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## Executive summary

Improving ocean observing and forecasting systems to tackle the societal challenges related to ocean health, climate change, mitigation of natural risks, and development of blue growth is possible only if the research community and private actors in the maritime sectors team up to jointly find new and more effective solutions. An active and beneficial collaboration between marine scientists and innovative technologies manufactures and developers is ongoing in the H2020 EuroSea project whose elaboration of new knowledge and products is shared with private and public end-users and stakeholders. The opinions used for the preparation of this document were obtained during face-to-face interviews conducted during the EuroSea Annual Meeting. They highlight the different aspects of the ongoing project interactions, its general benefits and the expected project legacy.

While innovation is crucial for companies' profitability and long-term survival on the market, cutting-edge technologies are essential for the modernisation of the ocean monitoring systems, thus ensuring the adequately high quality of ocean data able to meet the evolving needs of social and economic actors.

Building a stronger and better integrated ocean observing system thanks to the fruitful cooperation developed in EuroSea among public institutions and private organisations enables the elaboration of common standards and metadata and enhances the interoperability of the innovative solutions and instruments provided by the project.

The ability to share ocean information to facilitate multi-stakeholder communication and reuse avoids duplication of efforts and costs and supports the New Blue Economy which focuses on improving collection, analysis, and dissemination of ocean data to support global economic growth.

## 1. Introduction

The EuroSea project, funded by the European research and innovation programme Horizon 2020, is carried out by an international consortium composed by 53 partners representing public research centres, private companies, and intergovernmental no-profit organisations. The progress and results of the EuroSea activities rely on the efficient and effective collaboration developed by this cluster of public research centres, governmental agencies, blue economy companies, no-profit maritime associations, private marine data assimilations centres and SMEs developing instruments and new technological solutions. All these partners representing different scientific and socio-economic sectors are jointly committed to meet the overarching and common goal of improving the coordination and integration of the European and global ocean observing and forecasting system.

From the beginning of the EuroSea project a constant dialogue is being kept by the consortium members with stakeholders and end-users who, in their turn, are representatives of public bodies mainly responsible for environmental protection and marine resources management and private entities active in the blue economy with an interest in the use of the new knowledge and tools developed by this project.

This mutual co-designing and co-exploiting interface is going on especially in the three demonstration WPs focused on the realisation of new innovative solutions for the improvement of coastal operational services, ocean health and climate.



An exchange of beneficial inputs to the advancement, exploitation and legacy of the project is provided by the EuroSea Innovation and Stakeholder Committee (ISC) composed by private or public members of the demonstration work packages, representatives of the SMEs and companies involved in the partnership and by external stakeholders able to ensure that the potential of the project activities is developed at the maximum level with a view to the market valorisation of their final results and products.

The same fruitful public-private interface takes place regularly within the EuroSea International Scientific and Technical Advisory Board (ISTAB) whose composition blends excellent scientists on marine topics and high-profile technological experts in the maritime sectors related to the Blue Growth.

During the daily project work, especially in the demonstrators, but also during the important meetings of ISC and ISTAB, EuroSea builds functional links between the two communities, the private and the public, and make them interact effectively to tackle the societal challenges of improving ocean observation and forecasting systems.

## 2. Background and context

Many different types of ocean observations and predictions are constantly made in all parts of the Earth's globe to detect pollution, to track dangerous substances, to survey acidification and warming, to monitor changes in ocean circulation and health, and to forecast hazards such as hurricanes, earthquakes, tsunamis, coastal flooding events, marine heatwaves and harmful algal blooms. These activities are highly beneficial for humankind because these real-time data help prevent damages and casualties and protect the essential ecosystem services provided by the ocean.

But the wide and diverse range of instruments used to observe the ocean and gather data on its essential qualitative and quantitative variables can be very sophisticated and expensive. So only public institutions can maintain these observing and forecasting tools and networks for the long term necessary to ensure their prolonged reliability and the connected societal benefits. These considerable investments are usually sustained by public expenditure at national and regional level while EU funds support mainly research and innovation in ocean observing and forecast, even if some interregional or transboundary operational activities are made available through the funding resources of the cohesion policy.

According to the inception impact assessment on ocean observation circulated by DG MARE in October 2020 EU Member States spend more than 1,5 billion of euro per year in observing the ocean, a challenging task whose responsibility is mostly of national departments, governmental agencies, and public institutes.

Cooperation with industry is generally searched for their production and supply of sensors, models, buoys, platforms, under-water vehicles or other specific monitoring tools and equipment. Some management services can also be contracted to external private providers who use public open data to develop innovative technological solutions to improve the efficiency of the observing and forecasting systems.

In fact, many sectors of the blue economy take considerable advantage of more accurate, accessible and reliable information from ocean observations to support fisheries, aquaculture, maritime transport, offshore energy, tourism and recreation. The private sector is aware of the societal benefits that better knowledge of the ocean brings and is willing to participate in efforts to provide effective solutions to the needs of the international ocean observing and forecasting community.



There can be current and future applications for marine data that researchers and public operators may not be able to imagine, and only industrial developers can better identify for their possible commercial exploitation.

The implementation of the European policies related to the management of oceans and seas, the EU Blue economy strategy and at global level the Sustainable Development Goals Agenda and the actions promoted by the Ocean Decade strongly call for collaborative initiatives between the public and the private sectors whose cooperation is deemed essential to reach the ambitious targets established by these visions aiming at the progress and welfare of humankind while protecting natural resources.

Within the frame of these overarching strategies, targeted fora, exhibitions, conferences, matchmaking sessions, specific programmes, and projects offer visibility not only to oceanographic researchers but also to entrepreneurs, innovation start-ups and tech scale-ups who provide their know-how to the general societal good represented by the sustainable use of the ocean.

These partnerships among different actors coming from diverse sectors are critical to ensure that the present and future ocean observing systems are focused on the needs of end-users and provide all the benefits expected by innovative tools able to optimize operational performance of the information systems in order to better facilitate the knowledge transfer to all interested people.

### 3. Methodology

This current report draws on lessons learned in ocean observing from the business world and the public sector. It is based on the outcome of some interviews with representatives of these two communities involved in the EuroSea activities, selected as interlocutors because they are partners in the demonstration work packages and/or members of the ISC or the ISTAB. The interviews were conducted during the EuroSea Annual meeting in Cádiz from 9-13 May 2022. More than 20 questions were prepared to collect the opinions of these industry and business representatives and experts of public or no-profit institutions managing ocean observation systems.

The first group of addressed people includes:

- Representative of the network of 140 Norwegian companies producing and operating ocean technologies for Blue Growth sectors with a personal professional experience in a private SME providing geophysical monitoring solutions for the hydrocarbon industry with extractive fields offshore
- Business leader in an industry based in Norway that designs, manufactures and sells instrumentation for oceanographic measurements on the international market of sensors, meters, and buoys
- Manager in an international knowledge-based group with a company specialised in maritime technologies and characterized by a large portfolio of innovative and integrated products and solutions for customers engaged in the global Blue Economy

The second group of interviewed representatives of public institutions and no-profit organisations engages:

- Ocean observations team leader in the Irish national institute responsible for marine research, technology development and innovation promoting the sustainable use of Ireland's marine resources by managing ocean observing infrastructures and services

- Marine physics and ocean climate expert working in the UK national charity that manages programmes of operational oceanography also at international level
- Expert of physical oceanography, sea level hazards and implementation of warning systems based on observations and numerical models on duty at the Spanish government agency responsible for the coordination and control of the 46 State-owned ports

The interviewees were informed that no full transcript of each interview would be produced, as the goal of this dialogue was merely to gather opinions, reflexions and considerations useful to the elaboration of this project deliverable. Their answers are summarized in the following lessons learned which, based on the experiences gained during the EuroSea activities, pave the way for some more general reflections on the benefits of public-private engagement in improving ocean observing.

## 4. Lessons learned on public-private interfaces

### Different times and languages

Public research and academia are engaged in ocean observations and forecasts with the aim of better understanding future changes in Earth's climate and their impacts on the ocean and its many connected societal benefits. Scientists work for a constant, long-term knowledge able to support policy makers in a more effective manner, while industry needs research at very short time, because the innovation market requires urgent technological solutions. Pushed to progress rapidly in a global market, the private sector has an increased capacity to innovate with significant talent and skills, while public organisations are less prepared to rely on technology evolution to tackle the present and future environmental challenges in a quick and efficient way.

In addition, there can be a gap in communication and understanding: Industry usually speaks the language of publicity and lobbying, while the most important words for the public sector are responsibility and accountability. Even though, nowadays, even in the corporate world, the commitment to environment, health and safety is increasing in order to attract and consolidate the interest and attention of customers. Presently, corporate social responsibility is acknowledged as an important asset in the global business community.

### Transparency and mutual trust

To start any fruitful interaction between public and private actors it is paramount to define clearly from the early beginning the goals and related terms of this collaboration. A good communication and regular meetings are necessary to ease this dialogue among researchers, instrument developers, producers and providers. Transparency is a key issue because it is essential to understand the general context and the detailed conditions of this cooperation to find joint solutions to some societal challenges. An open transparent dialogue also helps to avoid possible problems of intellectual property right (IPR) that could raise if the common goals and specific single needs were not clearly defined beforehand.

The most beneficial collaboration between academia scientists and industry representatives relies on mutual trust. This is particularly true for the public and private partnerships involved in the EuroSea work packages, primarily in the demonstrators (WP5, WP6, WP7), who experienced, in many cases, previous collaborations in other EU funded initiatives, or have already had work relationships with project partners at national and/or international level.



Sometimes, private operators have worked before in public organisations, so they have the right contacts within the institutional and academia environment and know very well the needs and procedures of these sectors.

### Stakeholder and end-user engagement

Ocean observation and forecast data are particularly useful when they are used for specific economic and social activities. EuroSea stakeholders were identified very early in the project life by task leaders and partners and were kept informed of any progress through periodical consultations and webinars organised to gather valuable suggestions and feedbacks from them as representatives of public and private sectors focused on by the project development.

In particular, in its three demonstration work packages, where the EuroSea project applies new technological solutions that are merely designed to meet end-user needs, environmental agencies, port operators, local governments, planning authorities, fishing and aquaculture industries, and other maritime actors were involved in the realisation, use and maintenance of the developed products and services. In fact, the direct engagement with end-users is widely considered essential to understand the requirements of the products that must be fit-for-purpose to be also profitable for their commercialisation. Customer satisfaction is a key factor for technology producers and providers and contributes to the large social acceptance and awareness of the need of an improved and strengthened ocean observing and forecasting system fostered by public institutions.

### Benefits of interaction

Working together and pooling different competences in a common action like EuroSea is the best way to solve problems faster and maximize the strengths of each involved sector, especially when the objectives are clear and well defined in the description of the project work packages. Public-private engagement is always a fruitful opportunity to exchange knowledge, skills and practices to tackle complex challenges such as a deeper ocean knowledge. Co-development of products and services by an efficient team with the required expertise at the different stages of the project enables a more incisive alignment of the provided solutions to the end-users' practical needs by facilitating the transition from marine research to oceanographic operations.

Usually, governmental agencies and research centres produce measurements, satellite data and forecasts that are made free and easily accessible to all interested people. This information is relevant for stimulating scientific discoveries, innovations and entrepreneurship. Adding the data provided by the technological tools tailored by the marine industry for its clients boosts the development of industrial applications for the optimisation of the ecosystem services offered by the ocean, while improving coastal risks management and emissions reduction in the maritime sector.

Building an integrated ocean observing system thanks to the cooperative activities of public and commercial networks contributes to elaborate common metadata standards and enhance the interoperability of the instruments designed to provide data for multiple users. This certainly helps avoid duplicity of efforts and costs. Furthermore, this knowledge exchange, which serves to make ocean information versatile for multiple users and to better tailor products to their purpose, represents a good practice to improve the quality control, processing and validation of the information provided by innovative tools and contributes to the sustainability of the applied observing and forecasting systems.



For academia and the public sector, collaboration with the marine industry accelerates the implementation and operational process of ocean knowledge applied to environmental protection and risk management, while the exchange of information and best practices can generate new useful contacts and an increase in sales, customers and service and product portfolios for private developers and manufacturers.

### Innovation in ocean technology

Sustained ocean observations are essential to increase our understanding of the ocean and its functions, and this requires a wide range of increasingly efficient technologies and instruments to gather, store, transfer, and process large volumes of ocean data.

Essential Ocean Variables are to be measured to increase our knowledge on the role played by the ocean in our lives. This constant monitoring is important not only for environmental organisations and research centres worried about climate change, loss of biodiversity, pollution and acidification, but also for industrial actors with a view to the market of the necessary tools to perform and manage these measurements. It is very important to have at disposal new sensors, platforms, gliders, buoys, floating instruments able to better perform more advanced ocean observations and forecasts.

In this domain, innovation is paramount to produce these tools and transform observations and modelling systems into indicators and practical products that allow authorities to take decisions and final users to do business. Furthermore, cutting-edge technologies in the field of marine science are needed for the modernization of the ocean observing and forecasting systems along the years, and to ensure the adequate quality and exploitation of these ocean data to meet the evolving demands of public and private end-users.

Moreover, innovation is particularly crucial for profitability and long-term survival of companies. They risk disappearing from the global market if they are not able to innovate and adapt quickly to the rapidly changing dynamics of the marketplace.

### Funding

Private and public partners in EuroSea agree on the fact that EU Grants are surely a facilitating element of an increased participation in joint collaborative actions tackling relevant societal challenges. For SMEs and even for large companies, however, there can be some difficulties with the reporting procedures established by the European Commission for EU funds.

However, funding can also be a barrier to public-private interactions, as industry generally only undertakes environmental monitoring activities when compelled by law or pushed to do so by financial or tax incentives. More recently, the sensitiveness of the public opinion in the world towards environmental protection is stimulating practices of social responsibility in business activities.

For some of the interviewees industry can multiply investments in ocean observation and forecasts with loans and capitals when the expected returns motivated these investments, in particular if these additional funds can accelerate the market exploitation of ocean observing and forecasting technologies. In fact, the revenues that the Blue Economy sectors are able to guarantee to all its operators is surely a good reason for an increased combination of private and public money in Blue Growth clusters dealing with profitable maritime activities, thus bridging science and capital.





## New Blue Economy

The application of ocean data within multiple sectors, as the EuroSea project realises in its demonstrator work packages, supports the implementation of the New Blue Economy. This concept builds on the traditional one but instead of looking at the ocean for the economic exploitation of its resources it is knowledge-based, i.e. focused on data and information as the essential element to find effective solutions to relevant societal challenges. Improved collection, analysis, and dissemination of ocean and coastal-derived data and information to support economic growth, while protecting marine health, is at the core of the development of this application of ocean data within multiple sectors.

The need of sharing ocean observations and forecasts to facilitate communication and reuse among all operators and stakeholders helps to reduce costs of monitoring and enhance data interoperability. Therefore, the New Blue Economy provides the most favourable conditions to more frequent opportunities of cooperation and better connections between ocean industries, entrepreneurs, investors, and institutions. In this general framework, EuroSea contributes to this value chain of ocean information by strengthening coordination and integration in ocean observing system and producing innovative solutions for multipurpose services relevant for policy makers, economic operators, societal actors.

## Impact of public-private cooperation in EuroSea

All interviewees expressed the hope that the positive and fruitful public-private interactions ongoing in the project will increase the impact expected by this EU innovation action. According to them, the project is progressing well and it is very important that its legacy will outstand considerably beyond its end in demonstrating the benefits of the technological solutions developed to improve the knowledge of the ocean. It is paramount that the high value of providing observations and forecasts can be perceived by society, end-users, policy makers, managing authorities, and Blue Economy's actors, and EuroSea already engages all these stakeholders to contribute effectively to the establishment of a systematic and robust data value chain related to the ocean and its present and future challenges.

In this way, the public and private partnership involved in the EuroSea project is acting towards the achievement of the main global framework policies encompassing marine science: The GOOS strategy 2030, the Ocean Decade and the Sustainable Development Goal 14 (life under water) in the UN Agenda.

The implementation of all these societal strategies fosters interdisciplinary research capable of providing new indicators and metrics, and influencing the methods, tools, and technologies needed to categorize and analyse research findings, correlations and impacts for the benefit of all citizens on Earth.

## 5. Conclusions

The interviews realised during the Eurosea annual meeting in Cadiz have shown that continuous public-private interfaces are deemed essential to improve and strengthen our capability of monitoring the ocean to support more efficiently the data dependent New Blue Economy and management of ocean related natural hazards. In fact, discovering the untapped potential of the ocean to solve complex and urgent societal challenges requires rigorous scientific research and innovative technological solutions to improve our knowledge of the blue planet.



Interdisciplinary skills and competences, and cross-sectorial cooperation based on transparent behaviors and mutual trust are indispensable factors to provide effective solutions to improve the acquisition of the scientific knowledge needed for the sustainable management of the ocean.

According to the interviewees, the activities performed by the EuroSea project are progressing well just because scientists, engineers, practitioners, technologies manufacturers and tools developers teamed up with their different competencies and experiences for the common goal of strengthening the efficiency of the European ocean observing and forecasting system through new applicative solutions for improving coastal risks management, supporting Blue Economy sectors and contributing to ocean health.

More opportunities of public-private interfacing in such communities of practices, which must always involve also stakeholders and end-users, are considered very beneficial because these synergies among different scientific, economic and social sectors enable a useful integration of efforts and costs, reducing useless fragmentation and duplication of similar initiatives.

More frequent involvement of industry, business and NGO representatives in research and innovation applied to the ocean offers valuable opportunities for sharing knowledge and best practices to achieve the general common goal of ocean sustainability which is not only dependent on institutions and public operators, but must be pursued and implemented by all different actors and stakeholders to multiply its beneficial impacts for our planet.

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SDGs Agenda 2030 <https://sdgs.un.org/2030agenda>

GOOS/MTS Dialogues with Industry

[https://www.gooscean.org/index.php?option=com\\_content&view=article&id=400&Itemid=448](https://www.gooscean.org/index.php?option=com_content&view=article&id=400&Itemid=448)

## ANNEX I: List of interview questions

### Introduction/background information

1. In the project consortium, which partner do you represent?
2. Is it yours a public or private organisation?
3. What project activity are you contributing to?
4. Which connection have you with the other WP partners?
5. How is the cooperation in your WP realised in practice?
6. Who are the main stakeholders involved in your WP or task?

### Interview

7. How important is innovation to tackle ocean challenges, for you and your organisation?
8. What is necessary for effectively co-developing products and services for the ocean?
9. Which are the main barriers for private-public partnerships in ocean observation?
10. And the main drivers?
11. Do you think it is important to have regular meetings and cooperative actions to build trust and relationships?
12. Has the experience of products co-development strengthened your relationship with public/industry partners?
13. Did you experience any Intellectual Propriety problem in previous and ongoing interactions?
14. How important is interoperability among service designers, developers and end-users?
15. In your opinion, which are the main benefits of this cooperation between public and private subjects?
16. Can you, please, quote some best practices or innovative solutions you deem essential to achieve sustained ocean observations?
17. Do you envisage further developments in the exploitation of the project results?
18. How do you intend to contribute to ensuring the use of the results generated in EuroSea?
19. Do you think that the EC grant is an essential facilitator of this interaction?
20. How is it possible to overcome the funding and operational barriers in private-public cooperation?
21. For private partners
22. How important is social responsibility for your business?
23. Which ways of customer satisfaction do you usually practice?

### Concluding questions

24. Do you envisage other opportunities of private-public collaboration after the end of the project?
25. Is an institutional change necessary to improve the governance of this public-private cooperation for the Ocean?
26. In your opinion, which actions and interactions are necessary to achieve the SDGs related to the Ocean and Blue Growth?
27. Is there anything you would like to add that has not been covered on your experience with public-private interfaces in European ocean observing?
28. Which are your recommendations for effective PP partnerships in improving the ocean observation and forecasting systems?