
	<p style="text-align: center;">MISTIC</p> <p style="text-align: center;"><i>IST-1999-14155</i></p> <p style="text-align: center;"><i>Maritime Intelligent Systems for Transport and Inter-related Chain</i></p>
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Deliverable D1 – Final report

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DELIVERABLES SUMMARY SHEET**Project Number:****Project Acronym:** MISTIC**Title:** Maritime Intelligent Systems for Transport and Inter-related Chain**Deliverable n°:** D1**Short Description:**

This document is the final report of the MISTIC Thematic Network.

It provides a comprehensive view of the results obtained, the methodologies and approaches employed. The report addresses to objectives for the project as well as the degree to which these objectives have been reached.

Partners owning: METTLE

Partners contributed:

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1. PROJECT OVERVIEW

1.1. Overview of the MISTIC thematic network

The Thematic Network MISTIC contributes to the development and deployment of Maritime Intelligent Transport Systems. Indeed, MISTIC is aimed to be a stimulation activity for maritime players to develop and utilise Maritime Intelligent Transport Systems.

The MISTIC project was funded by the European Commission Directorate General Information Society, within the fifth Framework Programme for Research and Development, Key action “Systems and Services for the Citizens”, “Intelligent Transport Systems. The project started on 1st of November 2000 and ran until 30th of April 2004 (42 months).

Such stimulation has been achieved at four parallel levels:

- Level 1: Dissemination of state of the art and best practices based on EU RTD success stories
- Level 2: Collecting the end-users requirements and stimulating awareness and preparedness to change working practices and business processes to facilitate the deployment of innovative IST
- Level 3: Supporting the RTD ongoing projects by providing an overall economic and social assessment of RTD projects' activities and results
- Level 4: Creating awareness of the benefits of Maritime Intelligent Systems at the highest possible level of the decision making process and the public in the maritime regions, Member States and European Institutions such as Commission, European Parliament and Committee of Regions

MISTIC was, inter alia, tasked with attempting to identify a methodology to involve users and stakeholders more intensively in the development of maritime intelligent systems, particularly in relation to socio-economic aspects. The methodology recommended is intended not only to assist individual projects, but also to help in identifying end-user requirements for maritime intelligent systems.

1.2. Consortium's compositions

The MISTIC consortium comprised two main contractors, METTLE and AMRIE, and eleven members, forming the Core Consultation Group (M2M, MDG, RC AUEB, TMA, Euronautech, SCIRO, Fresti, MPIN, SP Transport Technology, IFN, Horama). The eleven members have been started their activities in the Thematic Network following the contract amendment on 03/12/2002.

1.2.1 METTLE, France

1.2.1.1 Short profile

The main goals of METTLE are:

- To rationalise abilities and resources in the corporate maritime, transport and tourism industry fields;
- To aim to assist companies throughout their projects before and after any investment;
- To sustain the innovation process for the transport industry. The exploitation at full scale and the technology transfer and consultancy of maritime engineering and design to the industry is a key factor of the METTLE corporate policy and strategy.

Main activities:

Engineering:

- **Transport and Environmental Engineering:** key competences for inter-modal transport and logistics, including vehicle and terminal designs, maritime technology, re-engineering, safety, marine environment impacts and assessment, risk analyses, intelligent transport systems, together with broad experience of full-scale maritime operations.
- **Basic Research:** fluid dynamics, hydrodynamics, materials, processes
- **Information Society Technology:** Application of Telematics to the transport Industry.
- **Industrial activities:** Design of ships, luxury boats, fast crafts, and others; Prototype of new concepts.
- **Consultancy:** Project management of large industrial and engineering project. Business planning. Logistics and Inter-modal Transport.

Human factors: The second important goal of METTLE is the improvement of maritime safety, in a way that the human element will be in the centre of attention. In order to focus not primarily on technological improvements but on developing social competencies and creating a company safety culture METTLE works on concepts to enhance attractiveness and quality of education and training, on concepts for the development of incident and accident reporting methods, and will develop tailor-made solutions for smaller ship owners with regard to management system implementation

Transport economics: METTLE serves as competence centre for questions related to quality in transport, focusing especially on transport economics and human factors. One major goal is the integration of economic aspects in the project environment, i.e. any developed solution has to be checked against its economic impacts.

Maritime consultancy: With its professional background METTLE offers state-of-the-art knowledge and experience to enhance the strength of current businesses and the scope for future growth of our clients, together with our clients.

As innovative solutions in their nature change current practices a natural part of the services offered is evaluation of needs of re-engineering workflows and competences, and the possible needs for training and teaching.

Market engineering: Technology without market does not create development; on the other hand market needs technology to grow and find new ways. METTLE merges technological approach and market knowledge for a “market oriented technology”.

1.2.1.2 Role and activities in MISTIC

During the three years and half years of MISTIC, METTLE was in charge of the overall project management of the Thematic Network. It included in particular the following activities:

- Co-ordination at consortium level of the technical activities of MISTIC;
- Project management and quality supervision of the phases of the project;
- Relationships with the European Commission, including organisation and management of review meetings;
- Representation of the project to parties outside the consortium;
- Overall legal, contractual, ethical, financial and administrative management of the consortium;
- Organisation of kick-off meeting and consortium meetings;
- Delivery of reports.

In parallel to these management and coordination activities, METTLE has carried out the following activities:

- Leader of the State-of-the-art activities (WP3)

- Responsible for the organisation and preparation of MISTIC Days
- Responsible for the dissemination activities (WP6)
- Contribution to the identification of end-users requirements (WP4) and support to the RTD IST ongoing projects (WP5)

1.2.2 AMRIE, Belgium

1.2.2.1 Short profile

AMRIE was formed in 1993 on the initiative of Members of the European Parliament and has now 22 sponsoring MEPs.

The mission of AMRIE is to give the maritime regional and industrial actors in Europe an effective voice and to contribute to establishing an “integrated maritime strategy”. AMRIE is the platform for people involved to express their ideas, protect their interests and develop the prosperity of the European maritime economy at the regional level.

The AMRIE members cover all maritime interests (Regional Authorities, cities, ports, research and training organisations, universities, industries, qualification societies, trade unions, etc.) and are located in all Member States of the EU and in some accession countries. This gives AMRIE a wide range of expertise on every maritime issue.

The AMRIE main activities are policy development and influencing the European Institutions to favour a development of the European Maritime Economy; networking between its members to launch common projects and disseminating information on EU policies and projects.

The main themes of AMRIE policy are economic development, transport economics, employment, environment and excellence, all within the framework of improving competitiveness. The areas covered include:

- Maritime regional development,
- Development of new information technologies
- Competitiveness and productivity in maritime transport and maritime industries,
- Education and training throughout a person's career,
- Research and development,
- Safety at sea, shipping quality standards and elimination of substandard ships and operators,
- Protection of the environment,
- Quality of life for citizens.

AMRIE has 5 Specialist Working Groups which meet 3 times per year: Centres of Excellence, Shipping Quality, Short Sea Shipping and intermodality, Maritime Regional Economic Development (MARED) and Marine Environmental care.

AMRIE is now involved in over 10 European Projects dealing with several aspects of the maritime activities

1.2.2.2 Role and activities in MISTIC

Regarding the management activities, AMRIE was financial coordinator and was in charge of the following tasks:

- Collection and distribution of funds received from the European Commission
- Collection of cost statements from the partners and members
- Consolidation and delivery of cost statements

- Follow-up of payments

AMRIE took also an active role in the management of the project, preparation of the contract amendment and follow-up with the European Commission.

Regarding the technical activities, AMRIE has carried out the following tasks:

- Responsible for the organisation and management of the Core Consultation Group, preparation of the Consultation Group meetings and Core consultation Group meetings
- Contribution to the State-of-the-art activities
- Responsible for the identification of end-users requirements (WP4)
- Responsible for the support to the RTD IST ongoing projects (WP5)
- Contribution to the dissemination activities (WP6)

1.2.3 Members

1.2.3.1 M2M

Profile

M2M marketing communication business is an Italian company created by a professional group in marketing and communication sector. Its aim is to support institutions and companies in defining and realising their marketing objectives. The marketing branch of M2M helps the companies in the determination of marketing strategies through directional advise, the determination of master plan, the co-ordination of market research, the projects will be presented at a national and community level.

Role

M2M has been responsible for the development of all dissemination media within the project (logo, web site, brochure, CD Rom). M2M was member of the Core Consultation Group.

1.2.3.2 MDG

METTLE Deutschland GmbH, Germany (MDG)

Profile

METTLE Deutschland GmbH serves as competence centre for all questions related to quality in transport. The overall objective is the engineering and development of concepts and feasible solutions for the maritime and transport economy in close cooperation with our clients and partners.

Role

MDG was leading the collection of information regarding relevant RTD projects and the establishment of set of criteria of what constitutes “success” in social and economical achievement for RTD projects. MDG contributed to the analysis of RTD projects from an economical point of view and to the examination of the requirements in the maritime sectors from a logistical point of view.

MDG was member of the Core Consultation Group and was involved in the quality control assigned to the Core Consultation Group.

1.2.3.3 RC AUEB

Research Centre of Athens University of Economics and Business (RC AUEB)

Profile

The Research Centre is a non-profit organisation established by the Athens University of Economics and Business. The Centre is devoted to the promotion of theoretical, applied and policy research in the

general fields of economics and management as well as in the fields of informatics and applied information systems. In this context, the Centre has completed a large number of studies, most of which have been financed by the European Union. Emphasis is given to the analysis of problems and problem-oriented research. The TRANsportation Systems and LOGistics Laboratory (TRANSLOG), which part of RC AUEB has a strong theoretical and practical background in the following methods and tools: i) Applications of Advanced Transport Telematics (ATT), ii) Demand Forecasting Methods, iii) Application of Multicriteria Decision Making Methods, iv) System Evaluation Methods, v) Geographic Information Systems (GIS), v) Development and Implementation of Decision Support Systems (DSS), viii) Applications of Total Quality Management (TQM), which have been applied in solving complex transportation and logistics related problems.

TRANSLOG's research interests are focused on intermodal transport, transport systems modelling, development and assessment of future scenaria on Supply Chain Management trends, public transport, emergency response logistics, transport and tourism related issues, performance evaluation and benchmarking.

Role

RC AUEB contributed to the identification of a methodology for eliciting user requirement (particularly regarding Multi Criteria Analysis and its use in other projects) and provided support on the implementation of the methodological framework developed.

RC AUEB was member of the Core Consultation Group and was involved in the quality control assigned to the Core Consultation Group.

1.2.3.4 TMA

Profile

Tony Morrall Associates is a Marine Technology Consultant, Consultant to British Maritime Technology Limited and member of the RINA Safety Committee. He has a wide experience in naval architecture, EC and government relations, liaison with Government Departments in relation to Research and Development programmes and EC coordination for European R&D project proposals, technical expertise to the European Commission for the Recreational Craft Directive,

Role

TMA contributed to the collection of RTD projects and the establishment of criteria was member of the Core Consultation Group and was involved in the quality control assigned to the Core Consultation Group. TMA carried out in particular the final review and quality control of the deliverable D3.

1.2.3.5 Euronautech

Profile

Euronautech SPRL offers consultant expertise on technical safety and operational issues for maritime transport and navigation. The main activities of the organisation are to address application areas and issues which are crucial to the evolution of tools and services for maritime transport, navigation and the integration of maritime transport within the inter-modal transport and freight community.

Role

Euronautech provided support to the organisation of the Consultation Group meetings, advising on the content of the CG meetings. Euronautech prepared plans for the collection of end users requirements, was member of the Core Consultation Group and was involved in the quality control assigned to the Core Consultation Group.

1.2.3.6 SCIRO

Profile

Sciro is a small/medium enterprise, which goal is to co-operate with Customers to find and solve their problems and develop their ideas and projects.

Sciro works as R&D consultant and technical support for national railway companies and in industrial realisations or feasibility analysis for large industries, most of them related to transport system (railway, metrorail systems, DC and AC supply systems, signalling systems, transport planning). Sciro has developed oriented software tools (as aided-decision tools).

Role

Sciro was member of the Core Consultation Group and was involved in the quality control assigned to the Core Consultation Group. They provided support in the analysis of selected projects from a socio-economical point of view.

1.2.3.7 Fresti

Profile

FRESTI is a Portuguese company, which started its activity in 1993 and since then has participated and co-operated in several projects at national and international scope. The major activities are those related to the Education and Training, Maritime Management and Consulting. Although being a SME the group of internal and external consultants allows it to participate in a broad range of projects both at national and international level.

The main activities of FRESTI are those related to Advanced Maritime Technology Applications, Consulting and Education & Training of personnel engaged in the maritime and fishing field, both ashore and at sea. FRESTI is also working in maritime Research & Development projects in the area of waterborne transport, fishing, protection of the marine environment and sustainable development of the oceans

Other activities of FRESTI include: Port and Maritime Management; Advanced Maritime Technologies Applications; Fisheries; Crew Management of National and Foreign Shipowners; Surveys and Inspections in the Maritime field; Maritime Safety; Marine Environment Protection;

Role

FRESTI was member of the Core Consultation Group and was involved in the quality control assigned to the Core Consultation Group. Fresti carried out in particular the final review and quality control of the deliverable D5.

1.2.3.8 MPIN

Profile

The Maritime Pilots Institute Netherlands (MPIN) was established on 1 September 2000 in Rotterdam. It accommodates all the consultancy, research and training activities within the Dutch Pilotage Organisation and has a great deal of specific maritime/nautical know-how, skill and experience in the fields of piloting, remote piloting and the navigation of all types of sea vessels, etc. Furthermore, it develops, co-ordinates and tends to all the activities associated with consultancy and research services, education, training and improvement of skills of the Dutch Pilotage Organisation, all of which is done in co-operation with the regional operating companies, including the education and training of registered pilots as commissioned by (any) trade organisation.

The sector Consultancy & Research combines specialist maritime pilot and engineering skills with practical experience and competence for world-wide marine and transport related projects. By achieving quality results, a link will be made between innovative, fundamental research, practical and

operational application, commercial exploitation and improvement of profitability. The professional reputation of the MPIN is based on practical experience, maritime and technical expertise.

Role

MPIN was member of the Core Consultation Group and was involved in the quality control assigned to the Core Consultation Group.

1.2.3.9 SP Transport Technology

Profile

SP, the Swedish National Testing and Research Institute, provides industry and society with services in the fields of technical evaluation, metrology, research and development, all characterised by the highest levels of expertise, efficiency, impartiality and international acceptance. In doing so, it contributes to the development and competitiveness of industry, as well as to safety, the conservation of resources and a good environment.

Through its ability to integrate activities all the way from R&D to final application, SP constitutes an important link between industry and universities. Results can be quickly disseminated to industry, finding applications in the form of more efficient solutions for improved competitiveness. SP operates an extensive programme of technology dissemination to small and medium-sized companies and participates actively in national and international standardisation.

Role

SP was member of the Core Consultation Group and was involved in the quality control assigned to the Core Consultation Group. SP carried out in particular the final review and quality control of the deliverable D3.

1.2.3.10 IFN

The French institute of navigation (Institut Français de navigation - IFN)

Profile

The French Institute of Navigation (Institut Français de Navigation or IFN) is a French learned society conforming the French law on non-profit making organisations. It was created in 1953 under the aegis of two State Secretaries, Navy and Air Force, in a similar way to the Institutes of Navigation of Germany, United Kingdom and United States, which had been created earlier.

The aim of IFN is to promote the sciences and techniques related to navigation of all types : maritime, aeronautical, ground transport, and space. IFN maintains a close cooperation with various navigation user organizations, with the various government bodies in charge of the regulation, the institutions, and the management of safety related networks, and with the industry of navigation systems and on board electronics.

Role

IFN was member of the Core Consultation Group and was involved in the quality control assigned to the Core Consultation Group. IFN carried out in particular the final review and quality control of the deliverable D5.

1.2.3.11 Horama

Profile

Horama Marketing & Engineering Services S.A (GR) is a small private independent engineering and marketing bureau recently founded by a team of Greek engineers with +13 years of service in the maritime electronic industry mainly from marketing/ sales and contract management positions.

Horama personnel has been or is involved actively in a series of projects related to waterborne Telematics such as PISCES, COMMAN, SHIDESS, TOMAS, EIES, ArchiPELAGO and ITEA-DS. Horama was also coordinator of the Thematic Network SWAN

Role

Horama was member of the Core Consultation Group and was involved in the quality control assigned to the Core Consultation Group. Horama carried out in particular the final review and quality control of the deliverable D4.

2. METHODOLOGIES

The MISTIC methodology was based on three different kinds of activities (see Figure 1):

- The workpackages, representing the “technical” work carried out by the consortium
- The MISTIC days, organised as local workshops in different European locations
- The MISTIC Consultation Group

2.1. Workpackages

Apart from the management tasks, the workpackages have been developed in order to take into considerations the main achievements in

- Current state of the art; past and ongoing research projects
- Solutions and methodologies for capturing end-users requirements
- Socio-economical assessment
- Dissemination of developed information

2.1.1 WP2 – Technical Secretariat

The scope of the Technical Secretariat was to provide to provide Technical Support and Administration for the organisation of the MISTIC events, in particular with the following tasks:

- Overall technical co-ordination of the Consultation Group (CG)
- Publication of Consultation Group Guidelines
- Organising the meetings (CCG meetings, CG meetings)
- Preparing advance support papers and reports, meeting agendas and minutes
- Support for the organisation of MISTIC Days

2.1.2 WP3 - Identification and analysis of RTD projects and scenarios

The objectives of this workpackage were the following:

- To conduct an examination and collection of relevant EU-funded and national funded RTD projects, from a qualitative point of view
- To establish a comprehensive set of criteria of what constitutes “success” in social and economical achievement for RTD projects, relevant to IST projects.
- To test these indicators to a selection of some IST projects,
- To evaluate the actual deployment and implementation of RTD results, based on an enquiry made to project coordinators.

2.1.3 WP4 - Identification of actors and end-users’ requirements

Workpackage 4 aims at identifying a methodology to involve users and stakeholders more intensively in the development of maritime intelligent systems, particularly in relation to socio-economic aspects. The scope is therefore the identified a Model/Methodology involving, first, the use of Object Oriented Analysis (OOA) and the combined use of OOA and Multi Criteria Analysis (MCA).

2.1.4 WP5 - Supporting the RTD IST ongoing projects and providing overall results

Within WP5, the goal of the project was to provide support to RTD IST project, by a Vade Mecum which summarises the lessons learnt in MISTIC and indicates the steps that might be taken – by users, stakeholders (including the European Commission), and developers.

The second part of the work is the Summary ISIS Cluster Report, which provides an analysis of a number of key IST projects to illustrate how successfully or otherwise the projects involved users and stakeholders in the system design and development process, with reference to socio-economic impacts.

2.1.5 WP6 – Dissemination

The MISTIC dissemination activities have been directed to the following categories:

- End-users:
 - Maritime Regional Authorities
 - Maritime cities
 - Ports, Terminals
 - Transport operators
 - Shipowners
 - Shipping lines
 - Shippers
 - Shipbuilders
 - Classification societies
 - Nautical academies / colleges / Institutes
- Other agencies:
 - AMRIE Members
 - European Parliament
 - Short Sea Shipping Promotion Centres and Contact points
 - Maritime Industries Forum
- Industrial suppliers:
 - Marine Equipment Manufacturers
 - Network suppliers and providers
 - Software developers

Various dissemination tools have been developed (printed brochures, poster, web presences, newsletters, etc.).

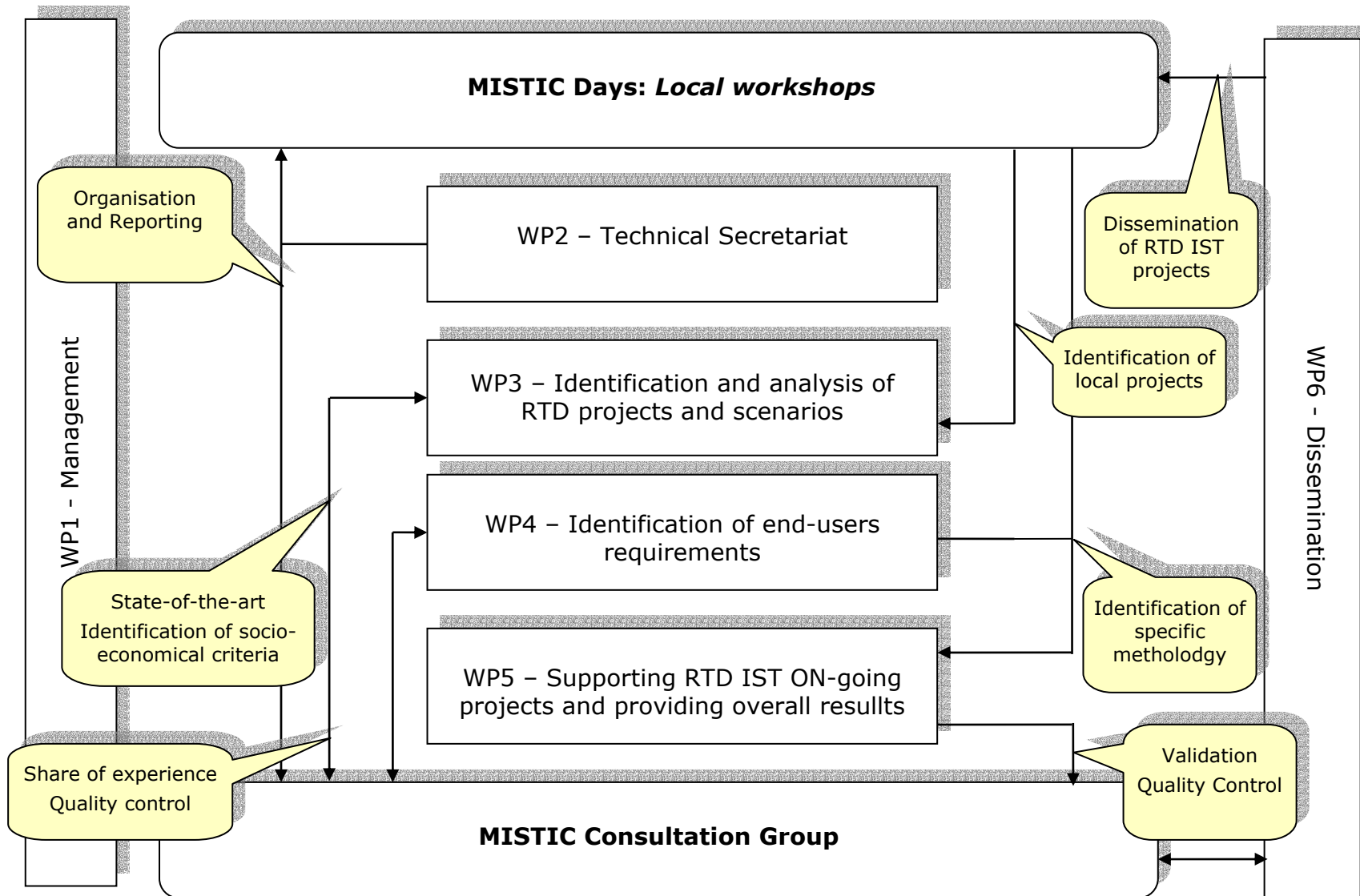


Figure 1 - MISTIC global methodology

2.2. MISTIC days

Five MISTIC days have been organised (see Figure 2), each in a different region, with the following common aims:

- to develop close links with the local organisation and interested end-users in the fields of maritime intelligent systems
- to locally disseminate the MISTIC work and maritime intelligent systems' potential
- to promote general awareness at local level on innovation in the area of maritime intelligent systems.

Venue:

To attract participants, the MISTIC days have been organised as much as possible in the Business area of a maritime city or in a port.

Invitations:

Usually, pre-invitations have been sent 2 months before the MISTIC day, without final agenda but with a presentation of MISTIC and the objectives of the meeting. Then final invitations have been sent 3 weeks/1 month before the meeting, with the final agenda and some supporting documents. The invitations have been addressed to:

- National, Regional and local Authorities
- Regional and local port authorities and terminals and port users
- Regional maritime and intermodal transport operators
- Regional and local shipowners, shipping lines, shippers, shipbuilders
- National and regional contacts points and SSS promotion Centres.
- Regional and local maritime universities and institutes
- Regional suppliers of hardware and software for maritime industry

Agenda:

One or several themes have been chosen (maritime transport, ship management, marine equipment, shipbuilding, port operation, ship/port interface, etc...), depending on the local situation, with usually the following structure:

- Opening:
- Presentations
 - The IST Programme in FP5 and FP6
 - MISTIC : its objectives, methodology, 1st results, next steps
 - MISTIC : how it may help the users (METTLE)
 - MISTIC : web site and dissemination
 - If possible, a local related project, by a speaker not belonging to the consortium
 - Results of 2 or 3 related projects (on-going or achieved), focusing on the theme(s) chosen
- Discussions : according to the date of the MISTIC Day and hence the progress of MISTIC work
- Presentation and discussion on the subject of the MISTIC days.

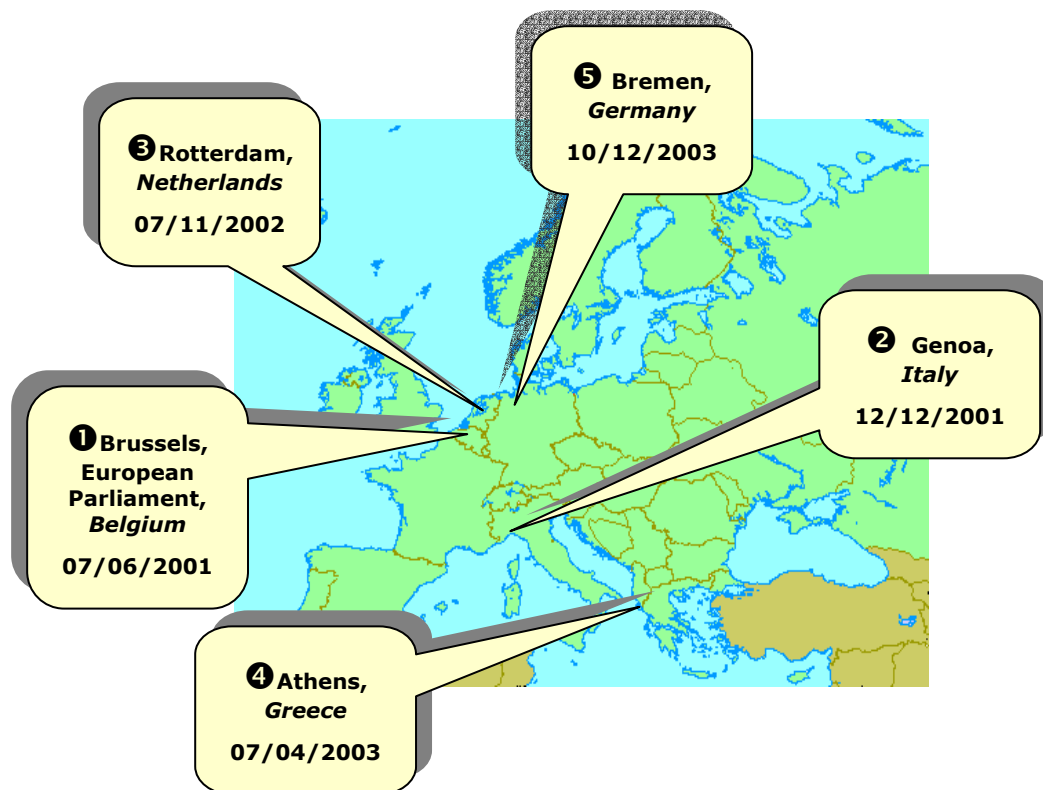


Figure 2 - Geographical coverage of the MISTIC Days

The following subjects have been tackled during MISTIC Days:

1. Planning, expenditures and investment on innovation in the maritime area at EU level (European Parliament)
2. How to improve efficiency and security of terminals by using “intelligent shipping” (Genova)
3. IST Applications to support the maritime pilot and IST Technologies for Safety in maritime applications within the 6th Framework Programme (Rotterdam)
4. Maritime Intelligent Systems for Commercial Transactions (Athens)
5. Port Community Systems (Bremen)

2.3. MISTIC Consultation Group

2.3.1 Working Methodology

An MISTIC Consultation Group has been composed, made of visionary experts from different locations and different specialities linked to maritime intelligent systems.

The main goal of the Consultation Group is to assist the consortium in establishing the state of the art on existing RTD projects, in the delivery of comprehensive methodology for capturing end-users’ requirements and in advising the consortium on the MISTIC activities.

2.3.2 Inputs to the Consultation Group

Input to the Consultation Group came both from the Consortium (through Workpackages) or the MISTIC days. Moreover, specific relevant RTD project presentations have been organised during the Consultation Group meetings.

2.3.3 Members of the Consultation Group

The views of the Consultation Group reflected the variety of interest of the various European industrial organisations and eventually of other interested associated countries involved in the Maritime IST.

The CG was composed of experts in different maritime fields and coming from various geographical locations. This group was forming the so-called Core Consultation Group (CCG – list of companies indicating in section 1), the CG being then opened to a larger audience.

2.3.4 Planning and organisation of meetings

The six meetings of the Supporting Group took place in Brussels, at the following dates:

- 1st Consultation Group meeting: Brussels, 1st February 2001
- 2nd Consultation Group meeting: Brussels, 26th September 2001
- 3rd Consultation Group meeting: Brussels, 12th June 2002
- 4th Consultation Group meeting: Brussels, 24th January 2003
- 5th Consultation Group meeting: Brussels, 21st October 2003
- 6th Consultation Group meeting: Brussels, 8th of March 2004

3. PROJECT RESULTS AND ACHIEVEMENTS

3.1. Results and achievements

3.1.1 MISTIC Days

The main conclusions of each MISTIC day are the following:

3.1.1.1 First MISTIC Day

The objective of the first MISTIC Day, held in the European Parliament, was to discover the tangible benefits of EU RTD investment in maritime intelligent systems to the maritime community. This was to be done by presenting the exploitable benefits/products developed as a result of Waterborne Transport RTD funded within the 1994-1998 Telematics Applications Programme. This also conveys to MEPs the practical results of RTD expenditure and the need for further research into maritime intelligent systems within the 6th Framework Programme. In particular new research should attempt to provide the tools and services needed to integrate maritime transport with other transport modes and enable the evolution of smart, economic, and efficient ships and infrastructures.

The presentation / demonstration of successes of the past projects was followed by a discussion to enable attending MEPs to have an opportunity to ask questions related more generally to the IST Programme as well as to the individual projects presented.

3.1.1.2 Second MISTIC Day

The second MISTIC Day, held in the port of Genova, was aiming at disseminating innovative projects in the area of Terminal efficiency and terminal safety and security.

The round table discussion centred on the key roles of MISTIC, i.e. to involve users; to create interactions between users and suppliers; and to ensure that the socio-economic as well as technological considerations were taken into account when developing maritime intelligent systems.

The IPPA project was cited as an example of how users' requirements may be captured and how the theoretical approach to this task can evolve into a practical approach. The project MOCONT has been also disseminated during this event.

The discussion on the subject of security in the intermodal chain, supported by presentations made by industrial leaders in this area (Sistema & Telematica, Elsag Bailey) dealt mainly with security issues in maritime terminals, with IT as tool to avoid operators' overloading, on Fleet Management - Tracing/tracking of trucks & cargo and the potential benefits of EDI and EDIFACT.

3.1.1.3 Third MISTIC Day

The third MISTIC Day was organised around the themes of IST applications to support maritime pilots. The project IPPA was presented as a potential innovation in this area. Moreover, presentation around Technology and Pilotage in future vessel traffic management in relation to safety, efficiency of traffic flow and total port accessibility and fairway workability supported the debate among participants. On the socio-economic side, the issue of who is going to pay has been risen. Indeed, pilot portable unit needs highly trained pilots on board. However, a shore based pilot would be too expensive and raise some political and economical issues. It introduces new way of working forward, requiring high level of training. Since masters are not trained for that, shore based pilot will allow only some ships to navigate without pilot.

It was therefore concluded that socio economical point of view was an essential factor in such research project development, and that human being and cultural awareness need to be taken into account, the main limits being economical, safety and environmental constraints.

3.1.1.4 Fourth MISTIC Day

“Maritime Intelligent Systems for Commercial Transactions” was the central theme of the fourth MISTIC Day, held in Greece. This event was also organised as a dissemination activity for the MARIDES project. MARIDES is a software system for the management of a chartering department in a shipping company, concentrating on the decision making process. It includes much of the basic functionality of similar systems – standard voyage calculations and estimations, database use, etc. Decision support tool is at its heart.

The presentation of MARIDES was supported by a video demonstration of the software, and discussion on the potential of standardised interfaces and XML.

3.1.1.5 Fifth MISTIC Day

The fifth and last MISTIC Day was organised in Bremen, around the subject of Port Community Systems. The scope of this MISTIC Day was to present the latest European developments in Port Community Systems, putting special emphasis on:

- Economic focus,
- Involvement of users and stakeholders in systems design and development,
- Integration of the various systems within ports.

During this event, some systems were presented covering different geographical European areas, and showed how the concept of port community has been successfully implemented among users, stakeholders and developers.

3.1.2 WP3: State of the art

This deliverable D3 “MISTIC State of the Art Report” contains the achievements of the work in the tasks of workpackage 3 in terms of examination of relevant EU-funded RTD projects from a qualitative point of view, the preparation of a technical overview of these projects, the preparation of a comprehensive set of criteria of what constitutes success in social and economical achievement for RTD projects with a focus on maritime intelligent systems and the associated assessment of 12 projects.

Maritime Intelligent Systems (MIS) is the collective name for a wide range of new technological advances in the fields of electronics, computing and communications, both ashore and onboard appropriate for applications such as: Financial management, Inventory control, Scheduling, Resource allocation, Cargo routing, Repair and maintenance planning and scheduling, Navigation and piloting, Collision avoidance, Ballast control, and Training and simulation.

69 RTD projects on maritime IST technologies and maritime transport have been assessed. As for the contents of the 69 projects, three thematic activity fields have been identified. About 40% of the projects deal with “Maritime Transport”, while 30% are concerned with “Integrated Intermodal Systems”. The focus of the remaining 30% of the projects is on “Logistics and Supply Chain Management”.

In the activity field “**Maritime Transport**”, the emphasis is on applications which provide navigational support or management information. Among these, there are mainly traffic control and management applications, decision support systems and systems to enhance ship communications. In comparison to the remaining applications in this field, the relevance of safety pollution prevention systems tends to be underestimated.

In the activity field “**Integrated Intermodal Systems**” the emphasis is on information interfaces and physical interfaces. In most cases, these have the purpose to improve the networking and linking of

different transport modes and/or to organise and coordinate traffic flows. But intermodal transport should not just be concerned with questions of tuning equipments etc. Compared to the technical aspect, regulating the financial as well as the legal aspect of intermodal transportation has until now not been considered to a sufficient degree.

In the activity field “**Logistics and Supply Chain Management**”, the emphasis is on e-commerce, applications to improve information flows and Internet applications/services. These mainly offer services to enhance the exchange of business information and organise transport. These are followed by applications which are concerned with improving the means of communication in the Internet respectively with optimising softwares for location, inventory, transport and production. E-commerce applications which deal with services of tracking and tracing of booking facilities are of almost equal importance. Until now, comparatively little attention in the RTD on logistics and supply chain management is paid to issues concerning operational decisions or financial flows.

In summary, the driving forces behind the projects are economic as well as technical interests: Economic advantages in terms of competitiveness, time and cost savings etc. can only be ensured by a constant improvement of existing technologies respectively by innovation, especially in the European IST industry. In order to attain and maintain technical advantages over competitors, perpetual investments into R&D have to be guaranteed. However, the perpetual development of applications also results in an increased user-friendliness which affects both the working and living conditions of users in Europe. Lastly, the remarkable environmental benefits which can be derived from research in the maritime IST industry have to be emphasised.

In order to measure the success of a RTD project in terms of socio-economic achievements a set of criteria had to be developed according to which a validation can take place. In general, the socio-economic impacts of a maritime RTD project can be seen as being subject to: i) its objectives, i.e. the characteristics of the system that is developed, ii) the stakeholding groups involved in and affected by the developed systems, and iii) the category of the socio-economic aspects that are considered each time. Taking into consideration the methodological requirements, the EU projects' objectives as well as the general concerns within the maritime industry with special consideration of the IST, a number of socio-economic criteria have been developed:

- Reinforce competitiveness of European maritime IST industry
- Reduce regional differences through technology transfer
- Reduce time and cost of transactions, transport and telecommunication
- Address consequences of economic changes in companies
- Increase training standards and qualification
- Contribute to overcome cultural differences
- Address innovative areas of RTD, propose relevant future research
- Validate management concepts
- Improve maritime intelligent transport systems
- Provide access to IST for SME
- Contribute to employment
- Enhance job satisfaction in maritime IST industry
- Improve working and living conditions
- Reduce negative environmental impacts of transport systems
- Identify energy saving solutions
- Reduce consequences of accidents
- Facilitate intermodal transport

After having identified the relevant criteria it is necessary to define how their successful implementation in the maritime IST sector can be measured. Success of a certain project can be defined as gaining advantage, superiority, victory, accomplishment, achievement, or added value as compared to an alternative solution. Project success is a multi-dimensional concept. It cannot be assessed based on a single, or even two dimensional measures. A project may provide an efficient solution to the customer's requirements, yet be considered a failure by the performing organisation in terms of business success. Similarly, some projects seem successful in the short-term, but may turn out to be less-successful in the longer run, and vice versa. In some cases, a long time has to pass before the original expectations can really be met and success evaluated.

There can be identified four primary categories of project success: efficiency during the project, effectiveness in the short term as regards benefit to the customer, current contribution in the medium term, and future opportunity in the long term. In the final step the success of the maritime IST projects has to be measured based on the identified socio-economic indicators.

Finally, the actual deployment, success and implementation of some selected RTD projects have been analysed. Indeed, the added-value of RTD activities is in the full-scale implementation of their results, even if these are manifest only in the long term, in both technical and policy making terms.

The evaluation of such success after the RTD phase of the projects was actually particularly difficult to obtain, due to the fact that most of this information is "hidden" or part of commercial agreement which are independent with the public funding received during the RTD phase of the project.

3.1.3 WP4

MISTIC WP4 was tasked with attempting to identify a methodology to involve users and stakeholders more intensively in the development of maritime intelligent systems, particularly in relation to socio-economic aspects. The methodology recommended is intended not only to assist individual projects, but also to help in identifying end-user requirements for maritime intelligent systems.

The MISTIC Model/Methodology identified in WP4 involves, first, the use of Object Oriented Analysis (OOA). OOA is a well-tested methodology used to collect user/stakeholder requirements and to include users as integral partners in the conceptual design of systems. (N.B. not system architectures). In other words OOA enables users to be involved in an integral manner in the user requirements capture stage of projects.

The advantage of this technique is that it may also be used at both a high level by the European Commission to delineate whole domains and at project level linked to object oriented design (OOD) and implementation (OOP). In this context OOA should be seen as a language framework for both users and stakeholders and developers.

As MISTIC is a thematic network, and not an RTD project, it has not been possible – both because of the essential nature of thematic networks and the limitation on resources – to attempt to prove empirically the validity of the methodological approach suggested in this report. However, it should be noted that OOA is not a new concept and its application to the maritime domain continues to be explored, both in specific EU projects, e.g. D2D; in specific national projects, e.g.

The second recommendation suggested in MISTIC is the use, combined with OOA, of Multi Criteria Analysis (MCA). MCA may be used to provide a mechanism (objective) framework for comparing the relative (subjective) values of the various goals and objectives via the criteria established.

This combination of OOA and MCA can be used to negotiate requirements among users and stakeholders in specific projects and subsequent to project completion to measure the resulting impacts of the projects. It may also be used in a 'top-down' manner to develop broad-brush requirements from the goals, objectives, and criteria. In this way these requirement specifications can be turned into calls for tender related to overall work programme priorities.

None of the above comments is to suggest that other methods of user requirement capture cannot work at project level or that there is only one method to identify socio-economic considerations/impacts. However, it is suggested for consideration for those involved in developing maritime intelligent systems that the generality of the combined approach offers a valuable new and possibly unique methodology. The problem is that in a thematic network there are neither the resources available nor the network purposes - as there are in an RTD project - to fully specify and test the hypothesis advanced here.

To attempt to discover whether in some current EU projects there was evidence of the full application of OOA techniques, three selected IST clustered projects (Telemas, IPPA, MARIDES) were analysed in relation to their claims to be using OOA in determining system user and stakeholder requirements. In fact, the analysis indicated that none have done so, even though the intent was present in at least one of the projects. The analysis of these projects is set out in Section 3.

Another selected IST project, Infolog, was analysed in relation to the utilization of MCA to define and then to measure the performance of the project in socio-economic terms. This analysis was presented in qualitative terms only. The project was then subjected to a partial, post facto, re-analysis using MCA to demonstrate how MCA could produce quantitative results. This involved selecting appropriate user and stakeholder domains and socio-economic variables and then measuring the socio-economic impacts of the project and its outputs. The measurement of socio-economic impacts was also referenced to the socio-economic objectives set out at the outset of the project. The analyses are set out in Section 4.

This use of the quantitative comparison of the socio-economic impacts after the completion of a project may, of course, be used during the project, as a means of monitoring progress against the initial set of socio-economic objectives of the project. Projects will each have their own specific set of socio-economic objectives, though some, such as employment will be common to all projects. An exhaustive, classified list of socio-economic objectives is set out initially in Report D3.

The framework of the approach to defining domains, user and stakeholder groups, and subject domains was then referenced to the full 69 projects analysed in D3. This larger classified set of projects was used as a basis for analysing gaps in provision. Because of the resource constraints inherent on MISTIC as a thematic network, it was not possible to apply the MISTIC 'model' to derive the potential gaps in provision. Instead, the MISTIC partners and members (Core Consultation Group) suggested the gaps in provision, supplemented by evidence from the CG discussions; the MISTIC days, and other MISTIC desk and interview research. For this reason the list may be said to represent an 'educated' view of a pan-European set of global maritime end-user requirements to be fed into the FP6 process. However, it has not one which derives directly from the application of the methodologies explored in the MISTIC network activity.

A number of conclusions were drawn and some preliminary recommendations made, to both project co-ordinators and to the European Commission. The aim of the recommendations was to attempt to improve the performance of IST projects in the maritime transport area, by indicating a methodology which may more objectively determine user and stakeholder requirements, including, in particular, socio-economic objectives. The methodology could be used, both during and at the conclusion of projects to assess the socio-economic impacts of individual projects and of clustered sets of projects from the viewpoint of users and stakeholders.

3.1.4 WP5

The first part of the work in WP5 was the production of a Vade Mecum which summarises the lessons learnt in MISTIC and indicates the steps that might be taken – by users, stakeholders (including the European Commission), and developers. The aim is to achieve a more efficient maritime intelligent systems development process in future. The suggested process would provide mechanisms to involve users and stakeholders in the analysis and conceptual design phase of systems development,

particularly to take account of socio-economic considerations and impacts. While there may be other methodologies for involving users, it is the view of the MISTIC Consortium that the combined use of object Oriented Analysis and Multi-Criteria Analysis offers a valuable route and one which is capable of dealing adequately with socio-economic issues.

The second part was the ISIS Cluster Report, which also represents, together with its Annexes (not published, but available on the web-site, the final report of the MISTIC Network. The Summary Report provides a brief analysis of a number of key IST projects to illustrate how successfully or otherwise the projects involved users and stakeholders in the system design and development process, with reference to socio-economic impacts.

The Annexes to the MISTIC BOOKLET are the following:

- The Full ISIS Cluster Report, contains a detailed analysis of the ISIS Cluster projects covered in Deliverable D5. The Report will provide an indication to developers, users, and the purpose is to inform the public and the policy-makers of the MISTIC approach and its analysis of the projects undertaken so far within this cluster/domain.
- The IST Programme Approach and Other Policies, places emphasis on the key issues dominating the current and future maritime policy agenda, i.e. maritime safety, inter-modality, and improvements to the overall efficiency of the maritime transport sector.
- Power point presentations of IST projects at the MISTIC Consultation Group meetings focusses on socio-economic aspects of the projects with special emphasis on the viewpoint of users and stakeholders on which the projects presented have an impact.

3.1.5 Dissemination

The object of the dissemination activities within MISTIC was to develop activities a substantial for attracting maritime sector companies to use IST and to deploy the new technologies related to maritime intelligent systems.

Therefore MISTIC results have been dispatched to a wider audience in a form suitable to users by means of seminars and workshops.

Different kinds of media have been developed within MISTIC:

- Printed MISTIC leaflet (Figure 3)
- MISTIC CD-ROM
- MISTIC public web site hosted on <http://www.ist-mistic.net> (Figure 5)
- Newsletters(Figure 4)
- Presentations in conferences, etc.

Mistic is

■ MISTIC is a 42 months Thematic Network, started on the first November 2000 and funded by the European Commission (contract no 1999-IN 10963) under the IST Research Programme.
MISTIC has been prepared for ensuring a higher level of involvement of end-users (Maritime Regions, Ports, Shipowners, Maritime Cities) as well as industrial suppliers (Marine Equipment Electronic Manufacturers, Network Suppliers) and so on.
MISTIC facilitates the introduction of Maritime Information Society Technology for Intelligent Transport Systems, encourages and enables the appropriate selection of innovative maritime services



This project is funded by the European Commission, under the Information Societies Technology (IST) Programme, Key Action 1 "Systems and Services for the Citizen".

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maritime
intelligent
Systems for
transport and
inter-related
Chain



Objectives

■ MISTIC is aimed at a stimulation activity of Maritime players towards Intelligent Transport Systems. Such stimulation will be achieved at several parallel levels:

Level 1: Dissemination of state of the art and best practices based on EU RTD success stories

Level 2: Collecting the end-users requirements and stimulating awareness and preparedness to change working practices and business processes to facilitate the deployment of innovative ST.

Level 3: Supporting the RTD ongoing projects by providing an overall economic and social assessment of RTD projects' activities and results.

Level 4: Creating awareness of the benefits of Maritime Intelligent Systems at the highest possible level of the decision making process and the public in the maritime regions. Member States and European institutions such as Commission, European Parliament and Committee of Regions.



Mistic

MISTIC will focus on the following issues:

Efficiency, safety and security, including minimization of risks to people, business and environment

Human factors: Intelligent solutions include handling the human factors involved to make technology organization and users work well together (including the issue of comfort).

Socio-economic assessment of identified scenarios (package of solutions): Choosing the right solutions involves assessments of the socio-economic costs and benefits associated with implementing the various possibilities at hand.

Dialogue and dissemination: Since the implementation of innovative technological and organizational solutions can be very challenging to the existing organisations an important scope of the MISTIC project is to make them aware of the benefits that can be reaped by adopting new solutions. Dissemination is thus a cornerstone of MISTIC activities.

Future roadmaps: The end-result should be identification of possible future pathways both for maritime actors, researchers and for the political and regulating bodies.

Partners

■ The Consortium of MISTIC consists of the two partners:



Mette (coordinator)



AMRE (financial coordinator)

with 11 members to ensure the achievability of the main objectives of MISTIC as a thematic network:

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Methodology

■ The Methodology of MISTIC work is based on clustering, networking and interaction between two sets of work

- External activities: workshop events (Mistic Days), a Consultation Group, the web site
- Technical tasks: 6 workpackages carried out by the Consortium



Figure 3 - MISTIC leaflet



Figure 4 - MISTIC Newsletter

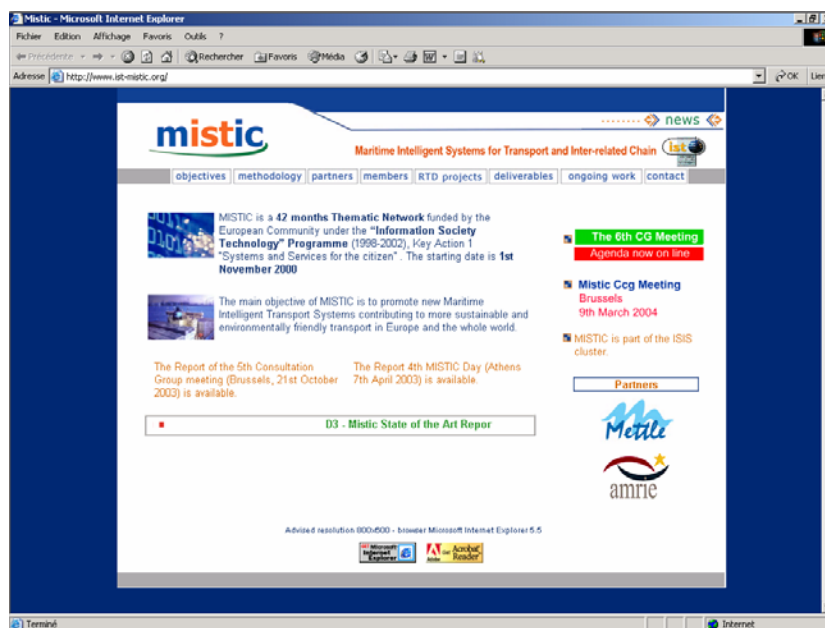


Figure 5 - MISTIC web site

4. DELIVERABLES

The following deliverables have been produced and delivered during the 42 months of the MISTIC thematic network:

N°	Title	Responsible
D1	Final report	METTLE
D2.1	CG MISTIC Handbook	METTLE
D2.2	Support paper for MISTIC Days and Consultation Group meetings	METTLE - AMRIE
D3	MISTIC State of the art report	METTLE
D4	Defined User requirements report	AMRIE
D5	ISIS Cluster report	AMRIE
D6.1	Dissemination Plan	AMRIE
D6.2 – 6.3	MISTIC Presentation leaflet	AMRIE - M2M
D6.4	MISTIC CD ROM	METTLE
D6.5	MISTIC Newsletter	METTLE – M2M
D6.6	MISTIC Web site	METTLE – M2M

5. PROJECT MANAGEMENT AND COORDINATION ASPECTS

5.1. Project Management

METTLE, the co-ordinating partner nominated a Project Manager in charge of directing the Project, who is responsible for monitoring overall progress and relationship with the Commission and others.

AMRIE was financial coordinator of the project, and was in charge of the collection and distribution of funds received from the European Commission, collection of cost statements from the partners and members, consolidation and delivery of cost statements and follow-up of payments. AMRIE took also an active role in the management of the project, preparation of the contract amendment and follow-up with the European Commission.

5.2. Project Reviews and Contract amendment

Four project reviews have been organised along the project life.

The first review concluded that some remedial actions had to be taken in order to steer the project in the right direction, re-focus its contents which was quite vague and expand the partnership to new members.

Therefore, the MISTIC consortium took the opportunity presented by the review to make suggestions for alterations to the Technical Annex and to the modus operandi of MISTIC, in line with many of the reviewers' suggestions.

Consequently, a contract amendment has been prepared, leading to a stand-by situation in the project during approximately six months. Within the same budget, the workplan has been revised and simplified, and the number of deliverables reduced. In addition 11 members have been added to the consortium, gathered in the Core Consultation Group. Out of these 11 members, 4 were considered as active partners and provided support in the technical work. The project duration has been expanded up to 42 months.

Progress and draft documents have been presented in the second review meeting. It was then agreed that the principal contractors with the help of some members would further working documents for the development of the Deliverables D3, D4, D5. The working documents for D4 and D5 were based on the generalised OOA methodology and the linked socio-economic impact identification and assessment approach discussed and agreed at the first Core Consultation Group meeting, further developed in working document since then.

The work continued in this direction and draft deliverables were presented at the third review and final drafts at the fourth and last review meetings.

6. OUTLOOK

This section details how the MISTIC activities have benefited to each partner.

6.1. METTLE

The various actions METTLE has carried out within the MISTIC project have allowed to significantly improving public awareness on the importance of developing the use of intelligent systems within the maritime industry. Thanks to public reports, workshops and articles, METTLE has indeed heavily promoted the need for the future growth of maritime intelligent systems.

METTLE has also contributed to outlining the needs and requirement of the maritime industry by interacting with the local representatives. Several round tables organised have indeed allowed METTLE to fully understand their expectations. Throughout the project, METTLE has committed to providing valuable alternatives that would help maritime industry overcome their challenges.

METTLE's contribution has made possible the design of innovative and effective solutions to simplify the transition towards intelligent systems. These results will be used beyond the MISTIC project as they provide the basis for future European policy and research activities.

6.2. AMRIE

The activities and the results of MISTIC have brought the following benefits for AMRIE:

1. A better understanding of the various roles played by actors in the maritime sector and of the inter-relations between them.
2. A mapping of the potential benefits of OOA and MCA methodologies to capture end-users' requirements.
3. The MISTIC results include the practical experience of how companies use ICT in order to better exploit their markets in joint projects or joint marketing on the basis of shared ICT platforms. This should allow AMRIE to feed into other projects and networks, e.g. the REALISE Thematic Network on Short Sea Shipping and the MISTIC Network examining how users and developers of software systems can achieve a better dialogue.

7. CONCLUSIONS

The MISTIC Thematic Network reached its objective, despite the difficulties and delays encountered in the beginning which resulted in a major contract amendment.

The various activities organised within the MISTIC Thematic Network proved the needs to go closer to end-users and to continue such action more and more locally.

However, a certain “e-fatigue” was felt after some meetings, which pushed the consortium to re-focus their work by working more and more with concrete examples, such as concrete business examples and projects as presented in some MISTIC Days, and more exhibitions with real demonstrations.

The dissemination activities were very satisfied, considering how maritime companies are usually reluctant to such activities.

The MISTIC activities gave finally a comprehensive view of the RTD situation regarding maritime intelligent systems, and provided these actors with a range of possibility which have been developed as the research phase and presented during MISTIC meetings.