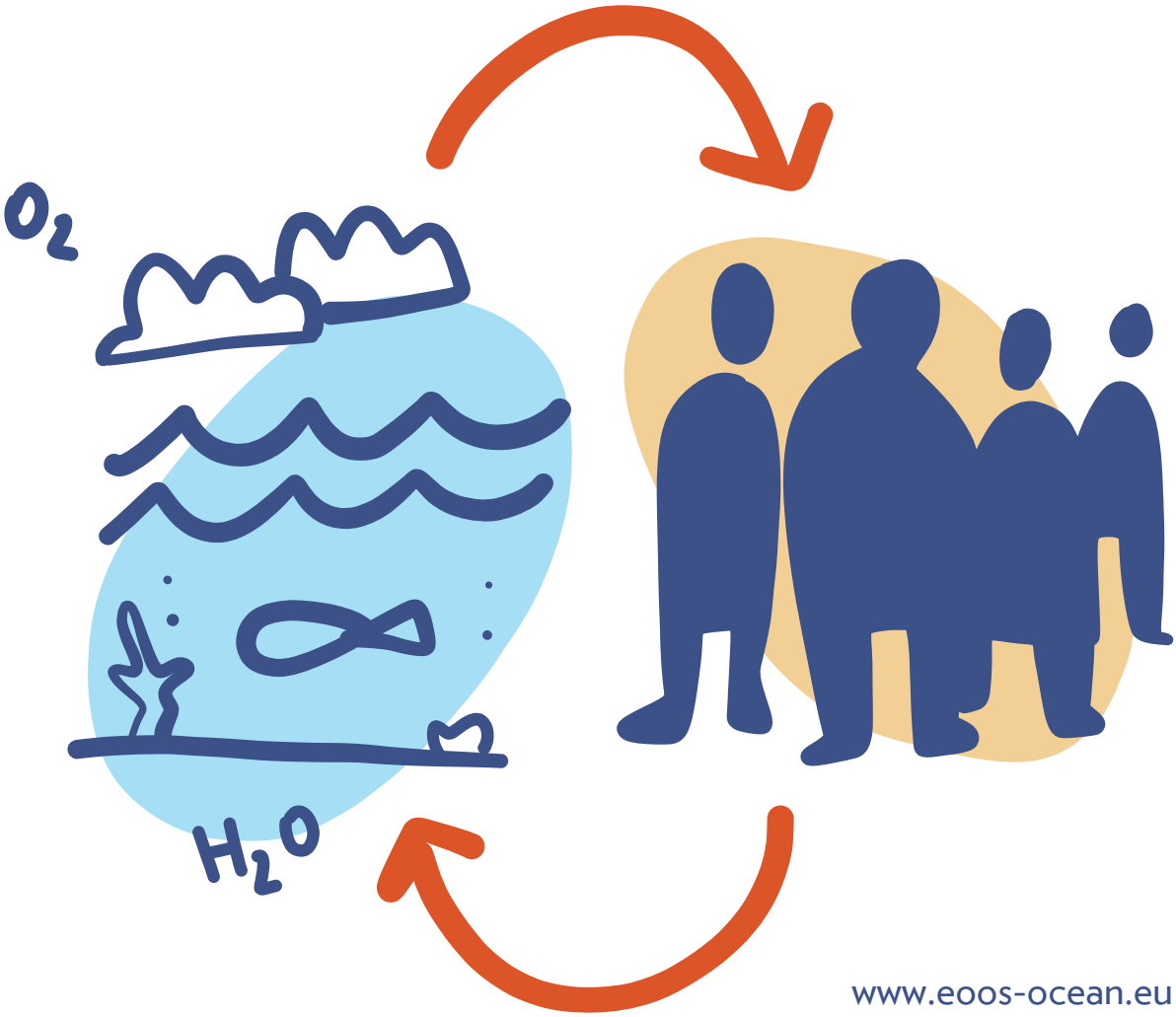
EOOS

European Ocean Observing System

Implementation Plan 2018-2022

OCTOBER 2018



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"The ocean is 71% of the globe. If we don't understand how that ocean works and forecast how it is going to change, then we are putting ourselves as human kind at risk."

Ned Dwyer, EurOcean – The European Centre for Information on Marine Science and Technology

This document provides an EOOS implementation plan based on the EOOS strategy. The plan covers the period from 2018-2022 with emphasis on the first two years. This plan is subject to revision during its lifetime to allow for evolution of EOOS. This included a stakeholder consultation period between 25 April and 15 June 2018 providing the wider EOOS stakeholder community an opportunity to co-design and contribute to early implementation actions 2018-2022.

Lead contributors: European Global Ocean Observing System (EuroGOOS), European Marine Board (EMB) and the EOOS Steering Group

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Introduction

The European Ocean Observing System (EOOS) is a coordinating framework designed to align and integrate Europe's ocean observing capacity in the long-term; to promote a systematic and collaborative approach to collecting sustained information on the state and variability of our seas and global ocean; to inform measures to protect and conserve the marine environment; and to underpin sustainable development, protection and conservation of the marine environment and its resources.

EOOS is being developed to achieve an integrated and sustained pan-European framework for ocean observation, applying the international Framework for Ocean Observing[1] and considering specific European requirements and needs.

This document provides an implementation plan for EOOS based on the EOOS strategy. The plan covers the period from 2018-2022 with emphasis on the 2018-2020 period. This plan is subject to revision during its lifetime to allow for evolution of EOOS. This included a stakeholder consultation period between 25 April and 15 June 2018 providing the wider EOOS stakeholder community an opportunity to co-design and contribute to early implementation actions 2018-2022.

The implementation plan focuses on six thematic areas: mapping and stakeholder engagement, policy context and foresight, implementation of system elements, funding, communications, and governance. EOOS is a community-driven initiative and stakeholder input and contribution is encouraged across all themes and activities.

For each thematic area the plan includes **tasks** outlining concrete activities for the implementation of EOOS. For some tasks, potential lead partners are defined. For others, lead contributors have not yet been identified. As this is a living document, stakeholders can indicate their intention to contribute by contacting the EOOS Steering Group.

The plan also includes **pilot projects**. These are early actions where tasks have already been agreed by members of the community and action is ongoing or imminent. The pilot projects are open to other participants and in some cases they are only partially allocated, therefore anyone who would like to participate should make their intentions known to the EOOS Steering Group.

Through the two EOOS consultations to date (2017 and 2018) and the EOOS Forum 2018, the Steering Group has been receiving suggestions or indications of potential EOOS projects to be implemented by stakeholders. It is proposed to open an ongoing call for **project submissions** to the steering group, which will be approved in a timely manner and moved into the evolving implementation plan (see Annex 2).

[1] http://www.oceanobs09.net/foo/

Activity 1. EOOS mapping and stakeholder engagement

Engagement of the wide range of stakeholders in a European Ocean Observing System (EOOS) is vital to the success of this initiative. Stakeholders comprise the funders, implementers and users of EOOS alongside the international networks such as GOOS, MBON, JCOMM, ICES, Regional Sea Conventions, and others, to ensure compatibility of EOOS at the regional and global scale.

Task 1.1 Mapping EOOS components, the stakeholder community and linkages to relevant initiatives

To ensure an open, inclusive approach to EOOS, it is important to map and identify the broad and diverse EOOS stakeholder community, infrastructures and platforms. This will be done on an ongoing basis and as a joint effort across key stakeholder secretariats. In addition to stakeholder events, EOOS will promote open and structured dialogue across the ocean observing community, including dialogue with related communities crucial to EOOS. This includes the satellite-based earth observations, weather and climate communities and Regional Sea Conventions, among others. Strong interaction with the major aggregators of European ocean data including EMODnet, Copernicus, SeaDataNet and ICES will also be promoted and implemented. The main users of EOOS need to be mapped as part of this process including scientific and non-scientific users, private industry, policymakers, regional and civil society organizations. An international context may be appropriate as EOOS conducts this work, particularly with respect to GOOS and regional observing systems, e.g. the US Integrated Ocean Observing System (IOOS), the Integrated Marine Observing System (IMOS) in Australia, and the European Global Ocean Observing System (EuroGOOS). EOOS will utilize these linkages in developing the community and business case for European ocean observing. The entire value chain should be considered from observation to information and assessment including the complementary role of satellite and *in situ* observations and the fundamental role of modelling and data assimilation (e.g. Copernicus Marine Service).

Pilot project 1.1.1 Mapping existing infrastructures and capabilities

Time-line: This activity will be initiated in 2018 for delivery by end 2019
by EuroGOOS and EurOcean

A wide range of capability currently exists in European ocean observing yet this is not mapped and documented in a systematic way. In this pilot project the key operators of ocean observing infrastructure will be identified and mapped. National monitoring programmes, relevant European Research Infrastructures, industries, international organisations and Regional Seas Conventions will also be mapped in this context. Among the key operators are the Marine Biological time series stations (MARS network), SAHFOS, ETN, SCANS and ESAS. The aggregators of ocean data from these and other operators will be documented and a database will be compiled including information on the scale of coordination, parameters measured, platform type, funding source and data archival mechanism. This will build on the activities of JCOMM and other aggregators of marine data e.g. CMEMS, EMODnet and SeaDataNet. An initial review of the products that are currently produced by operators, aggregators and industry services will be conducted for comparison to the requirements gathered in Pilot Project 1.3.1. This will allow assessing the current fitness for purpose of the system and the associated products and services from a user perspective. The project outputs will be disseminated in draft form to ensure inclusiveness and accuracy of information provided.

Task 1.2 Overview of EC and national research project outcomes

A host of valuable project outcomes that emanate from European Commission funded projects through initiatives including FP6, FP7, Horizon 2020 and Interreg, as well as activities at national level, have the potential to guide developments within EOOS. These include new sensor and platform developments, advances in Information and Communication Technologies and services developed within such projects that have the potential for wider adoption. A dedicated activity is required to track and report the outcomes of key relevant projects in cooperation with the EC funders and national representatives. This activity could be led by the European Commission building on the progress made in the H2020 COLUMBUS project or possibly networks such as EurOcean including work supported by JPI Oceans on infrastructure mapping.

Task 1.3 Requirements gathering

Critical to the design of EOOS is an accurate and unbiased statement/database of user requirements from a very wide range of stakeholders. The fora and events (see below) will provide some of the feedback needed for this process and this information will be augmented through other dedicated meetings and interactions with stakeholders to validate and understand requirements. These requirements will be archived and revisited periodically to ensure that EOOS evolves in a fit for purpose manner.

Consideration of the results from EMODnet sea-basin checkpoints and observing system simulation experiments will be included here. A gap analysis will be performed periodically to make sure that EOOS addresses the needs of stakeholders in different thematic areas including climate change, weather, security, and environment. Among the stakeholders from whom requirements will be sought are the Regional Sea Conventions, e.g. OSPAR and HELCOM, policy implementers, international fisheries organisations, e.g. ICES, industry users and collectors of ocean data, and representative users from civil society. The weather and climate community, e.g. ECMWF, GCOS and the hydrographic community (EC-IHO, IENWG), will also be involved in this process. The Copernicus services will also be involved in this consultation on requirements with a view to developing a specific pilot project on data required for CMEMS and other Copernicus services.

Pilot project 1.3.1 Requirements gathering for EOOS

Time-line: This activity will be initiated in May 2018 for delivery by July 2019 by EuroGOOS

The first requirements gathering exercise will take into account outputs of the EOOS forum (8 March 2018), results from the EMODnet sea-basin checkpoints and Copernicus Marine Service (building on previously elaborated requirements for future satellite observations), outputs of observing system simulation experiments and other project outputs, e.g. AtlantOS, INTAROS, ODYSSEA, PERSEUS, Blue Med. These will be further discussed with stakeholders at the EOOS conference (21-23 November 2018).

Task 1.4 Sustainability studies

Building on national plans and research infrastructure feedback gathered during the fora, events and direct additional interaction with system operators and funders, an assessment will be made of the sustainability of the observing system elements on a cyclical basis. The cycle will be repeated two-yearly and will be reported to the wider community outlining gaps, strengths and challenges within/facing the community.

Task 1.5 EOOS events

EOOS is a community-driven initiative and in addition to the regular EOOS forum, other events (conferences, workshops, exhibitions, webinars) will be organized to address or promote the variety of EOOS aspects and areas. A forum will be organized to gather EOOS stakeholder views on a regular basis. The aim is to have a common understanding of EOOS among funders, implementers and users of the observing system, as well as to broaden and strengthen stakeholder engagement. The first EOOS forum took place on 8 March 2018 and outcomes were used to inform the EOOS strategy and implementation plan.

Pilot project 1.5.1 EOOS conference 2018

Time-line: This activity was initiated in September 2017 for delivery in November 2018 by EMODnet, EMB and EuroGOOS

An EOOS conference will take place on 21-23 November 2018 organized by EMODnet, EMB and EuroGOOS, with the financial support of the European Commission's DG MARE, to address the breadth of implementation challenges and opportunities in building EOOS. The conference will follow on from the EOOS forum held on 8 March 2018. At the forum the communities' views on the EOOS critical questions were collected and brought into the EOOS strategy and implementation plan. After an open stakeholder consultation on those documents, the strategy and implementation plan will be officially adopted at the 2018 conference.

Pilot project 1.5.2 Stakeholder co-design of strategy and implementation plan 2018-2022

Time-line: This activity was initiated in January 2018 for delivery in November 2018 by EMB and EuroGOOS

The strategy for EOOS and an implementation plan (this document) will be presented and approved by stakeholders following a period of consultation with throughout 2018. The EOOS steering group will have the opportunity to periodically refine these documents as necessary in the evolution of EOOS. New inputs to the implementation plan will be enabled using an EOOS project template to ensure that the document remains live and responsive to user needs.

Activity 2. Foresight: Scientific and technological innovation, policy and wider societal drivers

Having a continuous look at likely innovations, technical developments and societal drivers for EOOS is critical to ensure that EOOS adopts and utilizes new technologies and is aware of the evolving policy context within which EOOS operates. A suite of foresight activities is planned in the coming years to ensure this forward look is incorporated into EOOS thinking and subsequent system design and evolution.

Task 2.1 Foresight activities

Scientific and technical foresight for key EOOS elements is vital to track emerging scientific and technological developments. Among recent activities, in 2017 and 2018 the EMB published foresight papers on the role of citizen science in ocean observing and wider marine research[2] (Garcia-Soto *et al.,* 2017), on strengthening Europe's capability in biological ocean observations (Benedetti-Cecchi *et al.,* 2018)[2], and marine ecosystem modelling state-of-the-art (Heymans, J.J. *et al.,* 2018). A paper on the European research vessel fleet status and evolution will be published in 2019[3]. Foresight activities could also include an examination of other scientific domains, e.g. medicine and space to anticipate cross-sectoral opportunities for EOOS.

Pilot project 2.1.1 Future science brief on biological observations

Time-line: This activity was initiated in 2017 with delivery by September 2018 by EMB

An EMB working group, in collaboration with EuroGOOS, conducted a foresight analysis on Europe's capability in biological ocean observing (Benedetti-Cecchi *et al.,* 2018)[2]. This study takes stock of current state-of-the art in marine biodiversity and ecosystems research and related biological ocean observation infrastructure. This is set in the context of global developments such as the identification of biological and ecological essential ocean and biodiversity variables. It also presents emerging scientific and technological advancements that will revolutionize biological sensors and sampling capability into the future. The study recommends gaps and priorities for enhancing the current biological ocean observing capacity as a component of the wider EOOS that is fit-for-purpose in the context of user needs and societal benefits. Outcomes from the AtlantOS project gap analysis and other relevant project outputs will complement this work.

[2] http://www.marineboard.eu/publications
[3] http://marineboard.eu/european-research-vessels

Task 2.2 Review of policy context and drivers

Regularly assessing the European and international policy context is vital to ensure EOOS can develop and evolve to maximize its relevance for marine environmental conservation, societal wellbeing and benefits as well as environmental sustainability. The EOOS steering group will regularly review the policy landscape.

Pilot project 2.2.1 EOOS policy landscape

Time-line: This activity was initiated in March 2018 with delivery in September 2018 by EMB

A report on the policy drivers and landscape to advise the EOOS steering group and wider stakeholders will be produced by EMB and the AtlantOS project. It will be presented to the EOOS steering group in September 2018.to ensure that the document remains live and responsive to user needs.

Activity 3. Implementation of EOOS observing system elements

Several tasks are proposed below in terms of practical steps to implement aspects of EOOS. More ambitious pilot projects requiring significant resources for implementation in the long term could include: increasing the number of glider transects in the European EEZ, implementing real-time transmission of data from research vessels in Europe, developing biogeochemical and Deep Argo capabilities, systematically collecting new biological variables, and high-resolution bathymetric mapping of areas of key European interest. EOOS should establish funding mechanisms for such projects in the 2018-2022 time frame.

Task 3.1 National Statements of Intent (including contributions to Research Infrastructures)

To streamline the delivery of EOOS, assess vulnerabilities in the system, and encourage collaboration, statements of intent from European countries involved in ocean observing activities are needed. This should also include information about national plans to support Research Infrastructures in the marine domain at European level e.g. EMSO, EuroArgo. This can be verified through discussions with the Research Infrastructures. It is hoped that inputs will be collated at national level, possibly built upon existing reporting requirements that countries have, e.g. GCOS and MSFD, and then consolidated within EOOS so that an annual status and likely new developments in observing system roll-out could be documented and shared. This will ensure that requirements are being met and that national investment in ocean observing is targeted appropriately. The EOOS forum will provide an opportunity for statements of intent to be discussed and agreed among countries. Significant additional contact with national operators will also be required in this task, particularly where there are several operators within a country. This task is a very important step, but also a very big task and will need significant stakeholder participation and input.

Task 3.2 System design tools

A suite of tools will be developed to allow the community to better design and implement a European Ocean Observing System using the EOOS framework. These could include EMODnet checkpoint-type analysis, Observing System Simulation Experiments (OSSE) and other tools (particularly related to biogeochemical variables) that aid and guide the community in optimizing the overall system. The initial step is to produce an inventory of the design tools in use both within the ocean observing community and more widely, e.g. meteorology, and to develop performance metrics to assess the progress in implementing EOOS based on international best practice. This activity should build on European H2020 project outcomes (e.g. AtlantOS), Copernicus Marine Service and GODAE OceanView experiences.

Task 3.3 Research Infrastructures planning

All relevant EU Research Infrastructures will be consulted regularly to ensure that such pan-European activity, e.g. ESFRI and other key infrastructures and platforms, is consistent with wider national efforts in ocean observing. As many research infrastructures are funded by European states this reporting will be cross-checked with task 3.1.

Task 3.4 Technologies mapping

EOOS needs to be capable of incorporating new technologies into the observing system as they progress sufficiently through the technology readiness levels. The community lacks the ability to systematically measure many of the Essential Ocean Variables for Biology and Ecosystems proposed by the Global Ocean Observing System (GOOS) and other variables required outside the EOV lists. Genomic technologies and observatories will be particularly relevant to this work. This task also needs to consider MSFD reporting requirements at national and Regional Sea Convention level to ensure there is strong complementarity between EOVs and national monitoring requirements. This is a task that needs some concerted effort by the community to address these gaps. In addition to these variables, bathymetry, sedimentology and all physical components should be taken into account.

Pilot project 3.4.1 EOOS Technologies Forum

Time-line: This activity will be initiated in 2018 for delivery in 2019 by EuroGOOS

A technologies forum will be established as part of EOOS to enable new and old observing technologies be compared, to share data from these new technologies, and to provide guidance to technology developers to ensure a strong understanding of the user requirements for such technologies. This forum will build upon work conducted in the AtlantOS project (database of technology readiness of known sensors) and activities of Research Infrastructures including EMSO, EuroArgo and Eurofleets among many others. Maritime clusters will be invited to participate in this Forum to share expertise and to ascertain user requirements for manufacturers and service providers.

Task 3.5 Hosting EOOS best practice documentation

EOOS will work towards systematic harmonisation of ocean observing in Europe. Key to this is an adherence to international best practice and standards in collecting, processing, archiving and sharing ocean observations. EOOS will contribute to the central repository of best practice materials hosted through existing Ocean Best Practice initiatives, e.g. IODE. Activities carried out by the European Marine Sensors Calibration Network and the European Metrology Network on Climate and Ocean Observation will be monitored will be promoted under this best practice activity.

Task 3.6 Open submission of EOOS projects

Through the two EOOS consultations to date (2017 and 2018) and the EOOS Forum 2018, the steering group has been receiving suggestions or indications of potential EOOS projects to be implemented by stakeholders. It is proposed to open an ongoing call for project submissions to the steering group, which will be approved in a timely manner and moved into the evolving implementation plan, using the template provided in Annex 2 of this document.

Activity 4. EOOS Funding

Task 4.1 EOOS Cost-benefit and Business Plan

Funding for both coordination and implementation of EOOS as it develops is a considerable challenge. The community is likely to see an evolution towards the systematic collection of biogeochemical and biological data to complement the mainly physical data that are currently available in real or near-real time with some exceptions. Regional Sea Conventions require quality-assured, calibrated and validated data on which to base assessments of marine environmental indicators and ocean health. All such data collection will require significant organisation and commitment at both national level and at EC level where a clear EOOS added value is demonstrated. Several funding activities are proposed to consolidate EOOS. Dedicated resources through a secretariat, or distributed secretariats, will provide stability as EOOS develops. Individual European states are also key to funding ongoing EOOS activity and the business case for such investments at national level must be well elaborated and clear to funders. The value-added of EOOS that can be achieved by working together including more efficient use of ocean observing resources will be clearly conveyed through the proposed tasks below. Key to EOOS governance is not to create an additional layer of organization that dilutes the ability of nations (with limited resources) but to contribute to a process intended to harmonise what already exists.

Pilot project 4.1.1 EOOS cost-benefit analysis and preliminary business plan

Time-line: This activity will be initiated in 2018 by EuroGOOS and will need additional stakeholder input

To document the extent to which EOOS will result in harmonisation and efficiencies in European ocean observing and to emphasize the value and unique nature of EOOS, a cost-benefit analysis will be conducted. This will involve socio-economic experts to quantify the monetary and non-monetary value of EOOS. These experts will work closely with the ocean observing community to collect and analyse pertinent information for the study. The work will build upon the recent activities of OECD and other relevant projects. A follow-on action from this work will include an EOOS business plan that can be used to support future investment in ocean observations.

Task 4.2 EC support for coordination and cross-cutting aspects of EOOS

While the majority of EOOS funding will continue to come from national funding, EC support will be sought for elements that demonstrate an added value at the European level. EOOS provides opportunities to align and integrate key elements of Europe's ocean observing capability. EOOS also has potential to enhance training and capacity development within and adjacent to Europe and in the European overseas territories. EOOS has the potential to demonstrate European leadership in ocean observing at the global scale through novel sensors, systems and services to users that are unavailable or under-utilized in other regions. To that end, EOOS will continuously liaise with the EC to explore opportunities to co-fund EOOS development where European value-added is obviously demonstrated. EOOS will engage with relevant EC Directorates General, e.g. ENV, CLIMA, GROW, MARE, and RTD to ensure that EOOS is visible and supported.

Task 4.3 Joint programming funding

Joint Programming Initiatives (JPIs) have already demonstrated the benefits of countries combining resources to address common societal issues of concern, e.g. JPI Oceans/Horizon 2020 ERANET co-fund on Marine and Maritime Technologies (MartERA) and JPI Climate/Horizon 2020 ERANET co-fund on Climate Services. JPIs have also demonstrated the ability to mobilize their member country funds to jointly address common questions on a relatively short timescale, e.g. JPI Oceans marine micro-plastics research projects and the developing action towards a European marine sensors calibration network. The JPI Oceans Strategic Research and Innovation Agenda recognizes the importance of establishing EOOS. EOOS will retain a dialogue with relevant JPIs to explore possibilities to co-fund relevant and pertinent initiatives through regular meetings and updates and through JPI Oceans representation on the EOOS Steering Group.

Task 4.4 Engaging national funders

Given that much of the investment in European ocean observing is undertaken by European countries it is important to have a mechanism to engage the national funders in the long term. National funders should be informed about EOOS and there should be sufficient background information to support the business case made at national level for ocean observing. An early action will include presenting and communicating the EOOS strategy, implementation plan and call for action following the EOOS conference in November 2018.

Activity 5. Communications and outreach

Engaging the existing and wider ocean observing stakeholders in EOOS is a critical need as this framework develops. There is some awareness of requirements, technical feasibility and challenges among system implementers, but this does not typically pervade funders and users. A concerted EOOS communication strategy will be developed by EuroGOOS with input from EMB and approved by the EOOS steering group to optimize engagement of key EOOS stakeholders with strong alignment to the fora and events planned through Activity 1.

Task 5.1 Develop overall communication strategy for EOOS

The EOOS communication strategy will examine the EOOS objectives and users, based on the stakeholder feedback, and distil the main EOOS messages and communication targets, as well as sketch out the expected communication impact. Among the initial EOOS targets are funders of ocean observations at national and regional level, European institutions, regional conventions, and international organisations. Citizen science organisations will also be emphasised in the EOOS communication strategy. EOOS communication outputs will range from printed and digital dissemination materials to presentations at events, and exhibition showcases. In order to enhance public awareness, regular activities will be planned to engage broad stakeholders.

Pilot project 5.1.1 EOOS communication strategy

Time-line: This activity will be delivered by end 2018 by EuroGOOS

EuroGOOS will deliver an EOOS communication strategy along the principles outlined in task 5.1. and taking into account, among others, the Atlantic Ocean Observing Blue Print and the its European strategy document, and the GOOS strategy. The implementation of the strategy will build on the already ongoing efforts in stakeholder engagement and outreach.

Pilot project 5.1.2 Maintain and evolve EOOS web presence

Time-line: This activity was initiated in 2015 and is maintained by EuroGOOS

High-quality pertinent internet-based information providing the background and rationale for EOOS is critical. A website was developed and is maintained by EuroGOOS to enable stakeholder access to relevant EOOS information. This will evolve to reflect stakeholder feedback in the coming years.

Task 5.3 Coordinate communication activities and link with relevant stakeholders

EOOS is an open and transparent framework developed for and by stakeholders – this will be the key principle in EOOS communications. EOOS will map the ongoing and new stakeholder initiatives and liaise on the communication strategies and activities. EOOS will continue to be presented and explained in the local, pan-European and global context at a variety of events.

Task 5.4 Monitor communication tasks

To track the effectiveness of EOOS communications outlined in the communication strategy the EuroGOOS office will periodically report to the EOOS steering group providing a critical review of communication efforts.

Activity 6. Governance

Most of the feedback from the first EOOS consultation (Dec. 2016-Jan. 2017) indicated a preference for a bottom-up governance model with strong nations' involvement and control at least in the initial development period for EOOS. The continued work of the EOOS steering group and the evolution of the EOOS governance model in due course are considered under this activity. Key to the work of the steering group is that EOOS does not attempt to satisfy all possible user needs but focuses on a number of high impact priority areas where progress can be made.

Task 6.1 Hosting and facilitating the work of the EOOS steering group

The EOOS steering group was initiated in 2016 and has met many times since then. The steering group has developed the EOOS consultation document[4] and led the drafting of the EOOS strategy, implementation plan and stakeholder consultations. The steering group will continue its work as the main committee giving the strategic direction to EOOS.

[4] http://www.eoos-ocean.eu/materials/

Task 6.2 EOOS Steering Group and Advisory Committee

Representatives from regional conventions, policy, industry, non-scientific users, and advocates of ocean literacy and citizen science will be approached to provide a wider perspective to the EOOS steering group. An advisory committee was formed in January 2018 to support the planning for the EOOS forum and conference in 2018. This advisory committee may be established on a more permanent basis through agreement among the steering group members. The advisory committee membership may evolve over time as other relevant communities are identified.

Pilot project 6.2.1 Evolution of EOOS governance

Time-line: This activity will be delivered by end 2018 by EOOS steering group, EuroGOOS and EMB

The EOOS steering group will consider the timing and mechanisms by which the EOOS governance should evolve in consultation with stakeholders using fora, events, and other mechanisms to secure stakeholder buy-in to the evolution of EOOS governance structure. The EuroGOOS and EMB steering group co-chairs have been tasked with exploring an optimal future governance model for EOOS including the mechanism to involve European countries and coordinate national monitoring activity. This could involve the establishment of an EOOS project office/secretariat to steer EOOS tasks and foster communication among stakeholders in due course subject to resourcing considerations.

Annex 1: EOOS Pilot Projects

Table 1: EOOS pilot projects as proposed in the implementation plan version 09.10.2018

ACTIVITY	PILOT TITLE	INDICATIVE TIMELINE AND TASK LEADER(S)
Activity 1. EOOS mapping and stakeholder engagement	Pilot project 1.1.1 Mapping existing infrastructures and capabilities	May 2018-January 2019, EuroGOOS and EurOcean
	Pilot project 1.2.1 Requirements gathering for EOOS	May 2018-July 2019, EuroGOOS
	Pilot project 1.5.1 EOOS conference 2018	Sept.2017-Nov.2018, EMODnet, EMB and EuroGOOS
	Pilot project 1.5.2 Stakeholder co-design of strategy and implementation plan 2018-2022	Nov.2017-Nov.2018, EMB and EuroGOOS
Activity 2. Policy context and foresight	Pilot project 2.1.1 Future science brief on biological observations	2017-Sept.2018, EMB
	Pilot project 2.2.1 EOOS policy landscape	March -Sept. 2018, EMB
Activity 3. Implementation of EOOS observing system elements	Pilot project 3.1.1 EOOS Technologies Forum	2018-July 2019, EuroGOOS
Activity 4. EOOS Funding	Pilot project 4.1.1 EOOS cost-benefit analysis	From 2018, EuroGOOS with additional stakeholder input
Activity 5. Communications and outreach	Pilot project 5.1.1 EOOS communication strategy	By Nov.2018, EuroGOOS
	Pilot project 5.2.1 Maintain and evolve EOOS web presence	From 2016, EuroGOOS
Activity 6. Governance	Pilot project 6.2.1 Evolution of EOOS governance	March-Sept. 2018, EuroGOOS and EMB EOOS steering group co-chairs

Annex 2: EOOS project proposal template

Through the two EOOS consultations to date (2017 and 2018) and the EOOS Forum 2018, the steering group has been receiving suggestions or indications of potential EOOS projects to be implemented by stakeholders. It is proposed to open an ongoing call for project submissions to the steering group, which will be approved in a timely manner and moved into the evolving implementation plan, using the below template.

Table 2: EOOS project proposal template

Project proposer's name and job title	
Proposing organization and country	
Short project description	
Alignment with EOOS guiding principles, strategy and implementation plan	
Projected sustainability impact	
Indication of the urgency of the project and projected threats due to non-delivery	
Resourcing required or secured	
Partners identified	
Projected milestones and outputs' deadlines	
Dates of the approval by the EOOS steering group and the inclusion in the implementation plan	
Comments	

Annex 3: List of Acronyms

CMEMS	Copernicus Marine Environnement Monitoring Service
DG MARE	Directorate General for Maritime Affairs and Fisheries
EEZ	Exclusive Economic Zone
EMODnet	European Marine Observation and Data Network
EOOS	European Ocean Observing System
EC	European Commission
ECMWF	European Centre for Medium-Range Weather Forecast
EMB	European Marine Board
EMSO	European Multidisciplinary Seafloor and water-column Observatory
EOV	Essential Ocean Variables
ERANET	European Research Area Network
ERIC	European Research Infrastructure Consortium
ESFRI	European Strategy Forum on Research Infrastructures
ETN	European Tracking Network
EuroGOOS	European Global Ocean Observing System
FP	Framework Programme
GCOS	Global Climate Observing System
GODAE	Global Ocean Data Assimilation Experiment
GOOS	Global Ocean Observing System
HELCOM	Helsinki Commission - Baltic Marine Environment Protection Commission

H2020	Horizon 2020
IHO	International Hydrographic Organization
IOOS	Integrated Ocean Observing System, USA
IMOS	Integrated Marine Observing System, Australia
JCOMM	Joint Technical Commission for Oceanography and Marine Meteorology
JPI	Joint Program Initiative
ICES	International Council for the Exploration of the Sea
MBON	Marine Biodiversity Observation Network
MFSD	Marine Strategy Framework Directive
OECD	Organization for Economic Co-operation and Development
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
SAHFOS	Sir Alister Hardy Foundation for Ocean Science

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