European Union and its Member States contribution for the 2025 United Nations Informal Consultative Process on Oceans and the Law of the Sea

"Capacity building and the transfer of marine technology: New developments, approaches and challenges"

<u>European Union</u>

Contribution of the European Union on the topic of focus of the twenty-fifth meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea: "Capacity building and the transfer of marine technology: New developments, approaches and challenges".

Capacity building and transfer of marine technology under the BBNJ Agreement and beyond

The European Union has consistently emphasised the importance of and supported capacity building and the transfer of marine technology (CBTMT) as essential components for the conservation and sustainable use of marine biodiversity, particularly in areas beyond national jurisdiction (ABNJ).

For example, the EU has provided financial support to the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) to build capacities of Parties to implement CITES listings of marine species, including sharks and rays, eels, and sea cucumbers, as well as developing non-detriment findings for specimens of CITES Appendix-II species taken from areas beyond national jurisdiction. Also, the EU supports that capacity-building and technical assistance should apply to activities covered by the future international legally binding instrument on plastic pollution given that plastic pollution, in marine and other environments, can be of a transboundary nature.

Part XIV of the United Nations Convention on the Law of the Sea (UNCLOS) focuses on capacity building and the transfer of marine technology to developing States by stressing the need to strengthen their scientific, technological, and institutional capacities. This includes sharing marine technology and expertise to enhance the ability of States to manage and conserve marine resources, conduct research, and protect and conserve the marine environment.

Likewise, CBTMT is an integral part of the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement). It aims to support the implementation of the Agreement in all its dimensions in a balanced way with a view to achieve its objectives of and contribute to sustainable development.

To achieve this, international cooperation under the BBNJ Agreement will play a crucial role. It can take any relevant form, including partnerships involving relevant stakeholders, and cooperation and coordination with relevant existing instruments, frameworks, and bodies. This cooperation shall involve full recognition of the special requirements of developing States Parties and take into account the special circumstances of Small Island Developing States and Least Developed Countries.

Cooperation should enable cross-sectoral capacity-building and contribute to improve coordination within ministries, amongst sectors and stakeholders nationally, regionally and globally. Coordinated approaches should improve ocean governance both within and beyond areas of national jurisdiction.

In recognition of this, the EU has launched an EU Global Ocean Programme of EUR 40 million, which will inter alia assist in building capacities of partner developing countries, in particular Small Island Developing States and the Least Developed Countries, to fully contribute and benefit from conservation and sustainable use of biodiversity beyond national jurisdiction.

The programme will provide support to those countries, at both national and regional levels, to ensure that capacities are developed where most needed. Through this programme, the EU aims to focus on

I. Enhancing capacities to respond to key global biodiversity-related processes in areas beyond national jurisdiction (e.g. by establishing a Technical Assistance Facility to deliver targeted and needs-assessed technical assistance for example preparing for the implementation of the BBNJ Agreement in relation to environmental impact assessments, access and benefit-sharing from marine genetic resources, area-based management tools (ABMTs)/Marine Protected Areas (MPAs), etc.);

II. Expanding access to Marine Genetic Resources (MGR) and related data and capacities to perform and undertake research on MGRs and related data and benefit from their use (e.g. by providing needed assessments, planning, governance, knowledge and training, procuring additional infrastructure and equipment necessary to create long-term biorepository facilities and laboratories with the capacity to generate and utilise MGR and data, identifying and planning for long-term financial and operational sustainability, and by promoting the participation of women);

III. Enhancing capacities to develop state of the art proposals for ABMTs including MPAs in ABNJ to be submitted to the future BBNJ Conference of Parties (e.g. by providing technical assistance and/or seed funding for other emerging sites, or for the identification of potential sites that have the potential to become ABMTs/MPAs in areas beyond national jurisdiction.

The EU believes that the BBNJ Agreement offers many opportunities to enhance cooperation, coordination and synergies among the many ocean stakeholders, enhancing transparency to many existing initiatives and triggering the implementation of many others, offering increased opportunities for capacity building and technology transfer to the benefit of developing countries.

In addition, the EU is mainstreaming the objectives of the BBNJ Agreement, and more generally the ocean dimension, in the regional programming of its development cooperation instruments. Developing countries that identify ocean related activities as key for their development can cooperate with the EU, including for the transfer of marine technology.

For instance, the EU has recently adopted ocean-related regional programmes[1] for sub-Saharan Africa that also include capacity-building activities. The EU funding amounts to EUR 170

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[1] West Africa Sustainable Ocean Programme, Blue Benguela Current Programme, the Central Africa Regional Ocean Programme, and the Sustainable Western Indian Ocean Regional Programme.

million and includes three pillars and a technical assistance component, namely, international ocean governance, sustainable and inclusive blue economy, and conservation/restoration of marine and coastal ecosystems. These programmes will deliver, among others, thematic expertise on climate risks and vulnerability assessments, biodiversity beyond national jurisdiction, use of nature-based solutions for blue economy, fisheries statistics and transparency, innovative blue economy finance, etc. They will also provide technical support services, e.g. thematic studies, knowledge-based products, economic assessments, legal advice, policy drafting and development, legal drafting, sector analysis, policy dialogue, etc. The specificities and needs of each region, country and ocean-related institutions in sub-Saharan Africa will be taken into consideration.

Another example is the BlueInvest Africa initiative. Since 2022, the EU organises match-making events between African entrepreneurs active in the blue economy and investors. The focus of the initiative is on supporting innovation, improving the business and investment environment, boosting the creation of decent jobs and value addition through sustainable investments as well as finding solutions to protect biodiversity and sustainably use natural resources. A capacity-building programme ("coaching programme") is offered to selected entrepreneurs prior to their pitches on issues such as balancing sustainability and profitability; crafting a clear value proposition, revenue streams and competitive advantage; developing financial projections and funding needs, etc.

The EU is also considering supporting the capabilities of developing countries in sub-Saharan Africa in ocean monitoring and prediction, which is another area where technological and capacity gaps are hindering conservation and sustainable use of marine biodiversity. The recently signed agreement with Mercator Ocean – Ocean Prediction Enhancement in Regions of Africa (OPERA) will notably enable African partners to develop their own fit-for-purpose Ocean prediction tools, applications, and services to meet their needs. OPERA will also be implemented through African institutions that have some initial capacities in ocean forecasting.

Further, the EU has been actively contributing to capacity building exercises carried out through the Regional Fisheries Management Organisations (RFMOs), particularly in the areas such as surveillance and control, participation in regulatory processes and ensuring regulatory compliance, as well as scientific advice on oceanic fisheries. Financial support and training assistance provided by the EU and the EU Member States contribute to capacity building exercises to support our RFMO's developing partners and Small Island Developing States.

By their very nature, RFMOs play a key role in identifying and addressing capacity-building needs, as well as facilitating technology transfer. Achieving sustainability for international and straddling fish stocks requires a true level playing field among all RFMOs' Contracting Parties. This can only be realised through robust and well-coordinated cross-regional capacity-building initiatives and the effective, timely, and appropriate transfer of technology. In this context, innovative technologies, including those relying on artificial intelligence, to support fisheries research, data collection, fisheries monitoring, and enforcement of regulations are worth a particular note. The lack of wide dissemination of such technologies could further exacerbate disparities between RFMOs' Contracting Parties in their abilities to manage stocks effectively. This might raise significant management imbalances and challenges that could undermine sustainable management of shared stocks.

Moreover, as far as good coordination across the regions is concerned, the UN, particularly the FAO, have a central and coordinating role to play, by working closely with RFMO Secretariats to ensure effective and harmonised implementation of conservation and management measures adopted by RFMOs.

Maritime Spatial Planning (MSP) is another domain, where the EU is active. Following the first MSP roadmap (2017-2021), the EU and IOC-UNESCO have launched an "Updated Joint Roadmap to accelerate Marine/Maritime Spatial Planning processes worldwide" – MSP roadmap (2022-2027). The roadmap covers a set of six priority areas, including knowledge support and capacity development and is supported by a new project (MSPglobal 2.0), where the EU is contributing with a budget of EUR 1 million. Overall, MSPglobal 2.0 aims to enlarge and to strengthen the pool of practitioners and stakeholders ready to support MSP. New capacity development and awareness opportunities will be created through a multilingual online training, communication activities, trainings, and workshops. Through national and regional activities, the project provides support towards institutionally strengthened MSP processes.

Since the first edition of the Our Ocean Conference (OOC) in 2015, the EU is strongly committed towards ocean sustainability. The EU is playing an active role and is one of the biggest donors in terms of commitments announced. At the ninth edition of the OOC in 2024, the EU announced 40 commitments for action worth EUR 3.5 billion, representing the biggest amount ever announced by the EU since the start of the Our Ocean Conferences.

Since 2015, the EU has announced commitments covering all OOC themes: marine protected areas, climate change, marine pollution, sustainable fisheries, sustainable blue economy and maritime security. For instance, the EU committed EUR 1.5 million to support the Sixth Port State Measures Agreement (PSMA) Global Capacity Development Programme Support Project, which aims to strengthen the implementation of the FAO PSMA to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) fishing and complementary instruments and tools to fight IUU fishing. Specifically, the Project will contribute to: i) a strengthened functioning of the PSMA and the running of the PSMA Global Information Exchange System (GIES); ii) increased capacities of developing States to implement the PSMA; iii) a strengthened implementation of complementary instruments and tools such as the FAO Voluntary Guidelines for Transshipment (VG-TS), the FAO Global Capacity Development Portal (GCDP) on IUU fishing, and the FAO Technical Guidelines for the estimation of IUU fishing.

These are only few examples. All of them include capacity-building and the transfer of marine technology, be it in the form of information, data, knowledge or strengthening of individual and institutional capacities, material and equipment.

Digital Ocean: technology transfer for operational and robust digital ocean systems

To ensure ocean health and effective governance, national and international policymakers need responsive, reliable, and transparent processes for decision-making and impact-assessment. In this respect, accurately depicting and predicting the state of the ocean is crucial. Digital Ocean systems enabled by cutting-edge science and technologies, are a game-changer in our abilities to do so.

The digital transformation of ocean science relies on the development of robust, integrated digital infrastructures that allow for real-time data access, analyses, forecasting and related

downstream application. As an example, the EU Digital Twin of the Ocean (EU DTO), which currently depends primarily on the Copernicus Marine Service (CMEMS) and the European Marine Observation and Data Network (EMODnet) data programs, represents the latest on-going evolution in operational oceanography and ocean socio-ecological systems. A digital twin of the ocean is a virtual representation of the ocean and its systems, using historical and real-time data and models to represent the past and present, and to simulate future "what if" scenarios.

At the EU level, the Copernicus Marine Service is a reference of ocean science collaboration. This fifteen-years pan-European network of experts provide reliable, science-backed, and updated information on the global ocean and European regional seas. Through the daily use of its ocean data by thousands of users, the Copernicus Marine Service demonstrates that ocean observations and modelling are key for deploying applications and solutions. The Service is providing already multiple capacity building opportunities on the use of their resources globally.

The European Marine Observation and Data Network (EMODnet) is the EU's in situ marine data service representing a trusted source of marine environmental and human activities data serving a diverse, multi-sectorial users base, through the open and free delivery of harmonized, standardized, and interoperable data and products.

The EU DTO can help the ocean economy by providing insights and information that can be used to optimize operations and improve decision-making by all ocean actors to mitigate the impacts of human activities, such as pollution and climate change, on the ocean and its ecosystems. For example, a digital twin of the ocean can be used to: monitor and track the movements of fish stocks, which can help with sustainable fishing practices; to identify and predict the impact of human activities such as pollution, shipping, and marine energy exploitation on ocean biodiversity and ecosystems, allowing for proactive measures to be taken to minimize these impacts; to monitor and predict ocean currents, tides, weather patterns, extreme heat waves and sea level rise, which can help with the planning and management of coastal and offshore infrastructures and areas.

By integrating artificial intelligence, machine learning, delayed mode and real-time ocean observations and models, the EU DTO, conceived as a public good to foster the development of such digital twins, will enable policymakers and stakeholders to simulate ocean scenarios, predict changes, and assess risks. Digital Twins are not designed to operate isolated from other systems. The EU DTO will be interoperable, connected with national and international systems for integrated support to sustainable ocean management, policymaking, and climate resilience.

Under the EU Mission "Restore our Ocean Waters by 2030 and the EU DTO, the ambition is to make ocean knowledge readily available to citizens, entrepreneurs, scientists and policymakers by providing them with an innovative set of user-driven, interactive and visualisation tools. This knowledge will help design the most effective ways to restore marine and coastal habitats, support a sustainable blue economy and mitigate and adapt to climate change.

Through its different initiatives, the EU is committed to play a significant role in supporting capacity building and technology transfer in this domain, putting particular emphasis in providing benefits for developing countries.

Enhancing marine safety and security through the transfer of Galileo and EGNOS technology

The benefits of the EU Galileo and EGNOS satellite navigation systems lie on enhancing marine safety and security, particularly in the areas of navigation, search and rescue (SAR), and emergency response. It is important to note that Galileo and EGNOS services are free for use worldwide and that the use of the intellectual property rights generated by those programmes are authorised subject to the terms described there.

Galileo's Open Service and High Accuracy Service offer high-accuracy positioning and timing information, which can be used by ships and vessels to improve navigation and safety. The system provides a robust and reliable positioning solution down to decimetre accuracy, not possible with traditional GPS signals. This is particularly important for ships operating in challenging conditions, where the risk of navigation errors is higher.

The Galileo Open Service Navigation Message Authentication (OSNMA) is a critical component of the Galileo system, designed to ensure the authenticity and integrity of the Galileo navigation message. By ensuring that the Galileo navigation is not forged, the position solution computed based on Galileo signals is resilient to many spoofing attacks, which impact the maritime traffic on a daily basis in many strategic regions around the globe. The Galileo Signal Authentication Service (SAS) is designed to authenticate the Galileo signal, ensuring that it has not been tampered with or altered in any way. This is particularly important for applications where navigation accuracy and reliability are critical, such as in marine navigation and SAR operations.

The Galileo Search and Rescue Service (SAR) enables the location of vessels and people in distress, allowing for swift and effective response from rescue teams. The system's high accuracy and reliability make it an essential tool for SAR operations, reducing the time and effort required to locate and rescue people in distress. The Galileo SAR return link service allows for two-way communication between the ground segment and the distress locator, facilitating the exchange of critical information between rescuers and the person in distress. Furthermore, the return link service will also include the capability for Remote Beacon Activation, allowing authorized personnel to activate distress beacons on board vessels from the ground in cases where the crew is incapacitated, or the vessel is overdue and lost. Future functionalities will include the capability to share the person's location with nearby vessels in real-time, enabling more effective and targeted rescue operations.

The Galileo Emergency Warning Satellite Service (EWSS) is an important part of the Galileo system, designed to provide timely and accurate warnings in emergency situations. EWSS allows national civil protection entities to send alerts to population in the event of a disaster and to provide the necessary instructions to follow. The EU has already been promoting the use of EWSS in coastal communities that are sensitive to ocean-related hazards. By extension, EWSS could also be used in the ocean and open seas, where exploitation, exploration and research activities take place.

While EWSS is currently proposed to EU MS only, the EU stands ready to explore with the United Nations the operational and legal mechanisms allowing the use, by other nations, of this innovative technology, thereby helping developing countries access the benefits of the ocean and seas. The European Commission is coordinating the development of EWSS with the United Nation's programme "Early Warnings for all (EW4ALL)".

Furthermore, EGNOS Safety of Life (SoL) service plays a crucial role in enhancing maritime navigation and safety across European waters. By augmenting GPS signals, EGNOS provides highly accurate and reliable positioning information, essential for ensuring safe navigation, particularly in challenging environments such as narrow straits, busy ports, and during coastal approaches. By improving situational awareness and offering integrity warnings, EGNOS SoL enhances decision-making for mariners, reinforcing Europe's maritime infrastructure and supporting the sustainability of marine transportation.

The transfer of Galileo and EGNOS technology to developing and/or coastal States presents various opportunities. The technology has the potential to improve marine safety and security, as well as enhance economic development through improved navigation and communication. However, there are also challenges associated with the transfer of technology, including the need for training and capacity building.

The EU encourages the use of these systems which offer added-value services with respect to alternatives, to enhance marine safety, security and authenticated navigation and emergency and SAR operations.

Maritime transport

Capacity building in the context of the energy transition involves developing skills, knowledge, and infrastructure to adopt and optimise new marine technologies. Initiatives such as technical training programs, collaborative research projects, and public-private partnerships have gained prominence. The International Maritime Organization (IMO) has been instrumental in promoting such capacity-building efforts, particularly in developing countries, through initiatives like the IMO Global MTCC ("Capacity Building for Climate Mitigation in the Maritime Shipping Industry") Network, which is funded by the EU.

A critical area of focus in capacity building is enabling the use of new types of fuels (e.g. bio- or e-methanol and -ammonia) and technologies (e.g. fuel cell-based technologies, wind assisted propulsion) on ships. This involves equipping seafarers and maritime workforce with the necessary skills to handle alternative fuels and new technologies, which require specialized bunkering, storage, handling, with appropriate safety protocols. At IMO level, with strong support from the EU, guidelines for training seafarers for using alternative fuels and new technologies are being developed.

The EU, under its Global Gateway Policy is also developing a flagship initiative to promote the creation of green shipping corridors with partner countries around the world.

<div align="center">**Portugal**</div>

1. Capacity building

Considering the fast-paced evolution of ocean/blue technologies, together with the need to increasingly rely on multidisciplinary approaches, the UNSG's Report on the 2025 ICP topic of focus should highlight, among others, the following adjacent themes:

1.1 Challenges

- Hardship in adapting to the fast-paced tech evolution and digital transition trends on the ocean sector due to the lack of qualified human-resources. There is a need to invest in training, reskilling and upskilling to adapt to emerging methods and tools in marine science and management, mainly for LDC, SIDS and LLDC.

- Early-career Ocean scientists face precarious employment, limited funding and unclear career paths.

- Building a skilled workforce requires long-term investment in education, training, and the creation of Institutional frameworks to support research and development (R&D).

- Persisting inequity in science capacity worldwide, leading to significant skill gaps in marine science and technology, especially in developing countries.

- Lack of comprehensive Technology Foresight and Technology Assessment processes, which can identify future technology trends and enable countries to harness and adapt to those changes.

1.2 New developments/approaches

- Develop new and attractive formats and materials to provide the best possible education for young talents, including the creation of curricula that integrate natural sciences, socioeconomics, policy, as well as strong computational skills.

- Improve professional skills and competencies of those working and being trained to work within ocean-related sciences.

- Development of e-mentoring platforms, establishing virtual incubators, and leveraging digital technologies for training in blue skills.

- Addressing skills gaps including the promotion of a more efficient science-academia-industry cooperation, including apprenticeship opportunities in industry and start-ups.

- Focus on long-term career development and retention through mentorship and stable funding.

- Development of learning and training ocean platforms and networks. As an example, the [All-Atlantic Joint Pilot Action on Capacity Development (AA-TP)](#) was established as a tool to identify training needs, gaps, initiatives and create workshops, summer schools, and floating universities for the benefit of early-career scientists and technicians in Ocean Science.

- At the level of Ocean Literacy: i) produce educational materials accessible to the public, such as videos or infographics, that demonstrate the relevance of the ocean to society and the economy; and ii) engage local communities in activities related to ocean science.

1.3 Considering the less developed countries

- There is a need to share/transfer technology, in mutually agreed and voluntary terms, but most importantly to adapt the technology to the local reality, strengthening local institutions, skills, and governance structures to ensure long-term sustainability.

- Support underrepresented groups and recognize traditional practices.

- Promote equitable partnerships by establishing joint research agendas, co-developing programs, aligning priorities, building long-term relationships.

2. Technology transfer (in mutually agreed and voluntary terms)

2.1 Challenges

- Increase knowledge uptake into higher development stages and market opportunities.

- Despite substantial investment in R&I, many initiatives struggle to overcome the hurdles of regulatory approval, large-scale deployment, market readiness, and industry adoption.

- Inherent complexity of ocean-related technologies, which leads to long development timelines.

2.2 New approaches

- Promote the collaboration between academia, private companies, and governments to transfer marine technologies and innovations.

- Mentoring of research efforts through a fit-to-purpose co-design process, engaging potential users of research results from the start, to ensure that inventions are transformed into innovations across public, societal, and private sectors.

- Efforts to support research by informing about pitfalls and providing guidance on funding opportunities at higher Technology Readiness Levels (TRL).

- Promoting standardization in innovation and procurement processes to scale up the application of new solutions at higher Technology Readiness Levels (TRL)