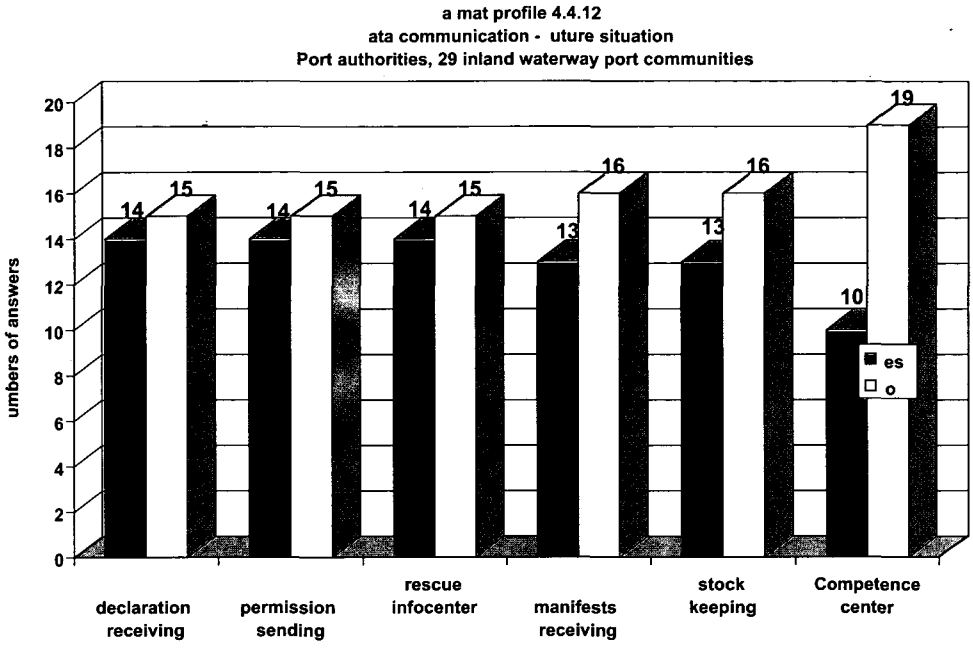


Chart 4.4. 12 - Use of data communication networks for dangerous goods information management, Future situation, Port authorities, 29 inland waterway port communities

4.4.4 Dangerous goods messages

The analysis and the findings of the dangerous goods messages are reported at the end of this section, Hazmat Profile Findings 4.4.5.

4.4.5 Hazmat Profile Findings

1. Management of the dangerous goods information

Current situation

In general 2/3 of the dangerous goods management by the port authorities in sea ports is done manually. The most frequently used applications are the dangerous goods stock keeping (28), dangerous goods rescue infocenter (21) and receiving of the dangerous goods manifest (18).

Almost all port authorities in inland waterway ports do the management of the dangerous goods manually.

The correlation analysis (number of TEUs) shows that the dangerous goods management is done manually mostly in medium and small ports.

Future situation

Most of the port authorities in **sea ports** and half of the port authorities in **inland** waterway ports plan to use software applications for managing the dangerous goods information, but 20% of the port authorities in sea ports plan to continue to do it manually.

2. Dangerous goods information management applications

Current situation

20 port authorities of the **sea port** communities have applications and operating systems for managing the dangerous goods information. The most commonly used applications are the dangerous goods stock keeping (27), receiving (22), sending (20) the dangerous goods declarations, and receiving of the dangerous goods manifest (20) and, dangerous goods rescue infocenter (19).

The correlation analysis (number of TEUs) shows that there are dangerous goods management software applications in large ports more than in small and medium ports.

5 port authorities in **inland** waterway port communities have software applications for dangerous goods management.

Future situation

More than 2/3 of the port authorities in **sea** port and half in **inland** waterway port communities are planning to have software applications for the dangerous goods management.

3. Use of Data communication networks for dangerous goods information management

Current situation

Value added networks are used for dangerous goods information only in some large ports. PTT services (telephone and telefax) are used for most of the data communication.

The correlation analysis (number of TEUs) shows that data communication is used mainly in large ports.

Future situation

2/3 of the port authorities in **sea** and half of the port authorities in **inland** waterway port communities are planning to use data communication systems for dangerous goods information management. Most ports report their willingness to use Internet for dangerous goods information management.

The correlation analysis (number of TEUs) shows that ports in all port categories have plans to use data communication networks for dangerous goods information management. The largest indication is in the medium size ports.

4. Dangerous good messages

The analysis shows that there are both Edifact and non-Edifact messages used for the dangerous goods management. The number of non-Edifact messages is larger than the number of Edifact messages in use.

There are also many national dangerous goods messages which have been used for years between the main port community partners.

The list of the most common Edifact messages used for dangerous goods management is included in the list of Edifact messages reported in Appendix 5. The most frequently used dangerous goods Edifact message is the IFTGDN message.

4.5 Future IT Profile

The main objective of this section is to describe the future IT development of the port community partners. The analysis is based on several questions and the results are reported through the following 3 items:

Item 1 ***Plans for outsourcing***

Plans for outsourcing were requested on two specific items:

- *Plans to outsource the system operations*
- *Plans to outsource the maintenance and software operations*

The outsourcing results are reported both at the summary level for all partners and on the partner level.

The distribution of replies in the plans for outsourcing system operations and the maintenance and software operations is shown in the charts below. The total number of applications which are not outsourced is reported and how many of these system operations of the applications are planned to be outsourced or not outsourced. The number of no replies is also reported.

In this study outsourcing is generally understood that specified system and software operations and their maintenance are operated by an external service company. Some of the replies may also imply insourcing which means that the 'outsourcing' is operated by a company owned by the port community partner itself.

Item 2 ***Main areas of future development***

The following 13 detailed questions have been asked from the port community partners:

- *New hardware*
- *New software*
- *New operating system*
- *Port community software application*
- *Automatic identification*
- *New EDI Management software*
- *Geographic Information Systems (GIS)*
- *Internet/Intranet*
- *Waste management*
- *Satellite communication*
- *Mobile communication*
- *Data communication*
- *Multimedia*

The port community partners replied by giving scores from 0-5. Zero indicated no plans for future development and 5 was planning for future development. For the analysis it was decided that all replies less than 3 indicated 'no future development' and replies more than 3 were expressing 'future development'.

The analysis is represented by one category: planned future development (3, 4 and 5).

The results are shown for all partners at the summary level. The biggest differences for the individual partners are reported.

Item 3 ***Port Community Systems***

The following 4 detailed questions were been asked of the port community partners:

- *Plans to join Port Community System (PCS)*
- *Plans to be a shareholder in a PCS company*
- *Do you prefer bilateral contacts instead of contacts via PCS*
- *Do you prefer both bilateral contacts and contacts via PCS*

The results are reported on the summary level for all partners.

4.5.1 Plans for outsourcing the system operations

The port community partners were asked of their plans to outsource their system operations during the next two years. The replies are analysed only for those applications which were not outsourced.

4.5.1.1 All partners

The results at a summary level are shown on the charts below. The results for the individual port community partners with detailed charts can be seen on the CD-ROM. List of the CD-ROM charts is at the end of this section.

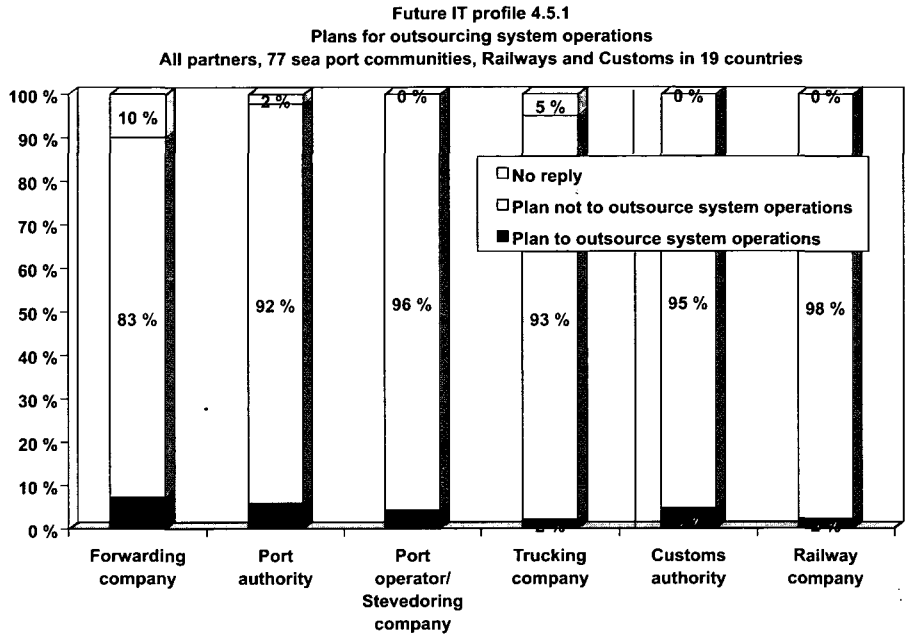


Chart 4.5. 1 - Plans for outsourcing the system operations, All partners, 77 sea port communities, Railways and Customs in 19 countries

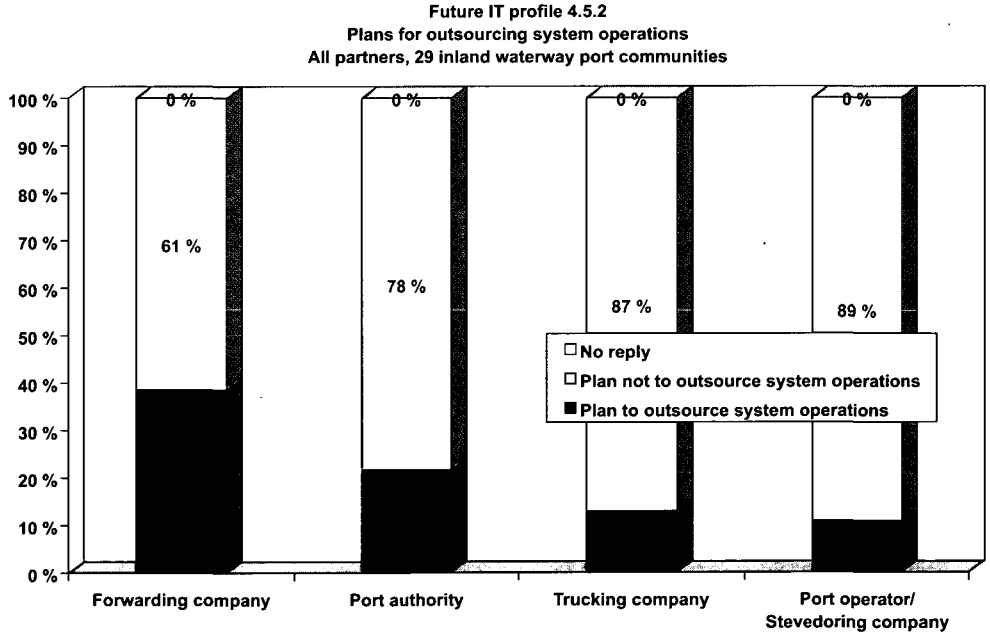


Chart 4.5. 2 - Plans for outsourcing the system operations, All partners, 29 inland waterway port communities

The port community partners are not planning to outsource their system operations to a very large extent.

In **sea** port communities the forwarding companies 7%, port authorities 6%, port operators/stevedoring companies 4% and trucking companies 2% are planning to outsource system operations. 5% of the customs authorities and 2% of the railway companies are planning to outsource their system operations.

In the **inland** waterway port communities the forwarding companies 39%, port authorities 22%, port operators/stevedoring companies 11% and trucking companies 13% are planning to outsource the system operations.

4.5.1.1 Port authorities

Only 6 **sea port** authorities plan to outsource their system operations. The biggest interest is upon the invoicing application. 5 **inland waterway** port authorities are planning to outsource the system operations of the 4 applications (invoicing, statistics, berth allocation and VTS applications). The greatest interest is for the invoicing.

The correlation analysis has been done only for the sea ports and is shown on the CD-ROM. The correlation parameter is: total cargo volume. Only 1% of the port authorities in large ports and 10% in medium and small ports are planning to outsource the system operations.

4.5.1.2 Port operators/stevedoring companies

Only very few port operators/stevedoring companies in **sea** ports were planning to outsource the system operations and 6 port operators/stevedoring companies in the **inland waterway** ports. The system operations of the invoicing and container yard management applications were mostly the object for outsourcing planning both in sea and inland waterway port communities.

The correlation analysis (total cargo volume) was carried out only for the sea ports. 6% of the port operators/stevedoring in large ports are planning to outsource the system operations. Less than 4% of the port operators/stevedoring in medium and small 2% ports are planning to outsource the system operations.

4.5.1.3 Forwarding companies

Three forwarding companies in **sea** ports and five in **inland waterway** ports were planning to outsource the system operations of 6 software applications.

The correlation analysis (total cargo volume) was done only for the sea ports, where 19% of the forwarding companies in large ports are planning to outsource the system operations and 5% in small ports. The forwarding companies in medium ports have no plans to outsource their system operations.

4.5.1.4 Trucking companies, Railway companies, Customs authorities

Only one trucking company (all three applications) in sea ports and two in **inland waterway** ports, one of the 19 railway companies (wagon tracing) and one of the 19 customs authorities (vessel declaration and manifest) were planning to outsource the system operations.

List of charts of individual port community partners:

* Chart 4.5. 3 - Plans for outsourcing the system operations, Port authorities, 77 sea port communities
* Chart 4.5. 4 - Plans for outsourcing the system operations, Port authorities, 29 inland waterway port communities.
* Chart 4.5. 5 - Plans for outsourcing the system operations, Port operators/stevedoring companies, 77 sea port communities
* Chart 4.5. 6 - Plans for outsourcing the system operations, Port operators/stevedoring companies, 29 inland waterway port communities.
* Chart 4.5. 7 - Plans for outsourcing the system operations, Forwarding companies, 77 sea port communities
* Chart 4.5. 8 - Plans for outsourcing the system operations, Forwarding companies, 29 inland waterway port communities
* Chart 4.5. 9 - Plans for outsourcing the system operations, Trucking companies, 77 sea port communities
* Chart 4.5.10 - Plans for outsourcing the system operations, Trucking companies, 29 inland waterway port communities

4.5.2 Plans for outsourcing maintenance and software operations

The port community partners were asked their plans to outsource maintenance and software operations during the next two years. The replies were analysed only for those applications which were not outsourced.

4.5.2.1 All partners

The analysing results at a summary level are shown on the charts below. The results for the individual port community partners with the detailed charts can be seen on the CD-ROM. List of CD-ROM charts is at the end of this section.

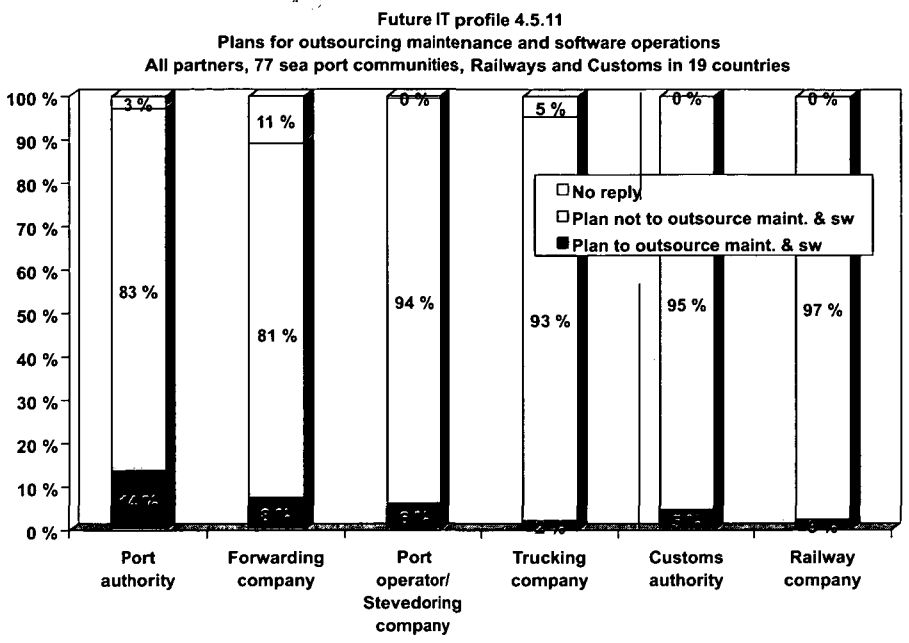


Chart 4.5. 11 - Plans for outsourcing maintenance and software operations, All partners, 77 sea port communities, Railways and Customs in 19 countries

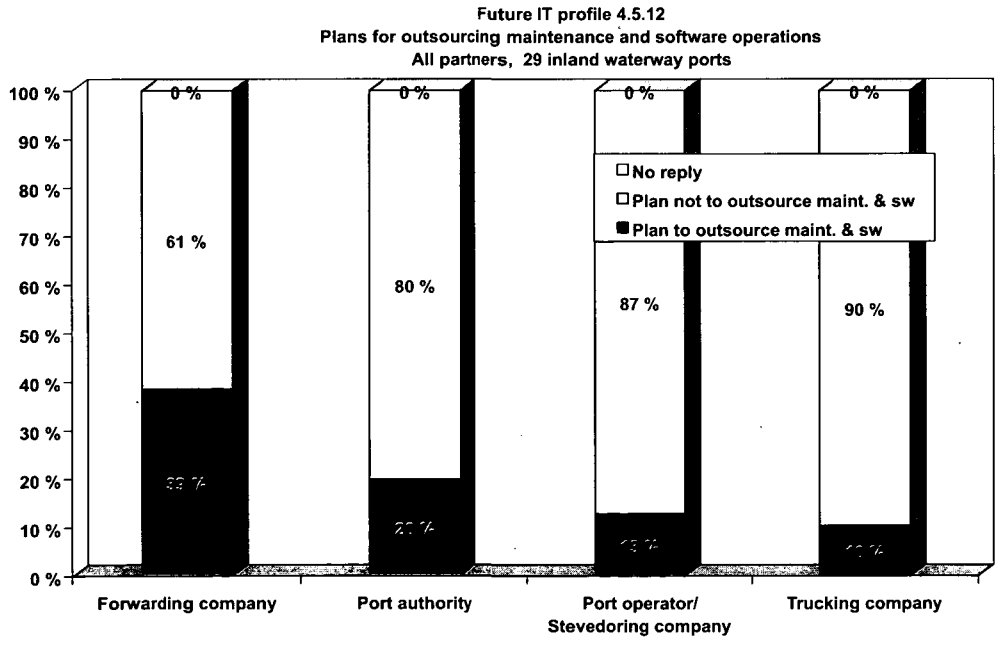


Chart 4.5. 12 - Plans for outsourcing maintenance and software operations, All partners, 29 inland port communities

The port community partners are not planning to outsource the maintenance and software operations to a very large extent. In **sea** port communities the port authorities (14%), forwarding companies (8%), port operators/stevedoring companies (6%) and trucking companies (2%) planned to outsource maintenance and software operations. 5% of the customs authorities and 3% of the railway companies planned to outsource the maintenance and software operations.

In **inland waterway** port communities the forwarding companies (39%), port authorities (20%), trucking companies (13%) and port operators/stevedoring companies (10%) are planning to outsource the maintenance and software operations.

4.5.2.2 Port authorities

Nine **sea** port authorities were planning to outsource the maintenance and software operations of invoicing and statistics applications and one was planning to outsource the maintenance and software operations of the dangerous goods management applications. Only two sea port authorities were planning to outsource the maintenance and software operations of the berth allocation and VTS applications. Five **inland waterway** port authorities were planning to outsource the maintenance and software operations of the invoicing, statistics, dangerous goods management and VTS applications.

A more detailed correlation analysis was done only for the sea ports. Nine percent of the port authorities in large ports (total tons) are planning to outsource the maintenance and software operations, 18% in medium and 26% in small ports.

4.5.2.3 Port operators/stevedoring companies

Very few port operators/stevedoring companies in **sea ports** have plans to outsource the maintenance and software operations of the stated applications. The highest indication for outsourcing the maintenance and software operations (8) was for the invoicing application which was also highest indication in the **inland waterway** port communities.

The correlation analysis was done only for the sea ports. It was noted 10% of the port operators/stevedoring companies in large ports (total tons) are planning to outsource the maintenance and software operations, 5% in medium ports and 3% in small ports.

4.5.2.4 Forwarding companies

Three forwarding companies in **sea ports** and five in **inland waterway** ports were planning to outsource the maintenance and software operations of 6 applications.

The correlation analysis (only for the sea ports) showed 19% of the forwarding companies in large ports (total tons) were planning to outsource the maintenance and software operations and 5% in small ports. None of the forwarding companies in medium ports are planning to outsource the maintenance and software operations.

4.5.2.5 Trucking companies, Railway companies, Customs authorities

One trucking company (3 applications) in the **sea port** communities and two in the **inland waterway** port communities, one of the 19 railway companies (wagon tracing) and one of the 19 customs authorities (vessel declaration and manifest applications) were planning to outsource the maintenance and software operations.

List of charts on the CD-ROM of the individual port community partners:

* Chart 4.5. 13 - Plans for outsourcing the maintenance and software operations, Port authorities, 77 sea port communities
* Chart 4.5. 14 - Plans for outsourcing the maintenance and software operations, Port authorities, 29 inland waterway port communities
* Chart 4.5.15 - Plans for outsourcing the maintenance and software operations, Port operators/stevedoring companies, 77 sea port communities
* Chart 4.5.16 - Plans for outsourcing the maintenance and software operations, Port operators/stevedoring companies, 29 inland waterway port communities
* Chart 4.5. 17 - Plans for outsourcing the maintenance and software operations, Forwarding companies, 77 sea port communities
* Chart 4.5. 18 - Plans for outsourcing the maintenance and software operations, Forwarding companies, 29 inland waterway port communities
* Chart 4.5. 19 - Plans for outsourcing the maintenance and software operations, Trucking companies, 77 sea port communities
* Chart 4.5. 20 - Plans for outsourcing the maintenance and software operations, Trucking companies, 29 inland waterway port communities
* Chart 4.5. 21 - Plans for outsourcing the system operations, Railway companies in 19 countries
* Chart 4.5. 22 - Plans for outsourcing the maintenance and software operations, Railway companies in 19 countries
* Chart 4.5. 23 - Plans for outsourcing the system operations, Customs authorities in 19 countries
* Chart 4.5. 24 - Plans for outsourcing the maintenance and software operations, Customs authorities in 19 countries

4.5.3 Main areas for future development

4.5.3.1 All Partners

The main areas for future IT development for the port community partners are shown in the charts below.

The results are at a summary level for all partners. The specific deviations for the individual partners are reported in the text.

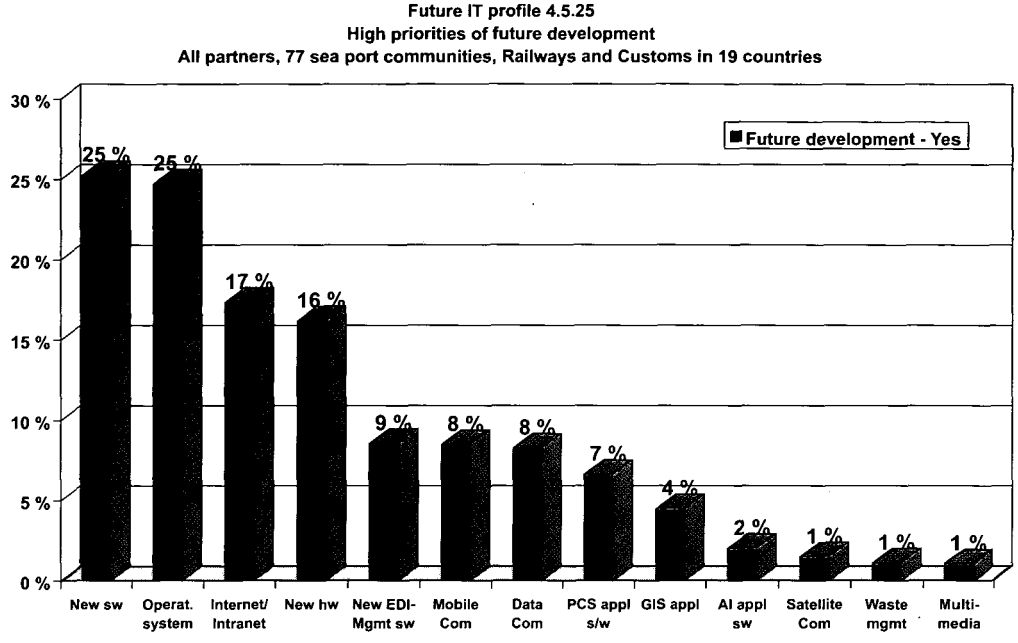


Chart 4.5. 25 - High priorities of future IT development, All partners, 77 sea port communities, Railways and Customs in 19 countries

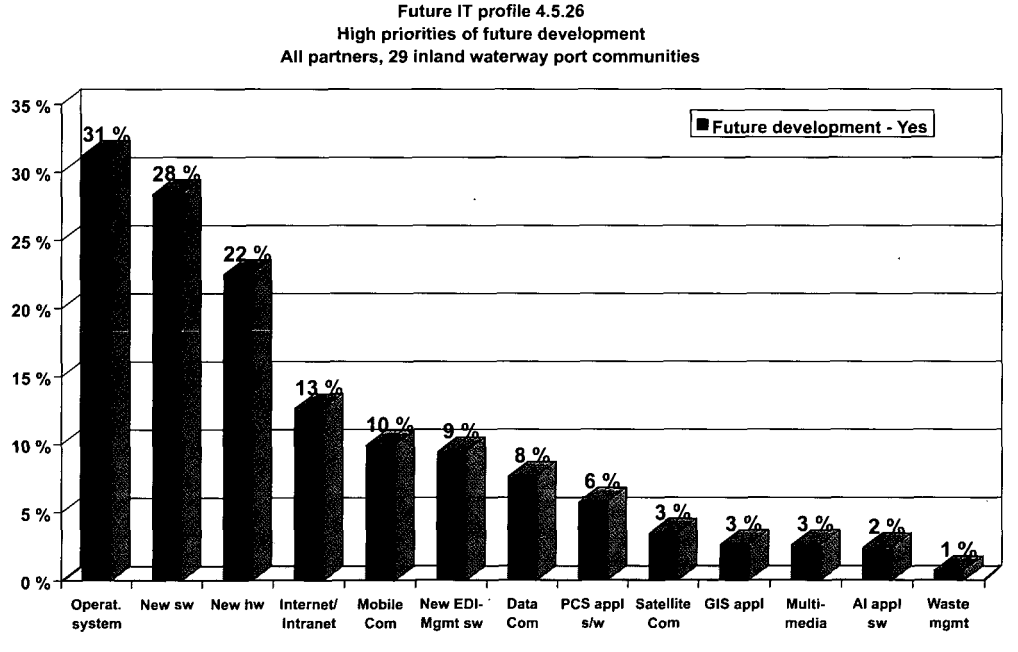


Chart 4.5. 26 - High priorities for future IT development, All partners, 29 inland waterway port communities

All the **sea** port community partners of the analysis have future investment plans for IT development in many areas. The most important are - new software, new operating system, Internet/Intranet, new hardware and new EDI Management software (9%).

Five most important development areas for all port community partners in **inland** waterway ports are: new operating system, new software, new hardware, Internet/Intranet, and mobile communication.

4.5.3.2 Port authorities

Five most important development areas for the port authorities in **sea** ports are: new software (30%), new operating system (29%), Internet/Intranet (18%), new hardware (18%) and data communication software (13%). In **inland** waterway port communities the areas are: new operating system (29%), new software (25%), new hardware (17%), Internet/Intranet (12%), and mobile communication (8%).

The detailed charts for the main areas of future development can be seen on the CD-ROM as:

* Chart 4.5. 27 - Main areas for future development, Port authorities, 77 sea port communities
* Chart 4.5. 28 - Main areas for future development, Port authorities, 29 inland waterway port communities

4.5.3.3 Port operators/stevedoring companies

Five most important development areas for the port operators/stevedoring companies in **sea** ports are: Internet/Intranet (24%), new software (23%), new operating system (20%), satellite communication (18%) and automatic identification software (14%).
In **inland** waterway ports they are: new software (32%), new operating system (26%), new hardware (25%), mobile communication (19%) and Internet/Intranet (18%).

The detailed charts for main areas for future development can be seen on the CD-ROM as:

* Chart 4.5. 29 - Main areas for future development, Port operators/stevedoring companies, 77 sea port communities
* Chart 4.5. 30 - Main areas for future development, Port operators/stevedoring companies, 29 inland waterway port communities

4.5.3.4 Forwarding companies

The most important development areas for the forwarding companies in sea ports are: Internet/Intranet (32%), new software (31%), new operating system (22%), satellite communication (22%) and geographic information software (GIS) (14%). In inland waterway ports they are: new operating system (39%), new software (31%), new hardware (26%), new EDI management software (18%) and Internet/Intranet (12%).

The detailed charts for main areas for future development can be seen on the CD-ROM as:

* Chart 4.5. 31 - Main areas for future development, Forwarding companies, 77 sea port communities
* Chart 4.5. 32 - Main areas for future development, Forwarding companies, 29 inland waterway port communities

4.5.3.5 Trucking companies

Five most important development areas for the trucking companies in **sea** ports are: new software (20%), Internet/Intranet (20%), satellite communication (11%), new operating system (6%), and automatic identification software (6%). In the **inland** waterway ports: new operating system (33%), new software (26%), new hardware (15%), new EDI management software (10%) and Internet/Intranet (7).

The detailed charts for main areas for future development can be seen on the CD-ROM as:

* Chart 4.5. 33 - Main areas for future development, Trucking companies, 77 sea port communities
* Chart 4.5. 34 - Main areas for future development, Trucking companies, 29 inland waterway port communities

4.5.3.6 Shipping agents

The most important development areas for the shipping agents in **sea** ports are: new software (18%), Internet/Intranet (17%), new operating system (16%), new EDI management software (10%) and satellite communication (8%). In the **inland** waterway ports they are: new operating system (32%), new software (26%), new hardware (25%), new EDI management software (19%) and Internet/Intranet (18%).

The detailed charts for main areas for future development can be seen on the CD-ROM as:

* Chart 4.5. 35 - Main areas for future development, Shipping agents, 77 sea port communities
* Chart 4.5. 36 - Main areas for future development, Shipping agents, 29 inland waterway port communities

4.5.3.7 Railway companies

Five most important development areas for the railway companies in 19 countries are: new software (31%), Internet/Intranet (28%), new operating system (16%), new EDI management software (14%) and satellite communication (13%).

The detailed charts for main areas for future development can be seen on the CD-ROM as:

* Chart 4.5. 37 - Main areas for future development, Railway companies in 19 countries

4.5.3.8 Customs authorities

Five most important development areas for the customs authorities in 19 countries are: new software (33%), new operating system (27%), Internet/Intranet (22%), new hardware (16%) and data communication software (14%).

The detailed charts for main areas for future development can be seen on the CD-ROM as:

* Chart 4.5. 38 - Main areas for future development, Customs authorities in 19 countries

4.5.4 Port Community Systems

The port community partners were asked of their interest to join a port community systems. The results are shown in the charts below:

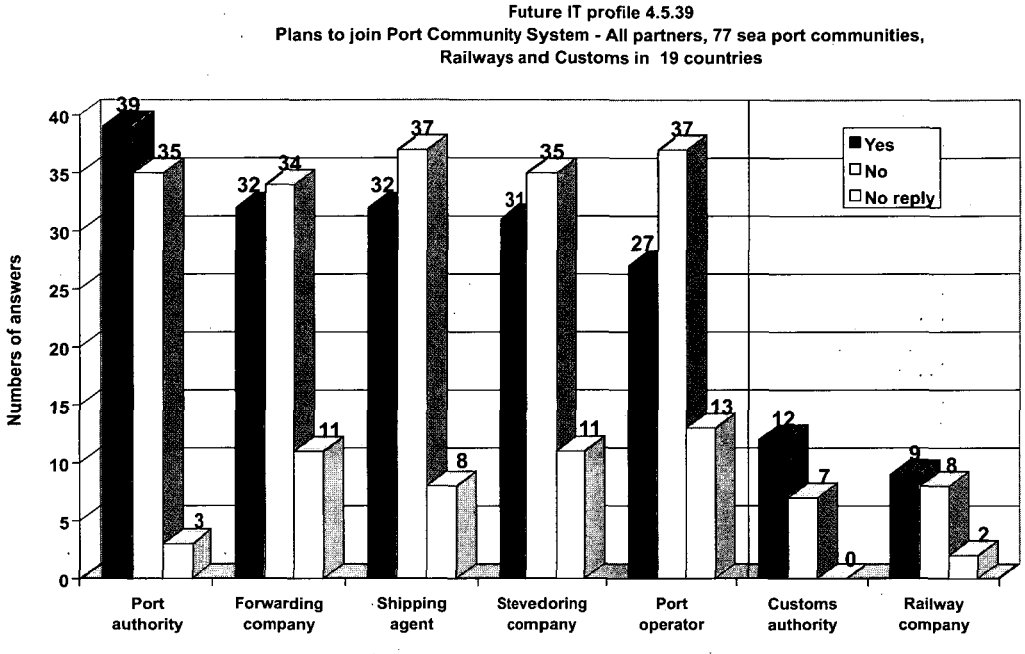


Chart 4.5. 39 - Plans to join Port Community Systems, All partners, 77 sea port communities, Railways and Customs in 19 countries

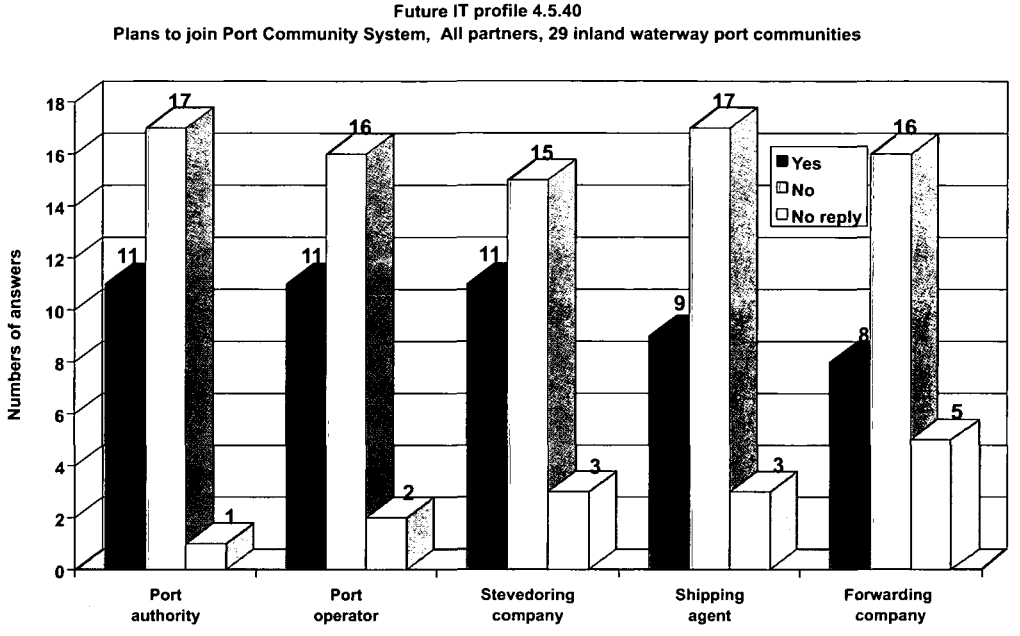


Chart 4.5. 40 - Plans to join Port Community Systems, All partners, 29 inland waterway port communities

The detailed charts for PCS questions can be seen on the CD-ROM as:

* Chart 4.5. 41 - Plans to be a shareholder in PCS company, 77 sea port communities
* Chart 4.5. 42 - Plans to be a shareholder in PCS company, 29 inland waterway port communities
* Chart 4.5. 43 - Bilateral contacts instead of PCS, 77 sea port communities
* Chart 4.5. 44 - Bilateral contacts instead of PCS, 29 inland waterway port communities
* Chart 4.5. 45 - Mixture of bilateral and contacts via PCS, 77 sea port communities
* Chart 4.5. 46 - Mixture of bilateral and contacts via PCS, 29 inland waterway port communities

4.5.5 Main areas for future development - regional distribution

The port community partners were asked their main areas for future development. The results have been analysed also on regional level. There are no common conclusions for the regional distribution for the asked main areas for future development. Some of the main areas for future development are mentioned below.

The Baltic port communities have reported that they will be developing waste management software applications. Mobile communication applications will be developed in the Mediterranean port communities. The Atlantic port communities have reported that there is not a big interest to develop port community systems. The Baltic port communities have reported a very low interest to develop multimedia applications.

The detailed chart for the main areas for future development, regional distribution can be seen on the CD-ROM as:

* Chart 4.5. 47 - Main areas for future development, Regional distribution, All partners, 106 port communities

4.5.6 Future IT Profile Findings

1. Plans for outsourcing

It can be seen from the number of answers (almost equal) that plans for outsourcing of the system and the maintenance and software operations go hand in hand. Thus, in the **sea** port communities the forwarding companies (7%), port authorities (6%), port operators/stevedoring companies (4%) and trucking companies (2%) are planning to outsource the system and the maintenance and software operations. 5% of the customs authorities and 2% of the railway companies are planning to outsource the system and the maintenance and software operations.

In **inland waterway** port communities the forwarding companies (39%), port authorities (22%), port operators/stevedoring companies (11%) and trucking companies (13%) are planning to outsource the system, maintenance and software operations.

Six sea port authorities are planning to outsource the system operations, mainly the invoicing application. Nine were planning to outsource the maintenance and software operations of invoicing, seven statistics, one dangerous goods management, two berth allocation and one VTS applications.

In **inland waterway** ports five port authorities are planning to outsource the system operations of invoicing, two statistics and two berth allocation applications. Five were also planning to outsource the maintenance and software operations of five specified applications.

Only 6 port operators/stevedoring companies **in sea ports** and **inland waterway** ports were planning to outsource the system operations. 8 port operators/stevedoring companies in sea ports and 5 in inland waterway ports were planning to outsource the maintenance and software operations of the 7 applications. The highest indication for outsourcing the maintenance and software operations was for the invoicing application (8). Three forwarding companies in **sea ports** and five in **inland waterway** ports were planning to outsource the system operations and the maintenance and software operations of the 6 applications.

One trucking company in **sea ports** and two in **inland waterway** ports were planning to outsource the system and the maintenance and software operations of the 3 applications.

One railway company had plans to outsource the system operations and maintenance and software operations of wagon tracing application.

One customs authority had plans to outsource the system operations and maintenance and software operations of vessel declaration and manifest applications.

2. Main areas of future development

The 13 development areas that were questioned received almost the same priorities by all port community partners, three most important being - new software, new operating system and new hardware. This was expressed by all partners.

3. Port Community Systems

Plans to join Port Community Systems

39 port authorities in sea port communities want to join PCSs and 35 answered that they do not want to join PCSs. The other port community partners stated more "no plans to join PCS" than "yes plans to join PCSs". Both customs authorities and railway companies wanted more to join than not to join a PCS.

The majority of all partners in inland waterway port communities replied they do not want to join PCS.

Plans to be a shareholder in PCS company

Only some port authorities in sea ports have declared their willingness to be a shareholder in a PCS company (24 yes answers and 23 no answers). The majority of the other port community partners both in sea and inland waterway ports answered that they do not plan to be a shareholder of a PCS company. In inland waterway ports the port operators/stevedoring companies answered - 7 yes and 7 no - to plans to be an shareholder of a PCS company.

Mixture of bilateral contacts and/or contact via PCS

All port community partners both in sea and inland waterway ports reported that they prefer having both bilateral and contacts via PCS to their trading partners. All partners answered that they too prefer bilateral contacts instead of contacts only via PCS.

Chapter 5: European Union Initiatives Related to COST 330

This chapter reviews the main EU/Commission initiatives associated with telematics applications for maritime and inland waterway transport.

5.1 The Fourth Framework Programme of Community RTD&D

The Fourth Framework Programme (IV FP) covers all the research and technological development activities due to be carried out by the Community in the period 1994-98.

The *Transport Programme* (continuation of the previous EURET Programme and APAS) specifically concentrates on achieving the objectives of the Common Transport Policy. Research will, it is hoped, contribute to the development, integration and management of a more efficient, safer and environmentally friendly transport system which will assure the sustainable mobility of goods and persons.

Within the IV FP, another three programmes specifically deal with Information and Communication Technologies:

- the *Information Technologies Programme* (or ESPRIT IV as it is known) focuses on improving computer performance;
- the *Advance Communications Technologies and Services Programme* (or ACTS) focuses on improving communication; and
- the *Telematics Applications Programme* (or TAP) focuses on applications combining information and communication technologies to meet specific user needs, in the transport sector among others.

Aside from the above-mentioned programmes, and COST itself, there are other programmes which may consider telematics applications in the waterborne transport sector, for example:

- the *Industrial Technology Programme* (BRITE-EURAM III) and
- the *Specific research, technological development and demonstration programme in the field of co-operation with third countries and international organisations* (INCO), namely with the countries of Central and Eastern Europe and the New Independent States (INCO-COPERNICUS, previously PECO-COPERNICUS).

5.1.1 The Transport Programme

The overall objective of the Transport Programme (with a budget of 240 MECU) is to contribute to the optimisation of transport systems in the Community by means of prenormative and prelegislative research. This is going to be achieved by a co-ordinated dual approach, focusing on a strategy which will, firstly, provide the basis for a Trans-European multimodal network through research into the general functioning of the transport system. And, secondly, it will support specific research concerning the optimisation of the individual networks. Research activities in both areas cover general policy concerns (competitiveness, safety, energy and environment) and at different aggregation levels (European, national, regional, urban).

Projects concerning telematics and waterborne transport may be found in three areas of the programme (of the seven in which are organised almost all the 250 projects selected at present): these are *waterborne transport*, *integrated transport chains* and *strategic research.*

5.1.2 The Telematics Applications Programme (TAP) for Transport

The overall goals of the research of TAP for Transport 105 projects (with a budget of 220 MECU) are to improve the efficiency and quality of transport services so yielding greater safety with reduced environmental impact. Emphasis is being placed on research into telematics tools common to several transport modes, the need to integrate services for both freight and people, and the development of interoperability to support the emergence of multimodal transport services. Achievement of these objectives is underpinned through the movement to standards and the development of common functional specifications, practices, and guidelines.

Issues taken into consideration include *interconnectivity* (data sharing), *interoperability* (process sharing) of information systems, *standardisation* and consideration of the global environment, *integrated applications* of commercial and public interest to attract investors, and *data security*, *integrity* and *privacy* to facilitate the widespread use of the new systems and services.

Two of the main areas of the Programme concern telematics applications for *freight intermodality* and *waterborne transport.*

Telematics for waterborne applications provide solutions enabling the automatic collation and dissemination of information for port systems and ships ashore or within inland waterways. Furthermore, the tools and protocols for the acquisition and exchange of information through surveillance, monitoring and communication contribute to the enhancement of safety and efficiency of transport. The application areas are: Integrated Vessel Traffic Management and Information Systems (VTMIS); sea environment and interactive data on-line networks, ship integrated decision support systems; advanced maritime navigation services based on ECDIS (Electronic Chart Display & Information System); optimal planning of container transport including co-operative management of resources, automatic identification, tracking, tracing and monitoring of equipment, vehicles, drivers and cargo, not only at the port area but in the intermodal logistic chain.

Issues addressing freight intermodality are: common data, data exchange needs for application tools, and the initiative to harmonise system architectures between the waterborne and freight intermodality sectors. Emphasis is placed in improving the role of sea shipping and inland waterways transport, and its integration in the intermodal transport chain.

5.2 The MARIS initiative

MARIS, the *Maritime Information Society*, is a G-7 initiative, part of a broader Information Society project which is seeking to promote the development of Information Technologies at a global level. The goal of the MARIS initiative is to demonstrate potential benefits of information technologies and telematics applications for a broad range of maritime activities, among others, in the fields of transport, safety, shipbuilding and fisheries.

The MARIS project, led by the European Commission and Canada, is currently structured in four sub-projects: *MARTRANS* (efficiency in logistics and multimodal transportation), *SAFEMAR* (environmental protection), *MARSOURCE* (preservation of ocean resources) and *MARVEL* (intelligent shipbuilding systems). *Maritime Education* and *Maritime Tourism* are under consideration to become MARIS sub-domains.

MARTRANS aims at establishing a real-time information system for cargoes and vessels in order to enhance logistics efficiency of ports, ship-owners, operators, consignors and consignees. The concrete aims of the projects are: interconnectivity of existing Port Community Systems; automation of non-automated ports; and tracing and tracking.

5.3 Other initiatives

5.3.1 Research Task Forces

The research task forces are joint initiatives by Commissioners responsible for research, education and training, telecommunications and information technologies, and transport. There are currently seven task forces.

The Task Force on *Transport Intermodality* seeks, as a first step, to add value through the improved co-ordination of existing and planned research activities. As a second step, it highlights gaps and promotes high profile demonstration projects which will provide an essential "critical mass" at the European level. The themes deserving high priority include information technology for transport management purposes which will improve service quality to the users.

The purpose of the Task Force on *Maritime Systems of the Future* is to contribute to the research and demonstration efforts which are associated with the maritime systems of the future. This Task Force also co-ordinates the G-7 MARIS project.

5.3.2 Other domains

The European Commission (DG Transport) also promotes specific additional initiatives which may partly concern telematics applications in waterborne transport, e.g. that related to the *Pilot Actions for Combined Transport* (PACT) programme. Some initiatives concern specifically EDI within port communities.

In order to accomplish the *European Directive HAZMAT* related to the transport of hazardous and pollutant goods by sea, the European Commission has also promoted a set of projects to interconnect several National Centres for the Notification of Hazardous Goods in some European countries (Belgium, Finland, France, Germany, the Netherlands and Spain).

Finally, in order to apply the European Directive 95/64/EC the European Organisation *Eurostat* has developed a pilot plan during 1995 and 1996 for the transmission of maritime/port related statistical data from France, Germany, Ireland, the Netherlands, Spain and the United Kingdom to a database held in common by Eurostat.

5.4 Projects with links to COST 330

The Fourth Framework projects related to telematics applications in waterborne transport are:

IV FP Programme	Acronym	Title
TRANSPORT	BOPCOM	Baltic Open Port Communication
	COMFORTABLE	To COMFORT VTS-Management
	EUROBORDER	The port as a hub in the intermodal chain
	HINT	Human implications of new technologies
	IMPULSE	Interoperable modular pilot plants underlying logistic system in Europe
	INCARNATION	Efficient inland navigation information system
	INFOLOG	Intermodal Information Link for Improved Logistic
	INTRARTIP	Intermodal Transport Real-Time Information Platform
	INTRA-SEAS	Safety & economic assessment integrated management of multimodal traffic in ports
	IPSI	Improved Port/Ship Interface
	MARNET	The Marnet Network, proposal for an interregional maritime information network
	OCTOPUS	Towards distributed hierarchic workflow methods for pro-active tracing of cargo
	OSIRIS	Optimised system for an innovative rail integrated seaport connection
	PISCES	Pipeline intermodal system to support control, expedition and scheduling.
	PROSIT	Promotion of Short Sea Shipping and Inland Waterway Transports by Use of Modern Telematics
	SCANDINET	Promoting integrated transport in peripheral areas of the Union. Case Scandinavia
	SPHERE	Small/medium sized ports with harmonised, effective re-engineered processes
	SSS-CA	Short sea shipping concerted action
	VASME	Value added services for maritime environment

IV FP Programme	Acronym	Title
TELEMATICS	CAPITALS	Integrated Telematics Applications on Large Scale
	COREM	Co-operative Resource Management for the Transport of Unit Loads
	ECHO	European Chart Hub Operations
	ENTERPRICE	Enhanced Network for Traffic Services and Information Provided by Regional Information Centres in Europe
	HAGIS	Hazardous goods information system
	INTERPORT	Integrating Water Transport in the Logistics Chain
	MAGNET	Multi-modal Approach for GNSS-1 in European Transport
	MULTITRACK	Tracking, Tracing and Monitoring of Goods in an Inter-modal and Open Environment
	POSEIDON	European Project on Integrated VTS Sea Environment and Interactive Data On-line Network
	SHIDESS	Ship Integrated Decision Support System
	SURFF	Sustainable Urban and Regional Freight Flows
	TILEMATT	Testing & Implementing Links in Europe for Multimodal Applications of Transport Telematics
	TRACAR	Traffic & Cargo Supervision System
	TRACAR Extension	Traffic & Cargo Supervision System Extension
	WELCOM	West-East Logistics Corridor for Multimodal transport
	WISDOM	Waterborne Information System Distributed to Other Modes
	VTMIS-Net	Vessel Traffic Management and Information System - NETwork
ACTS	EIES	European Information Exchange Service for the Communication between Harbour Areas
INCO	COMSINE II	Communications Infrastructure for Inland Navigation in Europe II
PECO-COPERNICUS	AMCAI	Application of Modern Concepts in the Automated Information Management in the Harbours by Using Advanced IT-Solutions
	COMSINE	Communications Infrastructure for Inland Navigation in Europe
	INVITE	Inland Navigation Telematics

The projects at European level that currently carry the MARIS label under MARTRANS are shown below. These projects are financed through different programmes from the European Commission.

Title	Short description
MARTRANS I	Design of a modular and scaleable EDI-system and the development of a demonstrator; design of a virtual intermodal transport chain and the development of a demonstrator; development of a multimedia presentation.
COST 330	Teleinformatics links between ports and their partners.
LOGIN Logistics Information Network	User requirements for an Intranet for logistics management and intermodal transport including a real life demonstrator (post trade activities only).
INTRARTIP	Development of a pre-trade Internet system architecture to match intermodal transport supply and demand, including demonstrators.
MARNET	Proposal for an inter-regional maritime information network.

Useful Websites for additional information are:

- 4th FP http://www.cordis.lu/
- Transport http://www.cordis.lu/transport/home.html
- Telematics http://www.echo.lu/telematics/home.html
- International co-operation http://www.europa.eu.int/comm/dg12/intco1.html
- Maris http://www.maris.int/start.htm

The list of projects was updated at the beginning of 1998 and does not intend to be exhaustive. Short descriptive fiches of the projects with strong links to COST 330 are presented in **Appendix 4**.

5.5 Conclusion

A close look to these projects, according to COST 330 results shows that R&D projects and initiatives in the EU Programs are some steps ahead from the current average users' and companies' basic needs.

A reason can be found in the low participation of SMEs in the European research, especially in the definition of their needs.

The gap between the existing and future technological solutions and tools and the solutions already in use, show some problems in the capacity of users and companies to follow the research developments.

It is also obvious that the research and development is not enough for the implementation of the new tools in the current European companies, mainly SMEs.

Chapter 6: Status and Organisation of Ports of COST 330 Action

6.1 Introduction

This chapter is based upon two elements:

- Contributions from Members of the COST 330 Action upon their port's policies.
- Extracts from ESPO (1996) "Report of an inquiry into the current situation in the major Community Sea ports".

The main objective is to highlight the similarities and the diversity in the status and in the organisation of ports between the participating countries in the COST 330 Action, and to note future trends.

6.2 General comments on the structure and governance of the ports

The different forms of organisation used to manage ports are due in the first instance to historical development and are a consequence of varying philosophies about the role of the ports prevalent in Europe. In many North European ports, the Hanseatic tradition prevails: the port exists to serve the community in which it is located and its prosperity will attract trade and industry to the location. The port is seen as an essential element in the community.

In other European countries the national strategic importance of the port is reflected in the strong Government control over the ports management and investment. This may take the form of state intervention even where the port is nominally autonomous.

Lastly, the growing importance of the private sector has led governments in some countries to adopt a market-based approach, which regards the port simply as another commercial organisation whose aim is to operate at a profit. In the UK this has been particularly marked, leaving only a few trust ports to be operated in the interests of their local community or run by municipal authorities.

Private sector involvement in port business however has increased throughout Europe. Many ports, even when run by public sector bodies, act in the role of landlords, leasing out their land, and in some cases their facilities and equipment, to operators who provide services such as stevedoring and warehousing. Many traditional port activities have moved in this direction. The risks thus inherent in the fluctuations of port traffic are transferred to the private sector rather than being shouldered by the public authority.

Even within each country there are often differences between port organisations depending upon the historic development of the industry in the regions. In general, the larger the port the more critical is its role in the country's economy, and thus the Government's interest is greater in its structure.

In some countries Central Government ("The State") plays a direct management role. Or through the appointment of an Authority or Board it may indirectly (but closely) manage the port enterprise. It may also do it through the exercise of economic or legal constraints, or by

regulating the port authority's discharge of its responsibilities as a landlord. In Spain the Puertos del Estado is a Government owned holding company. In Greece the ports organisations are closely linked to Central Government. In Portugal, Central Government has ownership or exercises ultimate control over all forms of port activity. In France the six principal ports are autonomous, but many smaller ports (called non-autonomous) have close links with their local authorities.

Many ports are owned or managed not by the central Government but by the Municipal or territorial authority. The ports may be run as a distinct and separate body on behalf of the municipality or it may be an integral part of the municipal administration, having no legal or economic existence of its own: German ports are a prime example of this latter category. In Belgium some of the ports are run as distinct bodies linked with municipal organisations. In Denmark the smaller municipal ports often share their management posts with the municipality; while larger ports have independent administrations. Port activity in Sweden is a matter for each local authority to organise - structures differ from place to place. In Finland major ports are owned by municipalities although they may delegate the task of organisation and running to local managers.

Privately owned companies as port owners are a feature in some countries - notably in the UK where privatisation has been pursued since the early 1980's and where in fact few ports were ever under national State governance. Some UK ports however remain as trusts (essentially run for the 'local good' and not set-up primarily to make a profit per see); or they are owned by the municipality. Generally private ownership is characteristically associated with ports set-up specifically to handle one or two traffics types (other than in the UK), or to provide marina or other leisure facilities.

6.3 Status and organisation of ports in Europe

As may be imagined given the wide variations in the port's governance there is no uniform organisational pattern for Port Communities in Europe. In Appendix 6 we present an overview of the status and organisation of port communities of the countries participating in the COST 330 Action.

6.4 Conclusion

In many countries represented in this Action, it has been seen that the internal structures of the ports are designed to keep a strong political grip on the direction of the port, whether this is exercised by central or municipal Government. Appointments to their Boards are only rarely by election, and in some cases (including the Unions) members are specifically nominated. The Chairman, if not elected by the Board, is usually nominated by the Government or by some other political authority.

Even where ports are nominally autonomous the State plays an important part in controlling the general role and direction. Privately owned ports conform to the requirements of Company Law, but otherwise are free from Government direction.

Globalisation and technological progress throughout the transport sector is modifying the historical situation and will continue to affect the maritime sector as well as the hinterland operators. Change will bring significant politic, operational, and strategic modification to the

maritime sector. Ports will face new pressures since they are a vital intermodal link in the extended and increasingly complex transport chains.
The efficiency of the ports in handling cargo and in reducing the handling costs are of major importance in maritime. This is simply because international competition urges ports and port communities towards reducing costs and maximising economies of scale in order to achieve more efficient and cheaper services.

Faced with these considerations, changes are needed to allow innovative political and economic measures to permit greater interoperability between all transport modes and operators. There is a need to develop a strategy which would attain a comprehensive uniformity across the European port community, in keeping their diversity in the character, nature, size, and speciality.

6.4.1 Green Paper on Sea Ports and Maritime Infrastructure and Trans-European Network

The Commission is taking into consideration the issues of the European port and maritime industry in the present competitive environment with the recent publication of the **Green Paper on Sea Ports And Maritime Infrastructure.** The paper reviews the critical issues to attempt to resolve concerns over state subsidisation, transparency in pricing, openness in international market access, as well as the port's role in the European Commission's Trans-European Network concept. The aspects of safety and environmental protection is also considered.

The objectives of the Green Paper, after consultation and discussions with the Member State governments and with the operators of maritime industry, are 'to try to develop a set of coherent policies on individual port issues in order to help maximise the overall potential of the sector and its contribution to European and world wide transport systems'.

In order to support the targets of the Trans-European Network (TEN) projects, the transfer of the transport of goods in Europe from road to sea, has to be accompanied by a complete and competitive logistics chain that uses waterborne transport. To fulfil this requirement, the port should be able to participate in an information chain which provides multimodal interconnectivity and interoperability. The logistics information network of the hinterland infrastructure (for instance, trucks, railways, barges) must be aligned with the port capacities and capabilities. Beside the existing maritime cargo flows the major industrial zones in Europe are also considered as a key factor for a port network. Three forms of access to waterborne transport demand different IT structures:

- direct sea port access
- inland waterways available
- no direct access to waterborne transport.

An ideal port should provide multimodal interconnectivity services. It should have EDI connections to all modes of transport which apply to inland waterways, railways and roads.

Chapter 7: Port Community Telematics: Features and Recommendations

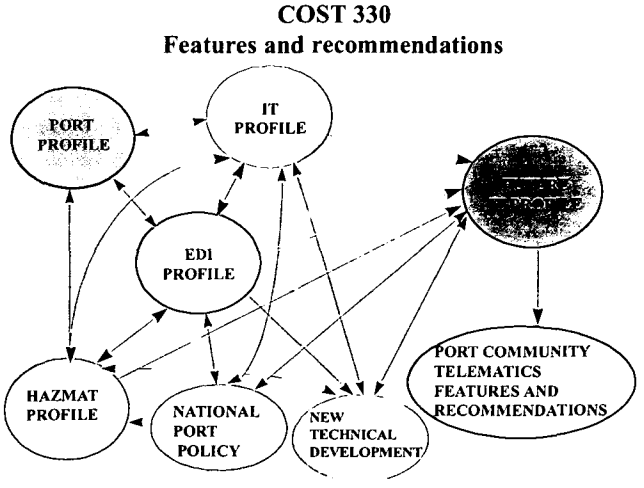
7.1 Introduction

There are now many techniques applicable in the domain of Information Systems, for instance note the methodologies of modern data base systems encompassing object oriented analysis and design techniques; the networks like Internet and Intranet which can offer multimedia and virtual reality services, procedures providing interconnectivity and interoperability between various information systems; there are narrow-cast and broad band and mobile communications offering new and innovative information and communication technology - all of which can yield procedures which may optimize logistics by the use of intelligent or multi-agent systems. Many systems are available 'off the shelf', they are not totally novel - but it is clear they are not sufficiently used by the sea and inland waterway transport.

The low use of information and communication technologies between port partners has been elicited from the COST 330 Action. Section 7.4 characterises the present "teleinformatic profile" of port partners through the main findings from the Action and it analyses possible effects for that profile.

The aim of COST 330 Action is not to explain new information and communications technologies, but it does forecast implementation to support intermodal transport via ports. Section 7.5 summarises the trends for the implementation of new technologies within port communities, based on the features in advanced ports and noting ongoing R&D projects. For discussion in this Section upon the implementation of new technologies a framework is defined - this includes various layers of applications.

The results of the Action show that there are obvious interdependencies between the different port community profiles. The current use of IT, EDI and Hazmat profiles does not influence uniquely the future IT profile. The national port policy and the new technical development has also a strong influence on the future IT profile of the port community partners.



7.2 Port community telematics - a key factor in cargo logistics

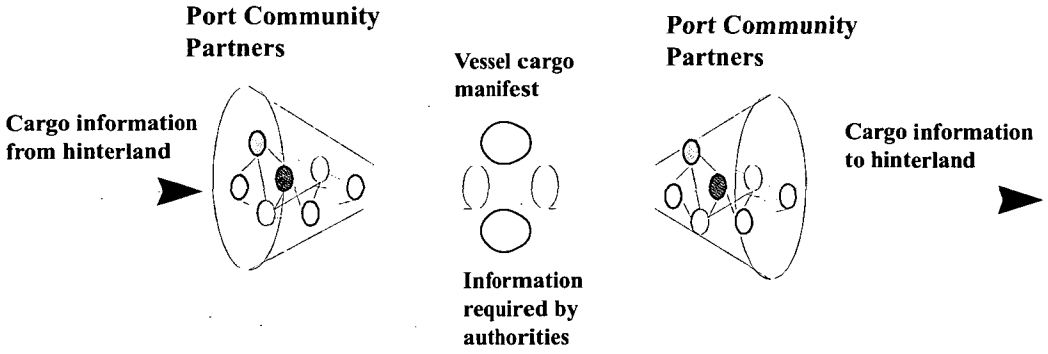
Port Community telematics is the core process supporting cargo logistics in ports. The modern, physical equipment for cargo movement in the port area is now very efficient, and the cargo can be moved very fast. By implementing modern port community telematics the cargo movement to and from the port area can be significantly improved - conversely, the lack of telematics can even be an obstacle for the logistics development.

Because of an obvious lack of transparency in these communities, the port community partners are not aware of their role in the transportation chain, or know of all the good IT solutions within the port communities.

Each cargo shipment normally generates several types of documents to be used by the different port community partners who, in turn, have different applications for handling these 'messages'. Further, the same cargo document may be used by several port community partners to administer the cargo information and the logistics follow-up. All the different document data are merged into the cargo manifest and the documentation required by the authorities. In the port of discharge the manifest information is distributed to the port community partners.

In this process of document management the port community partners of COST 330 Action handle approximately 50 million documents per year and more than half of the documents are handled manually. This process is presented diagrammatically below:

Port Community Telematics
Role in cargo logistics



7.3 Port community partners' IT infrastructure

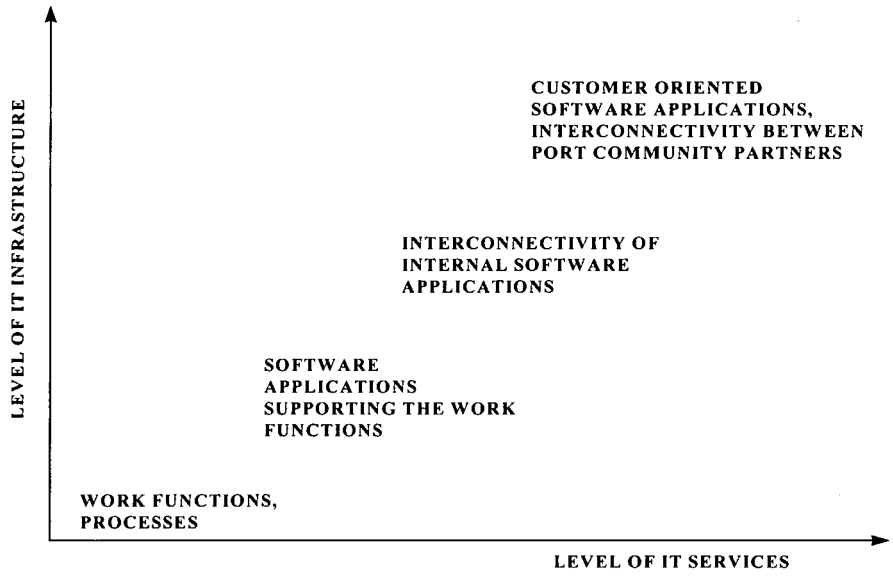
COST 330 Action has analysed the use of different types of software applications which were specified as supporting the current work functions and processes of port community partners.

Generation Gap in IT applications
The port community partners have many software applications on a variety of hardware platforms. Many applications are old and running on old-fashioned platforms. Yet some applications are ultra modern on very powerful platforms.

Internal interconnectivity gap
It seems that many port community partners have such old software applications that they cannot be integrated with each other, or transposed into modern software technology. Because of the low number or lack of their internal IT staff, much human capital and financial effort is required of the partners to maintain the software, hardware and their interconnection at the current levels, notwithstanding the need to develop interconnection.

It is obvious that the influence of the internal interconnectivity gap has been one factor preventing the implementation of customer oriented software applications, such as EDI, Internet or other IT services.

The level of IT infrastructure and the level of IT services is portrayed below:



7.4 State of the Art - Teleinformatic profile of the port community partners

Use of software applications
The average use of software applications within the port communities is seen as relatively low, although most of the port authorities use invoicing and statistics applications. Other software applications among port authorities, port operators/stevedoring, forwarding and trucking companies are found to be common in less than half of the participating communities. Railway companies and customs show, at their national level, higher use of basic software applications.

Some small port community partners seem to manage successfully without any IT, or with minor IT, to run their business. But inevitably the need for IT will increase rapidly as soon as there is a demand for more services and/or better quality from the clients' side.

Big port community partners in large ports normally have all available IT solutions. These companies are also participants of the European R&D programs which help them improve and implement the newest available technologies. In the terms of IT levels, the gap between large and small companies in the port communities is currently big, and may grow even bigger.

The inland waterway ports show lower use of IT than the seaports: and thus can be compared with small sea ports in their level of IT use. In most inland waterway port communities which are mainly small, the number of partners is generally very low, only one or two. For these historical reasons, one port community partner in inland waterway ports has fulfilled all the port community partner's roles. It seems also that most of the inland waterway ports which have handled mainly bulk cargoes normally do not need a high level IT. It is seen that the volume of general cargo is increasing in the inland waterway ports: this will increase their demand for new IT solutions. Interestingly, the sailing frequency in the inland waterways demands that VTS applications are used in many inland waterway ports.

IT platforms
Middle size hardware platforms and client/servers are common among all port partners. The use of mainframes is much higher among centralised organisations, e.g. customs authorities and railway companies. Stand alone PCs are a common solution among trucking companies and smaller ports.

Software supplier, software maintenance and support, outsourcing
When necessary, software applications are purchased from external suppliers and also maintained and supported by external service companies. This is common in half of the port communities in the sample; logically, this rate is higher (80%) when looking at the forwarders and truckers, as it correlates with their lack of IT staff. Software development, maintenance and system operations are, however, more time consuming for IT staff, because these activities are not generally outsourced. This trend seems to continue in the near future, except among inland waterway port communities, where the outsourcing may increase.

Outsourcing is not very high in the port community companies. The port community partners tend to keep the IT in their own hands and under their own control - but at the same time they are unsatisfied at not having enough IT to resource the necessary IT development and external interconnectivity. This finding is in contradiction to the levels of outsourcing of IT in other economic sectors, even in the IT industry itself.

IT staff
Economy of scales can be implemented for the port community partners. IT staff among port community partners is relatively small, this is seen strongly in the forwarding and trucking companies, probably due to their small size. Many small port partners have normally less than 5 persons in their IT staff meaning that most of the partners have only one person in charge of IT activities, maybe even using part-time staff. These partners are without any deep capability to produce value added services for their port clients.

Problems in IT
The small companies feel also that their telecommunication infrastructure is not sufficient for their purposes and also expensive. Perhaps this is evidence that the SME partners do not have enough know-how in telecommunications. Small trucking and forwarding companies obviously also miss vital knowledge to implement modern IT systems, and maintain their operation.

All partners agree that old software is, with old hardware, the main problem hampering their development of IT. Small and medium port community partners also highlight that telecommunications are expensive; the lack of telecommunications infrastructure is also reported to be a relevant problem within inland waterway port communities.

IT value added services
Some port community partners (port authorities, port operators/stevedoring companies) offer value added services (for instance tracking and tracing) to their clients. Companies who are producing value added services normally need a higher level of IT in order to manage the logistics information. Naturally, those companies who are not producing value added services for the clients do not need high level of IT.

It is obvious that low use of IT will force some port community partners to loose or to change their role. Companies with high IT levels are able to produce value added services for their clients and will achieve a more dominating role in the logistics industry.

Level of EDI - paperless message exchange
Having in mind the pictures described previously, it is not surprising that EDI is not widely implemented within port communities. Only 26% of the 106 port communities, stated that they use EDI, but EDI hardly exists within the inland waterway port communities. Given the profile of port communities participating in COST 330 Action probably implies that the general proportion of European port communities using EDI is not much higher. This is based on the fact that the ports participating in the Action covered over 60% of Europe's trade.

EDI is most frequently used by the port authorities and port operators/stevedoring companies, followed by shipping agents and forwarders and - without any use in our sample - trucking companies. In half of the participating countries the customs authorities are highly concerned to use EDI; the opposite is the case for railway companies. Trucking companies do not have any EDI contacts with the ports (in our sample). However, the trucks carry 65% of the cargo flow to and from the European ports. The biggest trucking companies have EDI contacts with their clients in the hinterland.

The forwarding companies mainly use EDI with the customs authorities. The forwarding companies are using EDI only for the administrative purposes, not for their value added services. However the driving force of EDI may change within each port community partner because of the re-organisation of the port system in each country as they move towards liberalisation and increased competition. In some port communities the port authorities seem to be the first driving force for the EDI development, customs authorities being the second. Thus these authorities may play the driving role for promotion and use of advanced IT mandating the use of Edifact-based EDI applications for customs declarations, Hazmat information, and the collection of statistics at the European level. (Edifact is an international standard for message structure.)

The port community partners are currently using a greater number of non-Edifact than Edifact messages. The partners have, however, expressed their willingness to adopt standard Edifact messages in future developments: this may be because Edifact messages are obligatory for example for the customs and Hazmat authorities.

For various reasons it may be difficult to implement Edifact messages in the small and medium size port community companies. For instance, port communities may use different

Edifact messages or subsets of Edifact for the same purposes. These local implementations may thus become a barrier against interconnectivity between partners in different port communities and countries.

Another reason for the more frequent use of non-Edifact messages in stevedoring companies is explained by the fact that some stevedoring companies have often been receiving cargo information from the industry in hinterland (forestry, car, etc.) using industry-specific messages for many years before Edifact was taken into use. They thus wish to remain with the familiar rather than waiting for a new standard to be developed.

The most frequently used Edifact messages are: CUSREP, BAPLIE, IFTDGN, CUSDEC, and IFCSUM. The same messages are also planned to be used by the port community partners. The main EDI applications are cargo manifest and declaration, cargo booking, stowage plans and - probably moved by the Hazmat Directive - some dangerous goods information.

There are two ports which have reported that they will stop the EDI development and concentrate the development to Internet/Intranet. Generally however, the SME port community partners consider that EDI, Edifact and telecommunications are confusing.

Port Community Systems

In large ports their Port Community Systems (PCS) are providing EDI for their partners in waterborne and intermodal transports in the sense of paperless message exchange (see application layer 1 in Section 7.5 below). These systems are supporting EDI services in the large ports to their port community partners. Partners in sea port communities are almost equally in favour or against PCS. Despite having a low telematics profile, PCS are not considered interesting by the inland waterway port communities. Port authorities express their strong willingness to be a shareholder in a PCS company - thus further development of the PCS infrastructures should continue.

Normally the Port Community Systems provide specific standards at the application level, thus users have to develop and install software on their premises for "bridging" their in-house EDP systems to the specific standards of the Port Community Systems. Even if Edifact were accepted widely, there would still be a problem to link existing internal EDP systems to EDI in Edifact format. Happily the standard Edifact offers some possibilities for special agreements to be provided individually.

Within the *EDI users* community software and hardware is not perceived to be a major problem compared with the *non-EDI users*. This may be because they already have expend adequate effort on their IT systems before EDI implementation.

The main problems areas in message exchange for all partners who are *using EDI* in the sea port communities are the perceived complexity and the lack of cost/benefit relationships of EDI projects. Half of the all sea port communities partners *not using EDI* feel that they would have problems in message exchange.

The use of EDI within the port community is not reported to increased significantly in the short term. However port community companies may prefer to focus their investments in alternative IT developments where they perceive a higher added value. In this respect, preferences are put upon new software applications, new operating systems and hardware, Internet and other means of communication - like mobile and satellite communication.

The use of an EDI agreement varies very much from port to port and from country to country. The experienced EDI port community partners normally make an EDI agreement with their EDI partners. Partners in small and medium port communities do not have EDI agreements.

Use of Software application for Dangerous Goods Information Management
Dangerous Goods Information Management has been mainly handled manually - probably because there has not been any common European or even national electronic procedure for handling this kind of information. The Hazmat Directive will be one of the driving forces in implementing new telematics as general.

Use of Internet/Intranet
Port community partners had a low use of Internet/Intranet by the time they answered the questionnaire and the great Internet revolution was yet to come. Most likely Internet will raise the IT level of small and medium size port companies. Allegedly the IT industry is generating masses of new business by new Internet applications. At the same time it may mean new and cheaper solutions for the SME companies.

Internet applications have high priority among all port companies, even among EDI users. The use of Internet is growing very rapidly in the communities outside that of the ports. In the sample of ports the respondents saw Internet mainly as a communication tool for E-mail and yellow pages information and to lower cost of telecommunication. However it must be noted that some of the data sample of COST 330 is now a couple of years old. And by 1998 the perception of Internet and its use has grown - thus ports and partners are likely to increase their use of Internet, Intranet and so on, for detailed trading purposes.

Improvement of the port community telematics
Improving the IT level is dependent on individual companies and on market forces. Software companies may find that the IT market of, for example, the trucking and forwarding companies is not big enough to attract them. Also, small companies if they have an IT base have many tailor made software solutions which need heavy investment to upgrade their interconnectivity features for EDI, or for Internet. These investments are regarded as too expensive in the small port community companies.

There is an obvious awareness within the port community partners of more powerful and user friendly IT solutions which may be available, in the market-place, but due to the small number or lack of their IT staff the adoption of new solutions is, or will be, very slow.

7.5 Trends and framework for the implementation of new technologies in ports

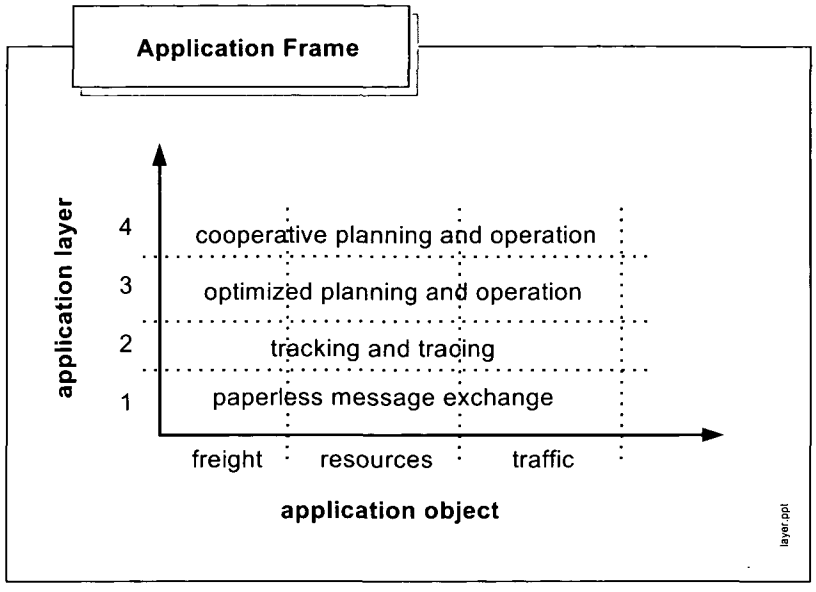
There is much new and innovative information and communication technology available but it is not sufficiently used by the maritime and intermodal transport sector. Users normally do not have the knowledge to use the innovative technology, and the suppliers of the new technology do not have enough information on the requirements of the use in practice.

The application areas for the use of new technologies can be defined in a two dimensional matrix. One dimension deals with the objects addressed, with the freight to be transported, transhipped or stored by the use of resources which normally creates the traffic. The other dimension considers the levels of applications and the use of communication technology which supports the planning and control of the operations for the objectives. This begins with simple applications, which will become increasingly qualified and sophisticated.

The first layer thus represents the application of simple systems but implies that EDI is put into use. In other words the partners are used to work in an electronically mediated environment, but without great sophistication.

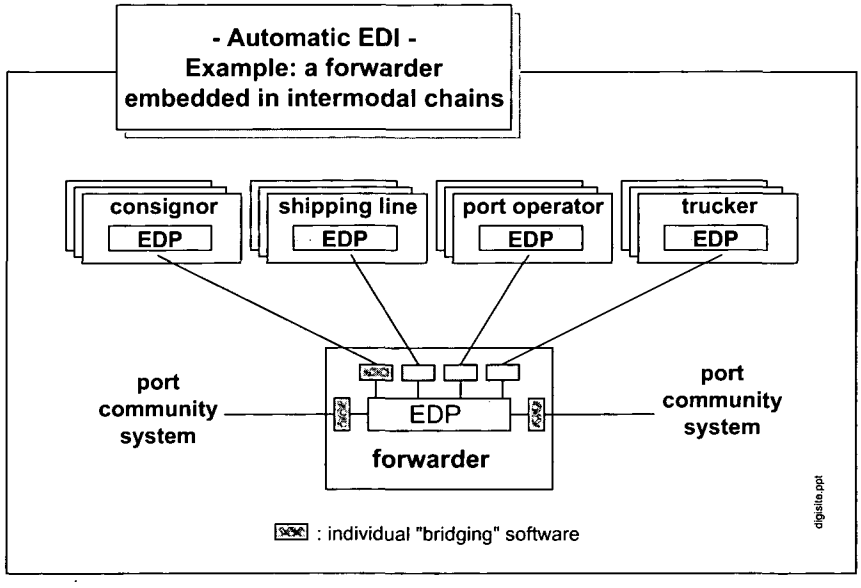
As soon as tracking and tracing systems are in operation, which requires current information on the status of the freight, equipment, vehicles and on the traffic flow and the capacity constraints that may be encountered in traffic networks in real-time it is possible to become more systemically integrated. Given an integration of systems the orders concerning the control of freight and equipment, the deployment of vehicles and the control of traffic can be transferred to the partners immediately. And as a consequence, information systems for supporting optimised planning and the operation of freight flow, the deployment of resources and the control of traffic can be implemented.

The third application layer looks to intelligent information procedures and information systems using telecommunications and full interoperability of data processing. The use of such systems requires much effort on the part of the adopting organisations. This is normally a hindrance for the acceptance, although strong cost/benefits and economic results and quality can be forecast.



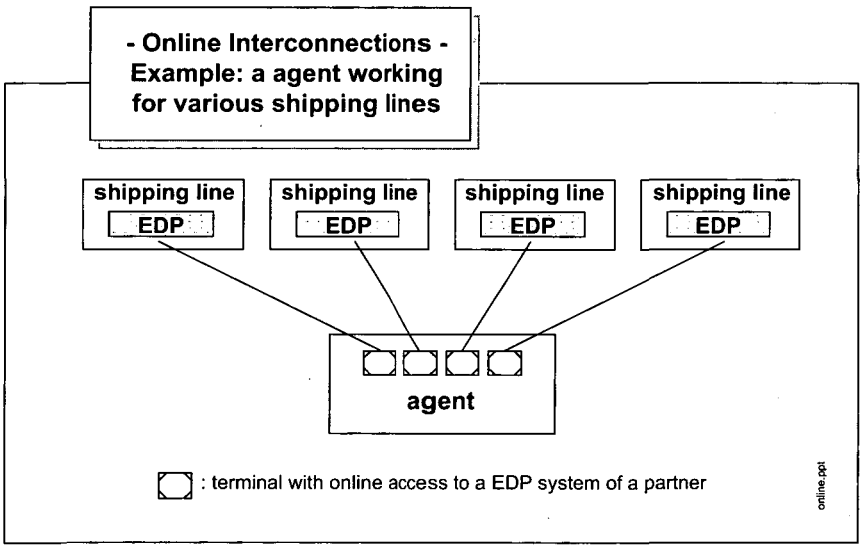
(origin: NEPTUNE analysis of ongoing R&D on telematics in logistics)

Although the third application layer also deals with the optimisation of individual tasks - like the transhipment in the area of a port operator (yard management), the fourth and highest layer could be the implementation of co-operative planning and co-operation between various tasks and partners. The co-operation could, for instance, be between the port terminal and the hinterland carrier aiming at tuning their individual planning under common objectives. Besides detailed demands on interoperability, new agreements for co-operation at a business level are required. This will be the cause of further delays as new partners learn to trust the other.



Consider the above scenario - take the case of a forwarder who is operating with automatic EDI with his partners. The forwarder has the disadvantages in working with partners who are apparently well established "digital sites".
Companies like shipping lines who claim that their partners (agents and forwarders) are interconnected to their EDP systems frequently misunderstand the meaning of interconnectivity. Often the partners are only interconnected on-line via terminals to the central EDP system of a main player (e.g. shipping line). There is no interconnection between the EDP systems of either side. From the point of view of a port, there is a disadvantage - those who are on-line interconnected partners (normally SMEs) have to operate individual terminals uniquely interconnected to different systems of their customers. For data processing purposes they may have to retype all data for re-input in both directions to their own EDP system as well to their partners' systems.

Most of the data communication in the ports is effected via 'other types of networks' which most commonly means telephone networks, the second most common being the VANs. PCSs are used mainly in a few large sea port communities by shipping agents and forwarding companies.



Interoperability - process to process interconnection between various EDP systems - is seldom implemented in practice. As noted (*Information Week*, 1(2) on 22 January 1998, pp 52-53) about 13,000 m $US per year are invested world-wide in the development and maintenance of software for "bridging" between various applications software across a wide spectrum of accounting and business operations: which is about 35% of the total cost for standard software in this area. Experts claim, that only about 2% of the effort required for "bridging between software islands" is already established and generally useful. Users do not know that they need external help for interconnecting their EDP systems internally and to those of external partners. In various R&D projects, for instance in BOPCom or MARNET, such "bridging" software has been developed to support the communications within ports, and between ports and the hinterland and sea transport.

In sea port communities there is little willingness to outsource system operations for some applications. Using such "bridging" techniques the tracking and tracing of freight, resource management and the management of the traffic flow in networks can be implemented (see Application Layer 2, above).

Port Community Systems normally support tracking and tracing of freight by the transmission of business and administration oriented data (e.g. ordering, advice notes, interchange messages or documents, customs declarations, etc.). Only a few trucking companies in sea ports use cargo tracing software applications, but most of the railway companies declare that they have applications for wagon tracing.

The data on operations of freight or equipment movements can be transferred via reader stations if the resources and the equipment are moving only within geographically restricted areas or networks (e.g. in a port terminal or on railways), because the technology to be installed on the freight or equipment has to be compatible with the technique of the reader stations. And there should be a high rate of encounter between freight and a reader station to make the systems economically viable. The use of mobile communications is also growing for tracking and tracing of freight (10% of the data communication in trucking companies is by mobile communication). But here too there is a similar problem regarding the introduction, because the freight and the related equipment (e.g. containers) are flowing through the hands of various operators. Thus the responsibility for the installation and maintenance needs of e.g. a tag on a container, changes. The question arises, who pays for the technique and the service? In addition, the freight flow often crosses the span of several communications network services, so that sometimes many techniques or services ought to be supported.

In comparison to the hindrances against the tracking and tracing of freight, the tracking and tracing supporting the employment of resources is already more evident, e.g. regarding the employment of equipment for transhipment in a container terminal, or the fleet management for vehicles on road. Normally the responsibility for this deployment is in the hands of only one operator who is often also the owner of a vehicle - who thus has a great incentive to be efficient and effective. Normally the resource management is undertaken judgementally, e.g. to a driver, whose working location can be connected via mobile communications linking with a centralised system supporting the planning and control of the deployment. Thus re-routing can be undertaken quite easily.

There are various systems already in operation, especially in the container terminals: and in fact the freight terminal software application is used by some port operators/stevedoring companies in sea ports and inland waterway ports. The container yard management software application is used equally by port operators/stevedoring companies in sea and inland waterway ports.

Regarding tracking and tracing for transport by road, most of the systems are "stand alone solutions", that means isolated software systems with procedures still missing that would allow easy interconnection to the tracking and tracing of the existing EDP systems in the overall business sectors.
Establishing of interconnectivity between tracking and tracing of freight on the one side and tracking and tracing of resources on the other will increase the availability and reliability of data for both sides. Examples for that are in the systems which are operating in container terminals.

7.5.1 Tracking and Tracing - Value Added IT Services

There are some R&D projects of the Telematic Transport Programme of the 4th Frame Work Programme dealing with tracking and tracing, e.g. the projects INTERPORT (Integrating Waterborne Transport in the Logistics Chain) with the port as a kernel; MULTITRACK (Tracking, tracing and monitoring of goods in an intermodal and open environment) from the intermodal point of view; or WISDOM (Waterborne Information System Distributed to other Modes) focused on container transports.

Tracking and tracing of traffic is a hot topic for vessel traffic services on the water side. One third of port authorities in sea and inland waterway port communities, where the ports have large container volumes, use VTS and berth allocation software applications.

The problems to be solved concern the establishment of interconnectivity between the VTSs of various regions, and between the authorities and private companies. There is an ongoing R&D project of the Transport RTD Programme called VTMISNet (Vessel Traffic Management and Information Services Network) dealing with such requirements.

7.5.2 Optimised planning and operation

Using the information provided by tracking and tracing the planning of freight flow and of the deployment of resources can be optimised (see Application Layer 3). Certainly optimising of employment could lead to a decrease of benefit if the results are not based on reliable information - on the actual ongoing performance of freight flow, resources employment and traffic intensity. If there is good data, the results of optimisation, e.g. orders to drivers, can be transferred immediately.

Information systems for planning and control of the employment of equipment are in use (e.g. for the transhipment and stowage in container terminals or for the stowage planning for ships). But seldom is a real optimisation realised e.g. the results of the algorithms of operations research, or procedures of artificial intelligence. The production planning software applications are used more in sea port operators/stevedoring companies than in the inland waterway ports by their partners.

7.5.3 Co-operative planning and operation

Only in R&D projects have solutions been tested for supporting co-operative planning for freight and resource management through process sharing within the information systems of partners (see Application Layer 4). Within the R&D project COREM (Co-operative Resource Management for the Transport of Load Units) of the Telematic Transport Programme a procedure has been developed for the co-operative planning of the interchange of containers between container terminals and road truckers.

7.6 Futuristic view of development

The use of information and communications technology will increase rapidly within the next years. Fees for communications and prices for hardware and software will decrease. Human oriented software interfaces, powerful communications networks and improved communications services will contribute to remove impediments as they are seen today.

In sea ports and inland waterway ports old software and old hardware are problems - but as they become seen as commodities, with low costs they will be able to be purchased quite readily. Similarly the lack of telecommunication infrastructure and high telecommunication costs seem to be obstacles for development in some sea and inland waterway ports.

The survey perceived almost the same priorities: the three most important development areas noted by all port community partners were the need for new software, new operating systems and new hardware. But one further and important resource is needed - they need IT staff.

Although aiming at interconnectivity and interoperability we understand the solution(s) will not become one common European standard or system. Bilateral interconnections are preferred even regarding partners interconnected to Port Community Systems. Yet new procedures and new services will arise to provide and develop the bridging between islands of information and communications systems. Research and development dealing with an object oriented approach at an EU level will also link more extensively, for instance with the "Common Object Request Broker Architecture (CORBA)" of the Object Management Group (OMG), or the "Common Object Model (COM)" of Microsoft.

Furthermore services will provide automatic identification of freight, equipment, resources and traffic situations by supporting multiple communications techniques and services, but under a common approach.

Intelligent procedures for the optimisation of planning and control of operations have not been really accepted in the past because reliable data has not been available on one side, and users have been overcharged by their data handling information systems for the optimisation of complex planning and control of various tasks on the other hand. With the availability of tracking and tracing systems decisions for planning will be based on guaranteed data quality, and multimedia techniques for human/system interfaces will support better understanding and control of complex interdependencies and which will promote suggestions and decisions provided by EDP optimisation systems. Such interfaces using the ATM technique are being studied e.g. in the R&D project EIES (European Information Exchange System) of the ACTS programme.

A common learning and mutual interchange of knowledge and experience will develop by using the technology for computer supported co-operative work (cscw). Thus the possibilities of co-operation in planning in a virtual environment of information systems will create an urgency to establish a new kind of co-operation, and new forms of organisation. And it will also influence the forming of juridical conditions, regulations and laws to support this development in future.

Another futuristic view of development can be found in the Appendix 7a: New Technologies - Internet based EDI.

7.7 Recommendations

In studying the following recommendations we should remember that many ports are interconnected by their physical logistics movements, and also in terms of the data they need and utilise. Similarly we proffer concepts such as 'harmonise' or 'openness and transparency' on the understanding that the supply chain management requires the co-operation of many agents who act between consignor and consignee, and they use many integrated services, some of which are electronic, but many remain manual processes. The proposals thus embrace plural concepts as well as supporting the idea of 'one-stop-shopping' - as in the use of telematics. They also cross the boundaries of many Directorates in the Commission.

We consider that telematics systems must support all ports in the future: but at present, some ports will require heavy investment in hardware, software, and in their human resources capital in order to adequately join the digitally mediated logistics chain. Other port communities appear to be further along the development curve. It is not our intention here to be critical or to applaud the currency of telematics in ports, but to propose actions to develop a coherent telematics future which will support global trade.

The audience

The recommendations are based on the analyses and findings of the COST 330 Action. They are targeted at the following audience:

The European Commission
The National Authorities
The Port Communities and their partners
The European Transport and Logistics Sector

The main areas covered by the recommendations are:

Harmonisation of the working routines
Port Community Telematics
Training in the use of Port Community Telematics
A real standard for data content
Inland waterway ports: developing their role in European logistics
Harmonisation of legal rules and instruments for Electronic Commerce

7.7.1 Harmonisation

Working routines and processes of the Port Community Partners
The harmonisation of the working routines of the Port Community Partners is indeed a global problem. To an extent it can be solved on a European (including global), national, individual port and at the European logistics industry level.

In order to reduce redundancy in data and message handling the current, non-harmonised, working routines which create extra work for the port community partners need simplifying and standardising in the way that has been accomplished, for instance, within the air freight industry.

7.7.2 Port community telematics

The Port Community Partners should be encouraged to make greater investments in their IT development (at least 2% of their annual turnover) to create a competitive tool which will improve their business. A clear model is needed to help evaluate the cost-benefit of IT investments for the 'Small and Medium Enterprise' (SME) Port Communities as part of their logistic supply chain so that the implementation of modern IT could be completed much quicker than today. Port Telematics should also be regarded as one of the critical quality factors of the Port Community Partners, which, once in place, will add value to their services.

The Port Community Partners should understand their role in the supply chain management. This is where the Port Community members could offer unique "one stop shopping" for the supply chain. They could offer many IT services to benefit their smaller partners, and all would benefit by this co-operation. Given there is increasing competition in the cargo logistics sector and the Port Community Partners should develop new value added IT services for their clients.

Port Community partners, software applications
New, easy to use, modular software applications which support the daily working processes should be developed, especially for the Port Community SME Partners to enable them to use and modify the software applications without creating huge IT departments. The software providers should offer reasonable services for this purpose and outsourcing at least for the smaller partners should be the target. IT should be brought closer to the Port Community SME Partners than is currently the case.

There is no clear market leader in Port Community software applications and/or outsourcing in Europe.

Port Community Systems
The existing Port Community Systems should be redesigned to be "right-sized" (a term indicating the appropriateness of the functionality of the software and hardware applications, capital investment and user costs) for the small and medium Port Communities.

New IT services based on Internet technologies for the Port Community Partners
The Port Community Partners should develop new value added IT services based on the Internet technology - provided that Internet guarantees safety and security of data transport. There may be new joint applications which several port community partners are using simultaneously - thus Internet services based on EDI should be considered seriously. There is a large potential for IT service companies to offer and host these new applications on an outsourcing basis since, currently, outsourcing in the ports communities is low compared with global averages in the IT-related sectors.

European R&D activities should be targeted to support new IT services based on Internet technologies.

Inland waterway ports, Port Community Telematics
Port Community telematics infrastructures should be developed specially for inland waterway ports in Central and Eastern Europe.

There is a need for programmes to promote the co-operation (not only in telematics) between West European and East European sea and inland waterway ports. And to support links such as the development of the Rhine-Maine-Danube as a potential highway for trade.

European R&D programs
The European R&D programmes seem to concentrate mainly on the discovery of and development of leading-edge technologies described as pre-commercial research. The participants in the subsequent development of these R&D projects normally are larger companies which have the means to implement the latest technologies.
Thus it would seem that the Port Community SME Partners do not have the technical and human know-how to implement the latest technologies and are seldom able to participate in European R&D programmes which are too complicated to understand, and getting a feeling for them is complex and slow.

It is suggested that a special R&D programme in Port Community IT for the Port Community SME Partners should be undertaken - having as its main objective the development of easy-to-use applications for the Partners. This should take place within the global, European, and national level of telematics development programmes.

Further - there should be EU Initiatives or Actions for the definition of the strategy for IT user-technologies and know-how for Central and Eastern European countries which are newcomers to the EU: this should be extended to the MEDA countries.

National R&D programs
At a national level, the needs of the Port Community SME Partners should be included in the national R&D programmes.

Green logistics telematics, green telematics
The port community telematics should be of assistance in moving cargoes from land to sea (and vice versa). Flexible and easy-to-use software applications will attract more cargoes to maritime transport - thus may help keep the cargoes afloat rather than transhipping to road haulage.

Who are the driving forces of IT development in the Port Communities?
A new study could be initiated in order to find out who are the driving forces in the development of Port Community telematics. These groups may be persuaded to co-ordinate a broader programme of integration of all partners in ports - large, medium and small - across Europe.

Technology transfer between European port communities
In many cases the success stories of IT implementations are more illustrative than the results from highly advanced R&D programs. Disseminating these success stories more widely may promote a much more open and transparent development of the logistics sector.

Quick and complete opening of telecommunications infrastructure
Demonopolisation of the telecommunication infrastructures (as per the 1st January 1998 target) and the opening-up of telecommunications competition should lead to cheaper telecommunications costs in all European countries. There should be a lower level of telecommunications charging among the Port Community partners because this form of

communication is an essential base to the port community telematics (as part of the transportation chain) both in inland waterway and sea ports, and thus the stimulation of trade.

7.7.3 Training

Modern IT know-how and implementation for Port Community SME Partners
Inland waterway ports - IT awareness training
The port community partners in inland waterway ports do not possess enough know-how about modern IT and its implementation. There should be a possibility to transfer the know-how by on-site training. This should include information on both hardware and software, the latter should cover both operating systems (e.g. Windows NT, etc.) and application modules. Application requires easy-to-handle procedures to modify the provided packages into tailor-made processes.

The inland ports have about 10% lower level of applications use than the sea ports, on average; and a lower level of human resources applied to supporting and developing their IT. It is vital to develop their skill base to allow them to be integrated in to the IT mediated logistics chain, thereby alleviating the pressure to utilise still more road haulage.

Training of the SME port community partners
The port authorities seem to have longer IT experience and deeper knowledge of general IT development among the port community partners. Their knowledge and experience should be used to benefit other the less advanced port community companies thereby distributing better information and intensifying the awareness of port related IT know-how, solutions, etc.

In some port communities the port authorities seem to be the first driving force for the EDI development, customs authorities being the second. Thus these authorities may play the driving role for promotion and use of advanced IT mandating the use of Edifact-based EDI applications for customs declarations, Hazmat information, and the collection of statistics at the European level. (Edifact is an international standard for message structure.)

A joint IT discussion platform in each port community would create a new route to better and more open discussions between the port community partners. It is shown elsewhere that openness and transparency of operations is of benefit to the whole community - the port community should be no different in principle.

Profound and targeted training should be addressed both to the management of all port partners and to their IT staff in order to improve the perception and use of IT.

7.7.4 EDI, Edifact - Standardised data content

Aiming at the improvement of the economic benefits, and to increase quality and reliability, the software applications have to be interconnected via automatic EDI by mandating interoperability between the data processing of various applications via automatic file transfers.

The Port Communities should promote the use of electronic communications between the partners by giving discounts in the costs of information delivered electronically (EDI, Internet, etc.) and maybe even offering a free service for their local partners over Internet.

A real standard for data content is needed at the global level. A simple and universal data content standard would help in implementing EDI solutions. Some discrete standard solutions based upon Internet technology have already been developed but, as always, because of the fragmented nature of the logistics chain the application of these is not universal.

For the small and medium sized partners (SME) in a port community a coordinated community approach is neccessary to address the needs of the low-tech partners who do not have the EDI capability. For some, only Web access to a Web based PCS may be sufficient, others may need a more extensive EDI interface for interrogation and some file transfer, others may need full interface and full file exchange. Only a local PCS with modern technology can provide the local solution tailored to meet the specific needs of their partners.

Using low cost, standard off-the-shelf components together with modularised functional software modules for the main business functions eg. Manifest transfer, etc. and other general areas which are standard in all ports, then the local and specific needs could be customised.

Once again it is seen that a more open interchange between the Port Community Partners is needed. This can probably be achieved through the use of the Internet given its common communication infrastructure, data content and format.

The new programmes of the European Community and the European Port Communities should be targeted at improving the global standardisation of messages for the common good.

7.7.5 Inland waterway ports, part of European cargo logistics

The European inland waterway ports do not have at present a large role in cargo logistics transhipment. These ports should be linked more closely to all European R&D activities so as to develop their potential across many sectors - in logistics, in telematics, and in human capital development.

7.7.6 Harmonisation of legal rules, instruments for Electronic Commerce

Harmonisation of the rules of Electronic Commerce should be sought at the European level if not the global level. The lack of common legal rules is considered to be one obstacle against using EDI and/or Internet as transmission tool in the European logistics industry. This is a particularly difficult legislative area - but it must not be ignored. Nor should regulation be allowed to be developed elsewhere to the detriment of European trade.

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Glossary

COST: European Cooperation in the field of Scientific and Technical research

Dangerous goods: Hazardous materials.

EDI: Electronic Data Interchange

EDP: Electronic Data Processing

ESPO: European Sea Ports Organisation

GIS: Geographic Information System

GSM: Global System for Mobile Communication (Groupe Spécial Mobile)

Intermodalism/intermodal transport: A linked logistic movement using two or more modes of transport. Typically (but not always) involving the interchange of freight in containers or trailers among different transportation modes, where the containers and trailers are of standard sizes, having common handling characteristics, permitting them to be efficiently transferred between modes as necessary during the origin-to-destination movement.

IST: Information Systems and Telecommunications

IT: Information Technology

LAN: Local Area Network

LEO: Low Earth Orbit Satellite

Manifest: A list of all cargoes on a vessel. The specifications of a cargo made out and signed by the master of a ship.

MEDA countries: Algeria, Cyprus, Egypt, Israel, Jordan, Lebanon, Malta, Morocco, The Palestinian Territories, Syria, Tunisia and Turkey.

Multimodal: Using more than one transportation mode to move load of goods.

Port authority: A state or local government that owns, operates or otherwise provides wharf, dock and other terminal investments at ports.

PCS: Port Community Systems

R&D: Research and Development

Roro (Roll-on/roll-off): A feature designed in a specially constructed vessel that allows cargo to be loaded and unloaded through doors in the vessel's hull; this feature enables cargo to be moved (rolled) in and out of the vessel with wheeled loading devices or under the cargo's own propulsion.

Shipping agent: A liner company or tramp ship operator representative who facilitates ship arrival, clearance, loading/unloading, and fee payment while at a specific port.

SME: Small and medium size enterprise

Software: A term used to describe the operating system code and/or an application programmed for use on a computer.

Stevedore: Person in charge of loading/unloading ships.

TEN: Trans-European Network

TEU: Twenty-foot equivalent unit (6.10 m). A standard unit for counting containers of various lengths and for describing the capacities of container ships or terminals. One standard 40-foot ISO Series 1 container equals 2 TEUs.

UN/EDIFACT: United Nations rules for Electronic Data Interchange for Administration, Commerce and Transport (a set of internationally agreed standards published by the UN/ECE in the UNTDID and maintained under agreed procedures; includes standards, guidelines and directories).

VAN: Value Added Network.

VTS: Vessel Traffic Service

WWW: World Wide Web

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Appendix 2: Memorandum of Understanding, Technical Annex

Background Summary

Data exchange systems operating between ports have been spreading for five years. They have been proposed as projects with objectives which are open to joint information systems with participants from/to the inter-land. Even so, sophisticate and integrated inter-operators electronic trading is growing very slowly in the maritime industry.

It is vital to analyse the real logistics chain and the global intermodal linking processes, not just its specific components. It is necessary to examine the role of EDI with respect to other information exchange technologies. The implementation of EDI needs too many formal interfaces which makes it cumbersome and costly to have widespread adaptation in the transport sector. In the US only 40,000 firms regularly use EDI (Saltman Roy, National Institute of Standards & Technology, US Dept. Of Commerce). It is understood that several organisations have 'pushed' EDI. However, these firms have not necessarily followed the standard ISO/EDI but their own one-to-one systems. Thus, for general use, these systems create a "lock-out" or barrier. Given that the CEC has supported studies on EDI for over 7 years, it is now time to consider why it is not commonplace. The Action will study the barriers and/or resistance in general of this technology. New Information Technologies (NIT) are technically available - the issue is to apply them at the right time and in the right place.

The economic stakes for port communities are to engage in Trans-European networks and to master the intermodal logistic chain. The collation of technical and economic data about the implementation of modern information systems and telecommunication can make ports and their partners more aware of various possibilities. This would be

- by analysing the purpose and expected benefits of setting-up port exchange networks which fit in with Trans-European networks (Bangemann and Oreja; "Telematics Applications for Application in Europe" in Christophersen Group documentation)
- by examining the kinds of partnership involved by studying the types of data transmitted

Thus an overview of the strategic use of information systems and/or electronic trading exchanges may be given to the operators.

The COST 330 Action is an economic investigation. It will study the long-run impact of IST in the field of inter-modal logistic chains which will include ports and maritime transport. Other organisations, like MIF, investigate commercial interests.

Description of the Action

1. Objectives

The use of Information Technologies is indispensable for consolidating a competitive edge for the European maritime industries. Furthermore, the implementation of the Short Sea Shipping Policy aims at attracting cargoes from land to sea. It appears that the organisation of modern logistics is no longer possible without using one or other of the Telematics tools.

The general objective is to review and to assess the development of strategies for interconnecting ports. We would expect ports to communicate with each other and their partners in order to improve maritime freight transport operations in a global logistics system. The prospect for Europe includes inter-modal and one-stop shopping to complete the transhipment chain.

The Action will study the strategic issues for Information Systems and Telecommunications (IST) for ports and their trading partners, to review plans, to collate information on existing and planned developments and to acquire knowledge about the role of ports in implementing IST, today and in the near future. A sub-objective will be to develop a critical evaluation of the barriers to EDI and to offer a plan for its development.

The Action will also analyse the value added port services such as trade facilitation points as a means to increase services and competitiveness (customers and clients versus commercial added value services).

The Action will also investigate the purpose and expected benefits of setting up European exchange networks by examining the kinds of partnership involved, and the type of data transmitted. The research includes:

- the analysis of general trends, the role of the port today and as a hub in the future
- the key features and components of IST
- the interactions between small and medium size ports
- the driving forces and critical issues
- the identification of technical-economic possibilities
- the implication of regulations such as the EU directives on hazardous materials.

2. The scope of the Project

The Action will consider the following:

- four geographic areas: the Baltic, the North Sea, the Atlantic Ocean, the Mediterranean & Black Sea
- inland ports (inland waterways)
- large and small firms
- automated and non-automated ports
- port authority/operator and port community
- short and deep sea shipping operations

The Action focuses on the links and information exchanges (commercial, administrative, legal and statistical) between commercial ports and:

- partners (e.g. shipping lines, forwarders, truckers, railways, distribution centres and service partners)
- types of cargo (e.g. chemical and oil, car manufacturing, dangerous goods and bulk storage)
- intermodal operations (road, rail, barge traffic (inland waterways)
- types of information (commercial, customs, other legal authorities (Hazmat directives, statistics),
- technical (VTS)

The Action concentrates on ports as distribution centres (hubs) for improving logistics.

3. Expected results

Ports have individual needs relating to their trade characteristics and their environment. However, there are some functional requirements common to all ports. These common requirements should be identified, studied and described to establish if standardised building blocks could be developed.

The Action will:

- gather data on the introduction of innovative technologies, tools, products (in different sectors) and examine the common rationale
- to look at the differences and common elements against other innovative tools, products and technologies
- describe and assess the impact of the latest technological developments
- define scenarios for the long term telematic needs of ports and their partners
- disseminate pertinent information for commercial operations about openness including networking, multi media, etc.
- comprehensively examine the reasons for the slow take-off of the use of Telematics in general (including EDI) in the maritime sector.
- design a set of recommendations allowing for the development of tools and actions to enhance and facilitate the use of Telematics (including EDI) in maritime transport.

4. Current state of knowledge in the proposed field of research

There are numerous available reports, studies and surveys on port information systems, particularly in European countries. Such documents may focus on individual ports, groups of ports in the same region or ports grouped together by some criterion. These may be regularly updated at the initiative of a port or group of ports in the same country. This will allow them to keep up with their competitors be they national or international public bodies. These reports are generally intended for the members of the port community in question.

There is no overall survey yet of the growing deregulation in this field. It is time to analyse and evaluate the trends at the European and international level. It is time also to identify the options available for existing or potential interested partners. By so doing it is expected to contribute to the development of national and European policies.

5. Grounds for research

There is an important range of new information technologies that can improve the logistics chain, but they often need large financial and human resources investment. This is especially the case for EDI: this explains why it does not catch on for small and medium sized firms.

The management of implementation of new information technologies require that the economic and commercial conditions of development have to be assessed very carefully, and with strategic perspectives in mind. Here, Porter's theories (Porter, M; 1990 "The Competitive Advantage of Nations", Macmillan, London) represent a good economic view of competitive advantage and competitive strategy. His earlier theories have been applied to information systems development (Wiseman C; 1988 "Strategic Information Systems" Irwin, Homewood Il.) using as classifiers - differentiation, cost, innovation, growth, alliance and returns.

6. Organisation of the Action: tasks and work plan

Task 1 : Method - 4 months
To endeavour to establish the elements required to describe IST projects and their operation in consistent terms thereby making them comparable and highlighting their features.

Task 2 : Evaluation - 9 months
- to draw up a critical bibliography
- categorise and assess the main projects, or realisations.

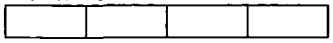
Task 3 : Identification - 9 months
- to analyse the objectives of IST project
- to evaluate the technical and other means employed
- to analyse the economic and technical links between the various parties
- to analyse the achievement of the projects - their success or failure
- to analyse any lack of interactively
- to analyse any lack of generic modules
- to analyse the information strategies and organisation of the companies involved with the maritime transport
- to analyse the quality of service and related cost/benefits
- to analyse the quality and currency of the technology employed
- to analyse the logistics organisation

Task 4 : Future solutions - 9 months
- to compile an awareness of pertinent new technology
- to assess the critical issues with respect to the impact of new technology on ports and their partners
- to present recommendations

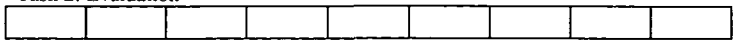
Work plan

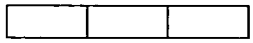
Year 1

Task 1: Method



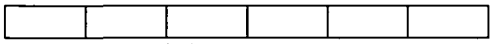
Task 2: Evaluation



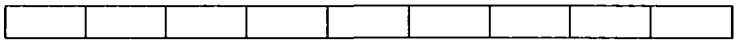


Task 3. Identification

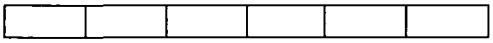
Year 2



Task 4: Future Solutions



Year 3



Final Report and Seminar

Remarks: Each cell represents one month.

An intermediate report will be presented at the end of each task

7. Duration of the Action

The Action will take 30 months (1995 - 1997)

8. Estimation of the cost

Due to the scope of the investigation, its breadth of coverage, the depth of the study, and taking into account the participant numbers the cost of the Action is estimated to be approximately ECU 1.5 million.

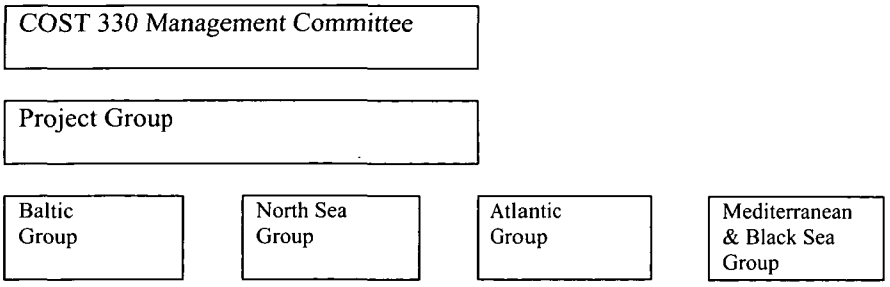
9. Organisation of the Action

The philosophy underlying the structure below is that of establishing a organisation to provide the driving force for the project. This structure will comprise the COST 330 Management Committee within which a Project Group will be set up, chaired by a project leader supported by other experts knowledgeable in IST, port operations and inter-modal chains. The latest, will be assured from the outset that they will have the resources needed for the duration of the project.
The Project Group will comprise about eight persons including the Chairpersons of the four regional groups (the Baltic Sea area, The North Sea area, the Atlantic area and the Mediterranean & Black Sea area). The main tasks of the Project Group are:

- to monitor the Regional Groups
- to co-ordinate the COST 330 Action
- to report to the Management Committee
- to prepare interim and final reports

The main tasks of the regional groups are:

- to investigate locally tasks defined by the project group
- to report their findings verbally to the Project Group with supporting written material which may be incorporated into interim and final reports.


COST 330 Management Committee
Project Group
Baltic Group
North Sea Group
Atlantic Group
Mediterranean & Black Sea Group

Appendix 3: COST Transport Overview

COST Transport is one of 17 domains existing in COST at the present time.

It was to be one of the seven areas seen as best suited for this new form of collaboration, which was officially set up by a Ministerial Conference in November 1971.

The Transport area lends itself particularly well to the COST framework, both because it combines aspects from a number of disciplines, and because of the need for harmonisation at European level. Liaison with the Transport Ministries and Administrations in the various countries is a key element of these COST 330 Actions.

The COST Transport Secretariat is located within the Directorate General for Transport of the European Commission. The location with the staff managing the Fourth Framework Transport RTD Programme, as well as the proximity with the Common Transport Policy Directorates, enables close collaboration between Transport Research activities and serves as a basis for further political action.

COST Transport Actions are authorised and supervised by the COST Technical Committee on Transport which, in turn, reports to the COST Committee of Senior Officials. Both of these decision making bodies comprise representatives of the national governments of the COST countries.

COST Transport Actions Underway

COST 318: Interactions between high speed rail and air passenger transport
COST 319: Estimation of pollutant emissions from transport
COST 321: Urban goods transport
COST 323: Weigh in motion of road vehicles
COST 326: Electronic marine chart display
COST 327: Motorcycle safety helmets
COST 328: Integrated Strategic Infrastructure Networks in Europe
COST 329: Models for traffic and safety development and interventions
COST 330: Teleinformatics links between ports and their partners
COST 331: Requirements for pavement markings
COST 332: Transport and Land-Use policies
COST 333: Development of new bituminous pavement design method
COST 334: Effects of wide single tyres and dual tyres
COST 335: Passengers accessibility of heavy rail systems
COST 336: Falling weight deflectometer
COST 337: Unbound granular materials for road pavements

COST Transport Completed Actions

COST 30: Electronic aids to traffic on major roads
COST 30 bis: Same aim as COST 30 but with demonstration action
COST 33: Forward study of passenger transport requirements between major European conurbations
COST 301: Shore based marine navigation aid systems
COST 302: Technical & economic conditions of the utilisation of electric road vehicles in Europe
COST 303: Technical and economic evaluation of dual-mode trolley bus national programmes
COST 304: Alternative fuels for road vehicles
COST 305: Data system for the study of demand for interregional passenger transport
COST 306: Automatic transmission of data relating to transport
COST 307: Rational use of energy in interregional transport
COST 308: Maintenance of ships
COST 309: Road weather conditions
COST 310: Freight transport logistics
COST 311: Simulation of maritime traffic
COST 312: Effects of the Channel Tunnel on traffic flows
COST 313: Socio-economic cost of road accidents
COST 314: Express delivery services
COST 315: Large containers
COST 317: Socio-economic effects of the Channel Tunnel
COST 320: Effects of E.D.I. on transport
COST 322: Low Floor Buses
COST 324: Long term performance of road pavements
COST 325: New pavement monitoring equipment and methods

COST Transport Actions in preparation

COST 338: Information overload in the field of traffic signs
COST 339: Technical and economic conditions for the use of small containers (Logistic Box) at European level
COST 340: Towards an intermodal transport network: Lessons from history
COST 341: Habitat fragmentation due to transportation infrastructure
COST 342: Parking policy : Effects on Mobility and the Local Economy.
COST 343: Reduction in Road Closures by Improved Maintenance Procedures.
COST 344: Improvements to Snow and Ice Control on European Roads.
COST 345: Procedures Required for Assessing Highway Structures.
COST 346: Instantaneous Energy Consumption and Emissions of Road Vehicles, especially of Heavy Duty Vehicles

Up-to-date information on COST Transport can be found on the World Wide Web, at the following address: http://www.cordis.lu/COST-Transport/home.html.

Appendix 4: Detailed Description of Projects with Links to COST 330

PROJECT				
Acronym:	**BoPCom**	*Start date:* 01/01/96	*Duration:*	36 months
Title:	**Baltic Open Port Communication**			
Programme:	Transport Programme		*Total project cost:*	5080 kECU

BoPCom focuses on:

- Open platform in the Baltic sea and comparable areas for co-operation in telematics and logistics of small and medium ports concerning the application fields of cargo booking, dangerous goods, vessel movement, combined freight traffic terminal, localisation of units, customs co-operation, statistics, berth allocation, hinterland transport.
- Interconnectivity of individual systems of e.g. single users, companies, authorities and local or regional communities.
- Confidential handling of information controlled by the individual users.
- Common data handling so far as reasonable e.g. concerning dictionaries, vessel information, dangerous goods, statistics, etc.
- Interconnectivity of different technical and organisational standards and networking services.
- Establishment of services and consultancy in adaptation or development of individual systems in local areas as well as dissemination of existing and new solutions to all parties interested in the solutions.

PROJECT				
Acronym:	**COMSINE**	*Start date:* 02/01/95	*Duration:*	18 months
Title:	**Communications infrastructure for inland navigation in Europe**			
Programme:	PECO/COPERNICUS		*Total project cost:*	

The objectives of the COMSINE project are:

- To investigate the requirements in inland navigation in the area of communications facilities.
- To establish an open communications infrastructure providing services, especially designed to meet the needs of inland shipping across Europe.
- To implement field trials in inland navigation on the trade route from the North Sea to the Black Sea.

The project will commence with an investigation into the current infrastructure and will identify the main bottlenecks in the area of communications, when sailing from the North Sea to the Black Sea. Next a study will be made of the requirements set by inland navigation. Based on the activities, an overview will be made of the possible services that can be provided by an Inmarsat-C communications system and that will meet the user requirements. The next activities will focus on the functional and technical design, after which the system will be built. After a field trial, an assessment will be made, on which further recommendations for the future implementation will be determined.

PROJECT			
Acronym:	**COREM**	*Start date:*	*Duration:*
Title:	**Co-operative Resource Management for the Transport of Unit Loads**		
Programme: TAP for Transport		*Total project cost:*	

The COREM project sets out to support co-operative work among companies in the transport area along the scientific lines of Computer Supported Co-operative Work. Advanced technological means will be used for this purpose, such as multimedia communication and handling and integrating multimedia documents.

Three pilot applications will be developed:

- The first will link one container truck operator's three branch offices to implement a prototype for intra-company co-operation.
- The second will link this truck operator with a container terminal representing an inter-company co-operation.
- The third pilot application will deal with the scheduling and operation of unaccompanied trailers on a ferry link and the related co-operation between the truck operators on the mainland and on the island.

Ports involved: Piraeus (GR) and Iraklion (GR).

PROJECT			
Acronym:	**EIES**	*Start date:* 01/09/95	*Duration:* 36 months
Title:	**European Information Exchange Service for the Communication between Harbour Areas**		
Programme: ACTS		*Total project cost:*	6827 kECU

The project aims at defining, implementing and experimenting an advanced communication service which has the task to support routine and non-routine communication between different players (harbour authorities, ship owners, customs, fire brigade, etc.) within harbour areas, on a pre-commercial basis. Routine communication includes the daily work communication on an internal, regional, European or international level. Non-routine communication includes the management of emergency cases.

Key issues are:

- To present an integrated interface gathering existing services and new applications
- The development of harbours through relations inter-harbours
- Multimedia and ATM within and between harbours
- To present a demonstrator on a pre-commercial basis
- To prepare guidelines on the implementation of advanced communications in and between small and medium harbours in Europe
- To demonstrate the delivery of services to ships using mobile communications

PROJECT			
Acronym:	**EUROBORDER** *Start date:* 01/03/96	*Duration:*	24 months
Title:	**The port as a hub in the intermodal chain**		
Programme:	Transport Programme	*Total project cost:*	2725 kECU

EUROBORDER sets out to analyse the processes connected to the vehicles, load units and related information, within the ports as well as between ports and their different customers. The main objective of EUROBORDER is to estimate how changes and development related to the port will impact on the port's attraction as a node in the intermodal transport chain. Such measures could be changes and improvements of old procedures, but could also incorporate development of new services.

The task of EUROBORDER is:

- To map and model the procedures.
- To define and describe the system (time/costs) to be studied and its boundaries.
- To identify problems and bottlenecks of the system in relation to the user requirements.
- To propose a tentative list of measures for improvement (as scenarios if meaningful).
- To assess the potential impact of improvements in the port and the importance of such changes in relation to the whole transport chain.
- To propose measures for implementation and/or testing.

PROJECT			
Acronym:	**INFOLOG** *Start date:* 1/01/98	*Duration:*	21 months
Title:	**Intermodal Information Link for Improved Logistics**		
Programme:	Transport Programme	*Total project cost:*	

The goal of INFOLOG is to improve the efficiency of intermodal transport based on waterborne and rail transport as a core through improved communication/information possibilities. The project aims at achieving its goal by demonstrating how to integrate EDI- and AEI-systems along specific intermodal transport chains. INFOLOG will use existing or emerging technology.

The achievements will mainly be:

- a telematic solution for integrated logistics along two specific and complete chains,
- software for interfacing between different EDI- and AEI-systems,
- an assessment of the impact of Interoperable information systems on shippers and transport terminal port operators, and
- input for standardisation.

The transport flows used in INFOLOG consists of

- Forestry products from the production sites in Sweden to the European continent, primarily in a system organised to a port on the Belgian coast, secondly directly to customers in Greece in a transport organised by agents.
- Steel products to customers on the European continent via the ports of Gothenburg and Gent.

PROJECT			
Acronym:	**INTERPORT**	*Start date:*	*Duration:*
Title:	**Integrating Waterborne Transport in the Logistics Chain**		
Programme: TAP for Transport		*Total project cost:*	

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 through the EDI network.
INTERPORT combines existing and emerging technology for electronic identification (tags, smart cards) and remote reading into an integrated system.
INTERPORT will demonstrate how to handle different standards and deal with organisational and administrative problems related to the operation and management of automatic equipment identification (AEI) systems.
Major validation sites: Ports of Helsinki (FI), Oslo (NO), Piraeus (GR), Volos (GR) and Bilbao (ES).

PROJECT			
Acronym:	**INTRARTIP**	*Start date:* 01/12/97	*Duration:* 24 months
Title:	**Intermodal Transport Real-Time Information Platform**		
Programme: Transport Programme		*Total project cost:*	1440 kECU

The aim of the INTRARTIP project is to develop a common framework for Pre-Contract Intermodal Information Systems aimed to facilitate the exchange of pre-contract information in the intermodal transport sector. This will finally contribute to integrate together transport modes.
More specifically the objectives of the INTRARTIP project are:

- To arrive at a *Common Semantic Framework* for the information involved in the intermodal transport, which defines how this information is exchanged among Information Providers and Information Clients and which form the basis for consistency of information across the intermodal chain.
- To arrive at a new *Open Architecture* for the information services and the associated information systems operated.
- To arrive at a *Pilot System* on which a number of key information services are implemented as IT applications that conform to the framework and architecture defined above. This system will be used for evaluating the feasibility of the INTRARTIP approach through a field trial.

The pilot system will be based on Internet technologies and will be used for establishing transport contracts in two different transport chains.

PROJECT			
Acronym: **INVITE**	*Start date:* 01/01/95	*Duration:*	24 months
Title: **Inland navigation telematics**			
Programme: PECO/COPERNICUS		*Total project cost:*	

INVITE aims to investigate the problems related to the inland waterways in a pan-European scale and to provide a harmonised approach to a telematic networking of a commercial and administrative users in this field.
INVITE investigates a distributed network concept to link the ships, the private companies and the inland waterway ports on a standardised system; interfaces of the proposed system will be extended to connecting the rail, road and sea ports communication infrastructure (existing and future) to the proposed approach.

PROJECT			
Acronym: **IPSI**	*Start date:* 01/04/96	*Duration:*	36 months
Title: **Improved Port/Ship Interface**			
Programme: Transport Programme		*Total project cost:*	1699 kECU

The goals for the project are:
- Develop a concept for flexible port/ship interfaces in the context of added value, inter-modal door to door (where applicable) logistics in Europe, based in increased use of waterborne transport, including utilisation of inland waterways.
- Develop methods and equipment for effective transfer of cargo and information about cargo in the above mentioned land/water interfaces, with focus on high efficiency and low investment. The IPSI project will, in addition, define requirements for a system to handle information logistics.
- Demonstrate the "new port/ship interface concept" to verify the effectiveness of multimodal cargo exchange in a "door-to-door" context.

PROJECT			
Acronym:	**LOCALE**	*Start date:* 01/10/95	*Duration:* 19 months
Title:	**Feasibility Study Concerning Low Cost Applications for Linking EDI**		
Programme: DG VII Study		*Total project cost:*	140 ECU

The LOCALE project is aiming at R&D in low-cost EDI facilities. The result of this phase is a feasibility study for the implementation of a low-cost EDI solution in the port area, with special focus on small and medium-sized enterprises. The study outlines:

- The requirements for telematics systems in the MARIS framework supporting information interchange and process integration in logistics and multimodal transport.
- The user requirements concerning telematics and EDI on the organisational and technical level providing interoperability and interconnectivity between partners and their EDP systems.
- The state of the art concerning available solutions such as message standards, EDIFACT, mailboxes, networks and protocols, existing EDI tools, situation in ports, big companies and SMEs.
- The necessity to create and maintain interfaces, to include SMEs in the telematics chain in an easy, reliable and low cost way developing a generic and flexible procedure.
- The specification for a generic EDI tool on the functional, technical and organisational level to be used for an application-independent low cost EDI solution.
- Concepts for EDI services, maintenance and support.
- Recommended implementation scenarios involving computerised fund non-computerised users being of high relevance in port communication.

PROJECT			
Acronym:	**MARNET**	*Start date:* 01/01/97	*Duration:* 24 months
Title:	**The Marnet Network, proposal for an inter-regional maritime information Network**		
Programme: Transport Programme		*Total project cost:*	1874 kECU

The MarNet mission statement is to provide a set of open and globally accessible information services to support logistic and multimodal transport operators. MarNet will set the basis for the creation of a multi-regional real time logistics information network.

The approach, stepping forward the existing situation, will:

- Help simplify the procedures for all Port Communities connected to the MarNet network either directly or via another network (such as Eurotrans Portnet), by providing harmonised procedures that will be used by all MarNet users regardless of their physical location.
- Combine existing systems and technologies to broader their usage from local to regional and inter-regional level.
- Make a new set of global enabling services available to the existing systems.
- Provide all Port Communities, whatever their existing information system is today, with a common access to all these services.

Demonstration site: Lisbon (PT)

PROJECT			
Acronym:	**MULTITRACK**	*Start date:*	*Duration:*
Title:	**Tracking, tracing and monitoring of goods in an inter-modal and open environment**		
Programme:	TAP for Transport	*Total project cost:*	

The goal of the MULTITRACK project is to provide a mechanism that allows the end-user to monitor the location and status of a cargo throughout a large inter-modal system which may comprise sea, rail and road transportation. The aim is to merge existing technologies in the fields of cargo identification, fixed and mobile data communications, database handling and directory-based data relaying.
Major validation sites: Dunkirk (FR), Santander (ES)

PROJECT				
Acronym:	**OCTOPUS**	*Start date:* 01/12/97	*Duration:*	30 months
Title:	**OCTOPUS: Towards distributed hierarchic workflow methods for pro-active tracing of cargo**			
Programme:	Transport Programme	*Total project cost:*		1988 kECU

The objective of the OCTOPUS Project is to solve current cargo communication problems. The Project will create a common and open distributed method for adaptive tracing of communication chains and tracking of general cargo through all sections of the logistic chain, from factory to consumer. The OCTOPUS will thereby focus on the integration of small but flexible 'inland terminals' who will benefit from the adaptive cargo tracing OCTOPUS servers. Such servers will be installed on a scaleable and hierarchic network so that the inland terminal accessibility and inter-co-operation will be maximally guaranteed. The hierarchic method is implemented by each OCTOPUS server which will support local translation processes.

The identification and validation of the cargo and means of transport will be done through development of ETL's = Electronic Labels and Read/Write Terminals (demonstrators and pilot studies). The demonstrators of the adaptive tracing method with the flexible recognition, will be installed by the operational partners. One pilot study will focus on tracing forest products, produced in Scandinavia and transported to Belgium. Another pilot study will focus on general cargo in Greece with terminals in Germany.

PROJECT			
Acronym:	**OSIRIS**	*Start date:* 01/01/97	*Duration:* 12 months
Title:	**Optimised system for an innovative rail integrated seaport connection**		
Programme:	Transport Programme	*Total project cost:*	1080 kECU

OSIRIS focuses on:
- Creating a model for the development of a rail integrated hinterland connections.
- Planning of an economic hub and spoke system between different sea ports and several economic regions in the hinterland and of a hinterland seaport centre.
- Requirements for an Information and Communication system (I&C system) supporting the business process as well as the terminal operation (integrating existing I&C systems with new developed parts).

Demonstration sites: Economic hub-and-spoke systems between sea ports and economic regions in the hinterland from the North-Range (FR, BE, NL, DE).

PROJECT			
Acronym:	**PISCES**	*Start date:* 02/01/97	*Duration:* 37 months
Title:	**Pipeline intermodal system to support control, expedition and scheduling**		
Programme:	Transport Programme	*Total project cost:*	1132 kECU

The project is concerned with the management of information within the transport chain so that effective decisions can be taken concerning the management of that chain. In particular, PISCES is addressing the problem of information provision to the users of the chains in the sense of the people sending freight (the suppliers), the companies moving those goods (shipping companies, ports, railways) and the receivers of the goods. PISCES will enable a transport chain to be scheduled and managed as a single process, over a range of modes and with different providers, without the need for all participants to adopt the same information system or even the same information standards.

The project will concern itself most directly with intermodal chains between ports and other modes of transport, demonstrations being restricted to target transport chains connecting European hinterland consignments to Western sea ports (typically Rotterdam, Antwerp and Hamburg), terminal services and selected deep sea carriers. Basic commodity flows that can demonstrate the feasibility and benefits of the concepts include automotive components, chemicals (food grade and industrial) and foodstuffs, including wine.

PISCES' strategy should not impose a significant extra burden on existing IT set-ups, it should not require publicising confidential information, and it should not give rise to extra operations. Once successfully demonstrated it is likely that the approach would become the de facto standard for information management of intermodal transport.

PROJECT			
Acronym:	**PROSIT**	*Start date:*	*Duration:*
Title:			
Programme: Transport Programme		*Total project cost:*	

PROSIT is aiming at the demonstration concerning the reduce of traffic demand in combination with the improvement of the acceptance of Short Sea Shipping (SSS) and inland waterway transport. PROSIT will demonstrate the use of modern telematics in order:

- To support an "intermodal brokerage" for linking and tuning the demand and supply side in transport including SSS and inland waterway transport.
- To focus on organisational aspects in order to improve the quality and reliability of SSS/inland waterway transport and its integration into intermodal transport chains.
- To establish an after sales service for monitoring the transport, reporting deviations, activating fallback solutions, etc., that means to guarantee the quality and reliability required for the acceptance of SSS and inland waterway transport.

The telematic architecture and respective software products of the project BOPCom will be used and adapted to the requirements of PROSIT. The telematic architecture of BOPCom will be enlarged for interconnecting modern systems for identification, tracking and tracing of freight by the use of mobile communications.

PROJECT				
Acronym:	**SPHERE**	*Start date:* 01/01/96	*Duration:*	36 moths
Title:	**Small/medium sized Ports with Harmonised, Effective Re-engineered processes**			
Programme: Transport Programme			*Total project cost:*	1599 kECU

SPHERE's main objectives are:

- To approach small/medium sized ports (SMPs) not merely as nodal points within the TEN but as autonomous business units as well and apply to them the principles of "Business Process Re-engineering".
- On the basis of the re-engineered processes, to develop a generic operational and organisational framework for the efficient, reliable and flexible operation of SMPs as service Centres for transhipment and distribution.
- To evaluate the developed framework within a virtual test site on a port process simulating tool.

Demonstration sites: Ports of Igoumenitsa (GR), Ravenna (IT), Harwich (GB) and Kokkola (FI).

PROJECT			
Acronym:	**TILEMATT**	*Start date:*	*Duration:*
Title:	**Testing & Implementing Links in Europe for Multimodal Applications of Transport Telematics**		
Programme:	TAP for Transport		*Total project cost:*

The idea of TILEMATT is to enhance multimodal short sea shipping links. Two links (Greece-Italy and Calais-Dover) will connect Trans European Networks for Transport using advanced telematics technologies such as on-line multimedia and support systems for passengers and management systems for freight. The feasibility of implementing telematics-based applications for interconnecting waterborne with other transport modes, i.e. rail and road, will be assessed on a third link, namely Rostock-Sweden.

PROJECT			
Acronym:	**TRACAR**	*Start date:*	*Duration:*
Title:	**Traffic & Cargo Supervision System**		
Programme:	TAP for Transport		*Total project cost:*

The overall objective of TRACAR is to establish a common Telematic standard for the identification, positioning, supervision and management of cargo in a multimodal situation (in terminals, on roads, railways, the sea and inland waterways) including the handling of freight documents.
The project builds on existing, low-frequency Tag/Transponder and other established technologies, i.e. computers, radio, and telecommunications, which will be applied and integrated.
The user chain runs from a user (a slaughterhouse) in Denmark through Germany and Switzerland to the end-user in Italy.

PROJECT			
Acronym:	**TRACAR Extension**	*Start date:* 1988	*Duration:* 18 moths
Title:	**Traffic & Cargo Supervision System Extension**		
Programme:	TAP for Transport		*Total project cost:*

The overall objective of TRACAR extension is to establish a common Telematic system/standard for the identification, positioning, supervision and management of reefer and dry cargo, transported in containers in a multimodal set-up (cargo in terminals, on road, railway, sea and inland waterways.
The project builds on existing, but upgraded, low frequency Tag/Transponder technology and other established technologies i.e. computer, radio, telephony and satellite technology. These technologies will become integrated and enhanced.
The pilot corridor of the project runs from a user (a slaughterhouse) in Denmark to a terminal in Hamburg (GE) and by sea to a terminal in Porto (PT) and further to the end user in Valadares (PT).

PROJECT			
Acronym:	**WELCOM**	*Start date:*	*Duration:*
Title:	**West-East Logistics Corridor for Multimodal transport**		
Programme:	TAP for Transport		*Total project cost:*

The main objective of the WELCOM design study is to create the basis for future phases demonstration and evaluation on the West-East Corridor. This design study will contain a detailed study of user requirements related to this corridor, and of the technical needs in the fields of transport telematics and freight resource management.
The project relies primarily on EDI message exchange along multimodal transport chains, including transport network information systems and freight resource management systems. Its conclusions will lead to the first sketch of the demonstrator and the definition of the pilot test sites and the users in the transport chain.

PROJECT			
Acronym:	**WISDOM**	*Start date:*	*Duration:*
Title:	**Waterborne Information System Distributed to Other Modes**		
Programme:	TAP for Transport		*Total project cost:*

Wisdom starts with two pilots in Rotterdam (NL) and in Bremen/Hamburg (DE). The Rotterdam pilot is focused on the control of a door-to-door services. The Bremen/Hamburg pilot is focused on the interconnectivity of systems in the North German area. Both pilots include the tracking of load units via low orbit satellites.
The Wisdom project applies existing and proven technologies for the implementation of improved working procedures between the involved partners.

PROJECT			
Acronym:	**VTMIS-Net**	*Start date:* 01/01/98	*Duration:* 24 months
Title:	**Vessel Traffic Management and Information System - NETwork**		
Programme: TAP for Transport			*Total project cost:* 4003 kECU

Vessel Traffic Services (VTS) and Vessel Traffic Management and Information Systems (VTMIS) currently operate on a local (e.g. port VTS) or a national (e.g. coastal VTS) basis mainly. From an European point of view locally or nationally available information could improve the efficiency of such services assuming improved communication between existing systems. VTMIS Net aims at added values from interlinking of VT(MI)S to establish local, regional and European VT(MI)S networks. Expected added values are improved dissemination of traffic information for traffic and transport operations and management access to vessels' data access to cargo data when required for safety reasons dissemination of marine pollution information.

VTMIS-Net objectives therefore are

- a methodology, guidelines and examples for the development of a VTMIS network in technical, institutional, administrative, financial and legal aspects based on the conditions within participating countries
- a specification of an appropriate architectural network of all relevant system levels
- tools for enhanced network operations allowing for interoperability of individual local solutions
- an information exchange network to promote efficient and safe flow of traffic and intermodal transport services
- introduction of a marine pollution information system as part of a VTMIS information network
- means to monitor the development of the network, to evaluate systems and services and to steer further development of the network towards an EU wide vessel traffic management and information system.

VTMIS-Net provides the information interchange network for already existing VTS, VTMIS, navigational, emergency, monitoring of the marine environment and other transport related information services and vessels. A major objective is to encourage the providers and users of VTMIS-related information to proceed to use the network after the conclusion of the project. It is therefore essential that the network is being established according to real cases. By establishing the network use will be made of existing installations, services and communication networks and links. Development work is required to provide interface software, common protocols and message formats, human-computer interfaces, interconnection of communication networks and geographical information systems (GIS) functionality.