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**COMMUNICATION FROM THE COMMISSION TO THE COUNCIL, THE
EUROPEAN PARLIAMENT, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**A European Strategy for Marine and Maritime Research
A coherent European Research Area framework in support of a sustainable use of
oceans and seas**

1. INTRODUCTION

The marine environment constitutes two-thirds of our planet and offers huge potential for citizens' well-being, with extensive resources that form the basis for many economic activities. The EU's maritime regions account for around 40% of its GDP and the maritime economy for 3 to 5% (see Box 1).

However, in the context of increased global trade and competition, human activities are exerting environmental pressure which is threatening marine ecology and sustainable maritime activity. In particular, unless properly addressed, the growing demand for maritime transport, tourism, coastal development, fisheries and aquaculture, security, surveillance and so forth could pose a major threat to the marine environment and biodiversity.

Science and technology provide one of the keys for reconciling promotion of sustainable economic growth in sea-based activities with environmental conservation. In an open global market, the competitiveness of advanced economies like the EU stems from their capacity to create high value-added, knowledge-based goods and services. Therefore, RTD efforts are necessary to increase their eco-efficiency and offer solutions to overcome the unsustainable use of resources. A large number of marine and maritime research activities are ongoing in the EU; these efforts need to be coordinated in the most efficient way.

Maritime-related knowledge and innovation requires an integrated approach to cope with complexity. Integrated and dynamic European research is required to solve complex issues and to find coherent solutions for exploiting all the economic potential of the seas within an ecosystem-based approach.

In this regard, in its strategic objectives (2005-2009) the Commission recognised:

"... the particular need for an all-embracing maritime policy aimed at developing a thriving maritime economy, in an environmentally sustainable manner. Such a policy should be supported by excellence in marine scientific research, technology and innovation."

With this statement, the Commission highlighted the need to promote **excellence** in marine research and technology development in line with the Göteborg¹ and Lisbon strategies².

Eight years after it was first launched, the proposal to establish the **European Research Area (ERA)**³ continues to constitute the main guiding vision for achieving an optimised and efficient European research system. It is a central pillar of the EU "Lisbon Strategy" for growth and jobs premised on achieving a "knowledge-based economy and society".

In 2007, the European Commission published a Green Paper on ERA⁴ reviewing the progress made thus far. This gave rise to a public consultation, following which new initiatives are being launched in 2008 to give further impetus to ERA. These include five new initiatives on

¹ Commission Communication of 13 December 2005 on the review of the Sustainable Development Strategy - A platform for action (COM(2005) 658 final).

² Lisbon Strategy: http://ec.europa.eu/growthandjobs/index_en.htm.

³ Communication from the Commission - Towards a European research area (COM(2000) 6 final).

⁴ Green Paper - The European Research Area: New Perspectives (COM(2007) 161 final).

specific areas of ERA and enhanced "partnership" governance under the so-called Ljubljana Process⁵. The proposed Marine and Maritime Research Strategy is consistent with, and forms part of, the wider ERA policy development. It has a fundamental role to play in European research policy, because it represents one of the first attempts to **fully establish ERA** within a research sector, in a process initiated in Galway⁶.

In response to the Green Paper on a future EU Maritime Policy in June 2006 and the ensuing consultation, many substantial contributions were received from the scientific communities and from other stakeholders calling for new impetus for EU marine and maritime research. This was further reinforced by the Bremen Conference organised by the German Presidency in April 2007 and by the declaration issued by the marine scientific community at the EurOCEAN 2007 conference in Aberdeen in June 2007⁷. The Aberdeen Declaration called on the Commission to initiate in 2008 an integrated European Marine and Maritime Research Strategy and to establish a sustained process to oversee its implementation and delivery within the context of a European maritime policy.

In its October 2007 "**Communication on an integrated maritime policy**" for the EU⁸, the Commission reaffirmed its central goal of creating optimal conditions for the growth of maritime sectors and coastal regions, while ensuring that the objectives of EU environmental legislation – and in particular those of the Marine Strategy Framework Directive⁹ – are met.

Following the maritime policy communication, an Action Plan was agreed. It announced the development of a **Marine and Maritime Research Strategy** (the subject of this communication), in consultation with Member States and stakeholders, which will support infrastructure, education, capacity-building and a new cross-thematic approach¹⁰.

The aim of the strategy is to propose the means to create a better integration between marine and maritime research. Whilst acknowledging the importance to pursue efforts within the different marine and maritime research disciplines (e.g. cleaner and more efficient marine engines, better vessels design, optimal logistics of traffic flows, safety and security of maritime activities, image of shipping, etc), the focus of the communication will be on improving interactions between marine and maritime research rather than specifically addressing well established research sectors.

⁵ Council Conclusions on the launch of the "Ljubljana Process" - towards full realisation of ERA, adopted on 30 May 2008.

⁶ Galway Declaration, 13-14 May 2004 - http://www.eurocean2004.com/pdf/galway_declaration.pdf.

⁷ Aberdeen Declaration, June 2007:
http://ec.europa.eu/maritimeaffairs/pdf/Aberdeen_Declaration_final_2007.pdf.

⁸ Communication from the Commission – An Integrated Maritime Policy for the European Union (COM(2007) 575 final).

⁹ Directive 2008/56/EC of the European Parliament and of the Council establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive), OJ L 164 of 25 June 2008.

¹⁰ Action Plan SEC(2007)1278 accompanying the Communication on "An Integrated Maritime Policy for the European Union" (COM(2007)575), Section 5, Building a Knowledge and Innovation Base for the Maritime Policy.

Box 1 – Maritime economy (*Maritime facts and figures – Green paper – Towards a future Maritime Policy for the Union*)

The maritime economy is indeed also diversified and the related issues are often conflicting:

- Maritime Transport (90% of external trade and 40% of internal trade in the EU is seaborne; the 1200-plus European ports host 3,5 billion tons and 350 million passengers per year).
- Shipbuilding (shipyards and marine equipment suppliers provide 0,8 million direct and indirect highly skilled jobs and account for a turnover of €90 billion; Europe is the world leader in the production of highly sophisticated vessels such as ferries and cruise ships).
- Energy (seas and oceans offer underexploited resource for the use of alternative energies such as tidal and wave power and offshore wind farms and account for 121€ millions in 2005).
- Fisheries and aquaculture (0,5 million jobs; 0,3% of EU GDP equating to about € 20 billion/year; aquaculture accounts for 19% of the Union's total fishery production).
- Tourism and coastal zones (maritime tourism accounts for about 3 million jobs with a turnover of €72 billions in 2005).
- New resources and blue biotechnology (emerging sector with predicted growth of 10% per year and a global market of €2,4 billion).

2. APPROACH

The strategy will propose concrete measures and mechanisms to improve the efficiency and excellence of marine and maritime research in order to address the challenges and opportunities presented by the oceans and seas.

A purely sectoral and thematic approach to research is no longer sufficient. EU research can play a role in fostering joint efforts between the marine and maritime research communities which extend beyond specific sectors. A more effective integration and pooling of knowledge and resources, along with a partnership sustainable over the long term, will form the basis for a concerted definition of research needs and priorities.

Therefore, the Strategy sets out:

1. to address **system complexity** and interactions through enhanced integration of knowledge and research. It will look at bridging traditional boundaries between science and policy-making, science and technology, scientific disciplines and industrial sectors. Means of promoting excellence, as well as multi-disciplinary and multi-sectoral research and innovation, will be defined;
2. to bring about new forms of governance in research that will seek consensus among all concerned parties and establish a continuous dialogue between scientists, policy-makers, industrialists and representatives from society. Governance will abide by the five main guiding principles of the Ljubljana Process.

The role of the European Commission in the implementation of this strategy is:

- to make full use of all Community instruments, including the 7th Research Framework Programme, as leverage to achieve the objectives of the strategy;
- to facilitate a coordinated approach between Member States contributing to the objectives of the strategy;
- to oversee the implementation and continuous adaptation of the strategy, in partnership with Member States and the marine and maritime scientific communities.

Actions will be taken by the European Commission in partnership with Member States, Third Countries and the marine and maritime research stakeholders.

3. ADDRESSING SYSTEM COMPLEXITY

Dealing with the following aspects will be essential in addressing system complexity:

- **Capacity-building:** encouraging the development of new means to achieve more ambitious goals in research. Many infrastructures are old; specialised infrastructures are costly. New skills and educational initiatives are needed to attract new professionals and to address the interdisciplinary nature of the research.
- **Integration** across established marine and maritime research disciplines. This aspect will seek closer integration of knowledge and research teams through cross-fertilisation, networking and information exchange, in order to reinforce excellence in science. By promoting cross-sectoral integration and improving knowledge transfer, existing and emerging markets in areas such as blue technology, energy, aquaculture and security will be in a position to turn to knowledge-based innovation while achieving maritime activities' sustainability, new jobs and delivering better products and processes.
- **Synergies** with and between Member States, regions and industry sectors. Community research funding accounts for only a small amount of RTD public resources. The greater part of public funding for research in Europe is spent through national and regional programmes. However, the EU research effort remains behind the target set by the Lisbon Agenda under which the Member States agreed to dedicate 3% of their GDP to R&D¹¹. It is therefore crucial that Member States and regions use the European Community instruments such as the Research Framework Programme, the Cohesion Policy Fund and the Competitiveness and Innovation Framework Programme to reinforce public and private investments.

The **international dimension** of EU Maritime Policy is an important consideration which cuts across these three lines of action. The fact is that the seas and oceans surrounding the European Union and its outermost regions are shared with third countries. International scientific cooperation is a powerful vehicle for the coordinated and integrated management of maritime activities in shared seas. Other benefits of the international dimension will stem

¹¹ Commission Communication of 11 September 2002 - More Research for Europe: Towards 3% of GDP (COM(2002) 499 final).

from the opportunity of drawing on mutually enriching knowledge and skills in order to address common challenges and reach a critical mass, which for certain categories of research would not be possible at a European level alone.

In the following sub-divisions, different aspects to be addressed will be presented in terms of their scope. Then they will be broken down into specific activities to be implemented in the years to come. These activities will be carried out in a partnership involving the different actors in the marine and maritime communities and the Commission, in the spirit of ERA.

3.1. Capacity-building

Scope

- Building new research and observation infrastructure;
- Promoting new and interdisciplinary research skills and innovation capacities;
- Developing new models for higher education in the marine/maritime field (e.g. via dedicated Knowledge and Innovation Communities at the European Institute of Innovation and Technology, EIT);
- Exploring new financing schemes combining various sources of investment.

To remain at the forefront of the advances in maritime research, Europe must identify the means with which it can strengthen its capacity to carry out research. Research capacities involve innovative financing schemes, new research infrastructures and nurturing a new generation of researchers and engineers. The European Strategy Forum on Research Infrastructures (ESFRI) has identified a list of marine research infrastructures of critical importance, which provides a good basis for defining priorities in this area.

Efforts should also be made to promote human capacity-building to make research careers and researcher mobility more attractive. Appropriate highly skilled researchers and support personnel are needed to underpin economic and environmental developments in the marine and maritime sectors.

The strategy will encourage exchange of personnel within and between industry and research, together with the rapid integration of progress in knowledge into education and lifelong learning schemes. Knowledge should be exchanged between research organisations and higher education institutions. Consideration should also be given to the activities of the newly launched EIT and its Knowledge and Innovation Communities.

Actions to be implemented

- (1) Developing sustainable support for the specialised pan-European research infrastructures¹² required to meet identified challenges and opportunities, including those proposed under the current ESFRI Roadmap and Integrated Infrastructures Initiatives (I3) of FP7;

¹² For instance, ocean observatories, specialised research vessels, sub-sea technologies, satellite and in-situ ocean observing systems, sustained monitoring and data collection facilities, databases and information portals, high performance computing, modelling and land-based facilities.

- (2) Defining at European level investment requirements (including their running costs) for new infrastructures needed to support pan-European and international marine and maritime research (for example using Cohesion Policy funds to co-finance them).
- (3) Developing adequate new and interdisciplinary skills, education and innovation capacities in order to respond to the current socio-economic and cultural trends and requirements;
- (4) Looking at a more efficient use of existing and new human and financial resources. These can be built on existing schemes at European, national and regional level (for instance, the use of State Aid Guidelines on employment, education and training, the opportunities offered by Cohesion Policy funds both for human resources and RTD support to SMEs, the opportunities offered by Leonardo da Vinci programme on education and training, Research Framework Programmes, the Competitiveness and Innovation Framework Programme (CIP), etc.

The Commission will promote in 2009 several activities to these purposes, in particular, developing a sustainable support for the specialised pan-European research infrastructure and facilitating mapping of needs of regional research structure complementing the ESFRI Roadmap and Integrated Infrastructures Initiatives. It will also motivate Member States and regions to use the available Community funds to these purposes and to adopt a coordinated approach to a new model for education and to develop a marine infrastructure policy supporting excellence in Europe, thereby guaranteeing access for scientists from small and new Member States without research infrastructures.

3.2. Integration

Scope

- Identifying cross-thematic research objectives across traditionally self-contained fields of investigation: e.g. climate change, transport, energy, biotechnology, environment and food, as well as promoting interdisciplinary approaches;
- Providing for closer integration and more efficient use of marine data bases;
- Optimising the use of existing research infrastructures;
- Strengthening long-lasting regional clusters;
- Fostering knowledge and technology transfer.

Marine and maritime research cuts across different scientific and technological disciplines. Integration is needed to set up an **interdisciplinary approach**. This communication has identified major research avenues where a cross-thematic approach is a necessity. These are presented in Box 2. In addressing these cross-cutting research issues, particular attention will be paid to the integration of social-economic research and the impact of management options.

World-class marine science requires specialised and sophisticated research infrastructures, which are costly. Today, most infrastructures are operated to take account of national priorities. To optimise their use it will be essential to build lasting and complementary relationships between infrastructure holders based on joint plans for future investments and **standardisation** in measurement, observation and reporting methodologies.

In a number of coastal regions of the EU, maritime clusters have been nurtured, with the support of various financial instruments at Community, national and regional level. These clusters can provide a focus for discussing maritime research needs and agreed actions to be implemented and integrated at regional level.

Actions to be implemented

- (1) Developing cross-thematic integration between the various marine and maritime RTD domains.
- (2) Promoting integration in the use of European marine research infrastructure holders, with an emphasis on the harmonisation of procedures.
- (3) Finding mechanisms for the sustainable support and management of data on the seas, including mapping of European waters and the integration of maritime surveillance systems.
- (4) At regional level, building on existing maritime clusters supported in the framework of the "Regions of Knowledge" initiative, mapping existing opportunities in 2009 and stimulating long-lasting clustering under Community Regional Policy.
- (5) In close partnership with Commission services, using the initiative Regions for Economic Change¹³ of Cohesion Policy, to further develop regional activities in this field.
- (6) In partnership with marine and maritime stakeholders, providing support measures to enable screening of marine and maritime technology expertise to promote rapid transfer at EU level.

In particular, in 2009-2010 the Commission will launch cross-thematic Joint Calls under FP7 on major research topics as listed in Box 2. In partnership with the Member States and with the marine scientific community, it will put forward options for sharing the development at European level of critical marine research infrastructures, as well as for optimising their use.

The Commission will coordinate the launching of a European marine observation and data network (EMODNet)¹⁴ in 2009 integrated with GEOSS¹⁵ and GMES¹⁶.

¹³ COM(2006)675 http://ec.europa.eu/regional_policy/cooperation/interregional/ecochange/index_en.cfm.

¹⁴ Section 3.3 of the Action Plan SEC(2007)1278 accompanying the Communication on "An Integrated Maritime Policy for the European Union" (COM(2007)575) foresees the creation of a European Marine Observation and Data Network.

¹⁵ Global Earth Observation System of Systems (GEOSS) - <http://earthobservations.org/>.

¹⁶ Global Monitoring for Environment and Security (GMES) - <http://www.gmes.info/>.

It will also seek to make use of the "Regions of knowledge initiative" to promote regional maritime clusters as well as synergy between regional marine research and innovation strategies.

A particular attention will also be given to Community Innovation Programme (CIP) with a view to boost eco-innovation and to transfer marine and maritime technology expertise at EU level.

Finally, the Commission will see to it that FP7 instruments contribute to research and innovation capability in local industries.

Box 2 – List of major research topics requiring a cross-thematic approach

Climate change and the oceans

We need enhanced detection and better assessment of the impacts of climate change on oceans and on coastal areas. Options to mitigate or make the best use of the impact of climate change are also important, as well as risks and opportunities in relation to the Arctic Ocean.

Impact of human activities on coastal and marine ecosystems and their management

Coastal and marine ecosystems are affected by land-based as well as maritime activities. A better understanding and mitigation of the cumulative effects of these activities through more eco-efficient technologies is crucial.

Ecosystem approach to resource management and spatial planning

Integrated ecosystem approach to marine resources management, as well as knowledge to develop coastal and marine spatial planning options to help optimise the management of marine and maritime activities and their sustainable development.

Marine biodiversity and biotechnology

The marine environment hosts a considerable part of biodiversity on earth. We need more knowledge on the functional role, evolution, protection and exploitation of marine biodiversity, the latter including biotechnology and bio-prospecting.

Continental margins and deep sea

Enhanced understanding of sediments in continental margins and deep seas, gas hydrate behaviour, deep-sea ecosystems and technologies needed to enhance deep-sea observation.

Operational oceanography and marine technology

There is a need to further advance in the development of marine core services within the GMES, with a view to improving prediction on the sea state and dynamics, assessment of risks such as algal blooms or pollution impact and support for maritime security issues.

Exploitation of marine renewable energy resources

The ocean is a huge reservoir of energy and the marine processes that can be used to produce energy are numerous. We need more knowledge on how to exploit the potential of offshore wind, ocean currents, wave and tidal movements.

3.3. Synergies

Scope

- Promoting synergies at national and regional level;
- Mobilising sufficient, sustained EU, national and regional funding for research in a more coordinated way, so as to reach a critical mass to address major cross-thematic marine research challenges;
- Attracting more private investments, inter alia through the activities of European Technology Platforms and other industry-driven joint initiatives.

It is crucial that marine and maritime research funding under FP7 is used as leverage to promote synergies between Member States' research efforts and, where necessary, **reach a critical mass** to address major cross-thematic marine research challenges.

The Community RTD Framework Programme can facilitate this process through its various funding schemes¹⁷. Networks of Excellence¹⁸ seek to establish a lasting structuring effect in skills, knowledge and infrastructures. Coordination actions support research communities in identifying gaps and defining common priorities for future research.

ERA-NET schemes¹⁹ allow national research funding organisations to coordinate their efforts and address common challenges. They may give rise to ERA-NET+, which supports Member States in setting up and financing joint calls, as a preliminary step towards the implementation of Article 169 of the Treaty.

On the other hand, European Technology Platforms²⁰ have been introduced to achieve consensus on research policies and priorities within a given industrial sector. A common vision for the future is elaborated and followed up with a Strategic Research Agenda which members are committed to implement.

All these opportunities for achieving synergy will be exploited in the strategy.

Actions to be implemented

- (1) Building on the achievements of the existing ERA-NET schemes to propose cross-national research schemes;

¹⁷ See Green Paper Maritime Policy, Background Paper No 8 on Marine Related Research and the Future European Maritime Policy - http://ec.europa.eu/maritimeaffairs/suppdoc_en.html.

¹⁸ For example: MGE, MARBEF, EUROCEANS, VISIONS.

¹⁹ For example: MARINERA, MARIFISH, AMPERA, BONUS, ECORD, CIRCLE.

²⁰ See WaterBorneTP Technology Platform - <http://www.waterborne-tp.org/>.

- (2) Facilitating the pooling of national public funding through ERA-NET+;
- (3) Taking preliminary steps towards the implementation of Article 169 of the Treaty by building on ongoing initiatives;
- (4) Coordinating with other Community and European schemes to finance research (CIP, Cohesion Policy funds, EUREKA, COST);
- (5) Define and implement joint programming.

The Commission will particularly make concrete proposals in 2009-2010 for the streamlining of existing ERA-NET. Where this is justified and supported by the Member States concerned, the Commission will consider the possibility of Article 169 support for marine research programmes and on long term will propose joint programming, in line with the principles and mechanisms laid down in the related Commission Communication²¹.

4. NEW FORMS OF GOVERNANCE IN RESEARCH

The strategy requires the design of an effective and innovative research governance framework that engages scientists, policy-makers and the public, so as to achieve shared understanding and informed decision-making based on sound scientific knowledge. Given the global nature of the challenges and the openness of ERA to partners in other regions of the world²², the international dimension will play an important role in this framework.

Both traditional marine and maritime research and technological communities have expressed the need to enhance dialogue between them in order to ensure a clear distribution of roles and responsibilities between the European Union, national public authorities and private enterprises.

A sound governance model, built upon a strong and lasting science partnership, is essential. This will facilitate the process of integration between marine science and maritime science.

The proposed governance model is expected to:

- Achieve consensus among marine and maritime stakeholders on strategic marine and maritime research issues at pan-European and regional levels;
- Stimulate interdisciplinary cooperation and generate integrated scientific knowledge on marine and maritime issues and disseminate research results and knowledge;
- Promote exchanges between marine science and maritime and marine industries, as a way to identify issues of common interest and potential cooperation between both sides;

²¹ "Towards Joint Programming in Research", COM(2008)468

²² For instance, since the Madrid summit in 2002, EU-Latin America and Caribbean (LAC) summits have been calling for the development of an EU-LAC Knowledge Area.

- Explore ways and means on how scientists can be involved in the commercial exploitation of the results stemming from their research;
- Foster a concerted dialogue between the scientific community and policy-makers, delivering greater consistency between research objectives and policy goals, and channelling findings of research towards policies;
- Strengthen partnerships with third countries, in particular toward countries with which Europe shares sea basins in order to enhance sustainable management of these common seas.

The Commission is proposing the launch of a new governance model for research that will take the form of a "**Forum**" bringing together a "**partnership sustainable over the long term**", involving existing networks and all key partners in the marine and maritime research and industrial sectors, that will:

- Update the research priorities on a continuous basis, identify gaps, in consultation with stakeholders, Member States and the European Union institutions, and deliver strategic advice.
- Implement the research priorities, with special attention paid to new forms of cooperation, innovative financing schemes, dissemination and exploitation of research results;
- Develop a foresight function in the medium-term;

The partners in the partnership will also be invited to make proposals to strengthen cooperation with third countries in order to enhance participation in large-scale international research programmes. Particular attention should be paid to research into the "blue ocean" beyond national jurisdictions and deep-sea research. Cooperation with countries neighbouring the EU should also be promoted in order to define common regional marine research strategies.

In order to consolidate this partnership process, the Commission foresees proposing actions in the coming years aimed at networking within the marine and maritime research communities. The Commission will also make the best use of all available tools and instruments to identify and promote international research cooperation with neighbours and other Third Countries in areas of excellence.

The EU Maritime Policy needs to be based on best possible marine and maritime scientific knowledge. Regular two-ways feedback needs to be put in place between marine science and maritime policy. Therefore a concerted dialog between the scientific community and maritime policy makers as indicated in the Communication on an Integrated EU Maritime Policy should complement the partnership process on research described above.

The Commission will assess in the coming year the conditions under which such an advisory mechanism can be established.

Furthermore, in connection with the EU Maritime Day, the Commission will facilitate from 2009 the organisation, on a regular basis, of a conference with European marine and maritime research stakeholders, while building on the support of a group of outstanding personalities.

5. CONCLUSIONS

The Commission invites the Council and European Parliament to endorse the Maritime Research Strategy for Europe, and in particular:

- to endorse the proposed means and actions designed to address the system complexity of the oceans and seas;
- to endorse the proposed mechanism for marine and maritime research governance; and
- to commit to implementing the actions within their respective areas of responsibility.

The Commission will monitor implementation of this strategy and will provide periodic reports on its progress. The first report will be presented no later than 2012.