



European
Commission

The Ocean Of Tomorrow Projects (2010-2012)

Joining Research Forces
to Meet Challenges
in Ocean Management



*Research and
Innovation*

EUROPEAN COMMISSION

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Meet Challenges in Ocean Management

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PREFACE

Seas and oceans have a huge impact on our daily lives, providing an essential part of our wealth and well-being. They are not only a critical source of food, energy and resources, but also provide the majority of Europe's trade routes and play a key role in climate regulation. The value of living by the sea, while intangible, is high to many of us. However, the impact of human activities on the marine environment keeps increasing. Maritime transport, offshore energy, tourism, coastal development, resource extraction, fisheries and aquaculture are examples of activities which can have a major impact on the marine environment, putting at risk marine ecosystems. Science and technology have a vital role to play to preserve the marine environment as well as to support the "Blue Growth"¹ and unlock the great economic potential of our seas and oceans. It is a key component to foster the 'Europe 2020'² goal of a smart, inclusive and sustainable growth.

The "European Strategy for Marine and Maritime research"³, adopted in 2008, is a key pillar of the EU Integrated Maritime Policy and provides a reference framework for multi-disciplinary and cross-sectorial marine and maritime research at European level. Commissioner Geoghegan-Quinn stated in 2010: *"Just as oceans ignore borders, marine sciences and technologies are by their nature cross-cutting and involve many disciplines. There is no other way but to look beyond traditional sector-specific research to foster sustainable growth of maritime activities"*⁴.

A key FP7 initiative in this context is the launch of "The Ocean of Tomorrow" (FP7-OCEAN) cross-thematic calls⁵. The "Ocean of Tomorrow" aims to foster multidisciplinary approaches and cross-fertilisation between various scientific disciplines and economic sectors on key cross-cutting marine and maritime challenges. Another key feature is the participation of business partners, in particular SMEs, in the research projects that are funded.

This brochure presents the 19 projects selected under "The Ocean of Tomorrow" so far. It comprises 9 projects from the FP7-OCEAN-2010 and FP7-OCEAN-2011 calls for proposals as well as 10 projects funded under "The Ocean of Tomorrow 2012" coordinated topics for a total EU contribution of 124M€ over 2010-2012. Although the "Ocean of Tomorrow" calls have progressively increased in size, it should be mentioned that many marine and maritime research actions⁶ continue to take place in the different thematic priorities and specific programmes of FP7.

More specific description of the FP7-OCEAN calls can be found in the following pages. A third and last "The Ocean of Tomorrow 2013" cross-thematic call is currently running. It is focusing on innovation and marine technologies for a budget of 55M€. The "Ocean of Tomorrow 2013" call is already making the link to Horizon 2020⁷ – it shows how potential synergies could be developed between the three pillars ("Excellent Science", "Industrial Leadership" and "Societal Challenges") and paves the way to the new focus on challenge-driven approaches under the new programme.

1 COM (2012) 494: http://ec.europa.eu/maritimeaffairs/policy/blue_growth/documents/com_2012_494_en.pdf

2 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF>

3 COM (2008) 534: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0534:FIN:EN:PDF>

4 See Speech of Commissioner Geoghegan-Quinn at "The Ocean of Tomorrow 2011 Infoday,": <http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/10/415&type=HTML>

5 http://ec.europa.eu/research/bioeconomy/fish/research/ocean/index_en.htm

6 http://ec.europa.eu/research/bioeconomy/pdf/ki3111104encmmm_en.pdf

7 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0808:FIN:en:PDF>

Micro B3:

Marine Microbial Biodiversity, Bioinformatics and Biotechnology

www.microB3.eu

With technological advances in the fields of 'Omics' analyses, oceanography and lab automation, marine scientists are now starting projects they only dreamed of 10 years ago. The deluge of data produced is beyond the skill-set of many marine scientists and very little data management infrastructure exists. Micro B3 (biodiversity, bioinformatics and biotechnology) will facilitate the whole process from sampling and data acquisition to analysis, leading to better understanding of marine ecosystems and their (meta)genomic background thus paving the way for novel biotechnological applications.

Nine interdisciplinary teams of experts in bioinformatics, computer science, biology, ecology, oceanography, bioprospecting, biotechnology, ethics and law are working together in this project. The primary objective is to integrate biodiversity, genomic, oceanographic and earth observation databases into one Micro B3 Information System (MB3-IS), based on global standards for sampling and data processing. The nine work packages are integrated into three main pillars:

- 1) Biodiversity: On June 20 2012, a pilot Ocean Sampling Day (OSD) was launched. Worldwide 20 marine research stations volunteered to take samples of plankton biodiversity using standardized sampling techniques. It was the first test-case to train logistics and best practice in sample processing, analysis, as well as in intellectual property management for the "Micro B3 Ocean Sampling Day", planned in June 2014.

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- 2) **Bioinformatics:** The bioinformatics-driven teams established a software development environment, technical infrastructure components, and a communication workflow. This includes a wiki, a software issue tracker system and a source code repository for the publicly transparent access to our open source developments.
- 3) **Biotechnology:** Industry leaders have been targeted through Think Tanks to promote understanding of the value of integrating environmental and 'Omics' data. Related Intellectual Property Rights issues are being addressed through model agreements facilitating access to and benefit sharing of marine genetic material, data and databases.

Micro B3 has begun to train young scientists including representatives from our industry partners. A range of expert and stakeholder workshops focussing on application-driven topics are planned.

The innovative Micro B3 Information System will allow for seamless processing, integration, visualisation and accessibility of the huge amount of marine data collected in ongoing biodiversity sampling campaigns and long-term observations. Interoperability is a key feature for seamless data transfer of sequence and contextual data to public repositories. Therefore, as a starting point, all entries will adhere to the Minimum Information checklists Standard (MIxS) for describing molecular samples as outlined by the international Genomic Standards Consortium www.genisc.org. We also offer analytical and feedback tools on our platform - unique in terms of integrating genetic and ecological information

and generating collective knowledge. This will in turn offer new perspectives for the modelling and exploration of marine microbial communities. The project's integrated Micro B3 Information System will provide other members of the team with information to generate hypotheses for more cost- and time-efficient biotechnological testing and applications.

MICRO B3 European Added Value

Micro B3 is set to revolutionise Europe's capacity for bioinformatics and marine microbial data integration to the benefit of a variety of scientific disciplines in bioscience, technology, computing and law. The size of the consortium, 25 European research groups with 32 participants from universities, institutes and companies, reflects the spirit of European researchers to jointly address pressing challenges in marine sciences and policy. Such critical mass could not be achieved by a single Member State. With Micro B3 we expect to achieve a new communication culture crossing traditional boundaries. Improved communication between disciplines as promoted by the spirit of "The Ocean of Tomorrow," approach will significantly enhance Europe's ability to make use of the Petabytes of data produced for in-silico modelling of key microbial ecosystem components to develop marine ecosystems biology and biotechnology.

Partners:

Germany (Coordinator), United Kingdom, Greece, France, Spain, Italy, Belgium, Turkey, The Netherlands, Denmark, Ireland, Monaco, Swiss, Iceland, Macedonia.

Project N°287589	Topic: FP7-OCEAN 2011-2: Marine microbial diversity	EU contribution: € 8,987,491	Duration: 48 months	From: January 2012
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