A EUROPEAN PLATFORM FOR MARINE AND OCEAN RESEARCH

1. Background

The paper is a response to the Green Paper on Maritime Policy[1]. It elaborates in particular on the points made in section 2.3 ("Remaining at the Cutting Edge of Knowledge and Technology") on the need for better access to available knowledge and data as well as the need for a more effective exchange mechanism.
The Green Paper makes the point that the EU Marine Strategy[2] forms the environmental leg of the proposed maritime policies. This present contribution which has been prepared jointly by the European Dredging Association (EuDA) and the Alliance for Maritime Regions in Europe (AMRIE), discusses mainly the marine research aspect of the marine strategy.

2. Introduction

Europe has a rich history of marine and maritime development, research and innovation. A diversity of institutions, sector organisations and regions has contributed to the build up of extensive know-how. At the same time, this diversity carries a risk of duplication.

2.1. Sectors

To illustrate the point it is recalled that projects in support of maritime safety improvements may be conducted in a variety of public and commercial organisations, covering engineering, law, environment, economics etc.
Similarly, pertinent data on the evolution of coastal zones may be found in university institutes, national coastal authorities, regional bodies or even military organisations. This broad coverage carries the risk of overlap.

2.2. Regional

Europe has also seen the concentration of specialist maritime/marine research build up around regional seas and sites with maritime commercial interests, often port cities, e.g. Turku, Southampton, Thessaloniki. The wide spread of research facilities, marine centres and development activities can and does lead to

[1] Communication by the European Commission: "Towards a future Maritime Policy", ISBN 92-79-01825-6.

[2] COM (2005) 504 – Thematic Strategy on the Protection and Conservation of the Marine Environment.

duplication in research efforts, particularly in domains where generic approaches are required, e.g. risk assessment, economic analysis, dynamics of biotopes.

2.3. Research funding

At the EU level the nature of European institutional funding has also led to duplication in research and linked activities. Framework Programme subjects for maritime/marine research have been covered by DGs Research, TREN, Environment, and Information society.
In the different regional zones, Interreg programmes have caused repetition of work, without coordination between different regional areas and without taking note of research done under the Framework Programmes.
Additionally, other sources of funding from national or industrial sources have not necessarily fared better and considerable overlap may be found in research programmes.

2.4. Research structure

Marine and maritime research is dealt with as a horizontal issue in the EU Framework Programmes. The Seventh Framework Programme (FP7) will again deal with marine science and technology issues as a cross-cutting, horizontal theme. Maritime, marine and coastal issues are covered in several of the nine vertical theme areas, e.g. Surface transport, Environment.
Added to this, research will be a priority to support the realization of the maritime policy currently under consideration. An increased emphasis on maritime policy is supported by the Committee of the Regions. It recognises the regional element and the diversity that should be considered under the maritime policy.
The concept of the European Research Area also embraces the research potential funded through the structural and cohesion funds, where regional needs and regional policy are the main drivers.

All these factors highlight the need for some framework which facilitates to improve coordination and management of European marine/maritime research.

2.5. Need for data

The marine and oceanic ecosystems are very complex. The interaction between different aspects, various driving forces and the many (scientific) disciplines involved in the study of these systems necessitate the availability of many different data sets. The Marine Board of the European Science Foundation[3] has outlined the complexity and the challenges posed by the marine ecosystem. It

[3] European Science Foundation Marine Board, Position Paper no.5, "Integrating Marine Science in Europe" - Nov 2002

makes recommendations for future marine research, but it also discusses the need for better integration and coordination of European research efforts in this field.
UNEP has published an authoritative report on the ecosystems approach. [4]In the report a number of research items for specific eco-systems are listed. The most pressing one is that a systems approach attempts to establish the relationship and interdependency between ecological functioning, various pressures and impacts, the interaction with other ecosystems and the impacts of human activities and development. It makes the following point:
"It is enormously challenging to measure the overall condition or health of an ecosystem. The ecosystem 'indicators' most readily available- and that have shaped our understanding of ecosystems- are far from complete. Each provides only a partial description of the bigger picture (….):

- Pressures on ecosystems, including such factors as population growth, increased resource consumption, pollution and overharvesting;
- Extent of the ecosystems-their physical size, shape, location and distribution;
- Production or output of various economically important goods by the system, such as crops, timber or fish."

The UNEP report does not cover the entire ocean ecosystem, but rather concentrates on the coastal ecosystems, which more or less coincide with the EU marine or maritime space. The coastal region is defined as: "the inter-tidal and sub-tidal areas above the continental shelf (to a depth of 200m) and adjacent land area up to 100km inland from the coast."

The various problems with the coastal zones in the European Union have been discussed under the heading of Integrated Coastal Zone Management[5], the referenced Marine Strategy as well as in the Maritime Policy Green Paper. In all these cases the point is made that massive amounts of data are needed to assess the state of the ecosystems and monitor the current trends; data that must be collected and interpreted. The UNEP report states for ex.: "Global data on extent and change of key coastal habitats are inadequate. Coastal habitats are difficult to assess from satellite data because areas are small and often submerged". Elsewhere it refers to water quality issues and points out that: "Remote sensing can help to fill the information gaps about occurrence and duration of algal blooms, oil spills, turbidity and sea surface temperature, but on-site monitoring is needed to evaluate many coastal water quality parameters such as eutrophication, coliform bacteria and persistent organic pollutants, as well as to monitor disease outbreaks among many organisms".

[4] UNEP Report – "World Resources 2000/2001: People and Ecosystems, The Fraying Web of Life." (see www.unep.org)

[5] See COM/00/547 – "Integrated Coastal Zone Management: a Strategy for Europe" – Sep. 2000.

Against the background of the above analysis, there appears to be an urgent need to improve on the collection, management and dissemination of data acquired in marine and maritime research programmes.

3. Inventory of needs

3.1. Uses

The Green Paper identifies the main uses of the marine and ocean space:

- Maritime transport
- Living resources (fisheries, aquaculture…)
- Offshore oil and gas (platforms, pipelines…)
- Renewable offshore energy (wind, waves, tides, cable links…)
- Non-living resources (aggregates, minerals, metals..)
- Recreation
- Coastal protection
- Military uses

3.2. Aspects

The Working Paper on Maritime Research that was prepared for the Commission as input to the Green Paper makes a number of very interesting observations on the needs and the structure of these research fields. From the section 'A vision for marine related research in Europe' the following is quoted:
"In the marine sphere there is a need for more science, more research and more knowledge to understand the complex interactions between the marine ecosystems, their resources and their sustainable exploitation (…). Long term data, better observation and data collection capacities are needed to provide the necessary input for science as well as interpretation and presentation of results and their implications that speak to policymakers.
(These) must be tackled in an integrated way, taking into account:

- Environmental
- Industrial
- Energy
- Transportation
- Social
- Economic
- Regional development
- Education and Training aspects."

3.3. Main Themes

The objects of the research efforts can be outlined in different ways. The referenced Working Paper states the following:
"Specific areas (of maritime policy) in which the contribution of research is needed include:

- Developing the ecosystem-based management approach
- Marine spatial planning
- Development of (…)solutions for coastal zone protection and management
- Sustainable management of resources
- Restoring degraded marine ecosystems
- Environmental monitoring technologies
- Assessment tools (e.g. models for environmental impact assessment)
- Impact of maritime infrastructures on the environment and the ecology
- Maritime transport safety and security issues"

These areas of research can be fine-tuned by asking specific topical questions, for ex.:

– What is the relationship between air emissions at sea and (regional) climate change?

– How can Europe's coastline be prepared to better cope with possible natural disasters? (storms, floods)

– What could be the effect of large scale carbon sequestration in the ocean?

Etc.

It is beyond question that such issues require multidisciplinary efforts. Moreover, there is an urgent need to apply the findings of basic research and data sets to the building of models: the needs of the maritime industries, in particular for building marine infrastructure, cover the required input data to prepare detailed Environmental Impact Statements. An EIS must be capable of producing credible forecasts of the expected effects in the near field and the far field, but also over longer time periods. Such forecasting requires the availability of sophisticated 2D and 3D models. **Note**: The current paper does not go into detailed needs for the contents of future research, but concentrates on the organisation of results and output data.

3.4. Coordination needs

As recalled in the Introduction, there is a widespread perception that too much duplication and overlap in research projects in Europe has taken place. The conclusion can be summarised in one sentence: the European Research Area is not yet functioning properly, at least in the domain of marine and maritime research.
Clearly the boundary conditions for and organisation of marine and ocean research can and should be improved; the management of research results and the access to data are a key component in achieving this goal.

Green Paper p.6: "Such a (maritime) policy should be supported by excellence in marine scientific research, technology and innovation."

Green Paper p.13: "alongside marine and maritime research there is an urgent need to support co-ordinated and sustained collection, archiving of and ready access to comprehensive marine data sets."

From a recent Belgian research project (MAREBASSE): "Data integration of multidisciplinary research projects remains difficult. Various formats (….) hamper an optimised data interaction."

L. d'Ozouville (personal communication): "While the oceanographic data centres are getting more and more articulated and coordinated at European level, current initiatives for collection, analysis and dissemination of information are mostly compromised of a myriad of isolated and fragmented efforts on the part of both public and private organisations, without having any harmonization or a coordinated approach. Therefore, critical information is not properly shared by the marine stakeholder community."

Again, the Marine Board of the European Science Foundation[6] summarizes the issue in the following quote:
"Concern has been expressed that despite the funding of some 242 marine related projects in the Sixth Framework Programme, coordination between those initiatives has not been optimal. Working towards improved coherence of marine research activities will require:
(i) enhanced **coordination** between marine research institutes;
(ii) fostering of greater **capability in marine technology** across the marine sector;
(iii) support for **long term observation** and national facilities on appropriate timescales;
(iv) strengthened commitment towards supporting long-term **oceanographic data centres**."

[6] European Science Foundation. Working Paper 8 – "Navigating the Future" - Nov 2006.

These comments and observations can easily be expanded, but the message is clear: there is a need for more coordination and exchange, as well as improved access to data sets and research results, in particular in the marine research domain, but also for maritime research projects. As a consequence of the diversity of various organisations involved in ocean affairs in Europe, timely access to relevant research results is often problematic.

4. How to organize?

These observations lead to recommendations for a possible European initiative in the context of the overall maritime policy.
In summary the considerations are:

- European research groups covering ocean and marine affairs are often specialised in specific sectors and cover certain geographical areas, but not the entire European marine space.
- The existing information on marine and maritime research, past and present, is quite dispersed and fragmented; a variety of information sources exists that is often difficult to find and to explore.
- The access to the internet has not fundamentally changed this situation as there is no special link or data exchange between the various sites.
- The development and management of information systems and network interconnections often lacks the specific input of the research community.
- The potential of the powerful capabilities offered by modern information technologies, also for research purposes, is underexploited.

In view of these findings an initiative was already taken in 2001 to establish a European Centre for Information on Marine Science and Technology (Eurocean) which was given three main objectives:

- Facilitate access to information on marine research in the widest sense, but starting with inventories of EU Framework Programme results;
- Promote the development of suitable indicators to support marine science and technology;
- Encourage cooperation and dialogue between existing European marine research organisations.

EurOcean has been operational for several years. In order to meet its goals it developed an internet portal which currently contains the following information:

– Directory of existing relevant websites and related sources of information

– Compilation of marine science and technology information related to the EU Framework programmes (indicators, projects, data bases)

– An inventory of available research facilities and infrastructure

- A Search routine
- Discussion Platform for scientists active in marine research.

Especially the second bullet item has potential for further development to provide enhanced coverage of relevant research results.

Drawing from the experience with EurOcean, where the focus is on ocean research, it is suggested to broaden the initiative and form a coordination network at EU level with the overall goal to enhance the knowledge of the seas and the oceans and their uses in the widest sense.

Such a strategic instrument must contain the following elements:

- A network and information highway which provides two-way access to results of past and present projects;
- A platform for interaction between research groups;
- The provision of dedicated support services to add value to data sets, to convert formats, to ensure compatibility, etc.
- An advisory service on data gaps, recommended approaches, problems with funding.

As to the effective organisation of such a facilitating instrument, there are different options. Above all, the structure needs to be flexible. Our proposal, which is elaborated here below, would be built around two focal points:

A centre for access to information in the widest sense and supported by strong IT tools;

and

A separate body to act as a service centre for marine and maritime data sets, also in the widest sense.

In addition the **observation and monitoring** tasks should as a minimum be coordinated through an effective network

Furthermore, there seems to be a need for more **overall coordination** of marine/ocean/maritime research. This could be provided by a high level platform that integrates the views of sector organisations involved in directing and funding research and users organisations.

Fig 1 provides a possible structure. It should be emphasized that the relationships between the various bodies do not constitute a hierarchy of sorts, but are purely functional. One may assume that the various bodies will be staffed by

representatives of leading research institutes and academia, (which are at the same time the users of the output), and leading users of the research results. The overall goal of the proposed structure is to facilitate access to information, optimise the use of research funds and improve the effectiveness of research programmes.

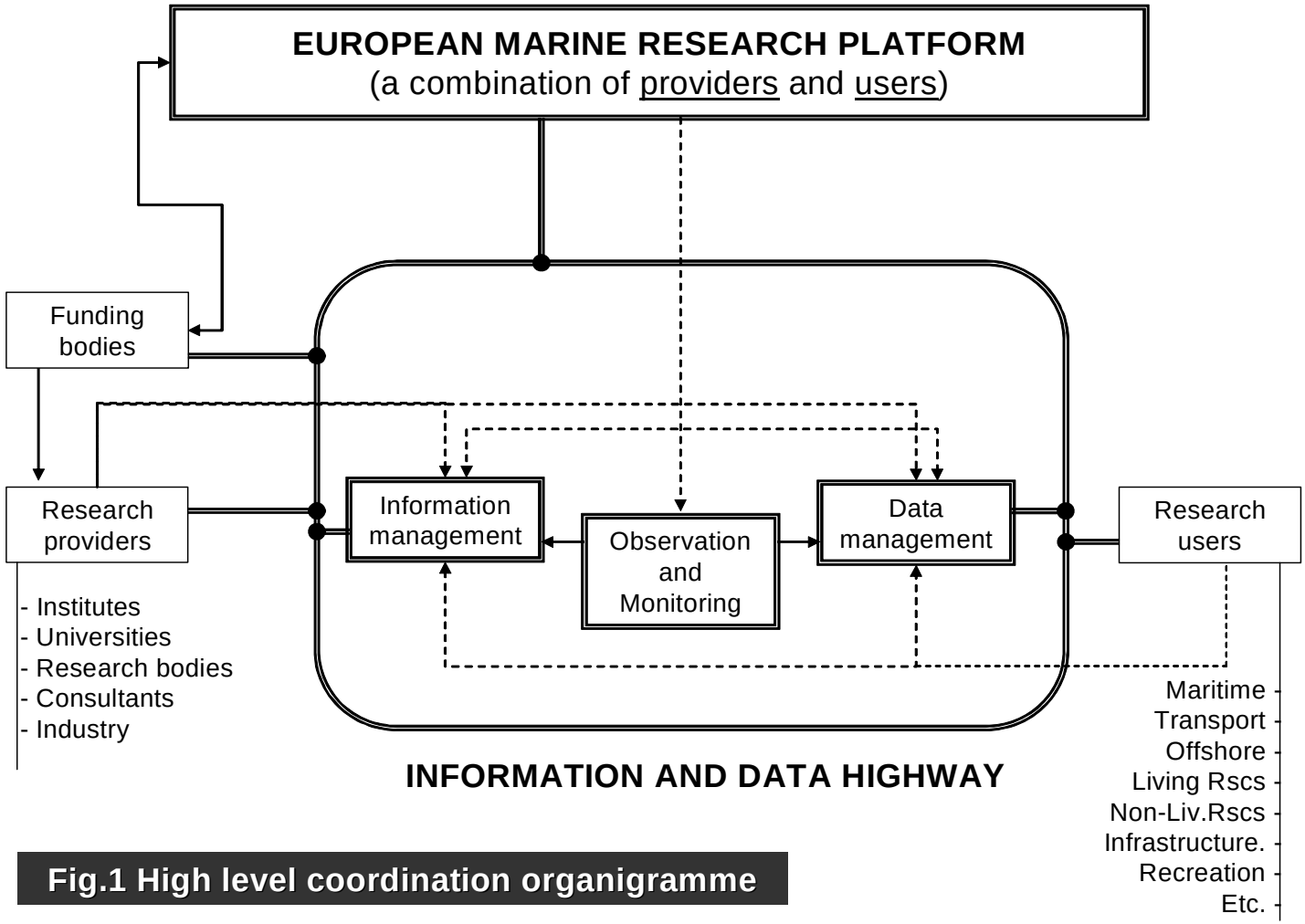

Fig.1 High level coordination organigramme

Task indication

European Marine Research Platform

- Overall coordination;
- Recommendations for funding ;
- Suggestions for thematic clusters and coordination between research bodies;
- Guidance on monitoring and data collection;
- Monitor progress and identify specific research needs.

Providers and Users

- Represent various sectors , diverse interests and disciplines;
- May consist of existing bodies that can be loosely integrated into the proposed network;
- Existing advisory bodies continue to provide specific sector guidance.

Facility for Information Management

- Extends scope of current Eurocean facility;
- Facilitates access to results of marine research projects;
- Provides a structured means for communication within the research community;
- Provides dedicated information on existing infrastructure, ongoing activities, programme management;
- Manages and structures the data highway;
- Archiving of research results;
- Optional: intermediate party in access to research infrastructure.

Facility for Data Management

- Provides access to existing data sets;
- Develop protocols for data management and format;
- Implements standard protocols ;
- Provides reformatting services;
- Converts marine observation data into user format;
- Provide quality control services.

Marine Observation and Monitoring Network

- Manages and collects data from satellite observation;
- Idem remote sensing schemes;
- Idem special monitoring programmes;
- Coordinates data collection at European scale;
- May provide observation tasks on demand.

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