



**EUROPEAN COMMISSION - DGVII “ TRANSPORT ”**

—

**MARNET  
Final Report  
For publication**



## TABLE OF CONTENTS

<b><u>1 INTRODUCTION</u></b>	<b>5</b>
<b>1.1 Scope</b>	
<b>1.2 Structure of the document</b>	<b>5</b>
<b><u>2 EXECUTIVE SUMMARY</u></b>	<b>6</b>
<b>2.1 MARNET General Presentation</b>	<b>6</b>
<b>2.2 Works realisation</b>	<b>7</b>
<b>2.3 Achieved results</b>	<b>7</b>
2.3.1 OPERATIONAL ASPECTS	8
2.3.2 TECHNICAL AND INFORMATION SYSTEMS	8
2.3.3 ON A BUSINESS PLAN	8
<b>2.4 Critical observations</b>	<b>8</b>
<b><u>3 PARTNERSHIP INFORMATION</u></b>	<b>9</b>
<b>3.1 Companies involved in computer related services in the transport field</b>	<b>9</b>
3.1.1 EUROMAR	9
3.1.2 PORTEL S.A.	9
3.1.3 GYPTIS	10
3.1.4 SISTEMI E TELEMATICA PORTO DI GENOVA (SET)	11
3.1.5 EUROTRANSPORTNET	11
3.1.6 SEAGHA	14
3.1.7 ICARUS	14
<b>3.2 Port Authorities (large and small ports)</b>	<b>16</b>
3.2.1 PORT OF MARSEILLES	16
3.2.2 PORT OF VALENCIA	16
3.2.3 PORT OF GENOA	18
3.2.4 PORT OF PIRAEUS	18
3.2.5 PORT OF SÈTE	19
3.2.6 PORT OF ALICANTE	19
<b>3.3 Shipowners</b>	<b>20</b>
3.3.1 COMPAÑA TRASATLANTICA ESPAÑOLA (C.T.E.)	20
3.3.2 SUDCARGOS	20
<b><u>4 OBJECTIVES OF THE MARNET PROJECT</u></b>	<b>25</b>
<b>4.1 MAIN EXPECTED DELIVERABLES</b>	<b>25</b>



<b><u>5 MEANS TO ACHIEVE THE OBJECTIVES</u></b>	<b>27</b>
<b>5.1 Presentation of the project organisation</b>	<b>27</b>
<b>5.2 Resources involved in the Marnet project</b>	<b>28</b>
5.2.1 GENERAL PRESENTATION	28
5.2.2 USE OF EXISTING SYSTEMS	28
5.2.3 OTHER SUPPLIES	28
<b>5.3 Works process</b>	<b>29</b>
5.3.1 WORK PACKAGE 1: USER REQUIREMENTS IDENTIFICATION	29
5.3.2 WORK PACKAGE 2: SYSTEM DESIGN	29
5.3.3 WORK PACKAGE 3: PILOT SYSTEM AND DEVELOPMENT	30
5.3.4 WORK PACKAGE 4: PILOT SYSTEM INTEGRATION AND SET-UP.	33
5.3.5 WORK PACKAGE 5: PILOT SYSTEM TRIAL AND EVALUATION	33
5.3.6 WORK PACKAGE 6: EXPLOITATION AND DISSEMINATION.	33
<b><u>6 SCIENTIFIC AND TECHNICAL DESCRIPTION OF THE PROJECT</u></b>	<b>35</b>
<b>6.1 Needs evaluation of transport operators</b>	<b>35</b>
6.1.1 ACTUAL SITUATION AND USE OF N.I.C.T.	35
6.1.2 USERS REQUIREMENTS EVALUATION	36
<b>6.2 Marnet Services Presentation</b>	<b>37</b>
6.2.1 E.U. SINGLE DESK MANAGEMENT (S1-1/...S1-8)	37
6.2.2 UNIFIED DANGEROUS GOODS SERVICES (S1.10/11)	40
6.2.3 SHIP TRACING (S2-1)	42
6.2.4 MANIFEST INTERCHANGE (S4-4 / ...S4-6)	45
6.2.5 COMMERCIAL INFORMATION INTERCHANGE (S6)	50
6.2.6 PORT CONSULTATION (S7-1/...S7-3)	51
6.2.7 STATISTICS (S8-1/...S8-7)	52
6.2.8 PORT CARGO COMMUNITY SYSTEM IN A SMALL PORT (S10)	55
6.2.9 MANIFEST SHORT SEA SHIPPING (S11)	57
6.2.10 EXCHANGE INTERPORT BY X400 (S12)	60
<b>6.3 How could we satisfy the needs of transport operators ?</b>	<b>61</b>
6.3.1 MARNET NETWORK TECHNICAL REQUIREMENTS	61
6.3.2 TECHNICAL RESPONSE	62
6.3.3 THE PILOT SYSTEM ARCHITECTURE	65
<b><u>7 CONCLUSION</u></b>	<b>73</b>





## **1. INTRODUCTION**

### ***1.1. SCOPE***

This report describes the Marnet project in detail. It also consolidates and summarises the work carried out and the results obtained by all the partners.

### ***1.2. STRUCTURE OF THE DOCUMENT***

The first part of this document presents and summarizes the Marnet project and the obtained results.

The second part focuses on the Marnet project objectives which were defined by the DG 7, EUROMAR and other Marnet partners when the contract was signed on the beginning of January 97.

The third part describes the organization and the Work Packages.

The fourth part presents the technical and scientific results according to three main axis which are: the Marnet services presentation in functional terms, the technical (Network and application) aspects and the marketing aspects.



## 2. EXECUTIVE SUMMARY

### 2.1 MARNET GENERAL PRESENTATION

MarNet is a Research and Development project co-funded by the European Commission in its 4th Framework Programme in the field of Transport. The project took off in January 1997 and was due to be completed over a two-year period.

MARNET project started in January 1997 and finished on the 11<sup>th</sup> December 1998.

The development of MarNet is coordinated by the Euromar E.E.I.G. (European Economic Interest Group).

The objectives of the project were to:

- Demonstrate the inter-regional interconnectivity and interoperability of EDI Port Community Systems, integrate tracing and tracking.
- Demonstrate the implementation of EDI in non-automated ports using common building blocks.
- Demonstrate the functionalities of a maritime information system integrating small, medium and large-size ports;
- Demonstrate the possibility to improve Short Sea Shipping.

A large number of partners were involved in the Marnet project representing the various actors of the port and maritime sectors:

- Port Authorities (PA),
- Companies managing Port Cargo Community Systems (PCCS),
- Shipowners (SP)

Those companies had different status in the project and were either partners either Associated Partners:

- Partners:
  - Port of Genova (PA),
  - Port of Valencia (PA),
  - Port of Marseilles (PA),



- Associated Partners:
  - Port of Piraeus (PA),
  - Port of Sète (PA),
  - Port of Lisbon (PA),
  - Port of Alicante (PA),
  - Sudcargos (SP)
  - Trasatlantica (SP)
  - Icarus Marketing
  - Seagha (PCCS)
  
- Eurotransportnet EEIG:
  - Hamburg (PCCS)
  - Bremen (PCCS)
  - Rotterdam (PCCS)
  - Felixstowe (PCCS)
  - Le Havre (PCCS)
  - Antwerpen (PCCS)

## **2.2. WORKS REALISATION**

A project management organisation has been set up at the beginning of the project. It was based on very accurate work packages considered as project themselves with objectives, deliverables and leaders.

Several teams (technical team, awareness team and financial team) were organized in order to harmonize the tasks in the technical, awareness and financial team.

- A steering committee in charge of the project orientation was named.
- A partner committee

This organisation satisfied us and we can note that it is still operational today at the end of the project.

A management manual has defined quality control procedures and the working methods since the project began. Maybe could we regret that a too big quantity of intermediary reports have been issued.

Some pilot operations in large scale allowed us to experiment and evaluate results of our work.

## **2.3 ACHIEVED RESULTS**

Results are presented in detail in the present document, we can summarize the main results according to the following way:



### **2.3.1. Operational aspects**

It exists needs for data interchange between port communities.

Those needs were grouped together around 10 services, which were the object of information systems developments and pilot operations [A3]:

- S1-1/...S1-8 EU Port single desk management
- S1-10/11 Dangerous Goods Management
- S2-1 Ship tracery
- S4-4/...S4-6 Manifest interchange
- S6 Commercial information interchange
- S7-1/...S7-3 Port consultation
- S8-1/...S8-7 Statistics
- S10 Port cargo system for small ports
- S11 Manifest Short sea shipping
- S12 Interport Data Exchange

Those services can be proposed at reasonable costs to automated or non-automated ports.

### **2.3.2. Technical and information systems**

The Marnet network has experimented different techniques and allows the standard data interchange without considerations of telecommunication means or of data interchange.

The use of Internet techniques allows us to set-up a distributed architecture based upon the concept of Marnet Node.

### **2.3.3. On business plan**

A network like Marnet will find its economic balance if between 20 and 30 Port Communities are potential users, what means about a hundred of transport operators.

## **2.4. CRITICAL OBSERVATIONS**

Investigations and pilot operations made in the Marnet Framework have demonstrated the utility of interport data interchange.

The use of New Information and Communication Technology (Internet, Java) accompanied by a weak utilisation cost make data interchange easy and useful.

Those conclusions were not obvious before the realization of Marnet, and in 1996, it wasn't proved that there were needs for such services and that those needs could be satisfied in acceptable technical and economical conditions.





### **3. PARTNERSHIP INFORMATION**

Considering the objectives pursued for the Marnet project, we deemed it would be interesting to gather a consortium of entities, representative of the would-be users and suppliers of the Marnet services. This is the reason why the Marnet team was set up with :

#### **3.1. COMPANIES INVOLVED IN COMPUTER RELATED SERVICES IN THE TRANSPORT FIELD**

##### **3.1.1 EUROMAR**

The Coordinator Partner is EUROMAR. The EUROMAR European Economic Interest Group was formed on 6 February 1996 by representative Cargo Community System Operators of ports in the Mediterranean region, namely SET, associated with the Autorita' Portuale di Genova; GYPTIS, associated with the Port Autonome de Marseille; and PORTEL, associated with the Autoridad Portuaria de Valencia. The Port Authorities of Genoa, Marseilles, Valencia, Piraeus, Barcelona, and Lisbon are honorary members of EUROMAR. The Group was formed with the aim of consolidating the benefits of information technology and telematic applications for intermodal transport activity in the Mediterranean region. Specifically, they intend to build an open communications network that will promote interconnectivity and interoperability among CCS's and allow the creation of new services such as tracking and tracing and cargo route optimization, as well as produce reductions in cost and delivery time.

The individual profile of the EUROMAR EEIG members participating in the project are:

##### **3.1.2 PORTEL S.A.**

PORTEL S.A. is a company created at the end of 1995 that has started its operations in January 1996; its main aim is to promote the implementation of advanced technologies in all Spanish commercial ports, by coordinating the experiences already in progress in some of them and in general by modernizing the telematic infrastructures of all the ports.

In the spirit of modernization and technology update, the "Ente Publico Puertos del Estado" (Holding Corporation of all Spanish commercial ports) and the Spanish Post Office (Telefonica de España S.A.) agreed on creating PORTEL taking respectively 51% and 49% of the capital.

PORTEL S.A. is created with a compromise of both its parent companies to invest 4.500.000.000 ptas (27.000.000 ECU's) each one in the next two years in telematics infrastructure for the Spanish Ports.

PORTEL activities can be summarized in three main lines:

- to provide logistic information services to Port communities;
- to provide support to port-related activities;



- to provide communication services among the different Port communities.
- Logistic Information Services:
  - Creation of a Port EDI clearing-house that will enhance the goods flow in all the Ports. To achieve that goal, agreements have been signed with the Spanish Customs and Health services.
  - PORTEL becomes the National Center for the communication of dangerous goods, in compliance with the HAZMAT directive.
  - PORTEL acts as the "single" window of Port related commercial activities, providing access to information related to the follow-up of goods as well as to external sources of information (such as Internet).
  - Provision of basic telematic services such as email, fax store and forward, etc.
- Provision of support to port-related activities:

In order to do that PORTEL will speed up the creation of telematic service companies in the different Port Authorities.

These companies called "SERVIPORT-X" will offer the following services:

- Portuary communication: basic telephone and radio-telephone services;
- Portuary operation: support to the Cargo Community System (CCS), aids to ship's navigation;
- Security and emergency: alarm control, access control, open warehouse management.
- Interconnection of Portuary Communities

These services will basically aim at the management of a corporate network of voice, data and images that will be offered to the different port communities.

### 3.1.3 GYPTIS

GYPTIS is an independent company, which has been created by the Port Community of Marseilles/Fos. Its capital is 5.4 Million French Francs, which are detained by professional associations of maritime enterprises. The turnover is about 20 Million French Francs.

GYPTIS is in charge of the exploitation of PROTIS, a port information system and an interconnectivity platform that links 300 companies in the field of transport. PROTIS is used in Marseilles, and has also been installed for the Port Community of Dunkirk.

GYPTIS also performs training activities for personnel in the area of transport logistics.



### 3.1.4 Sistemi e Telematica Porto di Genova (SET)

Sistemi e Telematica Porto di Genova (SET) was initially established in 1985 to meet the growing need for IT within the Port of Genoa and was a subsidiary of the Port Authority of Genoa. With the unilateral privatization of the port's operational sectors, SET is now free to enter the world marketplace with a line of products that are internationally competitive. In view of this new mission, SET is currently increasing its client and product bases and boosting its ability to develop customized as well generic applications for its customers.

Presently the SET product line is made up of a collection of integrated applications which include a Container Terminal Control System, with yard and ship support planning systems; a Marine Traffic Control System able to integrate VTS technology and TVCC based systems; a Bulk Terminal Control System; an Administration System with accounting and invoicing functions; and a Maintenance Support System for EDI/EDIFACT and EDI Community Systems. In addition, SET regularly provides EDI and telecommunication services to transport service provider organizations operating in the Port of Genoa, by exploiting the SETFREIGHT Cargo Community System.

In response to the growing internationalization of its market, SET is currently in the process of obtaining ISO-9001 and ISO-9000-3 standards certification of its Quality Control System. In the past, SET has been involved in several EC projects: COST306, an application for an intermodal goods transport chain from Italy to the United Kingdom; COMETT, the development of a simulator for container terminal planners; IACIS, a locally integrated information data exchange system on ship movements; NTMM, an EDI system using EDIFACT messages for transport management of vessels and cargo for the major Mediterranean ports.

### 3.1.5 EUROTRANSPORTNET

Eurotransportnet EEIG was established in 1993 to promote existing cooperation between the Port Community Systems (PCS) operators in the north West European ports.

The members of Eurotransportnet are providing electronic communication and information services in the major container handling ports:

CNS :	Southampton
Dakosy :	Hamburg
Datenbank Bremische Hafen :	Bremen und Bremerhaven
INTIS :	Rotterdam
MCP :	Felixstowe
SEAGHA :	Antwerp
SOGET (Havre Port Innovation) :	Le Havre



- Dangerous Goods Notification :

The cooperation between the PCS operators in Eurotransportnet originated from the joint initiative to improve the information exchange on dangerous cargo on board of seagoing vessels by the use of Electronic Data Interchange (EDI).

This project, which is named PROTECT, has been carried out by Eurotransportnet in close cooperation with the Port Authorities, which are demanding more precise and on time information about the dangerous goods entering the ports.

Based on (inter)national legislations the Port Authorities have been incorporating the rules for notifying dangerous goods in their local regulations, the port by-laws, for a long time. The sharpening of the rules regarding the quality of information exchange by the authorities aroused the need for improvement of communications between the industry and the authorities arisen.

With the increasing number of consignments on board of the vessels, in particular in the container trades, the processing of the information of dangerous goods requires electronic means of communication (E.D.I.).

Although the local regulations on notification of dangerous goods in the various ports differ one from another, the need for standardisation of the notification procedures was recognized by the port Authorities and the PCS operators. With combined efforts Eurotransportnet has developed the EDIFACT standard messages for the notification of Dangerous goods (IFTDGN).

As requested by the major container shipping lines, the ports participating in the project have harmonized their procedures for the notification of dangerous goods, which has resulted into a universal implementation guide for the the standard message IFTDGN

The standard message IFTDGN and the universal implementation guide are covering the requirements of the HAZMAT directive. This enables the shipowners to implement EDI for notifying the dangerous goods both for the local regulations of the Port Authorities and for the national regulations based on the HAZMAT Directive of the European Commission.

As a result of the work done by Eurotransportnet together with the Port Authorities, the shipowners and their agents are being helped by implementing EDI. The notification of dangerous goods is already prescribed by some ports in North West Europe, while others will follow in 1996. Over 500 companies are already using E.D.I. in notifications of dangerous goods in the participating ports.

Other ports in Europe, in the Baltic and Mediterranean region, are also implementing the PROTECT message scenario, in close consultation with Eurotransportnet.

By implementing the electronic notification of dangerous goods in the ports and creating a system to enable the shipowners' agents to exchange information among themselves in the various ports, the members of Eurotransportnet have built up a valuable experience and know-how. They are consulted by the national competent authorities in implementing the HAZMAT directive in their countries.

- EDI-Task Force and EDI infobase

Eurotransportnet is leading the consortium which was formed to carry out the project to establish an EDI task force and EDI infobase, supporting EDI developments in European ports. The consortium consists of :





- The members of Eurotransportnet
- Port of Marseille Authorities
- ITP, Puertos del Estado, Spain
- EDI management, Finland
- Cargo Community systems, Ireland

The project is co-funded by the European Commission DGVII.

### **3.1.6 SEAGHA**

Seagha is the Belgian EDI transport network located in the Port of Antwerp.

Seagha was created on the end of 1986 by the Antwerp private sector in order to set-up an EDI network on behalf of the Antwerp private companies.

Now Seagha is a complete EDI and E-mail provider with location in Antwerp but with national and international connections with the outside world.

A part of the network Seagha also provides EDI and EDIFACT software packages for the end users. e.g. Seagha-DGN software for the notification of dangerous goods to the Antwerp Port Authority, Seagha Sadbel for the customs declarations etc.

Seagha has connections with :

- The Antwerp Port Authorities for the exchange of nautical messages and notifications of dangerous cargo.
- The Belgian Customs for the declaration (import, export, transit) of goods and for the exchange of custom manifests.
- Belgian railway for the exchange of the electronic rail consignment note and the follow up of rail wagons on the European rail road network.

Seagha is connected with the Eurotransportnet members and the following international VAN's : IBM, Geisco, Bimcom, MCI, Sterling, Sprint, AT&T, DCS 400.

### **3.1.7 ICARUS**

Icarus marketing Limited is the company having the sole franchise for international marketing of the ICARUS products AND SERVICES OWNED BY Cargo Community Systems Limited .



Cargo Community Systems Ltd. is a joint venture originally formed to develop the IATA cargo STAR solution for the Irish aircargo industry. The Irish community was selected by IATA as the first pilot test site for CargoSTAR.

CCS Ltd. was established in February 1988, jointly owned by four international airlines and fifteen Irish freight forwarders and the Irish Continental Group shipping lines. The shareholders are:

- Airlines : Aer Lingus Plc, British Airways, Lufthansa, Ryanair Plc
- Shipping lines : Irish Continental Group Ltd (Comprising B&I Lines)
- Forwarders : AEI Ltd., Air Sea Forwarding Ltd., Byrne Air Freight Ltd., Castle Freight Ltd.,
- Intercontinental Cargo Ltd , Irish Express Cargo Ltd, James P Jones Ltd., Lep International Ltd., Emerald Freight Ltd., Meadows Freight Ltd, O'Reilly Aerold Ltd, Reindar Shipping Ltd, Sea Sky Express Ltd , Walsh Western Intl Ltd.

The objective of the company is to provide neutral and open EDI services for all its shareholders and other companies who wish to join. The goal is to provide the highest level of service at the lowest cost. The service and product are called ICARUS (Switching, translation, and routing). ICARUS has a number of facilities over and above the cargoSTAR specification.

CCS Ltd. was incorporated in February 1988. Firstly, an independent study was carried out to determine the requirements of the Irish community and it was decided in September 1988 that these were addressed by the IATA Functional Design Specification (FTS). This document was written by Philips NV Eindhoven under contract to IATA and has just been published afterwards. The IATA FDS became the basis of the ICARUS request for Proposal which was put out to tender to fifteen leading international computer services companies. Philips won the contract and successfully developed the software specified by ICARUS and implemented the project on time. ICARUS retains full ownership of the softwares and design.

The services offered by ICARUS Value Added Network are :

- Specializing in electronics links in transportation and logistic sector
- Electronic links to all carriers, major freight forwarders and logistic sector
- Interactive EDI connections. Responses can be received from the major world airlines within a second for tracking, tracing, booking and document transfer. ICARUS is also registered as a full public domain e-mail provider and has international agreements with all the major world Value Added Networks. It provides Store and Forward, Mail box and X.400 connections.

ICARUS software has been licensed worldwide and operates various Cargo Community Systems. ICARUS also provides end-user software.



## **3.2 PORT AUTHORITIES (LARGE AND SMALL PORTS)**

### **3.2.1 Port of Marseilles**

With global annual trade figures of 90 million tons, the Port Autonome of Marseille is one of Europe's leading port facilities. Its staff includes 1,600 engineers, mechanics, electricians, economists, computer specialists, legal experts, commercial staff, accountants, managers, operation executives, trainers and a whole range of other professions who carry out the diverse variety of functions necessary to support the port's many activities.

Port facilities include oil terminals, container terminals with 2,200 square meters of berth space, an ore terminal, a heavy load terminal, a 51 hectares car terminal, and other facilities for special cargoes such as ro-ro traffic, bulk liquids, dry bulk, and fruit and vegetables. In addition, the port is provided with a 105,000 square meter passenger terminal, ship repair facilities that include the European Union's biggest angraving dock, a deballasting station and numerous industrial zones. Currently, the Marseilles port is in the process of obtaining certification of conformity to the ISO 9001 operational quality standard.

### **3.2.2 Port of Valencia**

The Port Authority of Valencia is the public enterprise responsible for the management and administration of three Ports situated on the western coast of the Spanish Mediterranean: Valencia, Candia and Sagunto. It has some 350 employees and its gross earnings in 1995 amounted to approximately 56 million ECU. In commercial terms the Port of Valencia is the most important in Spain.

- The capacity for concentrating cargo is conclusive: 55,8% of Spain's gross production comes from its structural hinterland which represents 48,6% of the population and 42,0% of the countries total extension.
- The volume of traffic overpasses the 16 millions of tons, over 64 % of which is general cargo. Moreover, containerized goods traffic reached 7,5 million tons in 1995 (670000 TEU'S) and 90% of this figure corresponded to import/export traffic.
- More than 160 shipping lines link the Port of Valencia with more than 300 Ports in the five continents. The Port of Valencia has over 7000 meters berthing lines with depths ranging between 7 and 16 meters, 14 ro-ro berths and 36 cranes. The main specialized terminals are:
  - The Public's Container Terminal
  - The Cereal' s Public Terminal





- The Multipurpose Terminal

- About 51% of its traffic in 1995 was Short Sea Shipping concentrated primarily in the Mediterranean region.

The Port of Valencia is highly automated with a LAN of more than 160 personal computers supported by AS/400, Unix and Windows NT servers. Applications include:

- Internal Management System
- Office System
- Executive Information System
- Documentary Info System
- Computer Aided Design (CAD)

The Port Authority has encouraged the creation of a Community System which allows all agents of the Port Community to communicate with each other.

The system (which supports cargo manifest, Customs clearance, dangerous good notification, booking, loading notification, etc.) is based on Edifact Standards and is currently being used by a vast majority of operators.

As an extension of the EDI system the Port Authority offers its clients on-line information related to Vessel Traffic Management, available lines and services, dangerous good management, statistics and dock personnel management.

The Port of Valencia plays an important leading role in the Valencian Port Community. In order to stimulate and upgrade the community, the P.A.V. created in 1991 and now manages the Port Institute of Studies and Cooperation (IPEC) which serves trade by way of innovative human resources training programmes, research and technological developments as well as by cooperation and technological transmission on a national and international scale.

Its activities include:

- Training: Management training in business administration, ports and transport (University Master and Advanced Courses); Specialized seminars in Modern Port Management, total Quality Management and EDI implementation in the transport chain.
- Research: Lines of work include: training needs in the Port and Shipping Industry; promotion and development of multimodal transport and Short Sea Shipping in Europe; development and implementation of EDI in ports.
- Cooperation: in European Union Programmes (DG7, COMETT, ERASMUS, PHARE, FORCE) and UNCTAD Programmes with activities mainly focused on countries in Latin America, the Mediterranean and Eastern Europe.

By way of the IPEC and its Information System department, the P.A.V. will contribute to the tasks it is assigned in this project. The former has a task force of eight highly qualified experts involved in carrying out activities with an ample team of external collaborators. The latter has ten expert technicians and teams specialized in the analysis, design and operations of information systems.



### 3.2.3 Port of Genoa

More than 50 lines regularly connect Genoa with ports around the world, offering a variety of choice to importers and exporters. The large quantities of containerisable and other cargo generated in Central and Southern Europe and in the Northern Italian industrial hinterland are naturally tributary to the port of Genoa.

A large number of maritime service industries are established around the port area, providing a full range of services and facilities to terminal and vessel operators. With virtually all operations now under private management, it is a time of rapid change and development for the port of Genoa. The container terminals Southern European Container Hub and Voltri are rapidly progressing and expanding their facilities and client bases. At the same time, they are widening the range of services they offer and upgrading performance.

The port also includes terminals for general cargo operations, ro-ro vessels, bulk handling, cold store and fruit handling, forest products, passenger operations (both cruise and ferry terminals), oil products and ships repair. In addition, the port provides comprehensive maritime services: pilotage, towing, mooring, police, fire fighting, boatmen, bunkering, telecommunications, health and ecology.

As far as telematics and IT services are concerned, the Port of Genoa exploits integrated and advanced solutions that have been operated for many years by the Port authority and the port operators. The entire port area, which extends over 20 km of coast, is traversed by a fiber optic backbone which adapts to a variety of protocols (F.D.D.I., TCP/IP, etc.). The network supports the EDI communications between terminals and other operators of the port areas; also connected to this network is the Sistemi e Telematica EDI system and the SETFREIGHT Cargo Community system which connect to the external operators in the area of Genoa and world-wide.

### 3.2.4 Port of Piraeus

Piraeus Port Authority is a centralised state establishment in the form of a State Statute Legal Entity (S.S.L.E.). It is administrated by the Ministry of Merchant Marine. Under its jurisdiction lie the Central Harbour, Port of Irakleous, the Perama Akti, (Perama shore), the Ampelakia sound (isl. of Salamina), the Kynosoura point and part of the Aspropyrgos shore.

Piraeus Port Authority is responsible for:

- Construction and maintenance of port terrestrial constructions as quays, warehouses, dry docks, buildings and installations as well as the port equipment, by means of the necessary mechanical and other equipment;
- Berthing, mooring and docking of ships and determining of their location for cargo handling;



- Provision of port services and facilities to the ships calling the port;
- Stevedoring, storing, securing and delivery of merchandise imported in the port, as well as of those exported by the port;
- Facilitating transition of passengers ;
- General port administration, security and utilisation, and concern about smooth port operating.

The Piraeus port Organization may be divided into three sections of port activities : the Passenger Port, occupying the main basin of the Central Harbour and the Perama Port, the commercial Port which occupies the entrance harbour basin, most of the northern part of the Central Harbour and the Irakleous and Neo Ikonio Ports and finally the handling of bulk, cargo ships.

By means of an information system, based on Prime computers and Lans, Piraeus Port Authority covers some of administrative-financial activities such as payroll, income monitoring, material purchase monitoring, statistics, etc...

Port of Piraeus is a honorary member of Euromar EEIG.

### 3.2.5 Port of Sète

Deep water harbour well protected by a breakwater 2.4 km long, running East to West and forming two entrances. The Eastern entrance can accomodate vessels up to 13-18 md, whilst the Western entrance can only be used for fishing boats and yachts.

The container terminal carries container and ro-ro traffic and is called at by various French and non French shipping lines ; containers can be handled at two berths ; equipment includes a container gantry crane of 35t cap and a truck crane.

Treated with specialized equipment, the liquids in bulk include various products such as refined hydrocarbons, agricultural and food stuff (wines, molasses), chemicals. Located on the port and nearby, four hydrocarbon stores are supplied by seaway.

Regular Ferry services operate to Marocco and there is summer service to the Balearic Islands.

### 3.2.6 Port of Alicante

The Port Authority of ALICANTE is a public enterprise responsible for the management and administration of two ports situated on the Spanish Mediterranean coasting : the port of Alicante and Torrevieja. In 1995 the total traffic of both ports amounted to 2.5 million tons, 64 % of which was foreign traffic. Both ports typify the small size of ports which are so frequent in Europe serving certain market niches and constituting key infrastructures for the economic welfare of their surrounding areas.



An aspect that may be highlighted and for which the Port Authority of Alicante has joined this project is that the port of Alicante is a port of call for several typical Short Sea Shipping container and RO-RO services:

- Container services South of France (Marseille-Fos), Spanish Mediterranean, Canary Isles;
- Container and RO-RO services Alicante Balearic Isles;
- Container and RO-RO services Alicante – North of Africa (Melilla, Algiers and Oran);

Information systems in the port are at an initial development stage and full automation of information relating to regular line services is a priority for those in authority. A team made up by the heads of operations management, invoicing and information system will take part in the tasks scheduled for this project, under the supervision of the economic finance manager.

### **3.3 SHIPOWNERS**

#### **3.3.1 Compañía Trasatlantica Española (C.T.E.)**

The Compañía Trasatlantica Española is a Spanish shipowner company dealing in maritime and intermodal goods transport. It was founded in 1850 and towards the end of 1993 was sold by the public Group TENERE to the private group ODIEL. It has agencies in all main Spanish ports (including Valencia and Alicante) and in the Atlantic/North of Europe (i.e. Bremen, Antwerp, Leixoes, Lisbon) as well as in several American ports.

C.T.E. is a typical example of a small European Shipowning company dealing in container transport. It operates 6 vessels totalizing 64200 DWT in Short Sea Shipping in the Western Mediterranean / Canary Isle Corridor and also in Ocean going services linking the European Mediterranean and Northern Europe / Atlantic Waterfronts with the American continent (Gulf of Mexico, Caribbean, Central America and South America in the Pacific). It has liner services which call at the ports of Genoa, Marseilles, Valencia and Alicante, partners of the MarNet project.

The application of information system technology in services maintain its competitiveness in the market. Its participation in the project will be useful in order to adequately tackle the priorities of shipowning companies similar to C.T.E. on issues such as information systems, document interchange and cargo tracing and tracking.

#### **3.3.2 SUDCARGOS**

Sudcargos is a French shipowner company having headquarters in Marseilles and agents in various Mediterranean ports. It deals with maritime ro-ro transport services as well as containers and general cargo.

Sudcargos stands as the Mediterranean shipping company within the framework of a North-South interrelation. It proves to be the interface between Europe and the



Mediterranean Arab world. Its departures from France, Spain and Italy entitle it to be the link with all Europe's constituents. In the same way, its network implanted in both Maghrib and Near East ensures Sudcargos leadership over all routes from the South towards Europe.

The development strategy carried out by Sudcargos is closely related to those put forward in the economies of both European and Arab countries. The company has based its growth on a thick, interactive network made up of all Mediterranean partners. Therefore it has been developed a policy of strong partnership with subcoastal countries : a determination to obtain a well-balanced relationship.

Sudcargos has developed an energetic commercial policy in order to attract, via the ports in southern Europe, freight sailing from both the Far East and Far West.

The persons representing the partners during the project are listed hereafter :



COMPANY	TITLE	NAME	DISTRICT	STREET	POSTAL CODE	TOWN	COUNTRY	STATUS *
AUTORIDAD PORTUARIA DE ALICANTE	Mister	J. M. COLOMA RODRIGUEZ		Muelle de Poniente N° 11	03001	ALICANTE	SPAIN	AP
AUTORIDAD PORTUARIA DE VALENCIA	Mister	SANCHEZ Francesc		Muelle de la Aduana, s/n	46024	VALENCIA	SPAIN	P
AUTORITA PORTUALE DI GENOVA	Mister	GALLANTI	Palazzo San Giorgio	Via Della Mercanzia, 2	16126	GENOVA	ITALY	P
CHAMBRE DE COMMERCE ET D'INDUSTRIE DE SÈTE	Monsieur	Henri COURNON	2, quai Philippe Régy	BP 169	34203	SETE CEDEX	FRANCE	AP
COMPANIA TRASATLANTICA ESPAGNOLA	Mister	Antonio GONZALEZ		23, Miguel Angel	28010	MADRID	SPAIN	AP
EUROTRANSPORTNET	Mister	W. VAN HEZIK	Taxus Building	Victoria Park	3062 CE	ROTTERDAM	THE NETHERLANDS	AP
ICARUS MARKETING LTD	Mister	Michael GIBLIN	2, St-John's Court	SANTRY	9	DUBLIN	IRELAND	AP
PORT AUTONOME DE MARSEILLE	Mister	Bruno CARPENTIER		23, place de la Juliette	13002	MARSEILLE	FRANCE	P



MARSEILLE		CARPENTIER		Joliette				
PORT OF LISBON AUTHORITY	Madam	Clara XAVIER		Rua da Junqueira, 94	1349	LISBON	PORTUGAL	AP
PORT OF PIRAEUS AUTHORITY	Mister	T. KOINIS		10, Akti Miaouli	185 38	PIRAEUS	GREECE	AP
PORTEL	Mister	VIDAL Jose Francisco	A.V.D.A. Del Partenon 10-5	Campo de las Naciones	28042	MADRID	SPAIN	C
SEAGHA	Mister	Etienne VERSTRAETE		Brouwersvliet 3318	33200	ANTWERPEN	BELGIUM	AP
SISTEMI E TELEMATICA (SET)	Mister	Elio CEREGHINO B.	Via al Molo Giano	Calata Grazie	16126	GENOVA	ITALY	C
SUDCARGOS	Mister	Alain COUSIN		17, avenue Robert Schuman	13002	MARSEILLE	FRANCE	AP
GYPTIS	Mister	Didier LACOMBE		20, Quai du Lazaret	13002	MARSEILLE	FRANCE	C
EUROMAR	Mister	SANCHEZ Francesc		Muelle de la Aduana, s/n	46024	VALENCIA	SPAIN	C

(\*) AP : Associated Partners  
P : Partners  
C : Coordinator







## 4. OBJECTIVES OF THE MARNET PROJECT

The Marnet mission statement is to provide a set of open and globally accessible information services to support logistic and multimodal transport operators. This aims at enhancing the competitiveness of the European and Mediterranean maritime ports, and of the transport sector. To achieve this, the MarNet Project will set the basis for the creation of a multi-regional real time logistics information network.

Our 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 EurotransPortnet), by providing harmonised procedures that will be used by all MarNet users regardless of their physical location. This will open new possibilities of doing business for economic operators.
- Combine existing systems and technologies to broaden 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.

The measurable objectives of the MarNet project, within the two years of this programme, are :

- To demonstrate the feasibility of the MarNet concept by fully implementing a representative group of services.
- To provide operational access to these services to big, medium and small Mediterranean ports, regardless of their current information system.
- To demonstrate inter-regional interconnectivity.
- To set-up electronic short sea manifest exchange between agents.
- To create reusable building blocks, for access from non-automated ports.
- To develop the necessary training and awareness materials in order to support the implementation of the Marnet network.

### 4.1. MAIN EXPECTED DELIVERABLES

1. User Requirements for the MARNET services ;
2. The full design of the MARNET network ;
3. An operating prototype of the MARNET network for demonstrating a number of its representative services and interconnectivity and interoperability with existing EDI Systems ;
4. A number of building blocks for non automated ports providing access to the MARNET network ;



5. A strong collaboration with the BOPCOM project;
6. A demonstration system for the Lisbon '98 expo.



## 5. MEANS TO ACHIEVE THE OBJECTIVES

### 5.1. PRESENTATION OF THE PROJECT ORGANISATION

As the number of the Marnet project partners is high, we felt it necessary to build up a both participative and very structured organisation. The basic principles of the organisation were as follow, they were not questioned during the two years of the project development.

- The Steering Committee has the decision power. It is set up of a number of partners and DG7 representatives.
- An identified team of project management, with a project manager
- Euromar members (Gyptis, Portel, SET) will be in charge of the partners management, and animation in their action field, especially at the languages level.

The Work Packages (WPS) are considered as real projects with a WP leader chosen among the companies Gyptis/SET/Portel. A project plan and a list of expected results have been issued by each work package leader.

The project is split into seven Work Packages (WP):

- **WP1:** User requirements Identification.
- **WP2:** System design.
- **WP3:** Pilot System Design and development.
- **WP4:** Pilot System Integration and Set-up.
- **WP5:** Pilot system Trial and Evaluation.
- **WP6:** Exploitation and Dissemination.
- **WP7:** Project Management.

- Meetings between all the partners
- A technical team decides about technical choices
- An awareness team is in charge of awareness actions
- A team is in charge of financial and administrative problems

The project was managed thanks to a ISO 9001 project management method

After the works achievement, one may have noted a good general working, but a very heavy handling of documents, entailing far too much paper, at the time of computerisation...



## **5.2 RESOURCES INVOLVED IN THE MARNET PROJECT**

### **5.2.1. General presentation**

The partners have brought :

- skilled and experienced men
- existing computer systems : PCCS, data interchange systems
- computer and telecommunication means
- methodological experiences of analysis and development of large computer and telecommunication systems
- experiences of system management
- pedagogical and training skills and experiences
- skills and experiences within the field of awareness activities

All these means were put in common, with the utmost transparency, to the benefit of the project and all partners, in a dynamic atmosphere.

### **5.2.2 Use of existing systems**

→ Computer systems

The systems of the different companies, especially Seagha, Gyptis, Portel, were highly used.

→ Telecommunication means

The different partners subscriptions were highly used (X25, X400, Internet)

### **5.2.3. Other supplies**

- Awareness
  - Video
  - Powerpoint presentation
  - Press releases
  - Marnet newsletters



- Documents :
  - several thousands of pages per partner
  - for the manager : 5000 pages

### **5.3 WORKS PROCESS**

The achieved work details and the results are presented in various documents concerning the project and in particular for each work package which comprises a project plan, working papers, synthesis reports (please refer to **Appendix I** which presents the list of deliverables and **Appendix II**, which presents the list of all the documents issued within Marnet framework).

The project started by the elaboration of a management manual which defines the work method and the quality control.

#### **5.3.1. Work Package 1: User requirements Identification**

The WP1 aimed to determine the most accurate knowledge about the needs of transport operators and ports authorities in the field of data interchange. In order to complete this work we have:

- Prepared the writing and compiling work for appropriate questionnaires,
- Defined three working groups according to geographical areas,
- Realized about a hundred interviews towards managers and experts in the transport sector,
- Organized “Questions and answers” workshops about this thema.

On an other hand, a bibliographical study has been lead during the first phase of the project in order to provide a state of the art and the latest realisations in the fields related to Marnet ones.

The results compilation from the interviews and the workshops allowed us to issue a list of potential services in term of data interchange between port communities. These results of compilations were done according to the S.W.O.T. analysis method (Strength, Weakness, Opportunities, Threat). All the aspects of this work package are taken up in the User requirements final document [A2].

#### **5.3.2. Work Package 2: System Design**

The WP2 “System Design” consisted in:

- Creating a model blueprint that will serve as the basis for implementation of the Pilot Project and later for full implementation of the system;



- Determining the framework within which interoperability and interconnectivity will be developed and creating conceptual models of the “Building blocks” that will provide access to the MarNet network. An important component of this goal is the need to establish standardised procedures for operations on the network;
- Defining strategies for guiding the introduction of the Marnet in transport service provider organisations such as shipowners, terminal operators, shipping agents, freight forwarders, port authorities, etc...

The results of the WP2 are presented in the document named “Marnet System Design” referenced as Marnet DW2-MSD.04 / Version 02 [A4].

### **5.3.3. Work Package 3: Pilot System and development**

In order to achieve the development tasks, those tasks have been dispatched between companies: EUROMAR (Gyptis, Portel, Set), Eurotransportnet and Seagha. The associated partners contributed to the pilot operations as presented in the following charts:



PARTICIPATION OF MARNET PARTNERS IN PILOT OPERATIONS									
Selected MarNet Services and pilot operations	<i>EU Ports Single Desk</i>	<i>Unified Dangerous Goods Management</i>	<i>Container and Ship Tracing</i>	<i>Manifest Information Interchange</i>	<i>Commercial Information Interchange</i>	<i>Port Consultation</i>	<i>Statistics</i>	<i>PCS experimentation in small ports</i>	<i>Short sea shipping</i>
	<i>S1-1 /..S1-8</i>	<i>S1-10/ S1-11</i>	<i>S2-1 / ..S2-11</i>	<i>S4-4/..S4-6</i>	<i>S6-1/ ...S6-3</i>	<i>S7-1/..S7-3</i>	<i>S8-1/..S8-7</i>	<i>S10</i>	<i>S11</i>
Pilot operations manager	Portel	SeT	SeT	Gyptis Eurotransportnet	Portel	Portel	Gyptis	Gyptis	Seagha
<b>Eurotransportnet</b>	X	X		X					
<b>Gyptis</b>	X	X		X	X	X	X	X	
<b>Icarus</b>					X	Dublin Port	X		
<b>Portel</b>	X	X	X	X	X	X	X		
<b>Port of Alicante</b>	X	X			X	X		X	
<b>Port of Genoa (SeT)</b>	X		X	X	X	X	X		
<b>Port of Lisbon</b>			ships only	X	X	X	X		
<b>Port of Marseilles</b>	X	X		Sudcargos	X	X	X		
<b>Port of Piraeus</b>		X		X	X	X	X		
<b>Port of Sète</b>				Delom		X		X	X



<b>Port of Valencia</b>	X	X	X	Sudcargos	X	X		→ X	
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<b>PARTICIPATION OF MARNET PARTNERS IN PILOT OPERATIONS</b>									
<b>Selected MarNet Services and pilot operations</b>	<i>EU Ports Single Desk</i>	<i>Unified Dangerous Goods Management</i>	<i>Container and Ship Tracing</i>	<i>Manifest Information Interchange</i>	<i>Commercial Information Interchange</i>	<i>Port Consultation</i>	<i>Statistics</i>	<i>PCS experimentation in small ports</i>	<i>Short sea shipping</i>
	<i>S1-1 /..S1-8</i>	<i>S1-10/ S1-11</i>	<i>S2-1 / S2-11</i>	<i>S4-4/..S4-6</i>	<i>S6-1/ ...S6-3</i>	<i>S7-1/..S7-3</i>	<i>S8-1/..S8-7</i>	<i>S10</i>	<i>S11</i>
<b>Seagha</b>				X					Antwerp and Bilbao
<b>SeT</b>	X	X	X	X	X	X	X		
<b>Sudcargos</b>		X		Marseilles and Valencia					
<b>Trasatlantica</b>	X								
<b>Navican (Spain)</b>	X								

**Table 1 - Participation of Marnet Partners in pilot operations**





#### **5.3.4. Work Package 4: Pilot System Integration and Set-up.**

The Work package 4 comprised the following tasks:

- Define and prepare training activities
- Integrate the pilot system
- Set up the pilot-system
- Train Users
- Define the Pilot System Trial
- Define the Pilot System Evaluation

The choice of Internet solutions and the use of Internet browsers (Netscape 3.0/ 4.0, Internet Explorer 4.0) simplified in a very important way the tasks of service integration: the WP4 as it will be explained in detail in the related part.

In reality, the WP4 consisted in:

- Task 4.1 - Define and prepare training activities
- Task 4.4 - Train Users
- Task 4-5 - Define the Pilot System Trial
- Task 4-6 – Define the Pilot System Evaluation

In the same time, a presentation has been done during the Lisbon Universal Exhibition in June 98 as well as data interchange with BOPCOM.

#### **5.3.5. Work Package 5: Pilot system Trial and Evaluation**

The WP5 aimed to realize pilot operations concerning the services and the evaluation of their interests.

#### **5.3.6. Work Package 6: Exploitation and Dissemination.**

The WP6 comprises the awareness tasks, the Lisbon demonstration, the final workshop organisation and some studies for the Marnet Network expansion.

About the awareness tasks, we realized:

- Web sites (<http://www.euromar-eeig.com/initiat/Marnet.htm>)
- The “Seagulls” video presentation



- Different Press Releases
- 3 Marnet Newsletters dispatched at 1800 copies each
- The final workshop was organized on the 10<sup>th</sup> December 98 in Brussels (cf list in appendix N°3)
- The expansion plan has been developed and has demonstrated the possibility to develop real commercial services from the Marnet Services.
- An important number of Marnet projects

As mentioned hereabove, the WP7 consisted in the project management which was issued very professionally because the foreseen organisation worked all along the project, all the scheduled meetings were hold in time and all the deliverables delivered.

The financial management was a difficult point for all the Marnet partners and especially EUROMAR for which Marnet was the first Research and Development project funded by the DGVII.



## 6. SCIENTIFIC AND TECHNICAL DESCRIPTION OF THE PROJECT

The research project on a scientific and technical plan can be presented according three complementary dimensions based on three fundamental questions:

- Is there any interest for maritime transport operators to interchange and process data by electronic means between port communities?
- Are those services (interchange and processing of data) a potential offer to the transport operators by taking into account the evolution of New Information and Communication Technology ?
- Is there a market for such services and how can an offer be constituted in order to satisfy a potential market?

### 6.1. NEEDS EVALUATION OF TRANSPORT OPERATORS

In order to have a better understanding of the context in which the Marnet project has been developed, let's have a look about the current use of New Information and Communication Technology in the world of transport.

#### 6.1.1. Actual situation and use of N.I.C.T.

We studied very accurately the use of N.I.C.T in the world of transport whose utilisation can be summarized as follows:

1. Classical management (accounting, finance, human resources) thanks to private computer systems,
2. Managing of the goods follow-up of (administratively, physically, financially, for customs), of equipment (containers park) through private computer systems, in Port Authorities and transport firms.
3. Data exchanges:
  - Between all the companies, using P.C.C.S.
  - Pair connection between transport operators: for example: forwarders – customs or ship owner – shipping agent or shipping agent – cargo handler, etc...

We can see a great discrepancy between transport operators regarding the use of N.I.C.T., some of them are top advanced, others rarely use them.

The use of those systems for transport operators and port communities give them some advantages. Let's present the main advantages of P.C.C.S.:



### 1. Financial advantages

- The necessary investment for the complete development of a port Cargo community system is about 3 to 5 millions Euros and about 0.3 to 0.5 Million Euros for a port community which adapts an existing P.C.C.S.;
- The direct savings generated by avoiding multiple data entries, useless physical movements, phone calls, paper documents can be estimated at 20 Euros per container or per cargo unit in case of general cargo;
- The return on investment is of about 3 years, taking into account the exploitation costs of a P.C.C.S.

### 2. Improvement of ports services quality

- Decrease of port transit time in a scale of 0.5 day to one day;
- Real time knowledge of cargo status

### 3. Improvement of the Port Community organisation by an accurate definition of procedures.

## 6.1.2 Users requirements evaluation

Transport operators are interested in the use of P.C.C.S. and intend to extend their operation fields in a geographical dimension (in the field of interports data interchange with Marnet) and in the transport chain with the automatism of the intermodal chain.

Our surveys, interviews and workshops confirmed this trend. The transport operators would like to have at their disposal an interport data interchange service.

We have selected ten services which were considered as the most interesting by users according to the compilation results provided by the S.W.O.T. analysis.

- S1-1/...S1-8 EU Port single desk management
- S1-10/11 Dangerous Goods Management
- S2-1 Ship tracery
- S4-4/...S4-6 Manifest interchange
- S6 Commercial information interchange
- S7-1/...S7-3 Port consultation
- S8-1/...S8-7 Statistics
- S10 Port cargo system for small ports

- S11 Manifest Short sea shipping
- S12 Exchange Interport by X400

## 6.2 MARNET SERVICES PRESENTATION

### 6.2.1 E.U. Single Desk Management (S1-1/...S1-8)

#### 6.2.1.1. Definition of the service

Along time, every port has been defining and enforcing its procedures and regulations to control and to track the arrivals, the internal movements and departures of vessels. Because of this, port specific vessel entering and clearance procedures have to be followed in each port, reducing efficiency and increasing complexity of administrative operations as shown in figure 1.

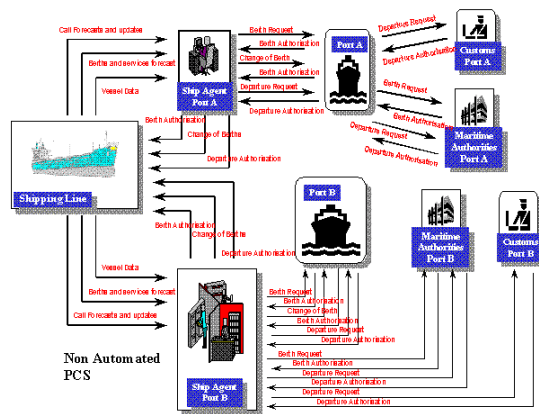


Figure 1 – EU Single Desk Management: Definition of services

The MARNET EU Port Single Desk services, on the contrary, propose a harmonised and common interface through which relevant documents can be submitted electronically to European port authorities. Using MARNET these documents could be submitted using always the same format and entering the same information independently of the port the vessel is calling at as shown in figure 2.

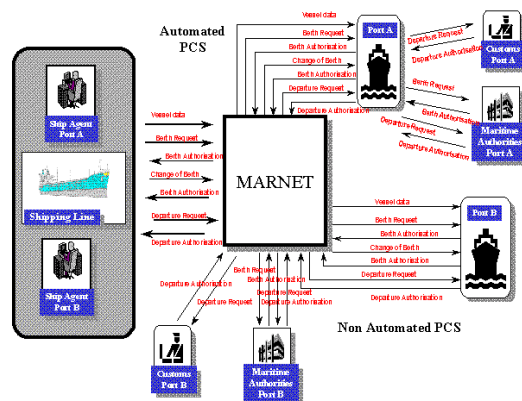


Figure 2 – EU Single Desk Management: Service Principles

In addition, the EU Port Single Desk services could be used both for the port where the user is based and for other ports, in such a way that :

agents and shipping lines could carry out vessel entering and clearance procedures for any port, not only the port where they are based ;  
Messages, such as vessel announcements, could be exchanged between Port Authorities or between Shipping Agents based in different ports.

### 6.2.1.2. Shipping line functionality

A shipping line has two interactions with the Single Desk Application: the management of voyage plans and the management of call requests.

#### 6.2.1.2.1. Management of voyage plans

A voyage plan is defined as the set of data associated with a vessel along its route inside a voyage. The concept of a voyage plan takes interest when a vessel calls at different ports and it has to present to the authorisation entities a set of documentation that is quite similar.

By defining the voyage plan a shipping line can define the characteristics of a voyage and afterwards it can automatically generate and even send the call requests to the different ports.

Shipping agents of a shipping line can also use the voyage plans to generate almost automatically the call requests of a vessel.

A voyage plan will be uniquely identified by a *voyage number* defined by the shipping line.

A shipping line can modify the voyage plan of a vessel whenever it changes and define new voyage plans using most of the data specified in the previous voyage.



Figure 3 – EU Single Desk: Management of Voyage Plan

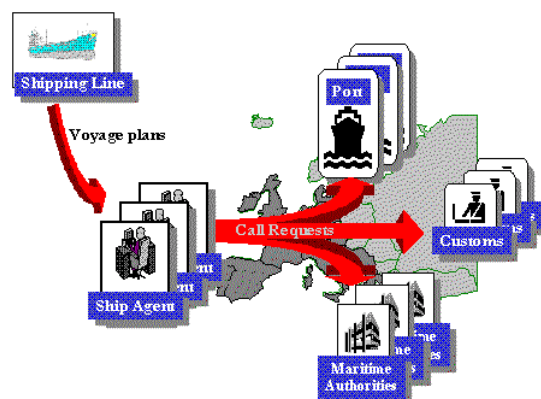
#### 6.2.1.2.2. Management of call requests

The Single Desk Application gives the shipping lines two possibilities of creating and sending call requests to the ports: generating the call requests themselves, or allowing their shipping agents to define the call requests using the data from the voyage plans.

Any combination of the two possibilities specified above are also possible. The call request management also includes the capabilities of viewing the responses given by the ports to know if the call is authorised or denied. Complex functions such as sending modifications of requests already sent and cancellations of calls or berths are also considered in the application.

#### 6.2.1.2.3. Shipping agent Functionality

Shipping agents can perform the call request management through this application. Call requests can be sent not only to the port they are currently operating but to new ports using the same interface. This makes easier the opening of new markets to both ships' agents and shipping lines.



**Figure 4 – EU Single Desk: Shipping agent functionality**

If the shipowner is working with the MarNet Single Desk Application, his shipping agents will automatically take advantage of the MarNet network through the use of the data contained in the voyage plan.

When the agent creates a call request, the application will ask him the name of the vessel and the voyage number; if MarNet databases have information about the voyage plan, the application will give the agent the possibility of copying the data from the voyage plan, saving the shipping agent from 70 to 90% of the time it takes to fill a call request.

The agents have a complete management console to deal with the call requests.

They can create new call requests, send modifications and/or cancellations and view the responses obtained from the authorisation entities to know in real time the authorised status of their call requests.

Agents can deal with call requests using a wizard which will guide them through the different steps to manage their calls or using the advanced user console which will allow them to manage all their requests quickly and efficiently.

### 6.2.2. Unified Dangerous goods services (S1.10/11)

#### 6.2.2.1. Definition of the Service

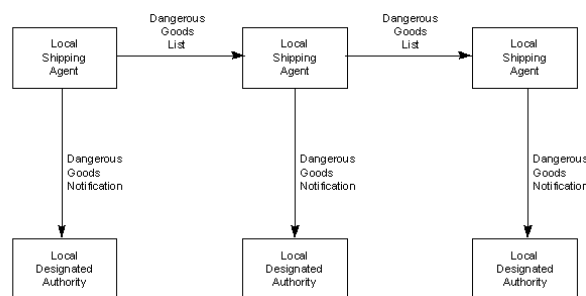
When a vessel carrying dangerous goods calls at a port, the shipping line or the representing shipping agent should submit to the local designated authority a Dangerous Goods Notification, reporting information on the dangerous goods to be loaded, to be unloaded or in transit through the port. This rule is enforced by local regulations in major ports worldwide.

Port Authorities have been establishing along time their own regulations and procedures for the submission of dangerous goods notifications. This resulted in very different procedures, making the process increasingly difficult, specially for transport operators working internationally.

Only recently, the European Union has initiated a harmonisation process, starting with the so called Hazmat directive. This directive states that vessels calling EU member states ports shall submit to a designated authority a dangerous goods notification.

MARNET Dangerous Goods Service has been designed in order to facilitate the above process by:

- Taking advantage of the EDI technology.
- Creating unified procedures for submitting electronically Dangerous Goods Notifications.



**Figure 5 – Unified Dangerous Goods Services: Information Flows**

The MARNET Unified Dangerous Goods Service is based on the information flow depicted in the above Figure:

- in a certain port of call, a shipping agent receives from the agent of the previous port of call the list of the dangerous goods carried on board the vessel
- in addition, he gathers information from local forwarders on goods to be loaded on board the vessel





- he prepares the Dangerous Goods Notification to be sent to the local designated authority; this notification contains information on dangerous goods to be loaded, to be discharged and in transit in the port
- he sends the notification to the local designated authority
- finally, he prepares and sends the list of dangerous goods carried on board the ship to the shipping agent of the next port of call.

#### 6.2.2.2.EDI Messages

The Unified Dangerous Goods service involves the exchange of three types of messages :

- Dangerous Goods Notification
- Dangerous Goods List
- Dangerous Goods Notification Acknowledgement

A fully defined specification has been developed for these messages, to allow users to exchange them without entering a specific message exchange agreement. However, specific formats could be supported by MARNET for specific users.

The format of the messages is based on :

- the EDIFACT messages IFTDGN, IFTIAG and APERAK
- the Protect messages, version 0.5.

#### 6.2.2.3. Automated and Non Automated Users

The MARNET Unified Dangerous Goods Service has been designed in such a way to be accessible either from automated users either from non automated users. While automated users access the service using EDI technologies, non automated users access the service connecting the MARNET web site.

#### 6.2.2.4. Overview of the DGS Application

The DGS Application is a web-based application which can be run contacting the MARNET web site. It provides access to the MARNET Unified Dangerous Goods Service to non automated users.

The DGS application can be used by all types of users, including shipping lines, shipping agents and port authorities. For shipping agents, it provides the following features:

- Creation of a Dangerous Goods Notification from a Dangerous Goods List
- Creation of a Dangerous Goods List from a Dangerous Goods Notification
- Entry and modification of a Dangerous Goods Notification



- Entry and modification of a Dangerous Goods List
- Message reception and sending
- Display of Dangerous Good Acknowledgement messages
- For Port Authorities, the DGS application provides the following features:
  - Message reception and sending
  - Display of received Dangerous Goods Notifications
  - Preparation of Dangerous Goods Notifications Acknowledgement messages

### 6.2.3. Ship Tracing (S2-1)

#### 6.2.3.1. Definition of the Service

Estimated and actual time of arrival and departure of vessels are very important information for all transport operators as planning of transport operations is often based on the knowledge of this information. For instance, vessel loading and discharging, cargo transfer to final destination, customs and other administrative procedures, are all activities that are planned when the vessel ETA and ETD are known.

Currently this information is often not available or reliable; in addition it is not known sufficiently in advance. This results in poor planning capabilities of the transport operators and, consequently, in overall reduced efficiency.

A way to achieve a better reliability is to require validation from Port Authorities who will be in charge of requesting, validating and then disseminating vessel arrival and departure information. This seems natural as Port Authorities are already requesting and processing this information for completing specific administrative procedures.

Most of major ports operate computerised system for enforcing local vessel arrival/departure regulations and procedures, called Marine Operation Systems in the following. Vessel arrival and departure announcements, vessel arrival and departure declarations, crew effects and lists, vessel certificates, dangerous goods on board and so on, are information usually stored and processed by these systems.

By accessing these systems, a number of useful and reliable pieces of information can be captured and combined to provide transport operators with basic information that they need to plan and optimise their activities. The Ship Tracing service is responsible for this processing, by providing the current position and the route for a given vessel.

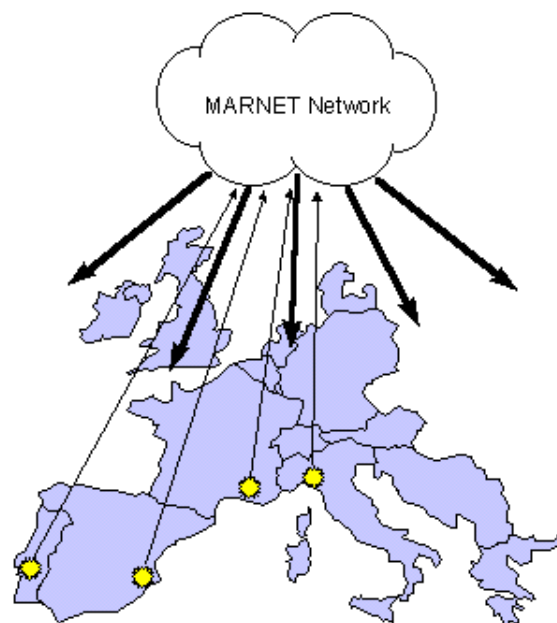
#### 6.2.3.2. Demonstration scenario

The actual demonstration scenario includes two classes of users:

Port Authorities whose Marine Operation Systems act as Service Providers: they receive service requests from the MARNET Network and provide information on vessel schedule and actual operations as results of these service requests:

Transport operators interested in vessel schedule information deploy application packages (called Service Clients) which access the MARNET Ship Tracing service. The Ship Tracing service is accessed by sending to MARNET Node the identification of a vessel, a port and a time interval during which the vessel called at the port.

When this information has been received, the MARNET Node starts to ask the port specified by the user for an information service. The port response will specify that the named vessel arrived on t1 and sailed on t2 towards port p1. The MARNET Node will then request a service to port p1 and so on, until the current position of the vessel has been identified.



**Figure 6 – Ship Tracing Service: Port Community System Interconnection**

This process described above is illustrative of how Port Community Systems could be interconnected and made interoperable to provide global services. In addition information used by MARNET are reliable as they have been provided by Port Authorities who validated them for supporting their internal administrative procedures.

The pilot environment is formed by four Port Authorities, who will be providing the information necessary for the Ship Tracing service:

- Port of Genoa ;
- Port of Marseilles ;
- Port of Valencia ;
- Port of Lisbon.

The concerning data are actually stored in a "local" database by the Marnet Node but they can easily be distributed towards the real ports.

### 6.2.3.3. Components of the system

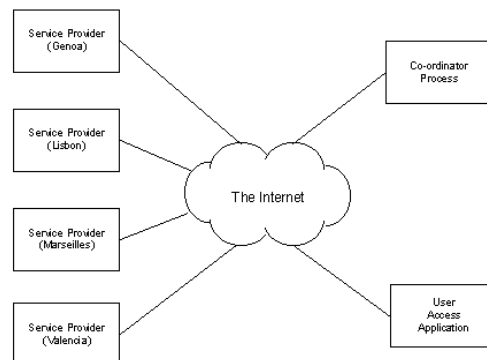
In order to set up the whole Ship Tracing service, three kinds of components have been used:

- Four Service Providers, which provide access to the Marseilles, Genoa, Lisbon and Valencia PCS.
- A Co-ordinator Process, which is responsible for evaluating the results of Ship Tracing Service requests ;
- An User Access Application, deployed by user for entering, submitting and viewing the results of a Ship Tracing service

The above components are fully developed using Java and take advantage of the distributed architecture.

### 6.2.3.4. Service Providers

Service Providers are processes that provide a common interface to the Co-ordinator Process for accessing the Genoa, Lisbon, Marseilles and Valencia PCS.



**Figure 7 – Ship Tracing Service: Service Providers**

Service Providers operate as servers waiting for service requests sent by the co-ordinator process. When a service request arrives they evaluate the service results by accessing the local PCS. Finally, when the service results have been evaluated, they are sent back to the invoking co-ordinator process.

A service request consists of the following data items :

- the vessel identification, consisting of the vessel call sign or Lloyd code ;
- a time range, for identifying a specific call of the named vessel at the port ;

A service response is formed by the following data items :

- actual date of arrival in the port (if any);
- actual date of departure and next port of call (if any).



#### 6.2.3.5. Co-ordinator Process

The co-ordinator process is responsible for evaluating the response to a Ship Tracing service sent by a user using the User Access Application. There is one Co-ordinator process in the Pilot, running on the Pilot MARNET Node. The co-ordinator process uses Service Providers to collect the information necessary to evaluate the service response from the involved PCS.

The Co-ordinator process, like Service Providers, operates as a server process waiting for Ship Tracing service. When a Ship Tracing service is requested, the following data items are specified and sent to the co-ordinator process:

- the call sign or the Lloyd code of the vessel ;
- the identification of a port, which is known to be called at by the vessel ;
- a time range, when the vessel called at the specified port.

By using this information, the co-ordinator process starts to build the route of the vessel. Service requests are sent to the Service Providers of the ports called at by vessel.

It starts with the port specified in the service request. The search continues with the ports specified by responses until a port has been found that is currently called at by the vessel. When such a condition is reached, a response to the Ship Tracing service is returned, including the route of the vessel.

#### 6.2.3.6. User Access Application

The User Access Application is deployed by users for requesting and obtaining the results of a Ship Tracing Service. It is a Web enabled application, so that users can use it with a WWW browser such as Microsoft Internet Explorer or Netscape Navigator.

It is essentially a window containing the input parameters for the Ship Tracing service request and the service results.

Controls are available to request the execution of the service and to navigate through the service results.

### 6.2.4. Manifest Interchange (S4-4 / ...S4-6)

#### 6.2.4.1. Definition of the service

The commercial relations between all the partners of a transport chain requires an increasingly faster and precise transmission of information. The Electronic Data Interchange (EDI) is a method designed to answer to this requirement, it rationalizes and speeds up the circulation of information, while decreasing the costs compared with traditional means of communication.

EDI consists in structuring the information in order to be processed through computers without any redundancy, nor repeat of entries.

In the shipping activity, one of the most important documents containing major



commercial information is the manifest. This document and its information change at each call and are exchanged between shipping agents in a context of shorter transit times.

Major Shipping companies and major shipping agents have automated the interchange of Manifest through Electronic Data Interchange (E.D.I.) an the use of an EDIFACT message whose name is IFCSUM (International Forwarding and consolidation summary message). The interchange of Manifests requires a high level of Information technology skills and financial resources. In this context, small and medium enterprises and small ports are penalized in terms of competitiveness and efficiency because of their weakness in technical and financial resources.

The Marnet project aims to demonstrate the functionalities of a maritime information system integrating small-,medium- and large-size ports.

Therefore, the Manifest Data Entry allows a user to enter manifest information, and generate manifest data in a standard EDIFACT format according to a cheap and easy access thanks to the Internet.

#### 6.2.4.2. EDI Message

This specification provides the definition of the Forwarding and consolidation summary message (IFCSUM) to be used in Electronic Data Interchange (EDI) between trading partners involved in administration, commerce and transport.

##### 6.2.4.2.1. Functional Definition

A message to be used for consolidation purposes from a party arranging forwarding and transport services to the party for which the transport of the consolidated cargo is destined. The message can be used to exchange information concerning the consolidated cargo between forwarders, carriers and agents thus enabling those parties to handle the consignments included in this consolidation. In addition it can be used for a collection of consignments originating from one shipper for forwarding and transport services.

##### 6.2.4.2.2. Field of application

This message may be applied for both national and international trade. It is based on universal practice and is not dependent on the type of business or industry.

#### 6.2.4.3. Principles

The IFCSUM message is a functionality in its own right, distinguishable from the transport booking and instruction messages. IFCSUM focuses on separate business areas in transport where the view on the operations is oriented towards transport means or equipment oriented rather than consignment. These business areas do not concentrate on concepts like booking or instruction. Currently, the IFCSUM provides merely a statement for a means of transport or equipment and their summary type information regarding the consignment carried. The IFCSUM message also provides a means to



incorporate the control and auditability information needed for the message receiver to perform the operation.

IFCSUM is used:

- in the consolidation and deconsolidation industry (stuffing and stripping of consignments in containers)
- in the groupage and degroupage industry (the full load description of rail-cars and road vehicles)
- in the collection and distribution industry (as the description of all consignments to be collected together (maybe from different places) and delivered at possibly different places in a certain region)
- for the declaration of dangerous cargo by shipping agents to their Port Authorities (as the listing of the dangerous cargo carried or to be carried).

The message provides information concerning cargo carried on a voyage specifying details regarding carrier, mode of transport, means of transport, equipment and the necessary details of the consignments included in the consolidated cargo.

Under given circumstances a cargo manifest can be obtained through the use of the IFCSUM.

For example, a IFCSUM message can be used in groupage traffic, where it may correspond to a loading list indicating the consignments that have been loaded on a truck.

There is a need for FUNCTIONAL SUBSETS to be derived from the message, for example:

- CONSOLIDATION ADVICE giving information about the departure of a voyage/flight or consolidation to the receiver.
- CONSOLIDATION STATUS giving information about the departure of a voyage/flight or consolidation to principals (e.g. carrier to freight forwarder, consolidator to co-loader etc.).
- CONSOLIDATION REPORT giving information about the arrival and unloading, clearance, etc. from the receiver to the sender.

According to the different information requirements of carriers, carrier's agents, and freight forwarders for the different modes of transport like air, deep sea, inland waterways, rail, road, combined- and/or multimodal- transport, different modal subsets can be derived from this message.

There is a need for INTRAMODAL SUBSETS to be transmitted between partners of the same mode of transport (e.g. railway to railway in different countries, deep-sea-carrier to deep- sea carrier, freight forwarder to freight forwarder etc.).

There is another need for INTERMODAL SUBSETS to be transmitted between partners in a multimodal transport (e.g. freight forwarder to trucker, trucker to railway, railway to port authority, port authority to carrier's agent, carrier's agent to carrier etc.).



- A consignment may contain several goods items.
- Goods items may or may not be containerized.
- A goods item may be transported in one or more containers, and a single container may contain one or more goods items.
- One goods item may be related to one or more customs tariff codes.
- Goods items related to one customs tariff code may be carried in one or more containers.
- Goods items may reflect either the contractual or operational description of the goods.
- Pre-carriage (advanced haulage) and/or on-carriage (destination haulage) of goods items or equipment within one booking or instruction may take place in different steps, each step specified with its own transport details group.
- Equipment may have other types of equipment attached to it, e.g. a temperature control unit attached to a container.
- Equipment and/or goods items may be attached to or transported on another load or transport device, which as such may be attached to or transported on yet another load or transport device, e.g. a container on a chassis on a rail-car.
- Transport devices, which have the ability of powered movement on their own, are specified in the transport details group. Other load or transport devices are specified as equipment.
- The expression of packaging for goods items can be expressed at up to three levels.

A number of generic transport terms are used in this specification, to be described as:

**MODE OF TRANSPORT:** the method of transport used for the conveyance of goods or persons, e.g. by rail, by road, by sea.



### 6.2.4.4. Functional Architecture

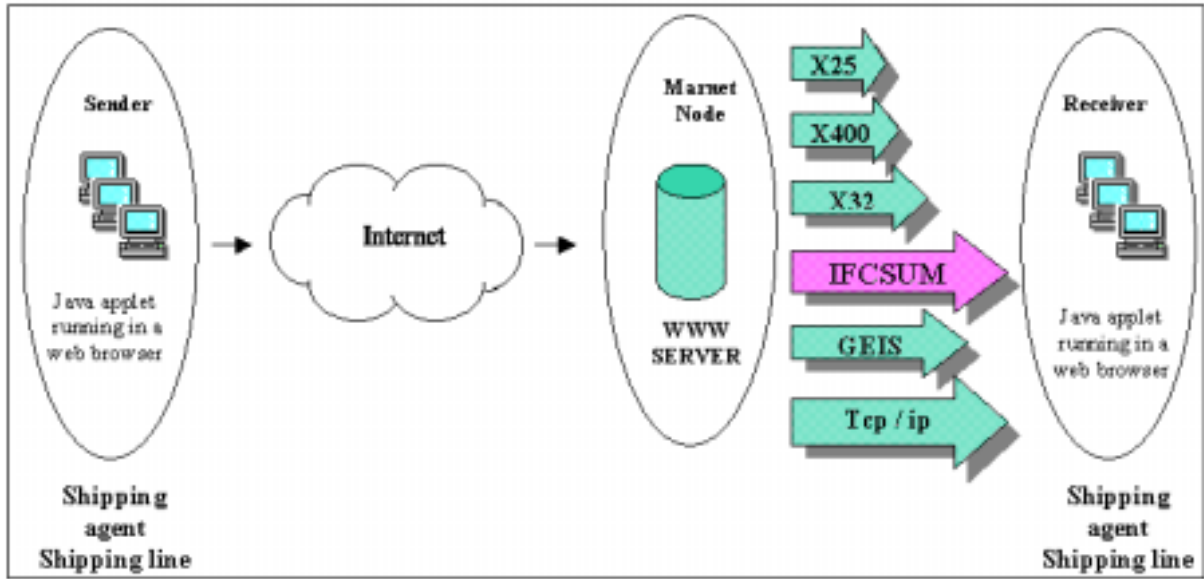


Figure 8 – Manifest Interchange Service: Functional Architecture

### 6.2.4.5. Branching Diagram

Manifest Message Diagram Branching  
Subset of the IFCSUM Message  
(Edifact D.94B)

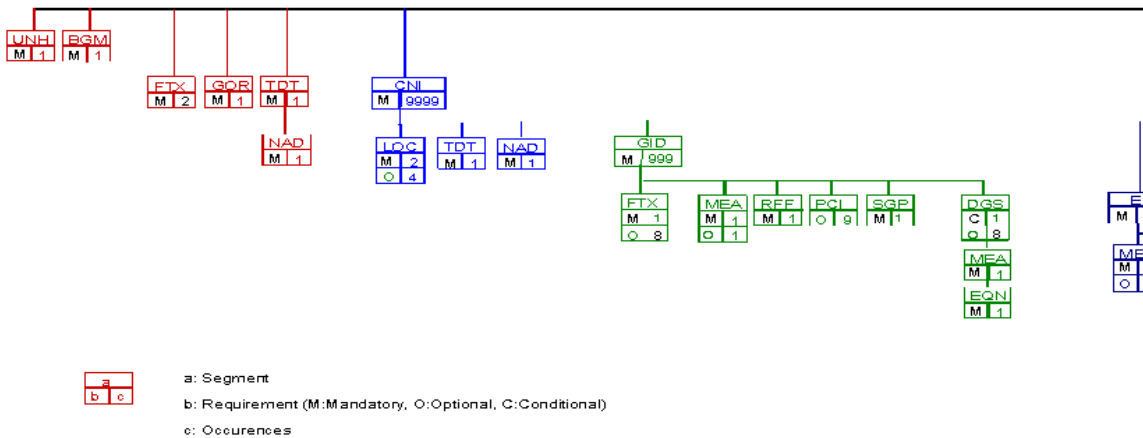


Figure 9 – Manifest Interchange Service: Branching Diagram



## 6.2.5. Commercial Information Interchange (S6)

### 6.2.5.1. Definition of the service

In a first part of this service, information included will be about lines and services (schedules, routes, vessels, joint services, etc.) Shipping lines and ports will provide this information in the following manner :

Commercial information: MarNet will allow agents – shipping lines, logistics operators, shipping agents,... – to offer information about their services via html pages.

Regular Lines and Services: in order to offer “value added” information MarNet ports will provide verified information about regular lines and services in the port.

Therefore, users can compare this information with that provided by other sources.

As the project develops, further information from other agents will be considered. Thus, logistics operators, shipping agents, etc. will be able to inform about their services by means of this MarNet service.

### 6.2.5.2. Service Description

Shipping lines will provide information about their services to MarNet, and users will have this information available via html pages.

When a ship agent/shipping line wants to register a new regular line or service in a port, the port validates this information before accepting it. MarNet will allow ports to offer this worthwhile information to their customers in an easy way.

Procedures for automated and non-automated ports are considered, so building blocks for non-automated ports will be developed.

Building blocks will consist in html forms for entering information and databases for storing it.

### 6.2.5.3. Services Components

Shipping lines/shipping agents will use forms to provide information about their schedules and services. All this commercial information will be available for the user by means of html pages.

Non-automated ports will introduce information about regular lines and services also by means of MarNet standard forms. Automated ports will download it from their databases. Users will also access this information via html pages.

As in Port consultation service, components to be developed will be:

- Html Pages.
- MarNet Standard Forms.
- MarNet Standard Databases.



### 6.2.6. Port Consultation (S7-1/...S7-3)

#### 6.2.6.1. Definition of the service

Service Users will be able to get all the information concerning ports and terminals characteristics and their operative situation, like weather forecast, tides, holidays and services available on those days, port and terminal access status, etc., as well as information concerning activities currently being done in ports, like vessels' arrivals and departures, vessels' distribution in the docks, ....

Therefore, Port Consultation Services can be split into the following sub-services:

Port Characteristics : this service provides information - considered as static information - about port features and facilities. This service also includes the possibility that shipping lines request ports about estimated rates for a call account (if the destination port offers this service).

Port Status : it provides information - considered as dynamic information - about current situation of the port and, if possible, about the situation of its container terminals.

#### 6.2.6.2. Service Demonstration

Ports and/or terminals will send to MarNet their static information by means of MarNet standard forms. They will be able to offer further information via their own web pages or via an e-mail address (web sites and e-mail addresses will be specified in the form).

Users will access the service home page in which they will select a port and the port web page will be shown. This page will show information previously sent by the port and/or its terminals and the necessary links with other web sites and/or e-mail addresses.

Port status information includes vessels berthed at the port, their location within the port, their scheduled time of departure, etc.

Terminals can also inform about their status. As a first draft, general information without privacy constraints about terminal occupation is taken into account. A first cut of the information to be shown might look as follows:

Date	Hour	Status	Incidents
15/6/97	18:30-22:00	Occupied	None
16/6/97	8:30-14:30	50%	Strike foreseen
16/6/97	14:30-18:30	Free	None
16/6/97	18:30-22:00	Occupied	Hurricane foreseen

Legend:  
Occupied (Red)  
50% (Yellow)  
Free (Green)

Figure 10 – Port Consultation: Terminal Status



Information regarding the operations of a particular vessel will be kept private, accessible only by the shipping line that owns the vessel and will include: operations being carried out in the vessel, expected time of operations beginning/ending, etc.

## 6.2.7. Statistics (S8-1/...S8-7)

### 6.2.7.1. Background

A legal text (a “ Directive ”) on statistical returns in relation to carriage of goods and passengers by sea has been approved by the Council of the European Union.

The Directive aims to ensure the production in the European Union of harmonised statistical data on transport of goods and passengers by sea, whether national transport, transport between Member States, or transport between Member States and third countries.

The Directive defines the information (variables and attributes) to be collected, establishes concept definitions and classifications for common reference. Then, in accordance with the principle of subsidiarity, collection will be carried out by the Member States, within the framework fixed at the Community level. Therefore, the design of the data collection system is the responsibility of each Member State.

Why are such statistics required ? What precisely is to be produced ? How will they be derived ? Has the need not to impose too heavy a statistical burden on the transport operators been sufficiently taken into account ?

#### 6.2.7.1.1. Why statistics on maritime transport ?

For the development, monitoring, control and evaluation of the Community's maritime policy, the European institutions and the national Governments need to have harmonised statistical data concerning maritime transport through ports within the territory of the European Union. Such data are also necessary for those actively involved in the socio-economic life of the Community, given the completion of the internal market. They are also required by research institutes and universities.

#### 6.2.7.1.2. What is required by the directive ?

The statistical returns concern in the first place concerned with the transport of goods and passengers performed by ships calling at ports located within the territory of E.U. Member States : tonnage of goods (loaded or unloaded) ; number of passengers (embarked or disembarked).

#### 6.2.7.1.3 Transport of goods

For each port handling annually more than 1 million tons of goods (“ selected reporting port ”), the variable “ tonnage ” shall be broken down according to a number of criteria :

- Direction (inwards, outwards)
- Type of cargo : liquid bulk, dry bulk, large containers, self-propelled Ro-Ro, non self-propelled RoRo, other general cargo



- Nature of goods, according to a classification of 24 groups of goods derived from the Standard Goods Classification for Transport Statistics (revised) (NST/R)
- Port of unloading, for goods loaded in the reporting port. The port of unloading is to be recorded if it belongs to a country of the European Economic Area (EEA), otherwise the maritime coastal area is to be recorded
- Country or territory of registration of the vessel which is used for the transport operation (i.e. the vessel's flag)

When unitised transport is involved (in containers or Ro-Ro units), additional variables “ number of units with cargo ” and “ number of empty units ” have to be collected.

#### 6.2.7.1.4. Transport of Passengers

For each port recording annually more than 200 000 passengers, (“ selected reporting port ”), the variable “ number of passengers ” should be broken down according to a number of criteria :

- Direction
- For the passengers disembarked at the reporting port : EEA port of embarkation or maritime coastal area (outside the EEA)
- For the passengers embarked in the reporting port : EEA port of disembarkation or maritime coastal area (outside the EEA)
- country or territory of registration of the vessel which is used for the transport (i.e. the vessel's flag)

#### 6.2.7.1.5. Movement of Vessel

In addition to this very detailed information on the transport of goods and passengers, the Directive also considers the collection of data on the movement of vessels (traffic).

For each selected reporting port, the variables chosen are the “ number of vessel movements ” and the “ dead-weight ” or the “ gross tonnage ” of these ships, which should be broken down by :

- direction
- type of vessel (according to a classification of 8 categories)
- size of vessel (according to a classification of 8 categories)
- size of vessel classified into 22 classes



#### 6.2.7.1.6. Quarterly and Annual results

Using this basic data, it is considered that Member States should provide Eurostat, quarterly and annually, with statistical data sets made up of the various variables, and broken down according to a number of criteria, at more or less detailed levels depending on the periodicity.

#### 6.2.7.2. Definition of services

In order to know better the incoming and outgoing flows of goods, circulating within the EEC, a " Directive " which is a European Commission's legal text regarding statistical returns in regard to carriage of goods and passengers by sea, has been adopted.

Therefore, the State Members will have to send the statistical data required by the Directive to Eurostat quarterly, and this at the latest by the year 2000.

The Marnet Statistics Interchange Service is a materialization of the " implementation " of the directive into the ports of the MarNet network by using electronic forms providing data exchange messages which are standardized (EDIFACT message) through the Internet.

The Marnet Statistics Interchange Service is a set of electronic forms generating GESMES message concerning:

- Dataset A1: Seaborne transport in the main European ports by port, type of cargo and relation
- Dataset A2: Non unit-load seaborne transport in the main European ports, by port, type of cargo and relation
- Dataset A3: Data required for ports for which detailed statistics are not required
- Dataset B1: Seaborne transport in the main European ports by port, type of cargo, goods and relation
- Dataset C1: Unit-load seaborne transport in the main European ports, by port, type of cargo, relation and loaded status
- Dataset D1: Passenger transport in the main European ports, by relation
- Dataset E1: Seaborne transport in the main European ports by port, type of cargo, relation and nationality of registration of vessels
- Dataset F1: European port ship traffic in the main European ports, by port, type and size of vessels loading or discharging cargo
- Dataset F2: European port ship traffic in the main European ports, by port, type and size of vessels loading or discharging cargo

#### 6.2.7.3. EDI Message

The EDIFACT message generated by the MarNet Statistics Interchange Service is the General Statistical MESsage to be used for the collection of maritime transport statistics as defined in the " Council Directive on statistical returns in respect of carriage of goods and passengers by sea". It can be used by all the actors of the maritime transport.

### 6.2.7.4. Branching Diagram

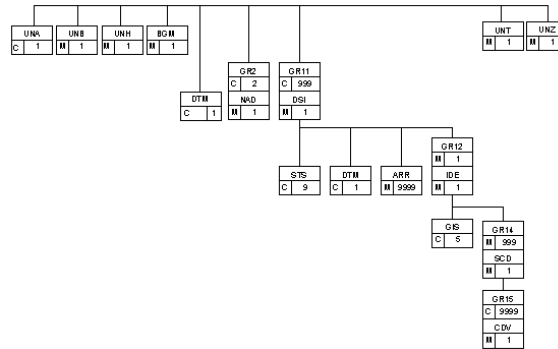


Figure 11 – Statistics Service: Branching Diagram

### 6.2.7.5. Functional architecture



Figure 12 – Functional Architecture

## 6.2.8 Port Cargo Community System in a small port (S10)

### 6.2.8.1. General considerations

The services provided to P.C.C.S. users in the big ports can be provided to the small ports. Actually, companies established in automated ports are using P.C.C.S. to organize their activities around the services provided by the P.C.C.S.. If the small ports don't provide equivalent services, the transport maritime users will concentrate on the ports offering the most complete range of services.



### 6.2.8.2. List of services used in a small Port Cargo Community System

The pilot operation for the use of a port cargo community system allows us to present a list of services useful for a small port :

<b>Service number</b>	<b>Utility</b>	<b>Users</b>
<b>S1-1/S1-3 Call management in relation with the Port</b>	Absolutely necessary	Shipping agent/ Port authority
<b>S1-6 Departure declaration</b>	Recommended	Shipping agent/ Port authority/ Forwarder/ Stevedore
<b>S1-8 Vessel schedule</b>	Recommended	Shipping agent/ Port authority/ Forwarder
<b>S1-9 Customs procedures services</b>	Recommended	Shipping agent/ Customs
<b>S1-10 Dangerous goods notification</b>	Absolutely necessary	Shipping agent/ Port authority/ Forwarder
<b>S1-11 Dangerous goods acknowledgement</b>	Absolutely necessary	Shipping agent/ Port authority/ Forwarder/ Stevedore
<b>S2-1/S2-2 Container data and schedule</b>	Recommended	Shipping agent/ Stevedore
<b>S3-1/S3-2 Cargo tracing and tracking</b>	Recommended	Shipping agent/ Stevedore/ Forwarder
<b>S2-5 Goods stuffed</b>	Recommended	Shipping agent/ Stevedore/ Forwarder
<b>S6-1 Shipping lines information (partly)</b>	Recommended	Shipping agent/ Forwarder
<b>S8-1/ S8-4 Statistics</b>	Recommended	Shipping agent/ Forwarder
<b>S9-2 Vessel route schedule</b>	Recommended	Shipping agent/ Forwarder
<b>S9-3 Voyage data</b>	Recommended	Shipping agent/ Forwarder
<b>S9-4 Vessel data</b>	Small interest	All users

Table 2 – Information Services Needed in small ports





### 6.2.8.3. Information processing and interchanges services to propose to a small port

Marnet services have been chosen for their pertinence. All the ports, even the smallest such as Sète, should work with these elementary services. It is obvious that utilisation of such a P.C.C.S. is highly recommended and even, in some cases, quite imperative (for example, in relationship with port authority)

Port users and companies members of the port Community seem to require some services dedicated to information processing and interchanges, whatever the size of the port is. Should a port not be able to provide these services, port users and members of the port community would have to choose another port having the capacity to propose these services. The offer of NTIC services is indispensable for a port, such as gantry cranes are indispensable to containers ship.

The services can be characterised by groups of services:

- Services connected to the process of goods (service of physical handling, documentation and Customs),
- Services related to the management of a ship,
- Services dedicated to the financial management and Human resources,
- Services of data interchange between ports.

The management of container parks was not experimented in Sète because private companies are in charge of it.

## 6.2.9. Manifest Short Sea Shipping (S11)

### 6.2.9.1. Definition of the service

This service has been developed by Seagha as part of the Marnet project, aiming to set up the exchange of short sea manifests between North and South European ports by means of EDI.

To decide on which message to use and which information to include Seagha has analysed several user guides of messages for the exchange of a manifest. Five user guides are part of this analysis:

- Port Autonome de Marseille, Protis Import (based on IFCSUM)
- Ediman, Maritime Cargo Manifest Message, Release 1, February 1997 (based on IFCSUM)
- CMB-file: SCL Manifest Message v.1
- Acsa '92 manual (based on IFTMCS)
- Port of Bilbao, Import manifest user guide, Version 2.2, October 1995 (based on IFCSUM)

Moreover Seagha has taken into account the information required to make a dangerous goods notification towards the Port Authorities and the information which is required by Customs: three additional user guides have been analysed for this:



- Protect Dangerous Goods Message Scenario, Version 0.5, October 1995
- Cuscar: manual of the Belgian Customs
- Customs Cargo Report Message for IMO Fal Form 2: Cargo Declaration

This first analysis was further refined after meetings with users of the manifest: the information was grouped into functional categories and data irrelevant for a manifest were omitted. Afterwards it was decided to send the manifest as a string of IFTMCS messages and to foresee the possibility to use the IFCSUM structure as a summary.

To obtain European and international recognition, the user guide is based on the most recent Edifact directory D97B and is compliant with the following ITIGG documents:

- the ITIGG Principles & Rules, Transport Freight Movements (document reference: JM4/ITIGG/135/v. 11)
- the ITIGG Principles & Rules, Multimodal Multiconsignment Messages (document reference: JM4/ITIGG/128/v. 1.2)
- the ITIGG Principles & Rules, Transport Equipment Movements (document reference: JM4/ITIGG/96.101/v. 13)
- the ITIGG General Recommendations (document reference : JM4/ITIGG/104/v. 14).

#### 6.2.9.2. Clarification of the usage of IFTMCS and IFCSUM in Short Sea trade

##### 6.2.9.2.1. IFTMCS and IFCSUM: different messages and structures

The IFTMCS message (Instruction contract status message) has the following functional definition:

A message from the party providing the transport/forwarding services to the party that issued the instructions for those services stating the actual details, terms and conditions (charges when applicable) of the service and of the consignment involved. In addition it can be used for the exchange of contract information between carriers mutually.

The IFCSUM message (Forwarding and consolidation summary message) is defined as follows:

A message to be used for consolidation purposes from a party arranging forwarding and transport services to the party for which the transport of the consolidated cargo is intended.

The message can be used to exchange information concerning the consolidated cargo between forwarders, carriers and agents enabling those parties to handle the consignments included in this consolidation. In addition it can be used for a collection of consignments originating from one shipper for forwarding and transport services.



The big difference between the two messages is the fact that IFTMCS is a single consignment message and IFCSUM a multi consignment message. However, the detail structure of IFCSUM, which is everything below the CNI segment (Consignment Information), is very similar to the IFTMCS message. In fact one could say that IFCSUM has an additional level compared to IFTMCS and that IFCSUM is simply a summation of several IFTMCS messages.

With regard to the sending of a manifest, the following is important:

- the IFTMCS message corresponds with one Bill of Lading;
- the IFCSUM message has an additional level, which corresponds with the manifest level
- the detail structure of IFCSUM is almost identical to the structure of IFTMCS.

#### 6.2.9.2.2. The exchange of Short Sea Manifests: requirements

It is crucial in Short Sea trade that as much information as possible gets to the receiving party as quickly as possible. The sooner the information gets to the other side, the sooner the receiving party can make all operational arrangements necessary to ensure a quick delivery of the goods to the ultimate customer, thus avoiding unnecessary delay because of the lack of right information at the right place.

The aspect of time is most important in the exchange of manifests between shipping agents. The practice of short sea may necessitate to send a cargo manifest or a dangerous goods manifest firstly, which can be complemented later by a freight manifest, since freight data are less sensible to time.

The unavoidable conclusion is that information is preferably stored at the receivers end: the sending agent should not wait until he has the entire manifest ready but should send information as soon as he gets it. It is better to have a part of the information than to have nothing.

#### 6.2.9.2.3. Which message to use for Short sea manifest exchange?

The general advantage of a single consignment message (IFTMCS) is that it is easier to use and quicker to send than one big IFCSUM message. As regards content one IFTMCS corresponds with one Bill of Lading. Using a string of IFTMCS for sending a manifest means sending a string of Bills of Lading. The receiving agent possesses (part of) the information quicker.

A single consignment message also solves the problem of "last minute arrangements", allowing to send a late addition without having to send the whole manifest again. Another, even bigger advantage of a single consignment message is that sending updates of and changes to previously sent messages is much easier. If you want to replace a previously sent Bill of Lading, you simply send it again, without having to send detail changes for the entire manifest. This is an important advantage since updates and changes are more the rule than the exception in short sea trade.

The advantage of the multi consignment IFCSUM on the other hand is that it provides a link between the different Bills of Lading and that the receiver knows he has the complete manifest, two aspects that are not covered by the single



consignment IFTMCS. The use of IFCSUM is advisable to anticipate the possibility of sending a summary. This message has an additional level, allowing to give the totals for the whole manifest (whereas IFTMCS gives totals per B/L). The use of IFCSUM, with control totals and freight totals, ensures the receiving party of having received the complete manifest (= having received all the Bills of Lading for the manifest) and provides an additional check for the accuracy and completeness of the manifest.

The use of IFCSUM, with control totals and freight totals, ensures the receiving party to have received the complete manifest (= having received all the Bills of Lading for the manifest) and provides an additional check for the accuracy and completeness of the manifest.

### 6.2.10. Exchange Interport by X400 (S12)

#### 6.2.10.1. Service presentation

In the context of the MARNET Project EurotransPortnet carried out activities in 1997 to obtain the basis for interport communications services.

In the first place the user requirements were recorded. For this purpose a questionnaire has been prepared which has been used in all participating EurotransPortnet ports to obtain an insight in the wishes and needs for the interport services (services like message relaying, message conversion, message split, fax delivery).

Most feasible areas for interport communications services are: dangerous goods reporting, bayplan and vessel movement messaging.

In a second step EurotransPortnet worked on getting agreement for interconnecting the EDI Service Provider in the ports (PCS, Port Community Systems) on the basis of X.400.

A technical document was created and agreed describing all steps to be taken to come to an operational **X.400 MTA-MTA Interconnect** between two systems. Also a scheme for the parameter for X.400 that needs to be agreed bilaterally to ensure interoperability was created.

#### 6.2.10.2. Results

The results of the efforts described above were as follows during the year 1998:

1. Until May 1998 the results of these actions were very little (some 5 new interport data exchanges were trailed).
2. Fortunately in June more and more data exchanges were reported by the EurotransPortnet Members. A number of 15 new interport trial data exchanges was reached that were established between companies in the EurotransPortnet ports. The good news was reported to Euomar/MARNET.
3. In the second half of 1998 also efforts were put in attracting new services, but only a few new interport trial data exchanges were reported. The total number of reported



trials is: 26.

4. Pilots are reported by all EurotransPortnet Members participating in the project.
5. It was also reported that not all interport data exchanges require the services of the EurotransPortnet Members (as PCS, Port Community System, the Port EDI Service Provides).  
Some data exchanges are reported where only one Member is involved in the port in which the data originates, while the delivery of the data takes place in the other port directly without interposition in the local Member.

There are also exchanges in place without interposition of any EurotransPortnet Member, so directly between the parties in the different ports.

### **6.3 HOW COULD WE SATISFY THE NEEDS OF TRANSPORT OPERATORS ?**

In Marnet, we have adopted a marketing approach:

Approach identification in functional terms;

- Constraints evaluations due to potential Marnet system users;
- Research of technical solutions;
- Technical solutions comparisons.

#### **6.3.1. MarNet Network Technical requirements**

The users have clearly expressed their requirements regarding the use of Marnet services which requires the technical requirements of the Marnet system. We summarised them here after according to several thema :

Convenience of use:

- Convenience to set-up
- Low exploitation costs
- Security, reliability, confidentiality.

In term of convenience of use, the users require a “Windows” ergonomy in roder to interchange data in transactional, by mailing system and according to private formats or standards (EDIFACT).

Regarding the set-up convenience, the potential users already computerized should not have to proceed to major development of their information systems. Non computerized companies should access Marnet with the most usual equipment (PC).

Transport operators are under the pressure of a fierce competitive context pushing them to analyse very carefully any additional cost:



The exploitation costs are broken down into :

- Marnet costs
- Telecom costs
- Company operational cost

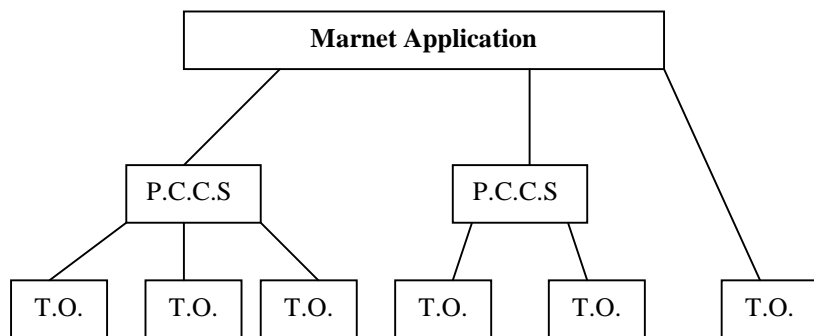
Concerning the safety, the reliability and the confidentiality the requirements are equivalent to usual ones for generic information systems.

### **6.3.2. Technical response**

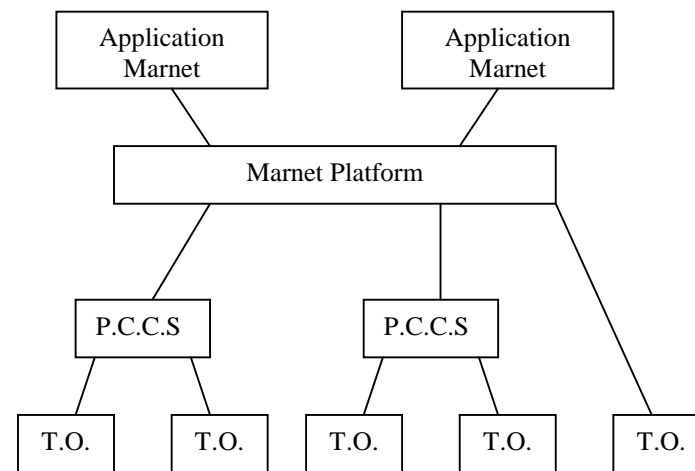
In adequation with technical requirements the Marnet technical team has defined 4 architectures types :

- Host system based on a private system (e.g.: IBM Main frame)
- Development of an interconnexion platform allowing access to users that will have developed a system upstream from this platform
- Intensive use of Internet
- Mixed use of Internet and the telecommunication platform

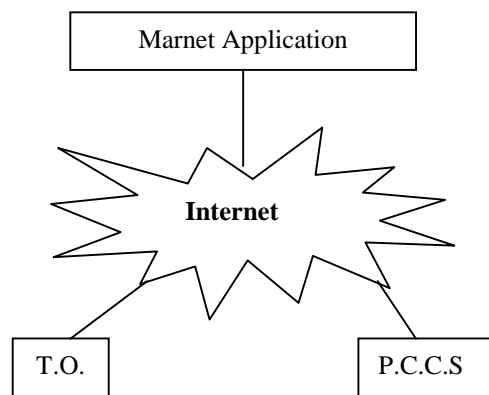
The following chart describes four types of architectures (Figure 13):



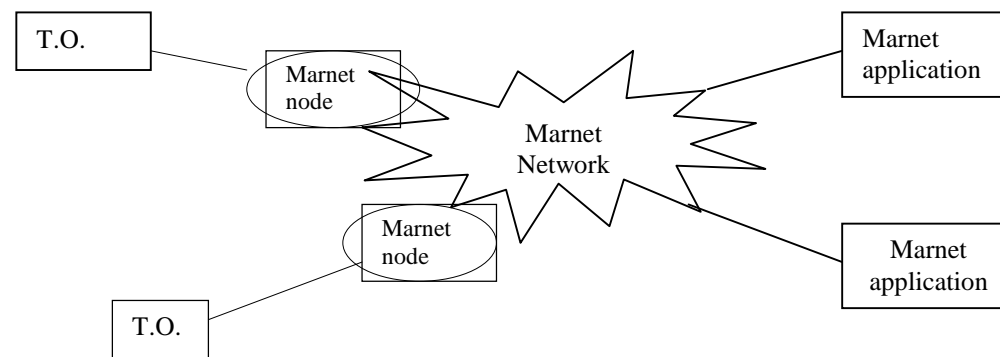
Host System (Type 1)



Interconnexion platform (Type 2)



Internet (Type 3)



Internet + platform (Type 4)



During the development of Marnet, we studied and compared those 4 types of architectures taking into account the state of the art of computerization and network. The following table provides a synthesis of the advantages and the inconveniences.

Constraints and services	Host system Type 1	Interconnexion platform Type 2	Internet Type 3	Internet + platform Type 4
Provides the required services	Yes	Yes	Yes	Yes
Required ergonomoy	No	Partially	Partially	Yes
Integrates existing systems	Difficult and expensive	Expensive	Yes, if the system has an Internet access	Yes
Provides services to non automated users	Yes but expensive and rigid	Yes	Yes with limited performance of the Internet	Yes
Marnet Costs	High in order to make the development profitable	High in order to make the development profitable	Low	Medium
Exploitation cost in the company	High	High	Low	Medium
Telecommunication Costs	X25 – X400 Networks	X25 – X400 Networks or Internet	Internet	X25 – X400 Networks or Internet
Safety	High	High	Internet Security Standards	Choice between Internet standards, X25 – X400 Networks or Internet
Reliability	High	High	Internet Reliability Standards	High
Confidentiality	High	To be developed	Coding	Dependent on the telecommunication means used

**Table 3 - Synthesis of advantages and inconvenients according to architecture type**

The type 4 architecture appeared rapidly as more interesting because :

- Implementation of all the services is possible
- Adapted ergonomoy
- Available for automated and non automated users
- Free choice for telecommunication means
- Effective cost for development and exploitation





### 6.3.3. The Pilot System Architecture

#### 6.3.3.1 The Overall Architecture

A relevant number of users will participate to the MARNET demonstration phase:

- big ports, such as Genoa, Marseilles, Valencia, Piraeus, Lisbon and members of the Eurotransportnet EEIG ;
- small and medium-size ports, such as Alicante and Sete ;
- Shipping Lines, such as Sudcargos, Trasatlantica and Navicon ;
- Shipping Agents and other transport operators.

Some of these users are automated, other non-automated. The MARNET pilot system will bring them all together as users of an integrated system, where :

- interconnectivity and interoperability of existing system is demonstrated ;
- non automated users could take part to the demonstration by using reusable building blocks.

Starting from these considerations, and keeping into account the MARNET System Design [A4], the overall Pilot System Architecture has been defined as depicted in Figure 14.

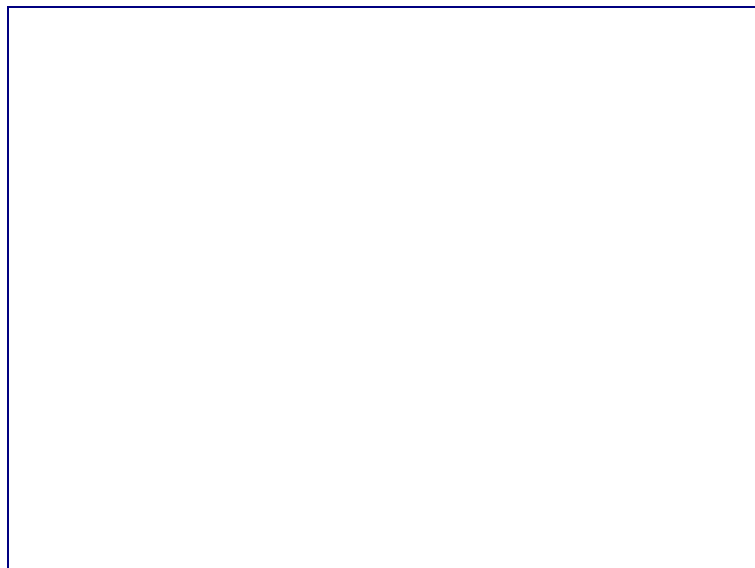


Figure 13 – Overall architecture



There are two types of users :

- automated users and
- non-automated users.

Non automated users access MARNET through the Internet by using web-enabled applications. Web-enabled applications are hosted in a WWW server inside the MARNET Network . When an HTML page referring one of these applications is selected, the application itself is automatically downloaded and made active so that the user can start to interact with it. MARNET web-enabled applications are all developed as Java applet.

Automated users can interact with the MARNET Network in two ways :

via EDI messages or,  
via Distributed Processing and Dispatching Service, which requires the co-operation of a number of existing PCS in order to evaluate the service response (see figure 15).

These two methods illustrate how existing systems are interconnected and made interoperable. EDI messages will be exchanged using both Internet e-mail or X.400 networks ; type 3 service invocations will occur through the Internet.

#### 6.3.3.2 The MARNET Network

In the Pilot System the MARNET network is composed of one MARNET Node . This has been decided in order to focus the development effort more on the application side. Indeed, this is the part of the system users interact with and, to better evaluate the feasibility of the MARNET concept, it is more important to advance with it.

The development of the MARNET Network as a set on co-operating nodes will be carried out during the industrialisation phase, before introducing MARNET into the market.

#### 6.3.3.3 The MARNET Node

The MARNET node includes several components ; some of these components are generic components, i.e., components that can be used by any service while others are service specific components.

Service specific components are described in sections 5.3.4.1. to 5.3.4.7.; generic components are described below.

The figure depicts the structure and the connections of the MARNET Node with external components. This architecture has been derived from the MARNET System Design, with a few modifications described in the following. See [A4] for a full description of the MARNET System Design and a definition of its components. By comparing this diagram with the corresponding one included in the MARNET System Design [A4], it emerges that some components have been removed. This is a consequence of the fact that the MARNET Network is composed of just one



node. In addition there are just two MSAD, namely the Internet e-mail and the X.400 over X.25 MSADs.

Service specific components are :

- Message Translation Agents
- Service Agents
- Service Co-ordinator Processes
- Web hosted applications
- Dynamic HTML pages
- Static HTML pages

They are described in section 5.3.3.4. except some general features and implementation guidelines that are defined in section 0.

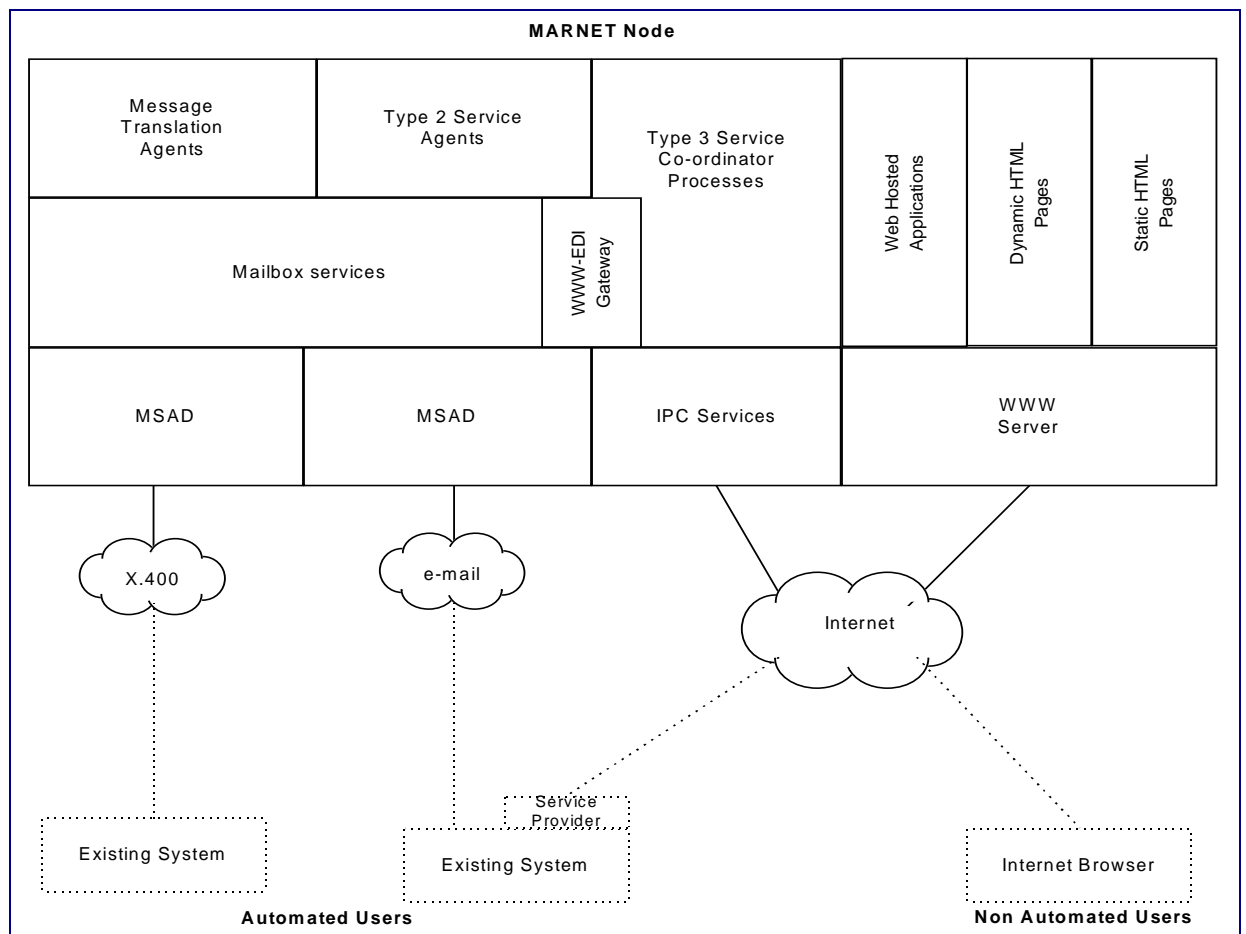


Figure 14: Marnet Node Description

The generic components are as follows :

- Mailbox Services



- Internet e-mail and X.400 MSADs
- IPC Services
- WWW Server
- WWW-EDI Gateway

#### 6.3.3.4 EDI Messages Exchange System

The EDI Message Exchange System incorporates four components :

- Mailbox Services
- Message Translation Agents
- Type 2 Service Message Processing Agents
- MSADs

All together, these components provide the MARNET Node with the following capabilities :

1. Message store and forward
2. Automatic message processing (either translation or type 2 services dependent processing) when defined events occur, such as the arrival of a mail
3. Delivery of messages over the Internet e-mail and X.400 over X.25 transports.

The EDI Message Exchange System is then a basic EDI System component that will be implemented using existing products.

#### 6.3.3.5 Web Hosted Applications

Web hosted applications (called Type 1, 2 and 3 Service Access Applications in [4]) are used by non-automated users for accessing the MARNET Network. The applications will be developed as applets using the Java programming environment for a number of reasons:

##### Simplified access

Users will be able to access these applications through the Internet, just by using a standard WWW browser such as Microsoft Internet Explorer or Netscape Navigator. No installation is required, but the application is downloaded and immediately executed when users access the HTML page hosting the application.

Write once, run anywhere :

Java applications and applets are genuinely portable at the execution level virtually over any hardware and software platform ; this allows user to access the MARNET services by using any Java supported platform.

##### Robustness

The Java programming language is a general purpose, object oriented programming language that provides the programmer with the flexibility necessary to develop code for checking complex data integrity constraints. The enforcement of these constraints immediately, while the user is entering the data, will guarantee



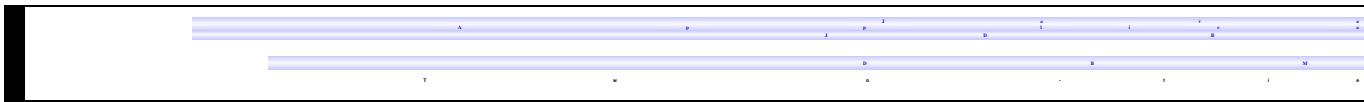
users to send consistent messages to the MARNET Node, providing a relevant level of robustness to the entire pilot system.

### Friend User interface

A friend graphical user interface could be developed, specially using the Swing library included in the JDK 1.2, which provides state-of-the-art smart controls such as tables, trees, tooltips, toolbars, etc. This is specially important in order to allow user to get quickly acquainted with the newly downloaded applications.

Most of the application will have to get access to a local or remote data base. The JDBC API will be used for this. JDBC is a low-level API that allows applications to access virtually any relational database.

The JDBC API supports both two-tier and three-tier models for database access. These models are shown in Figure 16.



**Figure 15 – Two-tier and Three-tier Model**

In the two-tier model, a Java applet or application directly interacts with the database. User's SQL statements are delivered to the database, and the relevant results are sent back to the user. The database may be located on another machine connected via a network. This is referred to as a client/server configuration.

In the three-tier model, commands are sent to a "middle tier" of services, which then send SQL statements to the database. The database processes the SQL statements and sends the results back to the middle tier, which then sends them to the user. The three-tier model is very attractive because the middle tier makes it possible to maintain control over access and the kinds of updates that can be made to corporate data. Another advantage is that when there is a middle tier, the user can employ an easy-to-use higher-level API that is translated by the middle tier into the appropriate low-level calls. Finally, in many cases the three-tier architecture can provide performance advantages. The three tier architecture is the recommended architecture for the MarNet web-hosted applications.

JDBC was designed to be a base upon which to build higher-level interfaces and tools to create programs easier. Tools of this kind are already commercially available by many software vendors like for example ADO for Java from Microsoft or DataGateway for Java from Borland. These tools will ease the development and deployment of smart forms and any other application using WWW technology with requirements of accessing to a database.



### 6.3.3.6 IPC Services

IPC Services is a process-to-process communication mechanism that is used for implementing type 3 services. It will be implemented using the Java RMI package. RMI enables the programmer to create distributed Java-to-Java applications, in which the methods of remote Java objects can be invoked from other Java virtual machines, possibly on different hosts. A Java program can make a call on a remote object once it obtains a reference to the remote object, either by looking up the remote object in the bootstrap-naming service provided by RMI, or by receiving the reference as an argument or a return value. A client can call a remote object in a server, and that server can also be a client of other remote objects. RMI uses Object Serialisation to marshal and unmarshal parameters and does not truncate types, supporting true object-oriented polymorphism.

### 6.3.3.7 WWW Server

It is a standard WWW server that is used to send HTML pages and Java applets to remote users. A standard product such as Apache could be used to implement this component.

### 6.3.3.8 WWW-EDI Gateway

The WWW-EDI Gateway is a component that provides the Web Hosted applications with the capability to access the EDI Message Exchange System. It is a Java package, composed of a set of classes providing the following features :

Connection and disconnection to/from the Message Exchange System  
Upload and download of messages to/from mailboxes ;  
List of messages stored in a mailbox.

The gateway communicates with the Message Exchange System using the tcp transport level protocol. Because of this, the Message Exchange System can be accessed through the Internet by any remote user workstation.

### 6.3.3.9 Pilot system component list

The following table contains the entire System Component List for the MARNET Pilot System.



#	Type	Component Name	Origin
1.	Generic	MARNET Node HW & SW platform	Procured
2.	Generic	X.400 over X.25 MSAD	Procured
3.	Generic	Internet e-mail MSAD	Procured
4.	Generic	Mailbox Service	Procured
5.	Generic	WWW-EDI Gateway	Procured
6.	Generic	WWW Server	Procured
7.	EU Ports Single Desk	Smart Forms	Developed
8.	EU Ports Single Desk	Message Conversion Agents	Developed
9.	EU Ports Single Desk	Type 2 Service Agents	Developed
10.	Unified Dangerous Goods Mngmt.	Shipping Line/Shipping Agent Application	Developed
11.	Unified Dangerous Goods Mngmt.	Port Authority Application	Developed
12.	Unified Dangerous Goods Mngmt.	Message Conversion Agents	Developed
13.	Commercial Information Exchange	HTML pages	Developed
14.	Commercial Information Exchange	Standard Forms	Developed
15.	Commercial Information Exchange	Standard Databases	Developed
16.	Port Consultation	HTML pages	Developed
17.	Port Consultation	Standard Forms	Developed
18.	Port Consultation	Standard Databases	Developed
19.	Ship Tracing	Genoa Service Provider	Developed
20.	Ship Tracing	Lisbon Service Provider	Developed
21.	Ship Tracing	Marseilles Service Provider	Developed
22.	Ship Tracing	Valencia Service Provider	Developed
23.	Ship Tracing	Co-ordinator Process	Developed
24.	Ship Tracing	User Access Application	Developed
25.	Manifest	Html Pages	Developed
26.	Manifest	MarNet Standard Forms	Developed
27.	Manifest	Marnet administration tool	Developed
28.	Manifest	Marnet Interchange agreement	Developed
29.	Manifest	MarNet Standard Databases.	Developed
30.	Statistics	Html Pages	Developed



#	Type	Component Name	Origin
31.	Statistics	MarNet Standard Forms	Developed
32.	Statistics	Marnet administration tool	Developed
33.	Statistics	Marnet Interchange agreement	Developed
34.	Statistics	MarNet Standard Databases.	Developed

**Table 4 – Pilot Components List**





## 6 CONCLUSION

Marnet objectives were ambitious because they were related to many fields like transport organisation, Information and Communication Technology and new activities creation.

Our Marnet group comprising transport users, NICT specialists, transport operators was able to build a potential service offer thanks to different approaches and contributions .

Despite the difficulty to manage such a project, our organisation in Work Package and in autonomous teams was a key point of our success. It is obvious that the Marnet partners have increased their knowledges, competences in the technical, operational and marketing fields.

Let us consider the initial objectives :

- ***Initial Objective:*** *To demonstrate the feasibility of the MarNet concept by fully implementing a representative group of services.*

The demonstration of the feasibility of the MarNet concept by fully implementing a representative group of services has been made, partners have experimented the services and concluded that they are very useful for their activities. Those services can be provided at a very acceptable tariff and at an adequate profitability.

- ***Initial Objective:*** *To provide operational access to these services to big, medium and small Mediterranean ports, regardless of their current information system.*

The operational access to these services for big, medium and small Mediterranean ports is made commonplace:

- In case of small entities (port, transport operator), the use of a PC or of a PC network by downloading Marnet applications.
- In case of entities automated with an Information System (access through a telecommunication platform like PROTIS Marseilles' P.C.S.). For this kind of users, there's no need to modify ones own system.

- ***Initial Objective:*** *To demonstrate inter-regional interconnectivity.*

Interconnectivity and interoperability are demonstrated in all the Marnet Services because the access and the data interchange can be done:

- From a PC or a network of PCs
- By different file format (flat file or EDIFACT)
- By different networks (X400, X25, Internet)

- ***Initial Objective:*** *To create reusable building blocks, for access from non-automated ports.*

In the Marnet project we have developed and adapted applications allowing non automated port communities to access all Marnet building blocks and to use the useful services of a P.C.S.



***Initial Objectives:*** *To develop the necessary training and awareness materials in order to support the implementation of the Marnet network.*

Regarding the training activities, the great experience of the partners in the field of pedagogy concerning information system (application and network) gave us the possibility to build a general pedagogical schema and a set of tools dedicated to Marnet.

The awareness tools (Marnet Newsletters, video, website, workshop) are available for the European commission and for all the Partners.



**FIGURE INDEX**

*Figure 1 – EU Single Desk Management: Definition of services ..... 37*

*Figure 2 – EU Single Desk Management: Service Principles ..... 37*

*Figure 3 – EU Single Desk: Management of Voyage Plan..... 38*

*Figure 4 – EU Single Desk: Shipping agent functionality..... 39*

*Figure 5 – United Dangerous Goods Services: Information Flows ..... 40*

*Figure 6 – Ship Tracing Service: Port Community System Interconnection ..... 43*

*Figure 7 – Ship Tracing Service: Service Providers ..... 44*

*Figure 8 – Manifest Interchange Service: Functional Architecture ..... 49*

*Figure 9 – Manifest Interchange Service: Branching Diagram ..... 49*

*Figure 10 – Port Consultation: Terminal Status ..... 51*

*Figure 11 – Statistics Service: Branching Diagram..... 55*

*Figure 12 – Functional Architecture ..... 55*

*Figure 13 - Technical Choice: 4 types of architectures.....*

*Figure 14 – Overall architecture..... 65*

*Figure 15: Marnet Node Description ..... 67*

*Figure 16 – Two-tier and Three-tier Model..... 69*