



EC - Contract n°: TCA5-CT-2006-031557
 EUROPEAN COMMISSION
 DG Research



Project no. 031557

CAPOEIRA

Coordination Action of Ports for Integration of Efficient Innovations and development of adequate Research, development and innovation Activities

Instrument: CA
 Thematic Priority: 1.6.2 – Sustainable Surface Transport

Deliverable reference number and title

Due date of deliverable: 01/05/2008

Actual submission date: 31/12/2008

Start date of project: 01/05/2006

Duration: 24 months

Organisation name of lead contractor for this deliverable: CETMEF

D5.0: Final Conference Report

Revision: [Rev 0]

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	✓
CO	Confidential, only for members of the consortium (including the Commission Services)	

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Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



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DELIVERABLE D5.0 Final Conference Report

		YES	NO
Distribution List:	INA	✓	
	CETMEF	✓	
	TLA	✓	
	BMT	✓	
	EUROPEAN COMMISSION – DG Research	✓	

0	31/12/2008	Lionel Kaniewski			CO
1					CO
2					CO
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Rev.	Date	Drafted	Checked	Approved	Status*

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CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
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EC - Contract n°: TCA5-CT-2006-
031557
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REVISION

Revision 0 (first issue)

PREAMBLE

This deliverable is the report of the final conference of the CAPOEIRA project which was held on the 29th of October, 2008, in the CLORA premises in Brussels. It aggregates presentations and discussions made during this day. All the members of the CAPOEIRA consortium strongly want to thank each speakers and attendees for their active participation to this conference. Much attention have been taken for the writing of this report but some errors or misunderstanding may remain. If so, please send comments to ices@wanadoo.fr

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



CONTENTS

1. Opening by the European Commission	5
2. Introduction of the CAPOEIRA project	6
3. Session 1: Port actors' needs.....	8
3.1. Port authorities' needs.....	8
3.2. Shipowners' needs	9
3.3. Harbour masters' needs	11
3.4. Container terminal operators' needs: the example of a terminal in Dublin .	16
3.5. Session 1: Questions and debate.....	16
4. Session 2: Research offer	17
4.1. Future research topics for container handling industries	17
4.2. An example of port dedicated research: the SECURCRANE project	18
4.3. The role of the European transport research institutes in the port research activities	20
4.4. The EFFORTS Experience and the Role of Technical Research Institutes in the Port Research Activities	22
5. Session 3: Reconciliation of offer and demand	26
5.1. Integration of port policy and society, example of the Port of Dublin	26
5.2. Taking into account the end-users' expectations, example of the SECURCRANE project	26
5.3. Taking into account port workers' demand, education and training activities in the EFFORTS project.....	27
5.4. Most urgent issues for EIRAC	29
5.5. A word about the Waterborne technology platform	29
6. Session 4: Conclusions and recommendations	31
6.1. General guidelines for research projects	31
6.2. The "Strategic Ports Research Agenda" (SPRA).....	32
6.3. Conclusions of the conference	33
7. Next steps of the CAPOEIRA project	34
8. Annexes	35
8.1. List of attendees of the CAPOEIRA final conference	35
8.2. Abbreviations.....	36
8.3. The Ports Vision 2020 (extracts)	36

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



EC - Contract n°: TCA5-CT-2006-031557
 EUROPEAN COMMISSION
 DG Research



1. Opening by the European Commission

Joost de Bock, CAPOEIRA project officer, Directorate General Research, European Commission

“Honour to have the opportunity to make some introductory statements. The European Commission spends millions on transport research. Yet these millions are only a small percentage of the total amount invested by industry itself. One can see that success for the future must be build on innovation and research. But it is not a sufficient condition. Innovation implementation of results from research, and notably technology research means by definition a rupture with existing traditions and processes, including existing employment conditions. Technologies, new high tech cathedrals, always have a human factor. And often that hurts. Since the industrial revolution interesting theories have been launched on innovation and change and how man should be integrated in the exploitation of the innovation. CAPOEIRA can be seen as a continuation of this theorizing on socio-economics. Yet it is definitely different notwithstanding a number of similarities.

CAPOEIRA is different because you will in vain look for theory to be spelled out. In fact it looks like you have to deduct it from the empiric that is being presented. It is different in dimension because it is placed in today's global context, in a period that is characterized by a tremendous speed of change; by the emphasis on the knowledge economy; in an economy where transportation and production are more than ever intertwined; in an economy where the workforce is well organised and thanks to their unions are a real force that can decide the success of innovation. CAPOEIRA is different because it is addressing the rupture issue before the innovation is decided upon. First it looks into the question of expected change or rupture and how one can anticipate this maximizing a successful development and implementation of the intended innovation; then decide on setting the innovation machine in the right gear.

CAPOEIRA focused on a specific domain: intermodal transport and ports. It analysed past and recent research projects, mainly EU projects. It did not assess these projects. It checked whether these research projects had considered the socio-economic aspects of innovation and how this impacted the final realization and implementation of the project objectives.

CAPOEIRA, as I said, has not developed a full fledged theory with axiom's and what have you. An outline of a methodology has been given but not more than that. This may be considered by some as a weakness. Others may consider it the strength of CAPOEIRA that it went straight into two major issues. The first is the workflow, where the rupture would be felt first, not just in economic terms but in terms of status, routine and skills. The message here is that they are a constructive force, even an innovative force when they are involved from the beginning and their experience is sought. The second issue is skills, education. Here the message is "have a skills and education development plan ready when you make the decision to innovate and change".

Today's workshop is to discuss with you. Whether you recognise and agree. Whether this can be integrated efficiently in a decision-making process concerning research and how this can be translated in an efficient monitoring of research projects. I hope that this will in the end result in new innovation and research initiatives in the intermodal and port sector which are successful, in industries or at an European level.”

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



EC - Contract n°: TCA5-CT-2006-031557
EUROPEAN COMMISSION
 DG Research



2. Introduction of the CAPOEIRA project

Geoffroy Caude, partner of the project and chairman of the conference, CETMEF executive manager

In the past twenty years, container traffic through ports has been increasing to such an extent that it seemed worthwhile to undertake basic or specific research in order to improve efficiency of port operations dealing with container throughputs, especially that this increase matches the increasing use of ICT. By the way, the industrial results concerning investments made by the European Commission and public authorities in the field of multimodal research for ports are particularly negative in term of return on investments (in the sense of transforming European RDI projects into actual products put in the market). At the same time, innovations coming from the private competitive sector have been numerous (gantry cranes, automatisms...).

The objectives of CAPOEIRA are:

1. To Improve the chances of success of applied research in the field of freight transport in ports (terminal and intermodal aspects).
2. To identify critical factors for success and determine recommendations concerning future RDI projects.
3. With all actors (ports, operators, industrial manufacturer, state administrations, trades unions, technological platform and advisory councils), to help to define a research roadmap at short, medium and long terms (until 2020).

CAPOEIRA began to identify critical factors for success through the analysis of failures and successes of previous national and European projects, and of RDI activities in three representative European ports over the last ten years (Rotterdam, Hamburg, Le Havre). Based on the analysis of the present situation and of the visions for the future of the relevant actors, guidelines for current and future RDI projects was produced on various aspects (technical, socio-economic, environmental...). At this stage, the work seems to be very complementary with the tasks taken over by the technology platforms and the advisory councils (such as Waterborne and EIRAC) or under the guidance of ECTRI.

Some national or European analysed projects suffered severe shortcomings such as poor management of research, difficulty to involve decision-makers in the process, resistance to change from port daily operators fearing for their jobs, IPR, difficulties to involve academic research on the topic...

CAPOEIRA is based on a human-centered approach combining socio-economic and systemic sciences called the TST approach, for "Techniques, Society, Territories". It allows to describe the way society uses techniques on a given territory at different times. To improve the chances of success of research, offer and demand must be put in adequacy at macro (the whole system) and micro (an element of a system) levels. Face to a demand, the society relies on techniques in a broad sense, not simply technologies, but also administrative frameworks, financial standards... within a given territory having geographical, geopolitical, cultural, ideological, religious characteristics to propose an offer. To maximise the success of research, offer and demand must be put in adequacy, i.e. constraints and obstacles identified and solutions suggested. Time is crucial : one have to consider the past so as to understand the present and build an adequate future, at short, medium and long terms. Therefore the approach used was simple but gives a powerful tool to understand what

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



EC - Contract n°: TCA5-CT-2006-
031557
EUROPEAN COMMISSION
DG Research



happens. It makes a large use of questionnaires (made with the TST approach) in interviewing main actors from the port industry or from the equipment industry to improve the understanding of the situation.

To conclude this short introduction, it has to be said that the main goal is to understand port actors' needs and to know how research can respond to these needs. In another words, the issue is to fill the gap between needs or demands and research or industrial offer.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



3. Session 1: Port actors' needs

3.1. Port authorities' needs

Florence Soudry, European Affairs, Le Havre Port Authority
Replacing Jean-Yves Le Ven, manager of Equipments Department (excused)

Ports were and still be in a mutation phase both in their physical structure and in their business environment notably due to technical changes and environment, territory and security constraints. New relations between stakeholders appear: it is another way to talk together which change the way of working. The main paradox of ports consist in the following gap: container ships are growing quickly but development of infrastructure is a very long process increasing discrepancy between port capacity and needs of shipowners. So ports have to anticipate. A port reform is under construction in France, where handling activities will only depend on private structures by July 2009.

Regarding Port 2000, it was a 10 years project for building a new infrastructure for containers, now in activity and involving:

- a large process of consultation of environmental associations, economic lobbies and trade-unions who have been associated at an early stage of the project. This way of consultation is still used for two another projects in Le Havre (a new LNG terminal and the lengthening of the "Grand Canal");
- the implementation of a new way of practising ecological engineering through the realisation of an artificial island, gathering many people (port engineers, environmental associations and ornithologists);
- the development of related research activities, notably the Sisyphe software to simulate the tides and the evolution of sediments, it was a pilot of research which has been sold later as a commercial product.

To balance the increase in volumes and the limited space, ports and terminals need to improve infrastructures productivity and RDI is one of the solutions to do this. There are already research projects to which the port authority of Le Havre participates, for example the FP6 SECURCRANE project for the development of a remote control crane cabin which will be developed later on by Jean-François Emery (see the presentation about end-users expectations). Ports are both confronted to changes of scale (in transport flows, requiring infrastructures development) and a poor social acceptability. Many ports are also obliged to share the vicinity with towns and industrial actors. One of the solution to cope with these difficulties is to transform former facilities into container terminals. In the present, ports have to create new developments in a limited space. In the future, ports will have to optimise logistics platforms without impact on the environment and try out tools and methods to develop high value services. The port authority of Le Havre also belongs to a logistics cluster (agreed by the French government) which will work on the improvement and sustainability of the port passage.

Regarding the increase in economic activities and the enhancement of environmental rules, ports are confronted to quite tough environmental rules and have to be prepared to new topics arising from the European Commission. Ports so need innovative solutions for environmental relevance and RDI is one of the solutions to do this. The port authority of Le Havre is leader of the sub-project "environment" of the FP6 EFFORTS project which address several port environment issues: energy management, water and air quality, noise and

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



annoyance. In the future, ports will have to work notably on the recovering of dredging residues, air quality (to cope with greenhouse gas effects), less polluting energies and light pollution.

Another paradox appears: port operations need to be more fluid but ports at the same time face to security constraints (ISPS code, 100% scanning) which have already changed or could change in the future ports habits. Ports so need innovative solutions for safe and flowing port operations. In the present, the port authority of Le Havre work on the national STEP project to study the feasibility of an innovative system for the transport of containers between terminals. In the future, there will be a need for traceability systems inside the port area as well as information systems for specified industries and short sea shipping.

Regarding barriers to research, one of these is the fact that final users have difficulties to have long term approach and sometimes lack of interest. The solutions is then to integrate users from the early beginning of the project and offer confidentiality agreement. In fact, a port authority can have a long term approach and develop pilot projects which suppose quite an important investment that another end users may not afford.

The chairman of the conference conclude the presentation by indicating that the scope of problems in ports are large, making difficult the port devolpment and operations. This huge scope of problems need a large panel of experiences and actions.

3.2. Shipowners' needs

Nadine Dangleteur, vice-president, French Shortsea promotion centre

The national short sea promotion centres were born in Europe with the support of the maritime industry court, the DG Transport and Energy and the Council of Ministers, at the time when people told about motorways of the sea and Marco Polo program, as it is difficult for companies to do short sea shipping with a lot of partners involved (to many things to think about, necessity to cope with large organisations). The French centre BP2S (www.shortsea.fr) is involved in the European Shortsea Network.

The centres so aim at promoting short sea shipping to:

- inform users and other decision-maker (“the right information to the right person”, SSS service database);
- improve the image of the maritime mode (success factor & stories);
- help integration in logistics chain.

And finally remove truck from roads to sea transport. Nowadays, the context is the following:

- the increase of the deep sea exchanges (even if the fuel cost are increasing) but also the short sea (containers and RoRo);
- multiple actors implying data exchange and information systems interconnection;
- an organisational trend toward vertical integration (sometimes to control handling due to possible deficiencies);
- increase of ships and scales costs;
- clients requirements which are more and more important, in terms of an increase in rapidity and frequency. Developing short sea shipping is now more about optimising frequencies than increasing ships size.

The short sea shipping is ambitious: if today, it can be considered as an alternative to the road, tomorrow, it will become a competitor to the rail, notably by implementing new types of services (e.g. mixing containers and roro traffics) and new types of ships (e.g. barges).

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



These development will imply consequences for ports (a passage with high quality and performances): adaptation of infrastructure and management towards multi-products terminals (optimization of space, management of different flows of product like containers and vehicles) and implementation of single window organisations.

Regarding the last point, customers and customers' demands have to be treated by an only person and a new form of organisations, providing an integrated port service gathering different port actors (pilots, handling operators, tug operators...) have to be developed. For example, Shortsea centres actually work on the administrative simplification thanks to an only transport document for all actors (shippers, agents, assurances, customs, port authorities, terminal operators...). This single electronic transport document should decrease administrative burden, complexity and associated workload.

Regarding the multi-products terminal, it is interesting to mix the product on a ship and so face to seasonality and guarantee a good load factor. One of the difficulty is yet due to the fact that RoRo goods are often mix with passengers activity. But these kind of terminals need also specific handling infrastructure and systems (an area and systems for handle containers and an area to load/unload roro goods at the stern of the ships).

Two other points have to be studied in detail to ensure a good port passage:

- drayage organisation (including barges solutions) to limit costs;
- interface with land networks.

Research drivers consist in:

- energy costs;
- technologies improvements;
- exchanges globalisation;
- requirements for sustainability and security.

One of the main stake for research is the need of fluidity on terminals to have a good evolution for motorways of the sea (for motorways to be really motorways, not just a line).

Research axis consist in:

- design of new ships, for example to combine car transportation in containers with car transport (to use empty containers);
- performing handling and transfer equipments able to move different materials;
- customs simplification as in short sea shipping, it is difficult to have good agreements if one does not have the good system and good relations with customs.

The presentation has been concluded by five statements:

- port is a complex environment and a part of extensive supply chains;
- short sea shipping is a crucial tool for the sustainable development of the transport European network;
- research is crucial to prepare the future, all the more in a changing world;
- education and training have to be considered: innovation have to be turned into realistic applications and operators learned to use it;
- need to have a quick exchange of data (necessity for frequency) and people have to know how use documents.

As question, the chairman wondered whether BP2S made at an European level common requirements for SSS and whether the different parts of the European network for SSS are

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



agree on a same approach even if the ports are different. To the first part of the question, BP2S answered the the unique document mentioned in the presentation is already a common requirement. For the last part of the question, a study revealed that many bottlenecks are very linked to the port concerned.

3.3. Harbour masters' needs

Capt. Andreas Mai, Harbour master, Bremerhaven port authority and European Harbour Masters' Committee

Italics correspond to the text Capt. Mai provided to the CAPOEIRA consortium before the conference. Numbers indicate the slides.

1 and 2 - Introduction

Ladies and Gentlemen,

Thanks for the occasion to present the Harbour Masters' views on future research needs. I am not presenting the ports of Bremerhaven and Bremen, although I might refer to them occasionally, but the European Harbour Masters' Council, a division of the International Harbour Masters' Association. As the project management rightly mentioned in their project outline, ports are a growing industry. Who has thought so about ten years ago? Ports and shipping were so-called old industry in some parts of Europe. Things have changed. But did research policy change as well? The 5th framework program lasted from 1998 to 2002, the 6th one from 2003 until 2006 and now FP 7 will last until 2013. Question is: if this time frame will allow to adjust to new demands or changed realities, like i.e 9/11?

Before taking you to the research subjects and respective comments, I consider it is necessary to reflect on some definitions, explanations or observations because we feel that the Harbour Masters functions and the role of ports are not seen realistically.

3, 4 and 5 - Observations regarding ports

There is always a legal part to a business, but you can read this at home, maybe. Through history, there have been changing definitions of ports. One of the most used at present is that of a 'nodal point...' (also used by CAPOEIRA).

A port is:

- a town with a harbour and facilities for a ship/shore interface and custom facilities;
- a nodal point;
- in legal terms: port means an area within which ships are loaded with and/or discharged of cargo and includes the usual places where ships wait for their turn or are ordered or obliged to wait for their turn no matter the distance from that area. If the word 'port' is not used, but the specific place is (or is to be) identified by its name, this definition shall still apply.

Ports also:

- *are more and more considered as clusters of activities; the most successful clusters are those that organise the cooperation between all activities and optimise them;*
- *are one of the elements in the whole supply chain and as far as competition is concerned, it is not so much ports that compete, but supply chains;*
- *form part of the Motorways of the seas; concentration of cargo flows is such that regular and frequent liner connections can beat road transport competition (the issue*

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



is mostly seen from an infrastructure-investment point of view but may have large impact on port operations and safety in ports);

- *are part of the Common Maritime Space; the completion of the EU principles of free movement of goods into the maritime field (until now, most of concern to national governments, but will also imply many changes in port operations).*

6 and 7 - The Port Authority

In order to define clearly the bodies Port Authority, Port Management and Harbourmaster, the following description is used (in MARNIS).

A Port Authority is considered as having two components; the Port Management and the Harbourmaster. Port Management in general is responsible for the development of the port, the lease of land, the construction and exploitation of the port-infrastructure.

The Harbourmaster (Captain of the Port) is responsible for the vessel traffic in the port, for port operations, for safety, security and environmental protection. He may have an advisory role in the management team of the Port Management as well as he has his own management role in his Harbourmaster organisation and his own (and mostly autonomous) responsibilities. It is on this last role that the focus lies in research tasks.

In fact, there is no clear definition of the port authority as it might be completely different things. Its tasks are managerial, legal, operational and concern safety and security aspects. Despite these huge scope of missions, it is difficult for research bodies to talk to port authorities and to expect that they know every aspects.

8 – The Harbour Master and their roles / tasks

An attempt to define a harbour master is made by the IHMA. The Harbour master is a central point of reference in the port and the natural partner ashore for everything concerning the ships' visit.

Definition of the HM (harbour master):

- jurisdiction is exercised over the water frontage or water area of a port or port approach;
- a legal and /or operational responsibility for the movement of shipping may be involved;
- in undertaking their role they possess an authority conferred on them by law, regulations or rules.
- there is significant involvement in ensuring that port or marine operations within the area of their jurisdiction are carried out safely.

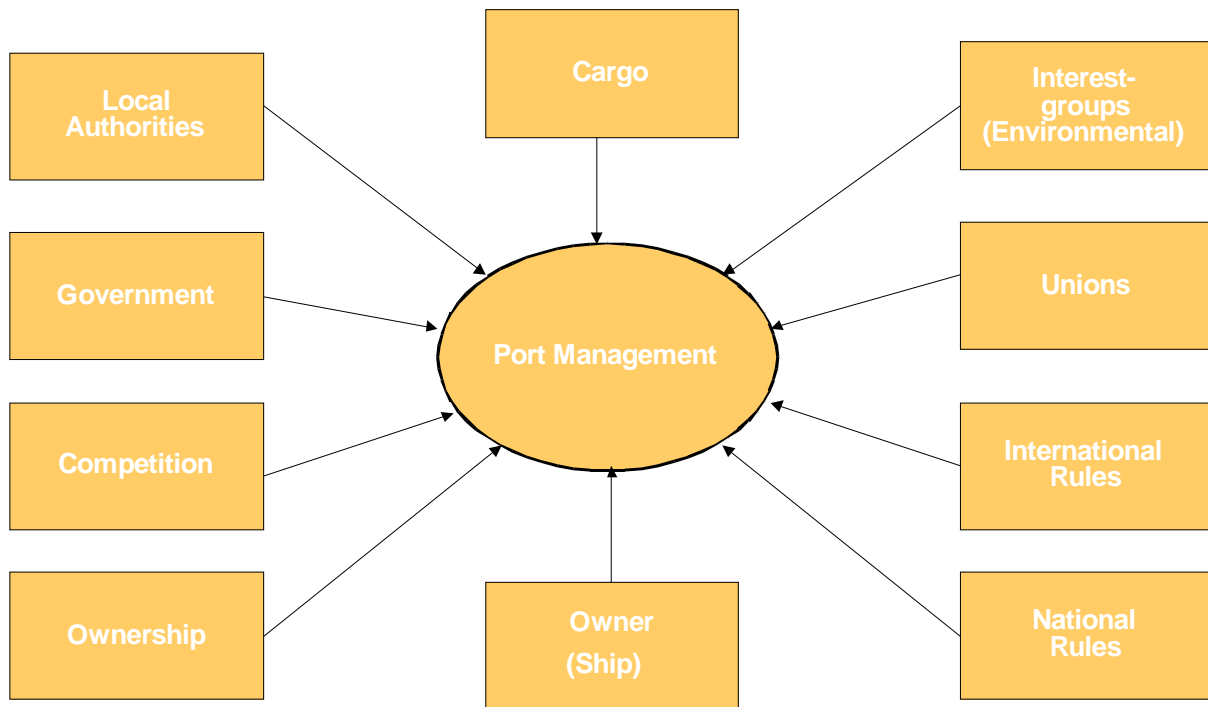
On the occasion of a research project we analysed 23 ports. In each port the HM has different functions to take care of. It varies within a country for what a HM is responsible. Nevertheless, Harbourmasters in Europe have something in common, they are often appointed as the competent authority in the enforcement of maritime port, nautical, environmental, transport and security regulations. In this capacity Harbourmasters promote the safe, clean, smooth and secured vessel traffic and marine operations in port waters, approach areas, fairways and harbour basins. But the effect of this variation (together with the fact that the maritime community has not always a big knowledge on the institutional structure within ports) is that it is sometimes difficult to have all the relevant responsibilities represented in a research project.

10 – Constraints in Port Management

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



In order to manage a port or the operations lots of facts and constraints have to be considered. The port is part of the society and subject to the national and regional developments, but also subject to international influence and developments. But after all everybody wants to earn money. But there is no one port manager. Aims of the activities of a port are to get a ship into the port and earn money. In order to be successful everybody has to obey the constraints shown on this slide, plus some more (see the image below).



11 – Co-operation in a port

Furthermore you have to co-operate with a number of people/institutions to be successful. Some of the people you probably do not like, but you will meet them again so you behave, also an incentive.

The HM although part of this process probably plays the role of an umpire. Harbour masters are usually capable of finding the balance between public and private interests. In research projects, HMs are capable of defining functional needs and requirements, taking into account present trends and developments.

This all happens at a high speed and is governed by a certain attitude and culture. One topic is that the spoken word counts. If you forget what you have said to do, you will be forgotten soon or at least be mistrusted. This also counts for outsiders like researchers.

Constraints and cooperation imply that, for each ships call, every actors are involved. It is not a one man show, as every people are dependant to each other. How in this case introduce innovation and changes?

12 – The current situation of RDI

Although the awareness is not too high, sooner or later a lot of HMs ran into RDI. A lot of people in the research community were impressed about the possibilities of a harbour master and especially the information he/she possesses. But a lot of paper was produced on similar subjects by different researchers at different times asking the same questions and all being paid by tax payers money. This is not what a seaman likes and appreciates.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



The current situation of research for HMs:

- usually only large ports have funds for RDI;
- Harbour Masters have usually no resources to be allocated to RDI;
- awareness among HMs is limited;
- port community is quite conservative;
- life cycle of innovations is too short to be an incentive;
- disappointing experiences with consortia.

13 – RDI in the past

HM's used as information base for improving and broadening the knowledge of port marine affairs but did not get feedback or the information were neglected. Only recently the activities where HMs are involved became subject of interest of the research community.

In the past, the day to day business was probably not very attractive for research and researchers.

14, 15 and 16 – RDI at present and in the future

EHMC starts to have the organisation and has some experience to actually participate in research projects. Some words on EHMC:

- 144 European members from 22 countries;
- harbourmasters from large and small ports, publicly and privately owned;
- working groups to participate in research;
- dissemination of results to wider membership;
- participation in research by expert opinions, best practices, reference groups.

In research projects EHMC can be:

- a platform for assessment of proposals and their implementations in ports;
- a platform for equal implementation of proposals and legislation among the ports;
- a platform for gathering and disseminating information and best practices.

EHMC participated in EMBARC, participates in MARNIS and will participate in EFFORTS. EHMC is open for calls at different levels of a research project.

18 and 19 – Research topics

I see two kinds of topics: concrete and operational, topics, and more abstract ones, depending on subject, focus and time horizon of the research. Important 'abstract' subjects are:

- decision support tools;
- motorways of the seas;
- Common Maritime Space;
- sustainability and economics in EU ports in view of international influence;
- Consequences of diminishing skills and resources in maritime professions to safety levels in ports
- 'flexibility' as driving technological innovations; no longer the concept of one ship leaving one port and sailing to one port, but cargo's that underways can split up and change destination; which effects will this have on port operations and port design?
- E-maritime deployment in ports. But what does E-maritime really means?

*These wide subjects should of course be split up into sub-subjects
Also in the 'abstract' subjects, HM's can and should have a role.*

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



For the short sea shipping for example, one of the big problem is international influence and problem of customs, as SSS leave national waters to international ones. More concrete topics are:

- navigation in fluid mud;
- real squat of ships (nobody currently knows it exactly). One of the solution is to determine it together with Galileo;
- minimum training requirements for pilot exemptions;
- manning of port service vessels (tugs);
- introducing standard marine communication phrases for tug boats.

20 – Barriers to research

A less adequate composition of the consortium also stems from the fact that all ports are differently organised and because there is not sufficient understanding on which are the relevant parties. For instance: in ship building research, the input of Harbourmasters and pilots could be of great value point of view safe mooring (position of panama hawses, bollard strengths...). In general, a lot of research has been very shattered and not been cross-industries. This could be improved.

The description of work (on which the decision to grant the research is based) is written in such a way that the assignment is commissioned, but the consortium finds itself during a long period of further defining focus and scope.

The research question often is focussed on an European solution or approach whereas shipping is highly an international business. Sometimes IMO would be the best forum to regulate things, with the European Commission as second best.

The European focus on port research could be so irrelevant as ports are international: these focus could be too restrictive and a world one could probably better adapted.

Not always is the composition of the consortium such that really all relevant parties are invited or involved.

Unrealistic aims apart from users' needs: one has to consider this together with the conservative components of ports. Administrative issues remain important, bureaucracy must disappear. Finally, as already mentioned, HMs used as information base only and in the worst case, HMs information not used at all.

21 - Solutions to overcome

Implementation of results to be improved, f.i. by better tuning between research and policy. Many research projects conclude by advising that (additional) training is required or that time and effort should be spent on changing attitudes. These advises however mostly tail the project but no budget is reserved for implementation.

- A honest approach in building and realizing RDI project seems to be necessary;
- a professional evaluation of projects is required even if it is difficult to find proper evaluator;
- projects should consider processes in a port;
- results to be communicated directly. In fact, all the dissemination processes have to be improved. In many European projects, the access to information is difficult (but it is also a social problem linked to the utilisation of Internet, sometimes not very well

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



established). But the issue is that the transfer of knowledge from a project to another one is essential.

3.4. Container terminal operators' needs: the example of a terminal in Dublin

Kevin O'Driscoll, Human resource and public affairs adviser, Dublin Port Company

The case study of Portroe Stevedores Limited

Portroe is a multi-modal stevedore operating in the port of Dublin (containers, dry bulks and break bulks and projects like wind farms, transformers, rail cars, structural steel...), founded in 1992. It is an interesting developing company, involved in many activities and locations. It handles about 50% of containers and 50% of other cargoes. Portroe has begun a project to develop a 500,000 TEU capacity terminal and has the potential to develop up to 1M TEU terminal. Currently, six Liebherr RTG's stacking one-over six and seven wide and 6 Houcon terminal trailer trains (up to 6 TEU per train) are used. Regarding IT systems, Portroe implemented Tideworks Tos and Spinnaker.

The needs regarding RDI activities of Portroe are:

- research to optimise land use. A better land use is actually the biggest need as there is no sufficient research regarding the utilisation of land and the transformation of land utilisations;
- European standardisation of processes. There is a clear need that, in addition to financial regulation, the set of standards in European ports is defined, even if the actors and their role are different from one port to another.
- linking educational planning to needs of industry;
- European standardisation of skills and competencies;
- assistance with business diversification;
- certainty of tenure and access to innovation;
- joined up political thinking across Europe;
- information technologies and software, which are important to gather the multiplicity of actors in ports.

3.5. Session 1: Questions and debate

The debate of the first session dealt with the time question and, linked to this question, the problem of performing research activities using public funding or in an only private way. Pros and cons as well as examples are existing in both solution: the Container Terminal Altenwerder developers and operators performed their own research activities and so innovations are only coordinated by themselves and not by the European Commission or another public stakeholder. For the timing (for the development of innovations), questions seem crucial as we are in a competitive world and the example of the Port of Hamburg (the development of innovations very closed to the market) appears to be the right choice. But for public research, the important is to find research projects at a long term, which could change every habits (meaning that the problem of competition disappear), which is done partially in technology platforms.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



EC - Contract n°: TCA5-CT-2006-031557
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4. Session 2: Research offer

4.1. Future research topics for container handling industries

Paolo Rossi, Fantuzzi Group

Fantuzzi Group provides engineering, manufacturing, assembly and service in:

- port related products: side-loaders, forklifts, reach stackers, straddle carriers, mobile harbour cranes, RTG, RMG, STS cranes, bulk (un)loaders, (double) jib cranes;
- non-port related products (i.e. desalination plant);
- specialised products (digital control, drive systems, software).

Fantuzzi Group was recently acquired by Terex.

The research activities in the past targeted the development of highly innovative automated systems in the field of handling (for maritime terminals or dry ports) both at national and European levels:

- collaboration with universities and industries, participation in projects co-funded by the Italian Ministry of Research;
- Consorzio Train;
- ASAPP (FP4) and ASAPP One (FP5).

ASAPP consisted in the development of an innovative ship-to-shore system based on Octopus, a shuttle (tested in Rijeka) and different control systems, able to transfer 200 cont./h from quay to yard using a fleet of automated shuttles on a dedicated overhead path. ASAPP One dealt with the concept of a split terminal (which is becoming important due to recent congestion in ports): an inland depot (dry port) linked to external transport activities and connected in real time to the port as a daily buffer and operated by the maritime terminal.

Ports and terminals have higher and higher requirements in terms of productivity, cost-effectiveness, and respect of the environment. They need to integrate ports and remote area (inland terminals) mainly by trains to reduce pollution and to increase their stacking capacity.

Nowadays, Fantuzzi Group wants to develop new products and services to answer to end-users' needs, notably improving both productivity in the yard and in the handling of vessels to avoid bottlenecks but also to manage bigger and bigger vessels and to improve transport system from quay to yard (and vice versa).

Currently, RDI topics explored are:

- development of STS cranes with large dimensions and improved hoisting capacity (for tandem lift);
- development of STS cranes of higher productivity and higher speed;
- data transmission to/from the quay and to/from the yard;
- semi or fully automated positioning of cranes;
- new transfer system on quay;
- fully electric cranes;
- environmental aspects (to reduce or eliminate air pollution notably by developing fully electric systems for stacking machine, to reduce noise emission, to reduce or eliminate fuel consumption);

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



- ergonomic aspects (to reduce noise and vibration exposure for the operators for the respect of two European directives, to automate operations from crane or from remote station, to make the maintenance easier to reduce costs and improve the availability of cranes, to ensure operator's safety).

Research activities are performed through internal programs, national or regional ones and European projects.

For the future, topics under exploration consist in:

- increasing of productivity on vessel and on yard;
- automation of port equipments to improve performances and lower exploitation costs;
- fully electric propulsion system;
- reduction of energy consumption;
- integration within port equipments to speed up handling operations and decrease port internal traffic congestion;

On the research itself, it can bring positive results (a concept is validated, through a prototype), negative (a concept is not validated), or in-between (concept partially validated). No industrial nor commercial results were obtained through ASAPP and ASAPP One projects, maybe too much in advance for the market despite a high investment. Yet, there is a new derivation with a French national project. It can happen that a good RDI project does not immediately give commercial results.

The presence of strong end-users and investors is required (before, during and after the project), which can paradoxically be a limitation, investors being not prone to take high risks. That's why EC funding is so crucial...as a capital-risk.

EC mechanisms (e.g. administrative) require little time to be familiar with, but EC projects bring lots of benefits. The creation of consortium for RDI projects is a very positive feature to operate within different industrial cultures, to complement know-how...and learn (e.g. collaborative project coordination). Confidentiality (IPR) issues have to be managed deeply, notably for projects with many partners.

For highly innovative concepts (with a very high technological risk), European funding is necessary to launch the projects such as the participation of motivated end-users with a strong investment capability.

The presentation was closed with a video presentation made by the Fantuzzi Group and presenting new ways of handling containers: new STS cranes with double trolley able to transport 2*40 TEU, two STS cranes side by side, able to operate two adjacent bays together with manual shuttle carriers to transport containers from the quay to the yard in tandem as well as a special RMG also in tandem.

4.2. An example of port dedicated research: the SECURCRANE project

Bachir Boukarri, project manager, remote controlled land systems, ECA

ECA group deals with the development and implementation of automated systems in complex environments and has activities in the following sectors: nuclear, naval defense, land defense and security, transport (automation, metrology, contactless inspection), offshore, aeronautics and training simulators. In the past, transport RDI activities consisted in an opportunistic approach to find fund and maintain the staff skills in transport. ECA

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



participated to RDI projects e.g. ASAPP One, ITIP and INHOTRA. It worked on innovative technologies transposable to other fields when innovation was more difficult to fund (defence, security). There is no outcome in terms of commercial results of these projects at all. It was hard to involve staff and to manage priorities inside the company due to the cofunding of European projects (compared to the lot of internal or private projects, not cofunded). It was not an internal priority to work on these projects for a manager.

Nowadays, approach has changed: it is now a business approach, which aims at identifying promising markets and corresponding calls and networking practices allowing to constitute adequate consortium (including end-users which is an important issue as difficult past experiences proved it). European projects is used also to develop staff skills and to transfer and develop innovative technologies towards realization of future products. It is still hard to involve staff in cofunded projects compared to the commercial ones. Outcomes of present projects are expected.

The SECURCRANE project consists in designing an innovative system for remote control of a STS crane (FP6 DG Research) including an innovative system with 3D and 2D visual perception. The consortium strongly implicates end-users and trade unions, which appears to be crucial for a good development of the project as crane drivers are a great source of knowledge and support. The project allows the implementation of a dedicated approach to grasp users' needs, elaborates systems specifications under their validation, and soon allows test for feedback before on-site demonstration and operation under real conditions. The SECURCRANE consortium wants to develop a demonstrator which will be tested on a real crane in February 2009 in Le Havre. Crane driver's had already tested the system in a show room in Le Havre, with great results. But the project needs different types of people in the project, not only cranes drivers as the development requires different abilities (for example for the cameras). If successful, the project will strongly modify the working habits of crane drivers. It will for example be a good opportunity to employ handicapped persons.

In the future, ECA wants to develop improvements of SECURCRANE through the genericity towards crane types and the automation level for non critical phases to remote operation of other port equipments (straddle carrier...) and to ensure security in ports (extension of ECA's civil security activities, land, surface and maritime unmanned systems).

Regarding the feedback opinions on RDI activities, two major issues appear as bottlenecks:

- accessibility of research: the need for lobbying and networks to find opinion relays and the finding of adequate call (which is difficult even if there is a good idea);
- the IPR problem: one must solve the paradox of publishing maximum information for dissemination but minimum market communication.

Some issues are specific to the robotic theme: there is currently no real norm for automation of mobile vehicles implying a need for derogation and difficulties to implement field tests with a demonstrator. Another issue is the fear of people when talking about automation (« *I will lose my job* » syndrome): socio-economic aspects are at the moment of prime importance.

Possible improvements are existing:

- creation of a medium enterprise definition with medium level of funding allowing to grow (final goal). For medium companies, there is a necessity to have sufficient fund to maintain innovation inside the company;

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



- advocate promising demonstrators to fund prototypes if justified (business plan, end-users interest...);
- integrate the socio-economic aspects and address the education and training issues.

4.3. The role of the European transport research institutes in the port research activities

George Charalampous, Centre for Research and Technology Hellas, Hellenic Institute of Transport, ECTRI working group « Freight Transport »

ECTRI was established in 2003 as a non-profit association whose objective is to promote integrated surface transport research and development in Europe. ECTRI is composed of twenty major transport research institutes or universities from seventeen European countries. Its vision is: “an efficient, integral European transport system that provides completely safe, secure and sustainable mobility for people and goods”. Missions of ECTRI are to provide the scientifically based competence, knowledge, and advice necessary to move towards its vision. To this purpose, ECTRI endeavours:

- to provide practically applicable answers to questions of policy formulation;
- to bring together the foremost, policy relevant, interdisciplinary scientific competence available in Europe, capable of carrying out state-of-the-art primary and applied research in transport;
- strives to continually improve the quality and overall efficiency of European transport research;
- continually looks for innovative solutions to the present and future challenges in the field of transport;
- endeavours to provide European transport research institutes with the conditions necessary for the development, maintenance and exploitation of their scientific excellence.

ECTRI have eight thematic groups and one dealing with freight transport. Their purposes are to:

- increase ECTRI's competence in science, research and development;
- promote interaction between researchers of member institutions;
- enhance international transport research cooperation;
- support establishing of consortia.

In the past, ECTRI did not have coordinated research activities for ports and freight transport. Each institute participated in port research activities separately in a European, national, or local level activities. The main thematic topics of yesterday and today are related to:

- feasibility analyses for port development and strategic planning;
- port performance and governance;
- environmental issues (air quality, coastal environment...);
- port infrastructure, superstructure, equipment and IT integration;
- port policy and port competitiveness;
- integration of ports in the intermodal networks;
- socio-economic impact of port development.

Still, these issues are not just present and past research activities as business and social drivers pose new research challenges in each one the research topics.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



ECTRI members encountered both problems and success during their past research activities in ports. There were difficulties in aligning innovative research issues with business opportunities and quantification of benefits, reluctance of the authorities to share data for research purposes, lack of vision and deviation from traditional role of ports and contradicting user needs in freight transport and also within the port community. But there were also success as the integration of ports in freight networks, the improvement of port infrastructure, an increased port performance and enhanced services, the raise of environmental awareness. Indeed, transformation of research results into business opportunities contributed to rational port development and investment plans.

The role of ECTRI Freight transport working group towards ports today and tomorrow is *inter alia* to concentrate the knowledge dispersed in the different members in applied research for freight transport and ports. The objective is to create a freight transport research agenda for the future by understanding the challenges of today including topics for ports. The research agenda will be based on the knowledge base of each member and assessment with port community needs and would be proposed to the EC and other international bodies for consideration for the next research calls of the FP and create new funding opportunities for Port Authorities. In addition the working group will be active in commenting EC strategic papers and open consultations on ports research and policy.

The research topics for the future that would be looked into port as freight operations are concerned may be:

- further assessment, impact analysis and bringing forward of contemporary research fields;
- advanced modelling approaches for research and development on the role of ports in the supply chains, research on scenarios on operational environment and the impacts on freight operations for ports and logistics, research on decision-making processes in ports and logistics networks and modelling on cargo movements within the port (freight terminal management optimisation);
- increase of value-added logistic services and upgrade of the role of the ports;
- support viability of the modal-shift through the ports;
- development of ICT solutions for complex logistics supply chains;
- development of ICT tools for efficient risk management and contingency planning increasing port security;
- development of concepts enhancing logistic and port security without affecting the supply chains effectiveness;
- port incentives for stimulating more environmental friendly technologies;
- virtual concepts for transport and port infrastructure;
- future role of governments in ports;
- optimized port systems for Europe;
- e-Freight and ports' implications.

In other words, future research in ports cannot be considered as a nutshell but will follow the future research in supply chain management, logistics and the needs of the freight transport industry for efficient, secure, and quality services. Any research activity in ports would aim at enhancing port competitiveness in the national European and global environment and ensure the balance between logistics efficiency and security.

ECTRI have identified barriers to research like for example the diversification of port user needs in relation to size and role, the difficulties in having integrated approaches in specific

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



ports' operations due to different roles in the port system, the reluctance to adopt/invest in innovative concepts in port management due to uncertain or long term revenues. But it proposed solution aiming at overcoming these barriers:

- simulation and pilot projects for testing and assessing innovative solutions and tools aiming at increasing maturity levels of innovation;
- ex-post impact analysis of any innovation proposals and implementations in the port communities;
- integration of risk management techniques for ensuring efficiency in introduction of innovative concepts;
- achievement of balance between dissemination of research results and confidentiality of sensitive information and commercial products for avoidance of competition distortion;
- achievement of balance between user needs within the port community and local/national/global environment aiming at system optimum approaches;
- to find the way to bridge the gap between ports and research community (ports have to be convinces to be "more open minded")

As a conclusion, it is relevant to say that future research in ports will be determined by the user needs of the stakeholders of the entire supply chains (port research as a part of the research on supply chain). The role of the research institutions is to optimize the port operations and based on research outcomes propose solutions for business integration and enhanced port management operations and sustainable development bridging policy with business objectives.

The chairman asked whether and how environmental impacts of transportation are take into account and how isolate the port passage on the logistic chain (in fcat, the research may impact the value added repartition between logistics chain components). ECTRI answered that in the past, DLR has made environmental research in ports and environment will be a topic for the research in the future. But one also should study and think about the coastal area.

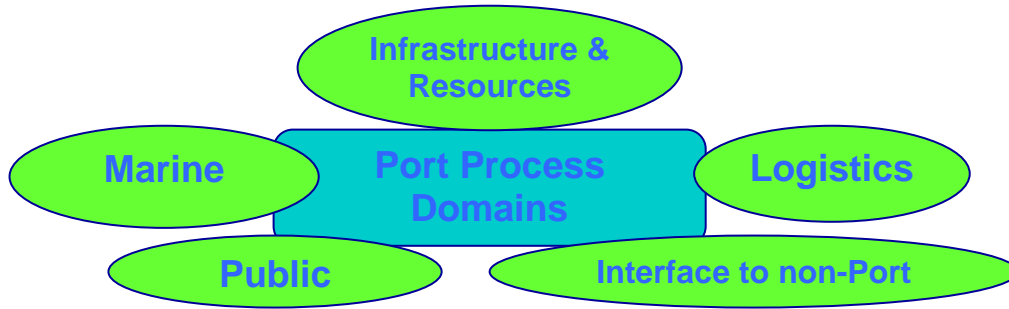
4.4. The EFFORTS Experience and the Role of Technical Research Institutes in the Port Research Activities

Prof. Jens Froese, Technical University of Hamburg, Maritime Logistics / ISSUS

EFFORTS is a very valuable experience for the future. It is composed of three sub-projects: navigation in ports, port environment and port organisation whose leaders are respectively the Dublin Port company, the Port Authority of Le Havre and the Port of Gijon. Such a main involvement of port authorities bridges the gap between the ports and the research world.

Regarding the issue of the standardisation of process mentioned earlier, one has to understand the process before, which is one of the goals of the sub-project "port organisation". Port process belong to five domains, as illustrated below.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



EFFORTS has also transversal work packages, notably the work package “integration” whose aims at identifying the commonalities. It begins with the terminology but not only and deals also with system understanding, problems, sources of information, methodologies, tools and applications. Dissemination is very important to sell the results but neglected in the majority of projects.

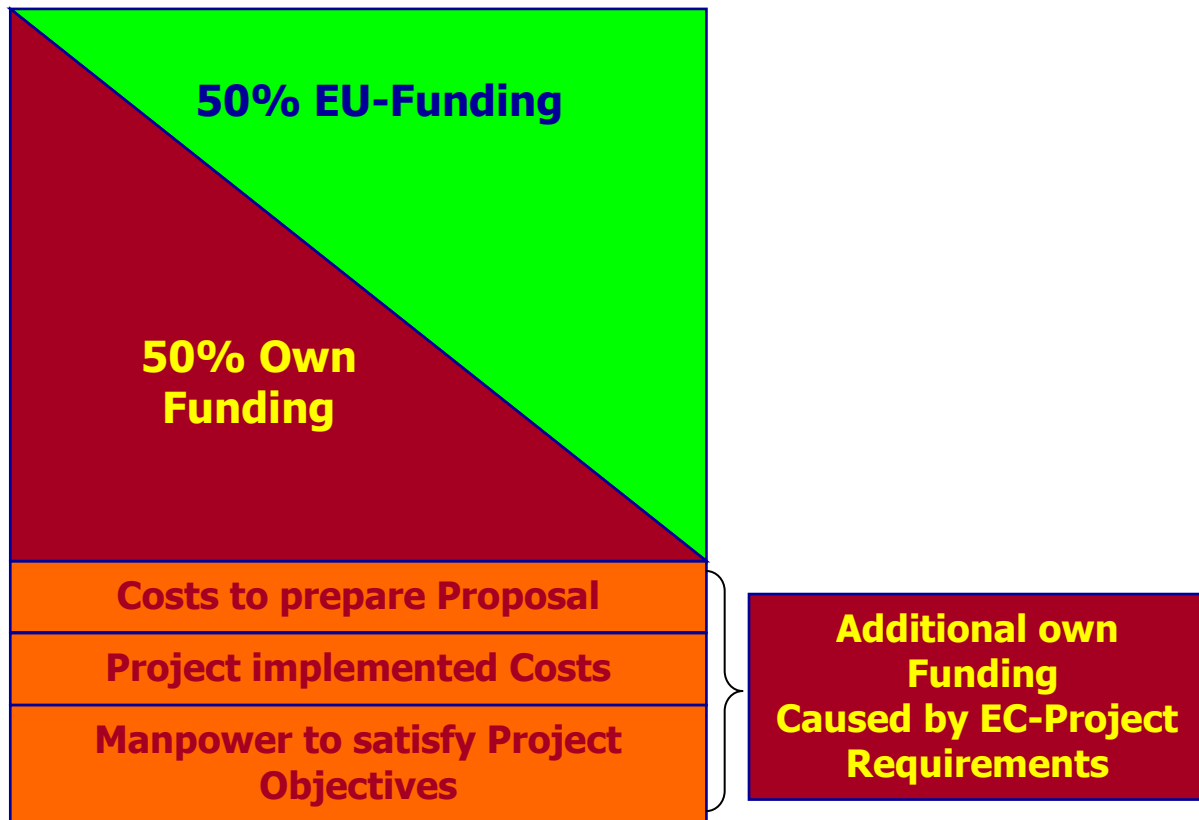
In a more general way, it appears that integrated projects (IP) are appropriate for car manufacturers, chemical plants or the aircraft industry but not for fragmented industries like ports. This results in too large consortia and too little relevant competence.

One can easily spent a lot of time and money to prepare proposal with only 10% chance of succeed. Efforts to prepare a sound proposal in the view of probability of success are too high. Identify evaluators able to understand the contents of the proposal is one of the major but difficult issue. In fact, how to identify and involve qualified evaluators?

The creation of a consortium and the realisation of the projects is still marked by too much bureaucracy, problems of intellectual property rights (IPR), a too long duration to get results (one of the problem of the academic research). This results in a weak industrial participation. There is some pure contract hunters, which do not do the job after the signature of the contract.

Regarding the financial aspects, the European projects funding, generally half of the project budget for the RDI projects, (and 50% of own funding) is not really true. It does not take into account additional costs required by EC projects, which is indicated below.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



Project officers are not paid to control (or to review) a project but to stir it. They have no staff, no budget to travel and are overloaded. Financial officers are not very keen on taking responsibilities and prefer to hide behind the back of the project officer. Solving financial and administrative problems is very cumbersome.

Socio-economics part of the project have to deal with economics activities compare to social life:

- level and quality of employment;
- role of individuals within social groups;
- role of collectives within social groups;
- coexistence of social groups;
- society as a whole.

The "job will get lost" phenomenon is not true. This important issue have to be treated.

Concerning the role of Universities, their traditional role is to provide scientific knowledge, methods and tools (scientific means based on actual state of the art, objective and reproducible -same results for the same experience-). So universities could mainly contribute both to the state of the art of relevant knowledge areas and the methods and tools to generate new knowledge.

This works fine in areas where we have a well established cooperation between science and industry like ICT, chemical, cars or airplanes (Airbus for example would only develop a new production site of significance when there is a relevant university faculty like it did in Hamburg). Within logistics and especially in maritime logistics including the ports, science still needs to convince the industry. This is difficult mainly because of lack of industrial

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



EC - Contract n°: TCA5-CT-2006-031557
EUROPEAN COMMISSION
DG Research



counterparts knowing about the potential of science and a lack of relevant application knowledge within the universities. About counterparts, the academics are new coming in logistics (it is a very new domain), which is not true in another one (like electronics for example). This partially explains the situation.

But European projects provide an excellent opportunity for universities to improve the relationship between them and the industry by:

- elucidating the potential of technique and technology;
- providing knowledge to allow for innovation;
- assessing feasibility of solutions;
- investigating socio-economic impacts.

Distinct from the industry protecting their IPRs, universities usually freely exchange knowledge and are very open to cooperation and hence contribute to transfer of knowledge in Europe and really live „cohesion“ beyond the duration of a project. Last but certainly not least, universities have to absorb new knowledge and include it into their lecturing programmes.

In a conclusion, universities need to become aware as they are doing and inform society. But how to improve the transfer of project achievements to the society?

- by convincing results matching real needs or generating new markets;
- by a better visibility of project activities by beneficiaries and society.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



5. Session 3: Reconciliation of offer and demand

5.1. Integration of port policy and society, example of the Port of Dublin

Kevin O'Driscoll, Human resource and public affairs adviser, Dublin Port Company

The port of Dublin have strongly evolved during the last decade: in 1997, the throughput is 15 million tonnes for a staff of 460 persons. In 2007, Dublin is now a world class medium sized port, with annual throughput of 34 million tonnes and a staff of 160 persons. Behind this evolution allowed by increased investments in infrastructures (240 M€), in port and shipping services and in a pension fund (223 M€), it is also a human history.

Moreover, ports are influenced by different drivers: traffics will continue to increase but security, safety and environmental issues will continue to grow in importance, leading to stricter regulation and community resistance (with neighbours, particularly whether there is no buffer zone, like in Dublin). The work force is ageing and the availability of highly qualified talent is becoming scarcer (port workers often have very little qualification). Port development is a major challenge where innovation is required but various barriers are existing (conservatism, suspicion, lack of resources, employment image...). In fact, policy and society issues are crucial and inter-linked. But there is no coordination, no integrated plan and not enough knowledge regarding labour and logistics. In fact, politics have difficulties to absorb challenges of supply chain but at the same time, the lack of knowledge are restraining good policy actions.

EFFORTS is the first European project for the port of Dublin which is notably involved in the work package "noise annoyance at ports". It appears that challenge of a political action, pressure from society and citizens and need of customers can be strong and positive drivers for innovation. EFFORTS shows that RDI projects can be tools to find solutions to decrease negative impacts of port activities and communicate toward societal appreciation of the value of port investment.

In conclusion, a real reeducation process is required in ports. But there is still cultural barriers as people often see education and training only as costs (but it is an investment). The lobby of supply chain is fragmented and self centered. The facilitators for change are politicians. Obtaining political support is crucial for the success of a research project even it appears to be difficult to have political agreement because information are not shared. For projects, consideration of users needs to the broadest extent is crucial. Society's concerns will have to be more and more considered in the future RDI projects (the chairman of the conference said that it is a very important topic). Communication and lobbies are of prime interest, as well as integration of the activities in education.

5.2. Taking into account the end-users' expectations, example of the SECURCRANE project

Jean-François Emery, Le Havre Port Authority

The SECURCRANE project, already mentioned in the conference, is a FP6 DG Research project which aims at designing an innovative system for the remote control of a ship-to-shore crane. It gathers a multidisciplinary team of researchers, industrials, consultants and

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



end-users (ports). First results consist in users' needs and specifications, design and laboratory tests, tests in a show-room and the next stage consists in on-site tests and demonstration. A SIOC (SECURCRANE Interest Operators Club) has been settled to follow the future improvement and industrialisation of the prototype.

SECURCRANE is existing in a context highlighted by:

- requirements for high throughput terminals from the maritime side;
- strong exploitation constraints increase the difficulty of operations;
- difficult working conditions: vibration, chocks, stress, fatigue and eyestrain of crane drivers;
- important safety and health issues: employers have to take care of employees health.

SECURCRANE is more for the old cranes than for new ones because working conditions for the recent cranes is better. In fact, trade-unions are interested by new technology profits in working conditions. They so survey the project with opened eyes. End-users management is interested in new organisation or equipment allowing less industrial diseases and if possible a better productivity. As an end-user, the port of Le Havre wants to participate from the beginning to the end of the projects while Industrial partners are expecting new markets.

After the prototype showroom, the feedback is globally positive but some crane drivers remain worry about their capacity to:

- feel their machine with different feeling means (noise, vibration, chocks, etc.);
- assume their work with the same level of safety.

But they accepted the current prototype as a first step and they agreed with participating to its improvement. Even with the current French Ports reform, the project is still in progress but in this particular context, speaking about innovation and future can help workers to better pass through the reform.

In general, research project permits to exchange about sensitive issues such as change, new jobs, new organisation, in fair condition and without dispute when all actors are involved at the very beginning of the project. In some trouble or stressing time, these project help workers to keep their mind open toward the future and to project themselves in the future. They minimise reluctance to change and prepares the future. To a well development of RDI project in ports, it is important to imply end-users as soon as possible (and then, there is less pressure because no yet implementation). Good contacts with trade unions is a pre-requisite for the fruitful development of a project. Complete integration of users from the beginning to the demonstration through specifications is important to obtain the adequate knowledge. It is also important to find partners with different interests to develop innovative solutions. Plans for managing the transition period (education and training) have to be elaborated during the project.

5.3. Taking into account port workers' demand, education and training activities in the EFFORTS project

Mick Sheehan, Dublin Port Company

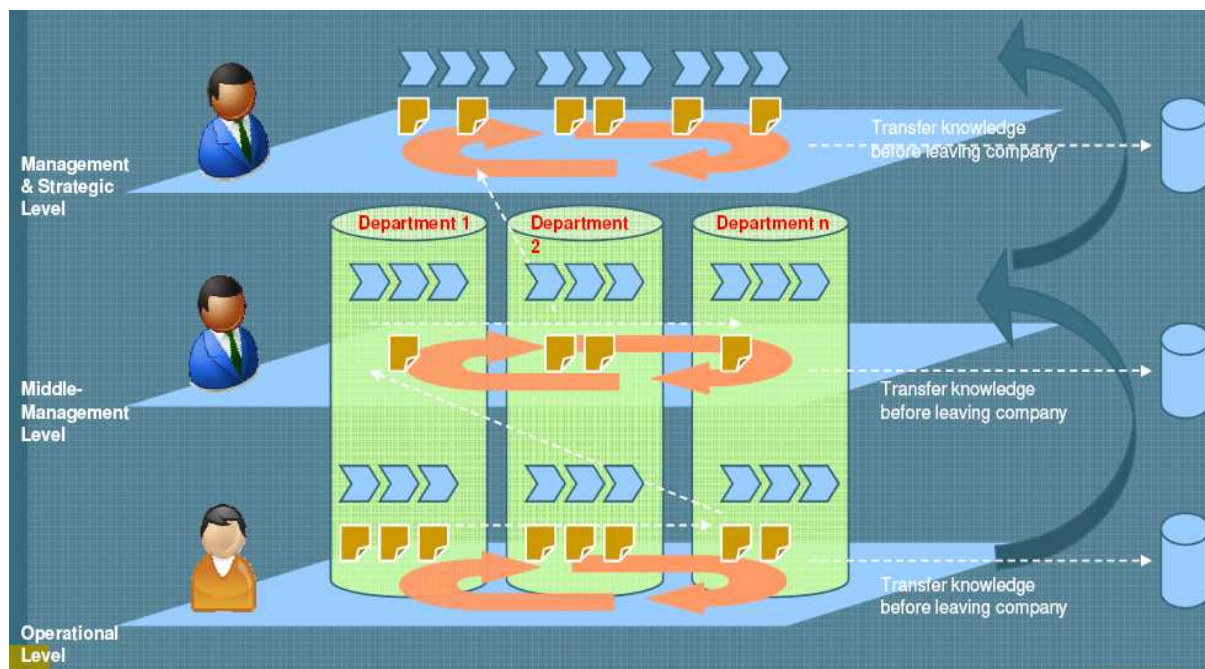
The Dublin Port Company is highly involved in education and training projects: the Dublin Port Training Network, port development and training in Indonesia and India, the UNCTAD Train For Trade, the working group on training and education for the Irish transport sector as well as the FP6 EFFORTS project. This last project represents an important development axis for the next two years which relates to training projects and knowledge management.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



The crucial point is within ports and shipping companies, people do not talk to each other. Thanks to network training and management, situation can change. Working to improve training and education is an investment in the development of the greatest resource, people, and must not be think as a cost: *"if you think training is expensive, try without"*. Education and training activities are crucial to manage the present and prepare the future of European ports. Within ports, there is a poor focus on human factors and the consequent effects on human behaviour. This is all the most true and important when dealing with innovation and research projects.

In fact, many ports have training facilities but do not export them. In EFFORTS, the Dublin Port Company aims at improving and harmonising port education and training activities at an European level. It wants to develop an observatory of port training (a web-based server), a database of port learning and training which lead to an European Passport of Port Skills and Competencies (when "students" do a course, they have a stamp on the passport). The training have to be made at different levels within the companies. As people progress in the management level, "students" need another set of skills, which requires another training. One important thing is when people leave the company (and the knowledge is gone with them): a knowledge transfer is needed (see the figure below).



The EFFORTS education and training work packages follows the different steps below:

- targets the demand;
- designates experts / pillars in the profession, teachers and union representatives of professional or general workers;
- proposes the construction of a programme which meets the real needs of the profession, based on a socio-economic philosophy;
- as some people will progress very quickly and others more slowly, the program will be tailor-made, customised to the skills of each individual.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



Regarding the future, the Dublin Port Company wants to extend its networks and ensure its promotion, as well as build new programs for various sectors and set up the Passport concept. Approach have to be coordinated, gathering professionals, trade-unions and trainers. In fact, *“innovation not lead necessarily to success; but success can not be reached without innovation”*. These activities aims notably at coping barriers like lack of European standards and harmonisation, a poor cooperation between educational institutions, training centres and ports, a lack of adequacy to the real operational world (and unavailability of resources), the unwillingness to change from operator side...

5.4. Most urgent issues for EIRAC

Dirk t’Hooft, EIRAC innovation manager

As some other technological platforms or advisory council, EIRAC has developed a “Vision 2020” as well as a “Strategic Research Agenda” and an “Implementation Plan”, bringing contributions to change and proposals for research topics in the 7th framework program. For the “Strategic intermodal research agenda”, published in 2005, the innovation priorities are to:

- take political and legislative initiatives, particularly regarding technical interoperabilities, transport documentation, information technology and infrastructure policy;
- have a safe, available and secure European transport network in 2020 (with a “hub and spoke” logic)
- have efficient sea-hubs connected to the regional land network by Motorways of the Sea;
- have efficient land services (including inland waterways services), land-hubs and inland terminals;
- create the Intermodal Train of the Future, according to the vision of ERRAC;
- create the Inland Barge of the Future;
- create the Container Vessel of the Future;
- improve environmental performance (in climate change issues, local air pollution, noise emissions, congestion, accidents and internalisation of external costs);
- have motivated, skilled and gender-balances international workforce through education and training.

The hottest research issues at the moment consists in improving capability of exploiting capacity either by new business models (developed by the industry based on reliability and efficiency aiming at reaching 80% capacity) or accompanying measures to improve the load factor but also in developing new collaboration paradigms (like methodology to calculate revenues and benefits including a legal framework to split costs and benefits or transparency and visibility to assess potential improvements in the chain). Finally, innovative transparent information technology is required: development of one standard for all messages for all modes, including logistics and customs, providing paperless (document-less) transport chain and seamless transport areas with harmonised procedures.

5.5. A word about the Waterborne technology platform

Geoffroy Caude, partner of the project and chairman of the conference, CETMEF executive manager, Waterborne French Group, replacing expected guests from the platform, who were not able to attend the conference.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



EC - Contract n°: TCA5-CT-2006-
031557
EUROPEAN COMMISSION
DG Research



The Waterborne platform is mainly dedicated on shipyard and shipbuilding, gathering the main actors of the sectors like CESA (Community of European Shipyards' Association), EMEC (European Marine Equipment Council), EBU (European Barge Union),...

Like in EIRAC, the platform wrote its "Vision 2020" as well as its "Strategic Research Agenda" and its "Implementation Plan", containing twelve "exploitation outcomes". But on these twelve topics, eight are concerning ships exploitation or ships building (low risk ship, low emissions ship, seven days ship design...) and only three are dedicated to intermodal topics, in general terms:

- intelligent integrated transport network;
- intermodal waterways;
- accelerated sustainable port development;

That shows there is a clear lack of taking into account ports and transport issues as well as needs regarding port research.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



6. Session 4: Conclusions and recommendations

Geoffroy Caude, partner of the project and chairman of the conference, CETMEF executive manager

6.1. General guidelines for research projects

Creation of the consortium

The creation of the consortium issues refers to the following questions: who is at the origin of the project, who makes the decision to present it and who ensures organisation of the consortium, defining the role of each person? The CAPOEIRA analysis reveals care must be taken in the composition of the consortia and regarding the involvement of the partners. Great attention must be paid to the prioritization of responsibilities and the participation of end-users must be sought out. In addition, it will be necessary to find compromises making it possible to respect the contradictory interests, a priori between European public stakeholders which would wish all the countries to benefit from research progresses and between the private interests which want to defend their advantage with respect to competition. The rest of the consortium (researchers, integrators) would also like to participate in the distribution of possible future dividends, but once again, it is rather risky and complicated. Instruments such as the consortium agreement and the industrial agreements are worth putting under the microscope.

A demand in front of the offer

Very often, the presentation of a project comes from an idea, often emanating from: a manufacturer having direct contact with the market, an academic person who had an interview with a professional and who gave him information on certain needs. Should this idea be consistent with the invitations for tender of the EU? The latter invites tenders after having used a procedure which, up to now, has not attracted particular comment, particularly from ideas emanating from professional organisations, technology platforms or lobbies, which are at the origin of this approach.

It is thus necessary that communication between the manufacturers and their European representatives operates perfectly. This point will be the object of a recommendation as, from our point of view, the role of platforms is essential and will have to be developed.

If the idea comes from a manufacturer, the latter, with rare exceptions, has little or no time to devote to research internally. He will thus have to sub-contract to a research organization. He has to decide whether or not to invest the money necessary to Community Research, according to his vision of the market and his strategy. He is the only master as far as the destiny of the project is concerned. For him, it is very simple: if the project succeeds, he will have a product to put on the market. He will not have spent too much money in case of success and, in the other case, the risk is minimal. The European funding acts as "risk capital" and it plays its role.

He will thus protect his idea to the maximum by patenting it but he has to find an end-user. Our analysis leads us to ask the following question: is there a specific demand in front of the offer?

This is where we find the first hiatus. Among all the projects presented by manufacturers that we had to analyse, only few had an "end-user" able to finance and guarantee the commercial launching of the product. In this way, the manufacturer protected his product but cut himself off from any convincing use of it during the trials.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



The sharing of research results and dissemination

On several occasions, potential users deeply involved in day-to-day operations asked us vehemently: “what is my interest in participating in a project if I cannot benefit from an exclusive use for a sufficient period of time to improve my comparative competitiveness with respect to competitors, what is my benefit? I would rather wait for manufacturers to propose a product that satisfies my needs as accurately as possible. This way, I do not waste time and my only investment is linked to purchase of the product and training of my staff”.

The role of Waterborne Technology platform and EIRAC

The role of Technology platforms must be essential as they are aware of the predictions concerning changes in the field of employment. They must act as filters between the European Commission and the project holders and they must check the seriousness of the partners. Finally, they must firstly seek for a better link between themselves to avoid duplication, particularly in the field of inter-modality and make common projects. A closer link with other partners likely to influence the results of projects could be useful.

6.2. The “Strategic Ports Research Agenda” (SPRA)

Visioning ports at 2020 lies on the following assumptions and framework that improvement of goods transfer between modes is a key element for the sustainable surface transport development and will allow to anticipate evolutions and manage change. This vision aims at integrating ones of the different surface transport modes (EIRAC, ERTRAC, ERRAC and WATERBORNE). So, based on the “Ports Vision 2020” (extracts of the Vision are put in annexes), research topics are highlighted.

They concern notably productive equipments like:

- new techniques (including IT) for fast and automated multi-cargo handling like faster horizontal handling systems, remote controlled of STS crane, automated road/rail vehicles for drayage, spreader fine positioning automation, (Semi-) automation of ro-ro handling (tugmaster);
- integrated ICT (Information and Communication Technologies) will have to be developed, to enable much more efficient planning, simulation, control of cargo during its transfer as well as other services supporting efficiency, safety and security;
- optimisation of equipment maintenance;
- applications of navigation and positioning systems need to be developed for tracking the position of vehicles and for collecting real-time traffic information. Investigate potential for improved and more accurate localisation to enable new functions such as parking identification, distance relative to other vehicles (platooning), Trucks Queue automatic management, based on vehicle-vehicle and vehicle-infrastructure communications combined with the GALILEO satellite system.

Research topics concern also the necessity to have a safe, secure and productive infrastructure:

- strategic infrastructure planning to better prevent risk, and set up effective emergency and crisis management;
- infrastructure engineering to allow real time data monitoring (“Smart infrastructure”)
- infrastructure design (robustness, new concepts);
- automated methods of inspection, maintenance and construction of infrastructure;
- infrastructure safety (e.g. Port ECDIS and monitoring of height, drayage activity);

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



- adaptation of the port rail infrastructure (ERTMS);
- off-shore and dry ports design.

Regarding the necessity to make port operations sustainable, one have to minimise the airborne emissions, to perform research activities on vehicle propulsion systems, and modelling and create decision-making tools to analyse air emissions or using new technologies (e.g. photo-catalysis). Sustainable energy management is also required and concern:

- research on the feasibility, economics and logistics involved in using alternative sources;
- equipments and supply for shore-side electricity;
- lighter equipment, promotion of new structures and materials;
- development of more energy-efficient control systems;
- standardised methodologies for measuring the energy efficiency of equipments;
- modelling and decision-making tool to analyse consumption and provide help for port eco-design.

Noise annoyance from ports have to be reduces, notably due to:

- research on new materials;
- modelling of noise generated by port operation, other port (industrial) activity, and handling equipment;
- simulation tools for noise annoyance assessment;
- effectiveness of noise reduction measures and the targeting of maintenance interventions;
- decision-making tool.

For ensuring sustainable port operations, research on assessment, prevention and management of water pollutions, eco-design and wastes/residues valorisation, decrease of surrounding road congestion, modelling and help to decision tools, cooperation models (how to allocate costs and benefits) as well as sensors network are needed.

6.3. Conclusions of the conference

On the one hand, “Ports Vision 2020” is ambitious, due to the complexity of the port system, gathering a multiplicity of actors, face to a huge scope of problems and it has to integrate other transport modes visions. Various innovations are in fact needed to reach the targeted objectives in terms of productivity, profitability, service quality, sustainability, safety or security. On the other hand, research is crucial, but above all synergies between research and business sides as well as collaboration between technological platforms and advisory councils, in order to minimize the risk of research, around a common interest: **the development of the research answering the port industry needs**, on the topics below:

- Intermodal connections and the intermodal connections, e.g. improved access to ports as terminals and to port hinterlands. This cannot be explored without a full intermodal logistics approach.
- Security: Creating a Code of Conduct for Intermodal Security, rules laid out for Intermodal players, how to behave and which security standards to observe, to become a recognised “Intermodal Secure Economic Operator”. A common securitised related IT infrastructure is needed to exchange and record transport related information in a secure IT environment, covering all players of the intermodal chain
- Cargo handling systems: the development of cargo handling technologies and systems has been identified as a key issue by EIRAC. Collaboration in this area

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



EC - Contract n°: TCA5-CT-2006-031557
EUROPEAN COMMISSION
DG Research



between the two Research Advisory Councils is not only useful but also essential if a fully integrated approach to the research and actions required is to be achieved.

- Design of vessels.
- Education and training.

7. Next steps of the CAPOEIRA project

The redaction the CAPOEIRA final book, aggregating the project results, articles from experts and results of this conference is underway. Publication during the beginning of 2009.

For further information, please contact:

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CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



EC - Contract n°: TCA5-CT-2006-031557
EUROPEAN COMMISSION
DG Research



8. Annexes

8.1. List of attendees of the CAPOEIRA final conference

	Name	Company
Scientific Board	G. Caude	CETMEF
	J. Froese	Technical University of Hamburg, Maritime Logistics / ISSUS
European Commission	J. de Bock	EC- project officer
Port Business Group	A. Mai	Harbour master, Bremerhaven port authority / European Harbour Masters' Committee
	K. O'Driscoll	Port of Dublin
	M. Sheehan	Port of Dublin
	J.-F. Emery	Port of Le Havre
	F. Soudry	Port of Le Havre
	N. Dangleterre	BP2S (French Shortsea promotion centre)
EIRAC & EIA	V. Recagno	EIRAC secretary
	D. T'Hooft	EIRAC innovation manager
	P. Wolters	EIA
	S. Barbarino	Procter&Gamble – EIRAC member
Researchers and Industrials Group	C. Navarra	TUDOR
	D. Evaristo	TUDOR
	N. Rigo	ULB
	L. Walle	TL&A
	B. Boukkari	ECA
	G. Charalampous	ECTRI
	J.-C. Dellinger	AREVA
	Paolo Rossi	Fantuzzi Group
Other participants	M. Julien	Research and Innovation Division (French Ministry of Sustainable Development)
	P. Salini	-
Consortium	J.-L. Deyris	Intecsa-Inarsa
	T. Morall	BMT
	Y. Tréméac	TL&A
	B. Lemaire	Ex-CETMEF
	S. Combes	CETMEF
	L. Kaniewski	CETMEF

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



8.2. Abbreviations

RDI	Research, development and innovation
EC	European Commission
DG	Directorate General (of the European Commission)
FP	Framework Program
IPR	Intellectual property right
ICT	Information and communication technologies
IT	Information technologies
IMO	International Maritime Organisation
IHMA	International Harbour Masters' Association
EHMC	European Harbour Masters' Committee
HM	Harbour master
SSS	Short sea shipping
STS	Ship-to-shore
RMG	Rail mounted gantry crane
RTG	Rubber tyre gantry crane
ECTRI	European Conference of Transport Research Institutes
EIRAC	European Intermodal Research Advisory Council
ERTRAC	European Road Transport Research Advisory Council
ERRAC	European Rail Research Advisory Council
ERTMS	European Rail Traffic Management System
ECDIS	Electronic Chart Display and Information System

8.3. The Ports Vision 2020 (extracts)

- *The European port system is productive, profitable and provides high quality services*

Ports respond to the demand of transport and its evolution in a reactive way. A limited number of big European sea-hubs received the giant 18-20000 TEU vessels while regional ports receive the new generation of feeders (and small ports are able to cope with intermodality). Efficient co-operation and liabilities between actors (service quality, reliability, legal, competition and insurance issues, loss and damage issues) are guaranteed. Logistic activities are well developed and integrated into port operations. In this network, port activities (sea-port and land-port) are highly integrated. The 2020 European ports are on the leading edge in the use of innovative and efficient cargo handling systems, optimizing big vessels turnaround time: remote-controlled ship-to-shore cranes operating in parallel, fleet of Automated guided vehicles interoperating with the straddle carriers and or automated stacking cranes and remote controlled/automated RMG. Automated road/rail trains are used for drayage allowing a reduced transshipment times. In 2020, ports can manage various kind of traffics (containers, roro...notably standardized intermodal container from EIRAC, intelligent ITU from ERTRAC...).

High performances vertical handling equipment manage new concepts of transport means (road, IWW) in an optimal way. Horizontal transshipment is used to (un)load trains, possibly for several containers at the same time and at two decks.

Port Information Technology (IT) is integrated into the "smart supply chain": IT systems allow high level of traffic control (based on harmonized information availability and automated tracking and tracing features).

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date



Sea ports IT are interconnected with inland ports (including the River Information Services). Sea ports are networked and exchange data on vessel locations, planned routes, cargo facilities and dates and times of movement, wastes, security and safety issues...Advanced operational tools are used, facilitating very fast sea land interchange, information flows are seamless, administrative burden is reduced to a minimum (single window), exchanges are paperless. Mobile communication enables the collection of data from distributed, moving vehicles in real time and allows more comprehensive management of traffic.

Regarding the infrastructure, in 2020, assessment tools are used for traffic management strategies, based on dynamic capacity optimisation. Land use is optimised owing to new dynamic traffic management and infrastructure technologies. Infrastructure communicates with its smart users (intelligent trucks, ...).

Off-shore ports and dry ports are used, double-deck quays and surelevated pathways can be exploited. Berths can allow dual mode of ship loading, vertical and horizontal, at the same time.

- *The European port system is sustainable*

In 2020, when possible, ports have expanded their capacity preserving the natural habitats in the surrounding areas, but above all and backboned by regulation, have achieved a balance between protection of natural habitat and species, social need and economical issues. They manage integration of their operations in their environment (marine, coastal, fauna, flora, air, residents) in a sustainable way. Special rates are given to “green champions”. Ports are working on eco-design to secure a sustainable port industry for the long term future:

- design (Life cycle costs);
- exploitation (port operations are not damaging the environment and in accordance with society needs: energy in port is cleaner, dependency of port operations on fossil fuel is lower, energy is managed in a more efficient way, wastes are valorised, noise annoyance is reduced, air and soil pollutions are at a minimum, no more surrounding road congestion or road vehicles queue owing an optimised space management and adapted process integrated into the overall supply chain);
- maintenance (planning before fluid leak);
- end of life (recycling).

- *The European port system is safe and secure*

Operations are safer owing to new processes and technologies. Infrastructure (quay, rail) is safer owing to e.g. automatic inspection. There are less accidents; but accidents always occur: their impacts are mitigated. Traffic incident and emergency management methods are more effective. ISPS code is well-managed, new security strategy and procedures are implemented (E-seal...), intrusions are difficult. Security is ensured without impeding port operations and competitiveness (scanning...).

Threats are continuously analysed, risk is assessed and prevented, effective emergency and crisis management plans are ready.

CAPOEIRA REFERENCE	CAP-W5 CETMEF	DV	500	Rev 0	31/12/2008
Internal partner reference:	Filing N°	Doc.Type	Order N°	Rev. N°	Date