OCEAN MONITORING AND FORECASTING CORE SERVICES, THE EUROPEAN MYOCEAN EXAMPLE

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ABSTRACT

From OceanObs 1999 to OceanObs 2009, ocean monitoring and forecasting core services have reached a first level of maturity; a network of operational oceanography centres formed today throughout the world a valuable capacity to bring to users a valuable depiction of the ocean based on space and in situ observations and assimilative models.

MyOcean is the implementation project of the European Marine Core Service, aiming at deploying the first concerted and integrated pan-European capacity for ocean monitoring and forecasting. During years 2009-2011, MyOcean will lead the setting up of this new European service, grown on past investments in research & development, system development and international collaborations. It is indeed in Europe one of the most important legacy of the GODAE initiative.

Implementing a European Marine Core Service is one of the top-three priorities of the GMES (Global Monitoring for Environment and Security) program led by the European Commission to enhance the development of new services based on Earth Observation, and organize their long-term sustainability. MyOcean is a direct answer to this priority. Co-funded by the European Commission up to 33 M€, MyOcean gathers a total amount of resources in Europe of 55 M€, and a consortium of 60 partners spread over 28 countries led by Mercator Ocean. More than 350 persons are involved, representing around 200 FTE. The scientific challenge deals with the development and operation of a reliable global ocean monitoring and forecasting service; the technical challenge concerns the transition to full operations at a pan-European level of a distributed system of systems (architecture and organization that integrate and homogenize the existing capacities) made of a dozen of centres on duty in Europe. The ultimate challenge is to turn our overall approach of operational oceanography to a full service organization driven by user needs, and linked on a sustainable basis with the main stakeholders of operational oceanography in Europe and at the international level. The project started on the first day of 2009.

This paper shows the current plan and status of this European "MyOcean" initiative and outlines the role played international collaborations coordinated by GOIDAE in its growing phase. Standards on data, exchange of data and model outputs, validation "metrics" methodology are today direct legacy of the GODAE "common" integrated in the European MyOcean organization. Thanks to this experience, MyOcean has revisited stakeholder's expectations, users' demands, and science and production capacity to propose a new service for Europe. MyOcean will demonstrate in Europe the strength and sustainability of the international collaboration invented during these past 10-15 years for operational oceanography.

1. OCEAN MONITORING AND FORECASTING CORE SERVICES, INTRODUCTION

GODAE – In 1997, the Global Ocean Data Assimilation Experiment (GODAE) brought to the international community in oceanography the vision of *"a global system of observations, communications, modelling and assimilation that will deliver regular, comprehensive information on the state of the oceans, in a way that will promote and engender wide utility and availability of this resource for maximum benefit to the community"*. Time had come to initiate global operational oceanography. Served by outstanding coordinated international and national efforts, ocean monitoring and forecasting systems, centres and services have been developed during these past twelve years throughout the world, and these new marine core services are today a reality.

Ocean forecasts are provided on a regular basis by more than a dozen of operational oceanography centres in the world. Forecasts are built through routine assimilation of real-time space and in situ data into numerical

models. Some of them describe the global ocean as a whole, others are regional.

Europe, Australia, the United States, Canada, Japan, and now China, are deeply engaged in the development and consolidation of an operational ocean monitoring and forecasting capacity. Space oceanography programs, as well as in situ ones (e.g. the international ARGO program), are gathering a wider range of countries in this global earth observation challenge for the ocean; this large international cooperative effort is actively coordinated through GOOS and GEOSS. On the service side, marine and meteorology operational teams gathered in the international WMO/IOC JCOMM committee recognize the maturity of operational oceanography and its capacity to foster the marine services development.

Core Services – This modern operational oceanography makes available to users new services to monitor the ocean: they are based on the joint use of space observations, in situ observations and assimilative models. They provide an ocean depiction consistent in space and time, in main cases available in real time, with delayed modes and reanalyses. The European GMES program has called "Marine Core Service" (see [5]) this service which consists in providing a reference and generic information on the ocean, identified as the common denominator data for users evolving in very different marine sectors. Marine Core Services are dealing with the ocean, its physical state and its marine ecosystems. They formed today the natural users of the international space and in situ observation network; they are the natural providers of a large number of downstream service teams in marine operations, marine resources, marine coastal and environment, climate and weather forecasting application sectors. Systems such as Mercator (France), Foam (UK), Topaz (Norway) and MFS (Italy) in Europe, and Bluelink in Australia, Hycom and ECCO in the United States, Concepts in Canada, and the systems run at JMA/MRI/JMASTEC in Japan, and SOA/NMEFC in China are today international references for core services.

Europe – Europe is deeply engaged in the implementation of the first European Marine Core Service. With the GMES Program for Global Monitoring for Environment and Security, EU has set up the framework required to foster collaboration amongst European teams toward this objective.

2. THE MYOCEAN CHALLENGE

The European Commission has proposed in 2007, through a Communication, an Integrated Maritime Policy for the European Union ("The Blue Book"), based on the clear recognition that all matters relating to Europe's oceans and seas are interlinked, and that sea-related policies must develop in a joined-up way. The EC Communication emphasises in particular the need for a governance framework for the Integrated Maritime Policy, supported by cross-cutting policy tools. These tools include, among others, data and information which should be used for better governance, expansion of value-added services and sustainable maritime development.

Europe acknowledged quite early the need and opportunity for a global ocean monitoring and forecasting capacity, and took structuring initiatives to make it happen in Europe. Leading countries such as France, the United Kingdom, Norway and Italy have been involved in international coordination since the early days to foster development of new systems, services and skilled teams in marine core services. The GMES MERSEA projects (see [2], [3] and [4]) made a real difference at the EU level to start integration of the different ocean monitoring and forecasting production national facilities in one pan-European approach, and gave to Europe a new and valuable focal point for international coordination.

Sustainability – Time had come today for Europe to consider the consolidation of this new ocean monitoring and forecasting capacity and turn it into an operational service. This implementation of the operational service is dominated by an overarching challenge: its long-term sustainability. Set up a sustainable service with a pan-European dimension requires meeting criteria of different nature and implying different actors and decision levels. The sustainability challenge cannot be addressed by the MyOcean partners only and has to involve GMES stakeholders and Member States. But MyOcean partners have a role to play, and in the overall definition and detailed specification of the project, they worked to define the best implementation conditions for a sustainable service. A special attention has been paid to (i) the involvement of the *users* in the decision chain regarding the service evolution (be driven by usefulness), (ii) the *integration* of the pan-European production system in a limited number of functional components (reduce and control operation and maintenance cost), (iii) organize conditions for a regular *improvement* of the service in product quality and reliability (ensure competitiveness), and (iv) focus the service on the "*European added-value*", i.e. the value that is better obtained through a pan-European approach than any other (e.g. national). This "European added-value" for marine services has been defined as the marine "core service": it's the foundation of the MyOcean service.

The Marine Core Service (MCS) – In October 2005, the European Commission held a workshop devoted to the marine component of the GMES program, which defined the "Marine Core Service" and took actions for its implementation. The MCS Implementation Group, set up by the Commission to supervise and validate the

implementation of this new Service, proposed this definition (see [5]): "*The MCS is conceived as one part of a processing chain which operates on observational and other forms of data to help create tailored information services to meet a wide range of end user needs. Almost all such end user services relating to the marine environment require access to information about the state and dynamics of the oceans and seas. The MCS provides that information to intermediate users who combine it with other forms of information and data (e.g. socio-economic data) to provide customized downstream services for the end users. The implementation of the overall chain needs to have some flexibility; as components of downstream services are developed to serve multiple uses, it may be more efficient for them to be provided as part of the MCS*". The illustration below illustrates this segmentation of the value-adding chain, and the role taken by the "core" service in this chain.

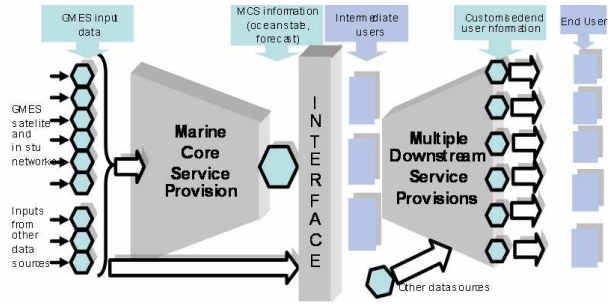

Figure 1. The GMES value-adding chain for the marine information services, positioning the Marine Core Service

3. MYOCEAN, A SERVICE, A PROJECT AND A TEAM

"MyOcean" is a service, a project and a team. In each of these facets stands an outstanding ambition for the development and sustainability of operational oceanography in Europe, in conjunction with the international challenge.

MyOcean is a service – MyOcean is the main component of the European "Marine Core Service" which aims at providing to users the best generic information available on the state of the ocean. MyOcean is committed to develop and run a pan-European service based on a worldwide capacity for ocean monitoring and forecasting, which implies data assembly, modeling and assimilation systems. The service is intended to serve any users requesting generic information on the ocean, and especially downstream service providers using this information as an input to develop value-adding services to end-users. These "intermediate users" cover a wide range of downstream sectors of the marine field itself but also connected fields (e.g. climate, living resources, etc.). The MyOcean service consists in providing "core" information on the ocean, defined as the common denominator data requested by these service providers for their different and specific sector. It corresponds to the main variables needed to depict the ocean state: temperature, salinity, currents, sea level, ice coverage and thickness, primary ecosystem variables, etc. MyOcean provides this information for the daily state of the ocean (real-time), its short-term evolution (forecast for the days coming, up to 10-14 days), and its history over the past 20-50 years (hindcast and reanalysis). Users access the information through a centralized service desk.

MyOcean is a project – MyOcean is a project of the European Commission 7th Framework Program (FP7), co-funded by the Commission and the partners participating. The project covers the 3 year period 2009-2010-2011 with a total cost of 55 M€, of which 60% (33 M€) are funded by the European Commission. The MyOcean project is one of the pillar projects of the GMES (Global Monitoring for Environment and Security) European program. MyOcean is one of the top-three-priority fast-track services identified to open the GMES service: MyOcean covers the implementation of the GMES "Marine" fast-track-service. It's a 3-year phase, and one step only in the Marine Core Service route to a sustained operational service. Internally, MyOcean has adopted a project organization to manage the technical, cost and planning objectives agreed between the Commission and the partners. At the end of the 3 year, MyOcean has to deliver a service, its assessment and an overall organization driven by user's needs.

MyOcean is a team – 61 partners spread over 29 different countries participate to the MyOcean project. It means a team of around 350 people with 29 different nationalities, gathered by a common objective. All maritime nations of the European Union are represented in MyOcean, and the team welcomes as well some non-European associate nations. The project gathers in this large team a large variety of skills and experience – research and development, operations and service, technical and industrial development, user applications, quality assessment and management – to contribute to the project activity. Each partner has been assigned a specific role to play. A group of around 20 "core partners" is committed to implement and provide the MyOcean service. They're playing a key role; European best players in operational ocean monitoring and forecasting are involved and duly committed. Another third of the consortium (~20 partners) provides to them the scientific and industrial support needed for the quality of the implementation, and the last third (~20 partners) forms a network in Europe devoted to set up and develop links with the user community.

MyOcean, a post-GODAE initiative – The MyOcean idea was born with the GODAE experiment: MyOcean was invented by European players actively involved in this international experiment and other world-leading programs, and mainly specified and prepared in Europe through the MERSEA Strand-1 (see [4]) and MERSEA Integrated Project (see [2] and [3]) with funding from the European Commission (2002-2004, FP5 and 2004-2008, FP6). MERSEA has worked specifically on the pan-European integration of the "production" capacity, i.e. the integration of the different data- and model-based systems used in Europe to elaborate the ocean monitoring and forecasting information. It has invented the "system of systems" organization, which forms today the foundation of the MyOcean production capacity. MyOcean is focused on the transition to service, with an operational demand. This is indeed clearly in line with the post-GODAE objectives and schedule.

What are the main choices we've made in Europe to define MyOcean? The market, the service offer, the production capacity and the organization that will drive the implementation of a Marine Core Service in Europe?

4. THE MYOCEAN MARKET

Market – The MyOcean market is composed of "intermediate users": they are service providers serving specific end-users and they share the need of core information on the ocean as an input to their activities. MyOcean has segmented the market in four areas to cover the whole spectrum of requirements and structure the marine core service offer. MyOcean has built a network organization to manage user requirements.

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The users – Users of MyOcean are the service providers requiring core information on the ocean to run their activities: they're called "intermediate users" since they're the mandatory intermediates between the core service and the end-users. They have different status, they are operational or research, they are of the marine sector with a wide variety of status. They have in common that they are in direct contact with the end-users, and that they need upstream core information on the ocean. They are national public agencies, such as national weather services and marine institutes; they are European agencies such as the European Environmental Agency and the European Maritime Safety Agency; they are private companies providing services on a specific market niche; they are research laboratories, and environment policy conventions (e.g. HELCOM, OSPAR, UNEP/MAP). MyOcean has identified a first list of intermediate users and invited them to join the project to foster the service and market development. Users of the MyOcean service are adding value to the core ocean information to cover a wide spectrum of application sectors which goes further that the sole marine sector.

The market segmentation – The MyOcean market has been segmented in four areas to help defining the core service required by coherent groups of users. These four areas of benefit are: (1) the "marine safety" area; (2) the "marine resources" area; (3) the "marine and coastal environment" area, and (4) the "climate and seasonal forecasting" area.

- The "marine safety" area gathers service providers involved in marine operations, oil spill combat, ship routing, defense, search & rescue… and all marine activities requesting offshore operations. These users request ocean core information on a real time and operational basis (hindcast, nowcast, forecast), mainly for the surface layers of the ocean and the mesoscale circulation (eddies, fronts, …). The European Maritime Safety Agency is one of the users identified in this area, as well as for instance the marine meteorology of the national weather services or navies.
- The "marine resources" area gathers service providers involved in the evaluation and monitoring of marine resources such as fish stock management. They request ocean core information related to ocean physics and primary ecosystems, with fully assessed analysis of the present situation and long-term trends based over the past years. The International Council for the Exploitation of the Sea (ICES) is one of the users identified in this area, as well as for instance national marine institutes.
- The "marine and coastal environment" area gathers service providers involved in coastal region monitoring and environment assessment activities. They request a three-dimensional depiction of the ocean state and variations, boundary conditions to force coastal monitoring systems, and reference and standard indicators on the ocean environment status. The European Environmental Agency and the national environmental agencies are natural users identified here, as well as environmental policy conventions such as UNEP/MAP in the Mediterranean Sea, OSPAR in the Atlantic, HELCOM in the Baltic Sea, and any institutes or companies running coastal monitoring systems.
- The "climate and seasonal forecasting" area gathers mainly services involved in weather forecasting, but also services monitoring polar ice extent evolution and global environment for climate. They request global ocean analyses and multi-decadal past trends with coupled ocean-ice models. The European Centre for Medium-range Weather Forecasting and national weather services in Europe are indeed users identified in this area, as well as groups involved in international initiative such as the International Polar Year; and any private or public entity involved in services linked

to the exploitation of climate and seasonal forecasting information.

The MyOcean 3-year experience will enable to improve this market segmentation.

The user's network organization – MyOcean is organized to capture and manage user's requirements all along the project, to specify service evolution. A network of reference users in Europe has been organized amongst the 60 partners of the project to cover the European territory (Fig.2).

Figure 2: MyOcean network of reference intermediate users involved in the project, spread in 28 countries

This network is tasked to link with the main users of the four market areas, and to organize and feed the user's requirement reference documentation. A core user group, composed of a small selection of users, serves as advisory group for the project coordination.

5. THE MYOCEAN SERVICE OFFER

Service offer – MyOcean offers to users a reliable and easy access to valuable ocean core information. The MyOcean service offer is driven by quality and simplicity: quality of the ocean information provided to users, and simplicity of the access to information. Providing a clear and easy access to the ocean core information available in Europe is considered by MyOcean partners as the first priority. This is why the first investment is on the inventory of the "core products" available (the portfolio) and on the service tools and organization (the desk). In the initial definition of MyOcean, this priority given to facilitate user's access to information as much as possible has been a strong driver, forcing technical & organization decision (one single desk) and legal / economical decision (open and free data policy).

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The information provided – MyOcean delivers "regular and systematic reference information (processed data, elaborated products) on the state of the oceans and regional seas, at the resolution required by intermediate users and downstream service providers, of known quality and accuracy, for the global and European regional seas". Here is the mission defined by the Marine Core Service implementation group of the European Commission, which drives the MyOcean service definition. The information provided concerns the physical state of the ocean (temperature, salinity, currents, density, sea level, ice coverage and concentration, …) and primary ecosystem variables, at the mesoscale . The service is provided daily all around the world thanks to a "global ocean" component and fostered in European seas through "regional seas" components. The information is based on the combination of space and in situ observations and 3D ocean models with data assimilation. MyOcean offers a real-time service which comprises nowcasts (real-time analyses), forecasts (1-2 weeks), and a reanalysis service describing past events and trends of the 20-25 last years.

The products portfolio – MyOcean provides access to a list of reference products. They are listed in the "MyOcean service portfolio". This document is indeed the cornerstone of the service offer, and drives upstream all the production chain. The service portfolio gives access to a detailed description of the reference products (geographical coverage, depth level, spatial & temporal resolutions, temporal extent, and quality flag), their quality & delivery characteristics (timeliness, format, user standards) and dissemination mode. The goal is to set up a simple and single portfolio for the whole pan-European MyOcean marine core service, with reference definitions shared by users, producers and stakeholders, and regularly updated.

The service desk – The MyOcean Marine Core Service will be provided through a "service desk", single entry point to access the product and service portfolio. This service desk consists in a secured web portal providing a self service facility including user registration form, user query form, the service portfolio, access to product documentation, visualization service, user outreach and feedback questioners and knowledge management resources. The MyOcean service desk consists as well in a service desk call centre (24/7), an operations service desk support team, an integrated IT service desk tool, change management, access rights management and knowledge management tools. The MyOcean service provision is governed by Service Level Agreements (SLAs) with the MyOcean users. The ITIL international standard for service organization has been chosen to drive the MyOcean service definition and organization.

The data policy – The MyOcean products are fully and openly accessible; they are delivered free of charge. This data policy is voluntarily left as simple as possible and designed to simplify access to products by users. The products are made available to users without any restriction of use (e.g. commercial) except uncontrolled

redistribution or reselling without added value. The only counterpart for users signing this license stands in the obligation to credit MyOcean and commitments to answer any future inquiry conducted in order to assess and improve the service. The MyOcean 3-year project is seen at European level as a full-scale demonstration of the value of this open data policy.

6. THE MYOCEAN PRODUCTION

Production – The MyOcean production capacity is based on a "system of systems" organization interconnecting different centres in Europe. It means that the European "production" capacity for ocean monitoring and capacity that will feed the single service desk will involve a dozen of first-rank centres in Europe and a number of others. This system-of-systems architecture has been chosen for its ability to involve the first-rank centres in Europe (to retrieve from them the best information for users) but with a clear and demanding industrial & service organization (to provide an operational service).

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The functional architecture is organised to allow operations of the Marine Core Service based on physically spread infrastructures (see Fig. 3). Functions cover all requirements in terms of production and service. Common functionalities have been federated into common sub-systems to allow interoperability, standardisation, and economy of scale.

The system functional architecture is broken down into 14 sub-systems: 12 production units and 2 central components. The production units are either "Thematic Assembly Centres (TACs)" dealing with observations or "Monitoring and Forecasting Centres (MFCs)" dealing with model & assimilation. The 2 central components are managing the overall information, and the portal to users: they support all TACs and MFCs, both for ensuring a common interfacing and standardisation and for cost-effectiveness (economy of scale). The physical architecture is spread across seven countries (Denmark, France, Italy, Norway, Spain, UK, Ukraine), centres being linked with WIS/GTS network, Internet protocols and in some specific cases with EumetCast.

The MyOcean production units – The production units are the real pillars of the MyOcean organization; they are 12 and each of them has a specific mission to conduct in the overall service organization. A MyOcean 'production unit' has its own internal organization, run under the responsibility of a leading entity, but has to ensure R&D activities to prepare the service evolution, system development and integration, service operations, and assessment of the production; each production unit is run by a leading entity with the potential involvement of other entities and operational service commitments.

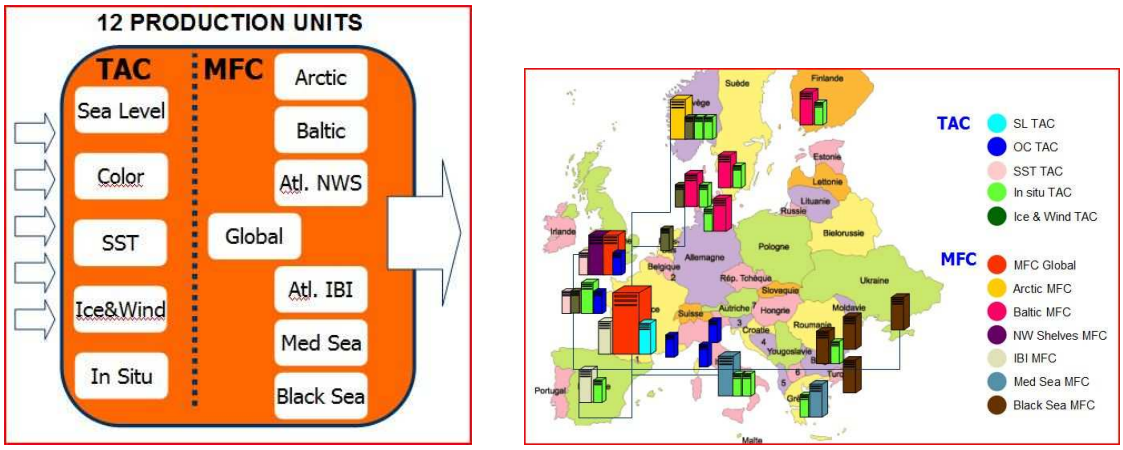

***Figure 3**: The MyOcean production "system of systems" composed of 12 production units*

a) The Thematic Assembly Centres (TACs) – They are the MyOcean Production Units dealing with the *observation-based* information ; they are committed to provide the observation data-based products useful to the MFCs for assimilation or validation, and the ones identified in the MyOcean products portfolio for dissemination to users. They provide hindcast (past) and nowcast (real time) information. They retrieved the observations from the observation agencies data centres with a first level of processing, and ensure the final processing and validation steps.

Five Thematic Assembly Centres are identified:

- The "Sea Level" TAC,
- The "Ocean Color" TAC,
- The "Sea Surface Temperature" TAC,
- The "Sea ice and Wind" TAC
- The "In situ data" TAC

b) **The Monitoring and Forecasting Centres (MFCs) –** They are the MyOcean Production Units dealing with the *model-based* information; they are committed to provide the model data-based products identified in the MyOcean products portfolio for dissemination to users. They provide hindcast (past), nowcast (real time) and forecast (future) information. They use the information provided by the TACs, and some additional ancillary data, run assimilative models and ensure the ocean state monitoring. Seven Monitoring and Forecasting Centres are identified, one for the global ocean and 6 for European regional seas:
    - The "Global Ocean" MFC, which deals with the whole global ocean
    - The "Arctic" MFC, which deals with the Artic polar region
    - The "Baltic sea" MFC, for the Baltic Sea
    - The "NWS" MFC, for the North-West-Shelves region in the Eastern-North Atlantic
    - The "IBI" MFC, for the Iberic-Biscay-Irish region in the Eastern-North Atlantic
    - The "Mediterranean sea" TAC, for the Mediterranean sea
    - The "Black Sea" TAC, for the Black sea

All in all these 12 production units (5 TACs and 7 MFCs) maintain appropriate capacities and mechanisms to ensure that the products are the best from the state of the art, are routinely and long-term qualified and packaged in the right standards. They set up appropriate mechanisms and activities to ensure the maintenance and the long term evolution of the committed service.

7. THE MYOCEAN ORGANIZATION

Organization – The MyOcean organization (see Fig. 4) is meant to transition the current organization, mainly driven by R&D rules and challenges, to an organization that will preserve its innovation capacity through R&D but fully compatible with a sustainable and efficient operational activity at European level. The MyOcean pan-European service organization is driven through a Board for the strategic issues, and an Executive Committee for the technical & service management. Two advisory bodies are provided support: one dealing with user's issues and the other with research and development. The work is broke down into 18 work packages, amongst with 14 of them are run as business units in charge of the 14 sub-components of the systems (the 5 TACs, 7 MFCS, the MIS, the Portal).

GODAE legacy – The MyOcean Board is tasked to develop and maintain international relations with other services and centres in the world.

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Governing Bodies – The **MyOcean Board** is the acting governing body supporting the coordinator in the steering and strategic management actions and decisions. It is composed of the coordinator P. Bahurel (Mercator Océan, France), six senior scientists and managers – M. Bell (Met Office, UK), F. Jacq (CLS, France), J. A. Johannessen (NERSC, Norway), P.-Y. Le Traon (Ifremer, France), N. Pinardi (INGV, Italy) and J. She (DMI, Denmark), the two chairpersons of the core user group and the scientific advisory committee, and three representatives of GMES Marine Core Service stakeholders. The board has two main roles: (1) a strategic role to explore any management, strategic, legal and organizational issues that could contribute to feed the GMES Marine Core Service long term roadmap, such as agreements with external providers or major users, links with international programs and national initiatives and preparation of the next Marine Core Service management organization; (2) a steering role to support the project coordinator in the project steering and important assessment or decisions (e.g. evaluation of progress objectives/achievements). The Board reports to the **General Assembly,** which is the ultimate decision-making body of the consortium, composed of one institutional representative appointed by each of the 60 partners.

Advisory Bodies – The MyOcean Board is advised by the **MyOcean Advisory Committee**, composed of high level representatives of GMES Stakeholders. These directors of European agencies and organisations provide a strategic vision and support to drive the project in full compliance with the main lines of development of GMES stakeholders, and with a view on the future sustainability step of the Marine Core Service. The Committee is co-chaired by the project coordinator and the chairman of EuroGOOS. Two other advisory bodies are supporting the coordinator and the partners in their action; they ensure an external and expert eye on main achievements and decisions. The **Core User Group** gathers a dozen of representatives of the User community, and provides recommendations on the service evolution, feedbacks on the present situation. It supports any analysis regarding a new service line (new products, new requests …), and help in setting up efficient links with the user community as a whole. The Core User Group is involved in the organization of the user's forum meetings. The **Scientific Advisory Committee** is composed of senior scientists and provides support regarding the scientific strategy. It deals with the scientific quality of the service provided and elaborates recommendations to ensure a state-of-the-art production capacity, encouraging transfers from the research community to the MyOcean team. The Scientific Advisory Committee is the reference committee to select new research investigation actions

and teams through the Open Call process planned in MyOcean.

Executive Bodies – The overall management is done through and by the **Executive Committee**, chaired by the project manager, and composed of the 18 work-package leaders. The Executive Committee drives the overall service and development activity and is responsible for the budget / technical / delay objectives set to the project. The Executive Committee's main role is to undertake the orientations decided by the governing bodies and monitor the work; it proposes the updated annual work plan and updated annual provisional budget, or any change required to meet project objectives and compliant with the overall commitments, such as termination, creation, or re-allocation of efforts and funds amongst tasks and partners. The Executive Committee drives the production, service and quality activities. The **Project Manager** – F. Adragna (Mercator Océan, France) – supported by its office team is in charge of the daily management of the Project.

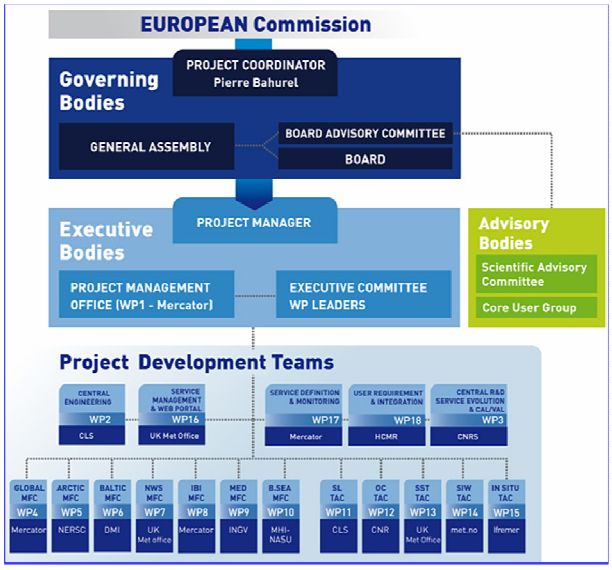

Figure 4: The MyOcean project organization

The MyOcean project management team is the easiest entry point to contact anyone or body in the project, and serves as a relay to the whole organization. It can be contacted through myocean@mercator-ocean.fr.

8. CONCLUSION

From OceanObs 1999 to OceanObs 2009, ocean monitoring and forecasting core services have reached a first level of maturity; a network of operational oceanography centres formed today throughout the world a valuable capacity to bring to users a valuable depiction of the ocean based on space and in situ observations and assimilative models.

In Europe, MyOcean is undoubtedly the most important initiative for the implementation of a reference ocean monitoring and forecasting service. MyOcean has already played a leading role in its preparation phase to foster European collaborations towards this objective, and will be in the coming years the natural framework to build the sustained Marine Core Service required for the development and sustainability of oceanography services.

MyOcean specifications rely on a thorough analysis of the stakeholders' expectations, the market demand and the science and production capacity in Europe. MyOcean foundations rely on the participation and commitments of the best ocean centres in Europe, and the involvement of experienced scientists and managers in oceanography. MyOcean is a European service opened to the rest of the world. It provides a worldwide service for ocean monitoring and forecasting and is irrigated in its science / operation / service / governance organization by international collaborations, amongst with GODAE Ocean View has a key role to play.

Throughout the world, teams running ocean monitoring and forecasting core services are now facing a double challenge: their transition to an operational status to secure their service to users, and their response to new societal needs. These societal needs are now quite diverse, and are not limited to open ocean forecasts. Innovation in ocean monitoring and forecasting core services will remain an important driver for the cominig years.

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