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OceanEye: An EU ocean observation initiative

Introduction

OceanEye is an EU initiative to boost **ocean observation**[1]**,** enhance our ability to understand and manage the marine environment and maritime activities and strengthen Europe's related innovation and industrial base.

Building on the existing EU assets and actions, OceanEye serves as a **core delivery mechanism of the European Ocean Pact as well as the EU Industrial Maritime Strategy vision of anchoring Europe's leadership in emerging technologies and market segments**. It positions the EU as a reliable global partner with its action firmly anchored in science and aims at bringing the Ocean to the heart of our societies and economy.

In the spirit of "**Choose Europe**"[2], it builds on the "**moonshot**" ambition for ocean observation outlined in the **Commission proposal for the 2028-2034 Horizon Europe Programme**[3]. The initiative aims for the EU to provide *by 2035 35% of the global ocean observing system, to secure 35% of the market for ocean observation technologies, and to become the world's leading provider of ocean intelligence*.

The ocean covers 70% of the earth's surface, yet only 5% of it has been explored and mapped. Ocean observation is essential infrastructure, not an optional capability.

We must sustain the ocean that sustains us. The ocean is of **strategic importance,** underpinning our **security, prosperity and resilience**. The ocean is the biggest carbon sink, and therefore our ally in the fight against global warming and it generates 50% of the oxygen we need[4]. It is also a central component of the **water cycle** and provides a wealth of **resources**, notably as a vital source of food through fisheries and aquaculture, which are also key for European food sovereignty, territorial cohesion and sustainable food systems. Sustainable management of marine activities is key to maintain essential societal functions in a variety of sectors.

The ocean is also a key geopolitical space for **maritime transport, energy and digital infrastructure, maritime security and defence**. In an era of evolving hybrid threats, the resilience of these critical maritime infrastructures has emerged as a strategic priority, making sustained ocean knowledge indispensable for safeguarding Europe's interests, strategic autonomy and leadership in a rapidly changing world. Also, the EU's **Security and Defence Partnerships**[5] with non-EU countries, including the UK, Norway, Canada, and India, reflect the increasing importance of ocean observation in strengthening joint maritime security efforts.

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1 Ocean observation can be defined as the sum of capabilities used to observe the ocean, both from satellite, in situ or through any other means. These capabilities are deployed through permanent and ad hoc activities, using established monitoring systems, observing platforms, instruments, marine vessels, autonomous vehicles and other tools.

2 https://commission.europa.eu/topics/research-and-innovation/choose-europe_en

3 Proposal for a COUNCIL DECISION on establishing the Specific Programme implementing Horizon Europe - the Framework Programme for Research and Innovation for the period 2028-2034, laying down the rules for participation and dissemination under that Programme, and repealing Decision (EU) 2021/764, COM/2025/544 final

4 The ocean – the world's greatest ally against climate change | United Nations

5 https://www.eeas.europa.eu/eeas/eu-security-and-defence-partnerships_en

Therefore, **a well-functioning Ocean Observation system is crucial for**:

- generating sustained, high-quality data on physical, chemical and biological ocean processes, which is essential for **protecting and restoring ocean health**, conserving marine biodiversity, and maintaining the vital ecosystem services the ocean provides;
- supplying the reliable ocean intelligence required for safe, efficient and low-impact operations and regulatory frameworks across sectors such as fisheries, aquaculture, biotechnology, offshore energy, tourism, ports and shipping, finance or insurance, thereby boosting the **competitiveness of a sustainable, regenerative, and still largely untapped *blue economy*;**
- creating **new demand opportunities for Europe's maritime manufacturing base** linked to specialised vessels, equipment and technologies (e.g. oceanographic research vessels, drones, drone-carriers, sensors, underwater robotics) fostering European technologial leadership and industrial sovereignity;
- strengthening the preparedness and resilience of coastal, island and outermost regions by improving **meteorological and climate forecasting, risk assessments** and early warning systems to support communities and blue economy actors in adapting to the effects of climate change and to other natural and man-made hazards including geological risks, marine pollution and waste, transport accidents and geopolitical disruptions;
- enhancing maritime situational awareness, situational intelligence and the protection of critical offshore and subsea infrastructures, thereby contributing to strengthening **maritime security, safety and defence.**

Ocean observation is also an **economic sector in its own, with strong growth potential.** It is estimated that each euro invested in ocean observing systems generates a return of EUR 5-6 in economic and societal benefits.[6] UNESCO estimated the **public investments** in global in situ ocean observation at EUR 0.85 – 1.3 billion per year, which covers only 60–70% of the required system[7]. Other sources estimate annual global spending at EUR 2 billion, of which about EUR 500 million in the EU[8]. At the same time, all US economic activities directly related to ocean observation products and services, have been estimated worth EUR 7 billion, and serving a much larger business ecosystem valued at EUR 35-80 billion[9].

OceanEye aims at:

(1) **strengthening national and European efforts and coordination structures** focussed on the in situ ocean observations,
(2) **creating an international alliance** to strengthen the Global Ocean Observing System,
(3) **establishing a European Digital Ocean System**, that integrates existing European marine knowledge services and is fed by both in situ and satellite observations, with a view to ensuring operational services while facilitating innovation and value-added services **and creating new markets for Europe's maritime manufacturing base**.

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6 https://cdn.ioos.noaa.gov/media/2017/12/ioos_devplan.pdf and https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/07/value-chains-in-public-marine-data_ec9a528e/d8bbdcfa-en.pdf

7 https://www.unesco.org/sites/default/files/medias/files/2022/02/en-ocean-presskit.pdf

8 Data collected through the Expert Group on Ocean Observation and from other reports

9 NOAA, 2021. *The Ocean Enterprise 2015 – 2020: A study of U.S. New Blue Economy business activity*.

The European Union and its Member States have invested significantly in ocean observation over the past few decades. The EU has progressively assumed a position of **global leadership** in the delivery of integrated ocean data, knowledge and forecasting services and possesses a world-leading marine knowledge value chain underpinned by three strategic assets:

- **Copernicus** notably its Marine Service[10].
- The **European Marine Observation and Data Network (EMODnet)**[11]
- **WISE-Marine** and WISE Freshwater[12]

These assets, as well as more specific data and knowledge platforms[13], and the forthcoming **European Digital Twin Ocean**[14], empower the EU to monitor the state of the ocean both locally and globally. They **depend on continuous, high-quality, in situ as well as space-based, and global ocean data streams**.

However, **ocean observation** in Europe and globally, **is fragmented and lacks systemic operational commitment and efficiency, facing extreme funding constraints, that are further exacerbated by geopolitical changes**. Reliance on underfunded and increasingly fragile observing systems exposes EU and global knowledge assets and services to disruptions, data gaps and political leverage, creating strategic dependency risks.

The OceanEye initiative is designed to support the development and implementation of a **comprehensive operational ocean observation system**, that connects the national, European and international levels dynamically and structurally based on an operational system that consists of **observations** from **space (**Copernicus, European Space Agency and national space agencies) and **in situ** (mainly from national but also from European infrastructures); **as well as digital systems: national and European data systems** (national oceanographic data centres, EMODnet), processing and **modelling infrastructures** (e.g. Copernicus Marine Service**,** European Digital Twin Ocean, EC Blue2 modelling framework) and delivering **operational services.**

Following the model of operational meteorological monitoring and forecasting, these elements will create a system in which countries structure and coordinate their contribution of in situ ocean observations and, in return, optimise their benefits from the highest-quality ocean monitoring, forecasting and sector-specific services at local, regional and global scale.

The OceanEye initiative is underpinned by four strategic pillars:

- **Pillar I,** focuses on enhancing **in situ ocean observation,** better data sharing and use by establishing an **EU governance framework, that is appropriately linked to the other components of the European Ocean Observing System**.

[10] https://marine.copernicus.eu/
[11] https://emodnet.ec.europa.eu
[12] https://water.europa.eu
[13] such as those for maritime transport and fisheries of the EMSA, EFCA and the JRC
[14] https://www.edito.eu/european-digital-twin-ocean-about/

- **Pillar II** focuses on the international dimension, particularly by launching an **international alliance** to support the Global Ocean Observing System[15].
- **Pillar III** focuses on developing innovative markets and sectors related to ocean observations, including through the European Digital Twin Ocean.
- **Pillar IV** focuses on fostering engagement, understanding, trust, and an emotional connection to the ocean through **strategic partnerships, outreach, education and skills, culture** and societal ownership.

Pillar I: EU governance – supporting the European Ocean Observing System

While current and planned **space observation** infrastructures are well organised (through the cooperation between the EU, the European Space Agency, the European Organisation for the Exploitation of Meteorological Satellites, national and international space agencies), additional efforts are required to better organise the various **in situ observation** infrastructures and programmes more efficiently. This includes improving the integration of EU marine knowledge assets with national assets, which would also strengthen the corresponding digital systems.

Similarly, digital infrastructures, notably AI, high performance computing and cloud systems, are fundamental enablers for ocean observations and have transformed their potential. Nevertheless, today, European and national entities rely on research-based infrastructures which are not designed to offer operational, secure and continuous services.

The lack of coordination and governance, at both national and European levels, leads to inefficiencies, financial costs, and critical gaps in monitoring, limiting the benefits that Member States receive from their investments.

1.1 Establishing a European governance framework for Ocean Observation

The Commission proposes establishing a governance structure for European ocean observation.It will be established in the Ocean Act (scheduled by end 2026) **and build on existing structures such as the European Ocean Board[16].** The Ocean Pact dashboard to be launched at the end of 2026 will also help monitor progress.

The goal of this Ocean Observation governance framework is to consolidate the entire marine knowledge value chain by providing a structured interface between observation needs and knowledge providers across sectors and policies. It will support the definition and agreement of the system's operational requirements, while improving its overall organisation and coordination. To achieve this, it will bring together all relevant actors, in a structured way:

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[15] The text uses **the term global ocean observing system** in full to refer to the global **system** for sustained ocean observations and the acronym **GOOS** to refer to the **programme** led by UNESCO's Intergovernmental Oceanographic Commission (IOC) (https://goosocean.org/who-we-are/).

[16] The high-level expert group supporting the implementation of the European Ocean Pact

First the EU and Member States supported by technical bodies at national and European level to focus on adopting common standards and operational in situ measurements. Second, it will interface with other European and national level actors responsible for other components. Third, it will reach out to users, such as the research community, as well as other stakeholders and users (such as the maritime and offshore energy sectors, cultural actors, education professional, etc.). Finally, it will establish a relevant interface and common European and national positions towards the international communities expressed through a dialogue with EuroGOOS[17].

Lines of work could include:

- joint priority setting, identification of areas of strategic interest for technological development, agreements on roadmaps and technical specifications on the basis of common needs;
- coordination of European research infrastructures. For instance, this could include research vessels (building on the experience of EuroFleets[18]), as well as potential collaboration with the industry (e.g. through multi sensor fishing vessels) to address current gaps in marine data collection;
- system design, metrology, work on common standards (e.g. standards on observation and measurement methods, data and meta-data, data processing, digital infrastructures, and reporting requirements, etc.), planning strategies and tools;
- facilitation of multiannual co-funding mechanisms, synergies between programmes and funds;
- coordinated action in the global landscape (within global bodies such as the IOC, the World Meteorological Organisation or regional sea conventions);
- data policies, to be further detailed as part of the forthcoming proposal on an Ocean Act, taking into account several critical elements such as national, EU and international commitments, Member States' competences, European and national autonomy, existing international agreements, security-related constraints, protection of sensitive and security information related to the economic activities and resource management activities, and other relevant legal and operational considerations. Given the sensitive nature of ocean observation in the context of maritime security, it is essential to establish a balanced and mutually agreed data sharing approach among relevant parties where necessary
- opportunities for improved data sharing as access to high-quality in situ data is key to the European Digital Ocean System and for the development of European Digital Twin Ocean applications, especially those of a local and sectoral nature.

Member States are encouraged to set up a national coordination structure, aimed at increasing the efficiency and effectiveness of national and European ocean observation activities.

[17] https://eurogoos.eu/

[18] The aim of Eurofleets, established with the help of successive European Research projects, is to strengthen cooperation and coordination between the European oceanographic fleets in order to optimize and facilitate the deployment of these national marine facilities, see https://www.eurofleets.eu/

1.2. Establishing a European Digital Ocean System

The integration of Copernicus Marine Service and EMODnet into **a European digital ocean system**, and with the appropriate interfaces with WISE-Marine, WISE freshwater and other assets, will further unlock their potential, reduce fragmentation and ensure a seamless operational flow of information from observation to knowledge services. This simplification, supported by an industrial-scale operation, will generate resource and productivity gains, creating a single, reliable, entry point for stakeholders while maximising the value and impact of EU marine knowledge assets.

By improving the collection, access, sharing, and interoperability of ocean data, the system will foster innovation across the blue economy, strengthen the competitiveness of European industries and service providers. It will accelerate the development of new digital applications, forecasting capabilities, and data-driven solutions for public and private users alike, supporting the develoment of a data-driven market.

This digital infrastructure will make it possible to monitor the deployment of ocean observation infrastructure which will help improve coherence and coordination among the different contributors at European and global level.

This emerging operational digital system could benefit from an integrated governance with Copernicus, currently including the Copernicus Configuration Committee and the Copernicus User Forum. In the broad perspective of an effective support to environmental, blue economy and security uses, the integrated governance will allow to build dynamic interactions with all Copernicus services, including the climate, emergency, security and maritime surveillance services and further to the proposed Earth Observation Governmental Service (EOGS)[19].

Defence and security users have specific operational and security needs. Accordingly, there may be a need for the **establishment of dedicated thematic assembly centres /shields** for dedicated and secure data and information production and distribution contributing as needed to national and European defence flagships and other structures (e.g. European Defence Projects of Common Interest or SEAs).

Following the model of operational meteorological monitoring and forecasting, this European digital ocean system will provide reliable and operational services to users across a wide range of sectors and applications. This integration is a prerequisite for successfully making the **European Digital Twin Ocean operational by 2030** and functioning as a comprehensive and trusted public service for ocean knowledge, forecasting, and decision-making, including a source-to-sea approach to reflect the priorities of the Water Resilience Strategy.

Mercator Ocean International is currently entrusted by the European Commission with the implementation of the Copernicus Marine Service and is one of the main developers of the European Digital Twin Ocean. Its ongoing transformation into an intergovernmental organisation will provide the long-term stability and shared ownership required by its strategic role and will help ensuring effective connection of the European digital ocean system with, and reliance on, national digital infrastructures and systems. Through its involvement in Copernicus, Mercator Ocean International will also contribute to Ocean Eye.

[19] https://defence-industry-space.ec.europa.eu/developing-reconnaissance-capabilities-eu-level-2024-01-23_en

Therefore, the Commission proposes to bring together existing European marine knowledge management assets in a European digital ocean system, through the extension of the scope of the Copernicus Marine Service.

Pillar II: The international dimension

2.1 An international alliance for the global ocean observing system

GOOS (Global Ocean Obsesrvation System) coordinates a global system of sustained **in situ** ocean observations, based on Essential Ocean Variables (EOVs) across physics, biogeochemistry, biology and ecosystems. Through a globally integrated infrastructure of ocean observing networks and national and regional observing initiatives, it provides the basis delivering essential ocean information that supports ecosystem-based management, economies, and communities worldwide.

Despite the essential role of in situ ocean observation, the system remains vulnerable to financial and geopolitical disruptions. It still depends heavily on a small number of major contributors and lacks sufficient back up capacity to ensure long-term stability.[20]

Key components, such as Argo and tropical moorings[21], are at risk of degradation, with projections indicating a 35% loss of Argo capacity by 2030 if corrective action is not taken. Significant gaps persist in the Southern Hemisphere, the Arctic, deep-sea regions and coastal zones.

The EU is highly dependent on the global ocean observing system. Flagship services such as those offered by Copernicus (mainly Marine, Maritime Surveillance and Climate services) and the European Digital Twin Ocean require continuous, high-quality global ocean data which have a critical impact on the performance monitoring and forecasting services. Large parts of these global ocean data lie beyond direct EU control.

To address these challenges, the EU and its Member States should strengthen their ocean diplomacy, outreach and strategic partnerships with like-minded third countries on ocean observing data, as well as increase and better coordinate their support for the global ocean observing system. They should assume a stronger global leadership role and call on international partners to join the EU in increasing their contributions and sharing responsibility for sustaining the global ocean observing system. In return, countries would benefit from more observations collected by their peers, generating high-quality marine knowledge.

Therefore, the Commission proposes to:

- **launch an International Alliance to support the global ocean observing system.**

  The objectives of the International Alliance will be to:
  - broaden the support for the global ocean observing system, including through financial or in-kind contributions;

[20] See status Report 2025, available at https://www.ocean-ops.org/goosreport/goosreport2025.pdf

[21] Argo floats are autonomous **drifting** instruments that typically measure temperature and salinity throughout the **water column**, surfacing periodically to transmit data via satellite. Moorings are **fixed** ocean observing systems anchored in place that continuously measure ocean and atmospheric conditions such as temperature, winds, and currents.

- improve the governance approach of the global ocean observing system to make it more structured, effective, and equitably funded, while securing the continuous data collection and access;
- sustain existing ocean observing infrastructure (gliders, buoys, observatories, Argo floats, etc.);
- close critical in situ observation gaps, to complete global networks, expand them into coastal domains and address blind spots;
- support international and multilateral commitments, including the implementation of Sustainable Development Goal 14 and the BBNJ (Biodiversity Beyond National Jurisdictions) Agreement[22], by enabling evidence-based decision-making.

Members of the international alliance for the global ocean observing system may include countries, philanthropic organisations and private partners. They should make commitments in line with their respective capacities. These commitments may include mobilising financial resources, providing access to observation capacities (such as observation vessels, sensors, drones and submarine cables), investing in and/or providing access to observation and digital infrastructures, dedicating human and technical capacity to the IOC or GOOS, and making available relevant data. Participation in the International Alliance will ensure better coordination of global ocean observation efforts thus rendering the use of infrastructure and assets more effective.

- **establish a strategic partnership with the IOC**

  As the intergovernmental body that coordinates GOOS and the International Oceanographic Data and Information Exchange, the IOC provides the institutional framework within which strategic priorities, standards and implementation arrangements are shaped.

  Through the OceanEye structured governance at European level, the EU will be able to establish common European positions on important issues such as priority setting, gap identification, standards, and the further development of the system.

  Therefore, the Commission will propose a Memorandum of Understanding between the EU and the IOC. that will ensure closer alignment between GOOS, the proposed European governance and the international alliance.

- **as a starting point, contribute to the Alliance in two ways**:

  Through the EMODnet Global Data service,[23] by extending the mandate of EMODnet to actively contribute to more resilient international marine in situ data flows;

  Through a dedicated EUR 50 million action under the current Horizon Europe Programme to strengthen the global ocean in situ observing system.

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22 https://www.un.org/bbnjagreement/en

23 EUR 12 million public procurement. https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2026-2027/wp-9-food-bioeconomy-natural-resources-agriculture-and-environment_horizon-2026-2027_en.pdf

The Commission will explore, together with Member States, how the EU can further support global ocean observation through improved coordination and greater long-term financial predictability.

2.2 Supporting global capacity development

A robust global ocean observing system is vital for the countries and regions most vulnerable to climate and oceanic changes, notably small island developing states (SIDS) and least developed countries (LDCs) which are at the forefront of risks related to climate change and biodiversity loss, and which need sustainable ocean economies the most.

The participation of SIDS and LDCs in the International Alliance will ensure that they can meaningfully shape the design and priorities of the global ocean observing system, without making their engagement contingent upon their domestic capacity to finance and operate observing infrastructures.

In addition, the EU will consider a range of instruments (including financial instruments) that could be mobilised by the EU and other actors to further support global ocean observing, in line with the Global Gateway strategy and the Pact for the Mediterranean, where relevant, to:

- **support efforts of SIDS and LDCs in developing their own observing capacities**, for instance by building on EU technologies, and contributing to the global ocean observing system;

- **co-develop digital tools with and for states and regions with limited capacities**, ensuring they have access to tailored support and capacity-building initiatives.

Pillar III: The operational and industrial dimension

3.1 Operationalising the digital infrastructure

The European Digital Twin Ocean aims to make ocean knowledge readily available to the public, entrepreneurs, scientists, and policymakers. Subject to the data policy to be further defined in the Ocean Act, it is conceived as a public good and therefore proposed to be owned by the European Union. Through its core infrastructure, EDITO[24], it provides a virtual representation of the ocean, enabling seamless access to integrated and actionable marine information.

The European Digital Twin Ocean needs to harness **unprecedented operational digital capacities, including high-performance computing, artificial intelligence and advanced cloud infrastructures,** to process and analyse vast volumes of ocean data and run complex, scalable simulations across all domains, from physics processes to socio-ecological systems. It integrates historical and real-time data from multiple sources, including satellites, sensors, numerical models and even personal devices like smartphone applications. Moving well beyond monitoring, it allows users to explore "what-if" scenarios, simulating the potential impacts of different policy options, climate warming scenarios/trajectories or economic activities before decisions are taken. However, dedicated digital infrastructures providing the

[24] https://www.edito.eu/

computing capabilities that meet the operational requirements of the ocean digital services are currently lacking.

Therefore, the Commission proposes to:

- **support the further development of the European Digital Twin Ocean (DTO)** so that it is **fully operational at the latest by 2030**, as a public service for the Europeans and as an offering for the rest of the world, possibly through integrating it into the Copernicus Marine Service and ensuring interoperability and synergy with Destination Earth, HPC, cloud and AI infrastructures;
- **develop a joint plan with relevant initiatives** (notably Copernicus and Destination Earth) for acquiring appropriate high performance computing capabilities, tailored to address their operational requirements and contribute to the Digital Ocean System and the broader ecosystem of Earth-system modelling;
- **provide support for research and innovation for developing targeted European DTO applications for policy** for both the public and private sectors, also by building on existing DTO components, such as the EC Blue2 modelling framework applications;
- **develop the marine thematic node of the European Open Science Cloud (EOSC)[25], as a component of EDITO**, ensuring the interoperability of ocean data with other thematic EOSC nodes;
- **by 2030, fully operationalise the source-to-sea digital continuum** that underpins both the Ocean Pact and Water Resilience Strategy, by developing coupled models among Copernicus, the European Digital Twin Ocean and Destination Earth and by establishing standardised open-source connectors to bridge the gap with local inland waters digital systems;
- **facilitate the development of downstream services** for the public and local stakeholders, particularly by supporting demonstrators, prototypes, common technical specifications and training in order to support resilience strategies, inform biodiversity conservation plans, and facilitate the contributions of locally generated data, including through citizen science;
- **remain mindful of the needs of the EU's outermost regions and islands, low-income countries and small island developing states**, and explore the development of tailored services, targeted training, and support for access to and use EU infrastructures for the development of their own capacities.

3.2 Strengthening Europe's ocean observation innovation and industrial base

Knowledge is a key asset. In a context of growing climate risks, maritime interdependence and geopolitical competition, the ability to explore the ocean has become a strategic asset.

Although no single authoritative study consolidates all relevant activities under a single ocean observation category, different studies indicate that the **global annual ocean observation market is worth between EUR 10 and 20 billion**, with a compound annual growth rate of

[25] https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/our-digital-future/open-science/european-open-science-cloud-eosc_en

around 5-10%. This serves a much larger business ecosystem worth EUR 40 to 90 billion, in which the United States holds the largest share.[26,27]

For the **EU**, becoming a global leader in ocean observation technologies is therefore a fundamental **economic and geopolitical choice** and a strategic imperative for resilience and competitiveness in a rapidly changing geopolitical context.

Particular attention will be given to deep-tech startups and scale-ups developing breakthrough solutions in sensors, autonomous systems, value added services based on data and data products, artificial intelligence, and digital twins. In line with its startup and scale-up strategy, the Commission will work towards supporting the transition from research to market, improving access to finance and use public procurement to stimulate demand and accelerate deployment, possibly through regulatory sandboxes[28].

Innovation policy will therefore combine technology push with demand-driven development. Ocean observation technologies must respond to clearly set out industrial, policy and regulatory needs, including climate adaptation and mitigation, environmental compliance, security and defence, fisheries and aquaculture, biodiversity monitoring, marine protected areas, offshore infrastructure protection, maritime safety, transport, tourism and offshore energy. Aligning research, regulation and market demand would accelerate deployment and help European companies to capture emerging markets in cost-effective and autonomous monitoring, AI-enabled ocean intelligence, and integrated space-ocean systems.

Dual-use and security-by-design considerations will be integral to this approach. To strengthen maritime domain awareness, particularly in maritime security, military mobility, and the climate and defence nexus - while protecting critical underwater infrastructure and developing secure data architectures, it is necessary to have resilient and trusted technologies. By embedding cybersecurity, compliance and interoperability into system design, the EU can position itself as a global provider of secure and responsible ocean intelligence solutions addressing among others needs from Security and Defence Partnerships.

As malicious actors increasingly exploit grey-zone tactics, ranging from cyberattacks and sabotage to foreign information manipulation and interference, including disinformation, robust maritime observation capabilities - from space to the seabed - are essential for detecting, deterring, and mitigating risks before they escalate into systemic disruptions. By improving real-time monitoring and information-sharing mechanisms, the EU can strengthen its strategic autonomy while countering hybrid interference that seeks to exploit vulnerabilities in the maritime domain and enhancing resilience against kinetic and non-kinetic threats.

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[26] 2021 study "Uptake of new technology for ocean observation", Service Contract EASME/EMFF/2020/3.1.16/SI2.833154-SC08. Updated and improved figures will emerge from the ongoing "Study on the competitiveness of EU sustainable blue economy sectors: focus on ocean observation technologies" Service Contract CINEA/EMFAF/2025/3.5/Lot2/02/SC10/4500128122 implementing framework contract No CINEA/2021/OP/0011 – LOT 2.

[27] The Ocean Enterprise 2015-2020: A study of U.S. New Blue Economy business activity

[28] For instance, by clarifying and enabling low-risk ocean observing activities to the EEZs, reducing administrative barriers, in full respect of sovereign rights and jurisdiction of coastal States under United Nations Convention on the Law of the Sea (Marine Scientific Research regime)

The new European Competitiveness Fund, working in synergy with the next Horizon Europe programme, will provide seamless support to European innovators, from research and innovation to deployment also for technologies relevant to ocean observation, in line with the proposed "Moonshot" ambition. Synergies and complementarities of measures under the relevant EU spending programmes for ocean observation policy will be pursued in line with their respective policy objectives and governance.

Therefore, the Commission proposes:

- **promoting a coherent innovation-to-investment journey** in line with the proposed 'moonshot' ambition;
- **setting out priorities for ocean observation in its research and innovation strategy for Ocean and Water** and strengthen the investment journey, from fundamental research to innovation and scaling up;
- **using EC Strategic Foresight**[29] to support the development of a robust and resilient system;
- **committing EUR 30 million for a European Innovation Council thematic challenge on ocean observation technologies**, under the Horizon Europe work programme for 2027, to prepare key innovation pathways to leverage investment in view of OceanEye.

Pillar IV: Strategic partnerships, education and skills, culture and societal ownership

4.1 Deepening collaboration with private, national and international initiatives

Beyond the international alliance, the OceanEye initiative will proactively build strategic partnerships with private actors, national programmes and international initiatives to strengthen the coherence and global impact of ocean observation.; including in the context of Security and Defence Partnerships that have a maritime security component, or in key regions such as the Arctic.

By aligning investments and priorities, the initiative will leverage national capacities and research infrastructures while fostering engagement with industry. One notable example is **Mission Neptune,** an international initiative; recently launched by the French government, to accelerate deep-ocean exploration.

Furthermore, the recently launched Knowledge and Innovation Community on Water[30] (EIT Water) under the European Institute of Innovation and Technology is building a strong European innovation ecosystem around water and ocean innovation. It will contribute to the objectives of the initiative by bringing together top businesses, research centres, and

[29] https://joint-research-centre.ec.europa.eu/strategic-foresight-eu_en

[30] Focusing on Water, Marine and Maritime Sectors and Ecosystems

universities to provide entrepreneurial education, innovation-driven research and business support activities.

Existing philanthropic activities promoting ocean protection and/or conservation, for example through marine protected areas, could be strengthened with an observation and/or exploration component to make them more effective and strategic. The OceanEye initiative will further mobilise philanthropists, promote social engagement and enhance international visibility, particularly through common branding, recognising that sustained ocean observation requires broad societal support as well as public investment. To increase visibility of OceanEye, a **label** for all infrastructure contributing to the initiative will be developed.Through co-investment mechanisms and coordinated programming, the OceanEye initiative will create a trusted ecosystem in which public and private actors will work together to deliver sustained observations, innovation and operational services.

4.2 Connecting Europeans to the ocean: ocean observation as a pathway to connecting people and inspiring civic engagement and action

When translated into meaningful action, ocean observation can reshape how Europeans understand, value and relate to the ocean. To foster collective societal ownership, the OceanEye initiative will develop a strong educational, cultural and outreach dimension, that bridges science, entrepreneurship, art, education and society. The Commission will explore – for example under the New European Bauhaus - the development of lines of action linking art, culture and ocean science in order to bring ocean observation out of offshore laboratories or digital dashboards and bring it into public spaces, ports, museums and coastal cities across Europe. The aim will be not only to communicate science, but also to cultivate imagination, empathy and shared stewardship.

Ocean observation is also a source of high-quality employment and innovation. By showcasing career pathways and connecting education with industry, the Commission will support the development of a skilled workforce capable of sustaining Europe's leadership in the blue and digital economies, including through a **blue generational renewal strategy** in 2027. Emphasis will be placed on interdisciplinary skills that bridge science, digital technologies, engineering and communication.

The OceanEye initiative will further strengthen ocean literacy by leveraging the **EU4Ocean** coalition[31], which has enhanced Europeans' knowledge of our ocean and waters since 2020, and other scientific and educational networks such as the Network of European Blue Schools, the Youth4Ocean Forum, the European Atlas of the Seas, the Education for Climate Coalition, and the eTwinning network on the European School Education Platform.

Therefore, the Commission proposes:

- **launching the New European Bauhaus Ocean, Coastal and Island Communities Lab,** seeking to bridge ocean observation with art, design and civic engagement and bringing ocean knowledge closer to society. This could take the form of travelling

[31] https://maritime-forum.ec.europa.eu/theme/ocean-literacy-and-blue-skills/ocean-literacy/eu4ocean-coalition_en

installations, public events or collaborations with museums, artists, research institutions, cultural networks and civil society, translating ocean data into accessible and meaningful experiences and fostering a stronger bond between Europeans and the sea and transforming ocean observation into a civic and cultural tool;

- **bringing ocean observation in education, in particular, to children and young people through EU4Ocean by** making ocean observation the overarching theme of EU4Ocean's activities in 2027 and thereby supporting the objectives of the OceanEye initiative. Through an **Ocean Observation Week** in schools, European Blue Schools and youth projects, awareness campaigns, a thematic working group and dedicated #MakeEUBlue awards, EU4Ocean will support and recognise initiatives that combine ocean data with education and public engagement. In collaboration with UNESCO, EU4Ocean will host a summer school where young people from Europe and beyond can learn about and engage directly with ocean observation;
- **promoting knowledge-based jobs and skills** linked to ocean technologies, data science, maritime operations and environmental monitoring, with particular focus on supporting early-career ocean professionals including though maritime vocational education. These efforts will be complemented by EU4Ocean mentoring and traineeship schemes for young people interested in ocean-related careers, as well as dedicated workshops at key European flagship events such as the European Youth Week, European Ocean Days and European Maritime Day.
- **launching annual communication campaigns in collaboration with the EU research vessels fleet**, to open research vessels to the public in European ports.

V. Access to finance and investment

The **annual financing needed** to achieve the level of ambition for the OceanEye initiative, has been **estimated at three to four times the current level of investment**. Significant investment needs have been identified to sustain and improve the in situ ocean observation network, develop digital tools for knowledge integration and support continued research investments to further develop services.

Meeting these investment needs requires the coordinated use of current and future EU funding, national measures, and actions to attract private capital across the entire innovation to investment journey. Dedicated advisory, matchmaking and project pipeline tools, such as BlueInvest[32] and the EIB Advisory under the InvestEU Advisory Hub[33], can facilitate access to resources and create favourable conditions for financing projects.

However, key gaps remain:

- In situ observation infrastructures should be made operational, shared and compliant with quality standards and common technical specifications. There is also a need for dedicated operational digital infrastructures.
- Ocean observation systems are characterised by short-term, research project-based funding, while the substantial investments required for technological capacity building, are infrequent and lack well-defined time horizons. Long-term operational funding is

[32] https://maritime-forum.ec.europa.eu/theme/investments/blueinvest_en

[33] https://investeu.europa.eu/investeu-programme/investeu-advisory-hub_en

required to ensure the continuous operation of the systems and to strengthening the observation networks (e.g. deep-sea moorings and biological monitoring).

- EU funding is fragmented with distinct rules and timelines, leading to limited predictability and insufficient strategic coherence. The proposal for the next multiannual financial framework aims at addressing such fragmentation.
- Private-sector engagement is limited, particularly in high-capital-expenditure areas such as autonomous underwater vehicles and satellite constellations, and insufficient support for data standardisation and interoperability, which hinders the ambition of the European Digital Twin Ocean.

Starting in 2026 and 2027, the Commission will mobilise available resources and existing instruments in support of the OceanEye initiative.

To support the innovation-to-investment journey, **the Commission will explore how its full range of instruments can best work together in synergy and complementarity**. Horizon Europe will aim to continue to support breakthrough research and demonstration and, under the European Innovation Council, will back high-risk, high-impact innovators.

The next multiannual financial framework could help support the objectives of the OceanEye initiative, including through the proposed European Competitiveness Fund (ECF). National and Regional Partnership Plans could support fisheries, aquaculture, marine activities and the European Ocean Pact.

The Commission calls on the Member States to increase their support for ocean observation and align national budgets with EU priorities, ensuring stable funding for improved long-term observation series.

Member States are also encouraged to:

- **expand national ocean observation programmes**, align national marine research budgets with EU priorities and ensure stable funding for long-term observation series;
- **promote public procurement of ocean observation services**, for example through pre-commercial procurement to stimulate innovation in real-time marine data delivery for public agencies;
- **foster industry-academia partnerships** for example by encouraging national innovation agencies to support ocean tech incubators and living labs, including testing autonomous gliders in real-world conditions.

Conclusions

Ocean observation and the marine knowledge value chain are critical for sustainability, competitiveness, resilience, strategic autonomy and security. Yet, in Europe and globally, ocean observation is fragmented, faces funding constraints and data gaps, and lacks efficiency and operational commitment. These challenges are exacerbated by a shifting geopolitical context, creating strategic dependency risks.

The OceanEye initiative is a strategic EU endeavour to deliver a comprehensive operational European ocean observing system.

By further developing and mobilising the full range of partnerships, infrastructure and marine knowledge assets at its disposal, the EU can secure its strategic autonomy in ocean observation, infrastructure, data and information services while also recognising its dual use, and position itself as a reliable global partner and a value-driven leader in international cooperation.

The upcoming legislative proposal for an Ocean Act will develop a robust, integrated, and multidisciplinary European marine knowledge value chain — turning data into action, and science into solutions for all. This will strengthen the competitiveness of the European industrial ecosystem for ocean observation technologies and user-centred services.

The Commission will work with the other EU institutions, Member States, stakeholders, and international partners to deliver this operational system, partnerships and governance that lie at the heart of the OceanEye initiative.